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Contents

ORIGINAL ARTICLES

- Computed Tomography Arteriography of the Upper and Lower Extremities
in the Evaluation of Vascular Injuries in Trauma Patients
Aarti Anand, Bhawana Sonawane, Amit Kamble, Prashant Titare 1
- Comparative Evaluation of Extraoral and Intraoral Periapical
Radiographic Technique in Children
N S Venkatesh Babu, Purna Patel 7
- Is Misoprostol Alone, Administered 24 h a Valid Option for Medical Abortion?
Kaur Shail, G Harleen 13
- Comparative Study between Herniorraphy and Meshplasty - 500
Inguinal Hernia Surgeries
Suresh Karlatti, R B Uma 17
- Comparative Study between Intralesional Steroid Injection and Oral Lycopene in the
Treatment of Oral Submucous Fibrosis
Habie Thomas Samuel, G S Renukananda 20
- Evaluation of the Effectiveness of Oral Tablet Clonidine as a Premedicant Drug:
A Prospective Study of 100 Cases
B Brinda, S Chakravarthy, S Manjunatha Prasad 23
- Clinical Spectrum of Flank Pain and ITS Association with Urolithiasis
Naveen Kumar Singh, Abhijat Kumar, Sadhna Singh 29
- Ondansetron Pretreatment to Alleviate Pain Produced by Propofol: A Randomized
Controlled Double Blind Study
R B Uma 33
- High Resolution Computerized Tomography Evaluation of Influenza
H1N1 Infection
Sonali Salvi, Dileep Kadam, Minakshi Gajbhiye, Shephali Pawar, Ajay Chandanwale 37

- Influence of Age on the Visual Fields of Normal Subjects: A Clinical Study
Nazia Farah, Syamala Devi Moparthi 41
- Pre-operative Oral Bisoprolol Improves the Surgical Field during Functional Endoscopic Sinus Surgery: A Randomized, Controlled, Prospective and Double-Blinded Study
P Sophia, B Sowbhagya Lakshmi, P Krishna Prasad, K V Chandramouli 47
- Comparative Evaluation of Oral Health Status in Children with Acute Lymphoblastic Leukemia
N S Venkatesh Babu, B S Kavyashree 52
- Effect of Intravenous Dexamethasone in Prolonging the Duration of Supraclavicular Brachial Plexus Block with 0.5% Ropivacaine: A Prospective, Randomized, Placebo Controlled Study
Shahedha Parveen, Vishnu Vardhan Athaluri, Bandi Sowbhagya Lakshmi 56
- Relationship between Serum Lactate Levels and Fatal Outcome in Critically Ill Patients: A Prospective Study in Intensive Care Unit
Arif Pasha, Nageswara Rao, Siva Prabodh, Desai Vidya Sripad, N V S Chowdary 61
- Prevalence and Treatment Adequacy of Migraine Among Semi Urban Population in Chennai
Balaji Arumugam, B Kailaash, R Vijay Thiraviyam, S Ganesh Kumar, C Thirugnanasambandhan 64
- Cautery versus Scalpel: A Study on Surgical Incisions
Siva Rama Krishna Valluru, K Babji 70
- A Clinical Study on Technique of Subfascial Endoscopic Perforators Surgery: A Recent Advancement
Siva Rama Krishna Valluru, K Babji 74
- Sacral Index: Application in Sex Determination of Sacrum
Gurdeep Singh Bindra, Ajay Mohan 79
- Comparison of Automated Refraction with and without Cycloplegia for Detection of Refractory Errors: A Cross-Sectional Study
Ch M Subramanyeswara Rao, M Sarada Devi, R Thilagavathi 82

Management of Hollow Viscous Gastric and Duodenal Perforation Cases by Surgical Method versus Non-Operative Management: A Comparative Study <i>N Durgaprasad, V Manmadharao, K Babji, K Satyarao</i>	86
Assessment of Ophthalmological Causes of Headaches in a Tertiary Care Center in South India <i>Ch M Subramanyeswara Rao, Seshu Babu Ponnada, R Thilagavathi</i>	90
Incidence of Osteoporosis in Chronic Obstructive Pulmonary Patients in a Tertiary Care Hospital: A Prospective Clinical Study <i>Seshagiri Rao Damaraju, Raghavendra Rao Manukonda, Haritha Sangineedy</i>	94
REVIEW ARTICLES	
Carcinoma Gallbladder: A Review of Literature <i>Yatin Ghosh, B Thakurdas</i>	98
Role of Obesity in Chronic Periodontal Diseases: A Systematic Review <i>Amit Tirth, Vaibhav Tandon</i>	104
Minimally Invasive Thyroidectomy: A Review Article <i>Chanda Ramana Chalam, K Appa Rao, S Praveen</i>	108
CASE REPORTS	
Deep (Aggressive) Angiomyxoma of Vulva: A Case Report <i>Swati Pabbi, Dharm Chand Kothari, Shashi Bhushan Tailor, Harsh Kumar Baid</i>	112
Gastric Bezoar Following Gastrojejunal Anastomosis: An Unwanted Case Presentation <i>Sanjeev Somashekar Rathod, H D Vinay, Bollet Pazing, Sapam Opendro Singh, Takhellambam Yumjaobabu Singh</i>	117
Typhoid and Malaria Co-infection from North Karnataka: A Case Report <i>Sudheendra Kulkarni, Pramod S Manthalkar, Chandrakant Chillargi</i>	120
Electrosurgical Management of an Unusual Pregnancy Epulis: A Case Report <i>Harsh Kapil, Meghna Singh, Karandeep Singh Arora, Shreeyam Mohapatra</i>	122

- Successful Use of Non-invasive Positive Pressure Ventilation in a Patient with Peripartum Cardiomyopathy: A Case Report
N Pavan Kumar Reddy, Md Mukarram Iqbal, Younus Saleem, Ahmedi Fatima 125
- Use of Immediate Veneer Retained Indirect Fiber Reinforced Composite Bridges in the Replacement of Failing Anterior Teeth: A Case Study Presentation
I Kerr, R Blanchard 128
- Sclerosing Stromal Tumor of Ovary - A Rare Ovarian Disease Presenting With Hyperandrogenism: A Case Report
Nandita Biswas, Arup Jyoti Rout, Saif Omar 133
- Orthodontic Alignment of an Impacted Maxillary Incisor: A Case Report
Rajesh Kumar, Abi M Thomas 136
- Isolated Adult Hypoganglionosis Presenting as Sigmoid Phytobezoar: A Case Report
Bulabai Karpagam, S Vinayagam, Jai Kishore, Justine Samuel 139
- Congenital Diaphragmatic Hernia in Adult Presenting with Obstruction: A Rare Case
Th Chito Singh, Ch Gyan Singh, Khenpaw N Lamare, N Babitha, Anderson Kharnaier 142
- Amelogenesis Imperfecta: A Case Report and Review of Literature
Pankhuri Nigam, Vijay Pal Singh, Krishna Deo Prasad, Jalaj Tak 146
- Malignant Mixed Mesodermal Tumor of Ovary in Young Female: A Rare Case Report
Dharm Chand Kothari, Vaibhv Kumar Goyal, Swati Pabbi, Omprakash Singh, Harsh Kumar Baid, Shashi Bhushan Tailor 150
- Rectus Sternalis: A Case Report
Rupali A Gajare 154
- Modified Quad Helix: A Case Report
M V Ashith, Shourya Hegde, Dilshad Umar, Vivek Amin, K V Ajitesh 158
- Bone Marrow Necrosis: A Case Report
Shaista Choudhary, H T Jayaprakash, B R Shiva Kumar, G Suba 163
- Intestinal Obstruction by Carcinoid Tumor in Ileum: A Case Report
N Durga Prasad, V Manmadharao, K Babji, Dinesh Kumar Reddy 166

Interstitial Lung Disease in a Glass Industry Worker: A Rare Case Report

Seshagiri Rao Damaraju, Raghavendra Rao Manukonda

169

Multiple Endocrine Neoplasia Type 2b: A Rare Case Report

V Manmadha Rao, M V V Gandhi, B Vivekanand

172

Computed Tomography Arteriography of the Upper and Lower Extremities in the Evaluation of Vascular Injuries in Trauma Patients

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Abstract

Introduction: Conventional angiography is considered as the gold standard for investigating vascular diseases. However it is invasive and it can fail to demonstrate involvement of the arterial wall and extravascular structures. Arterial puncture is not required, and arterial wall involvement is well-demonstrated in computed tomography arteriography (CTA). As CTA had good sensitivity and specificity, it can be used as primary diagnostic modality in the evaluation of vascular pathologies in the patients of trauma.

Aim: The aim was to evaluate the diagnostic accuracy of CTA of upper and lower extremities in patients with trauma to the extremities.

Material and Methods: The study included 15 patients with peripheral vascular injury in whom CTA was done.

Result: The present study included 15 patients with a history of trauma seen over a period of 2 months. In 8 patients CTA accurately diagnosed the arterial involvement. It also accurately diagnosed 6 patients without any vascular involvement. It failed to diagnose arterial involvement in 1 patient. Thus, the sensitivity and specificity of CTA in trauma cases in the present study was 88.89% and 100%, respectively.

Conclusion: CTA had good sensitivity and specificity in the diagnosis of the patients with vascular injury in our study. Thus, it can be used as primary diagnostic modality and can replace the conventional angiography in the evaluation of vascular injury in patients of trauma.

Key words: Computed tomography arteriography, Diagnostic accuracy, Trauma

INTRODUCTION

There has been an increase in the incidence of vascular injury over the past four decades that has paralleled the increase in assault with firearms, motor vehicle crashes, and invasive medical procedures. Mortality and the utilization of medical resources are higher among trauma patients with vascular injury than among trauma patients without blood vessel

injuries.¹ Color Doppler sonography, computed tomography (CT), arteriography, magnetic resonance imaging and digital subtraction arteriography are some of the techniques that have developed over time for accurate diagnosis and delineation of the vascular injury. The advantages of instant acquisition, real-time information, increased contrast sensitivity and the ability to electronically manipulate images have made digital imaging a superior method of imaging. The benefits include using less contrast material, using a less invasive approach and movement of angiography to an outpatient setting. Multidetector CT has had a substantial effect on CT angiography, offering shorter acquisition times, lower doses of contrast medium, and improved spatial resolution for assessing smaller arterial branches.² It has overcome the difficulties with other modalities like the invasiveness, observer dependence, and limited spatial

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resolution. Though conventional angiography is the gold standard, it is not performed in many cases as it is an invasive and potentially complicated technique. Hence, multidetector CT arteriography (CTA) is emerging as an advanced imaging modality in depicting vascular morphology and in providing the information needed for therapeutic intervention by vascular surgeon in patients of trauma.

Aims and Objectives

To evaluate the diagnostic accuracy of CTA of upper and lower extremities in the diagnosis of vascular injuries of patients with trauma to the extremities.

MATERIALS AND METHODS

Our hospital based retrospective study was done in 15 patients with trauma suspected to have peripheral vascular injuries. It was carried out over 2 months and included patients of all age group in whom CTA was done. The detailed clinical history, examination findings and other investigation like Doppler if done before CT were also noted. CT imaging of these patients was performed on a multislice (64) multi-detector Helical CT machine. Nonionic contrast was injected using pressure injector. Proper positioning of the patient was ensured, and a topogram was taken initially followed by a plain and contrast-enhanced scan. For the examination of upper extremities patient lies supine with both upper extremities raised above the head. Both arms were secured with an adhesive tape with a support between them to reduce movements. Patient was placed head first position.

For lower limb arteriography patient lies supine. Patient was placed feet first. Total volume of intravenous contrast was calculated as: (Total scan time + post threshold delay) × flow rate.

Scan delay (for venous phase) – 50 s after contrast injection. The CTA findings were compared with surgical findings and conventional angiography study. Correlation with Doppler findings was also done. Qualitative data were represented in the form of frequency and percentage. Association between qualitative variables were assessed by Chi-square test with continuity correction for all 2 × 2 tables and with or without continuity correction in rest and Fisher’s Exact test for all 2 × 2 tables where P-value of Chi-square test was not valid due to small counts. Quantitative data was represented using mean ± standard deviation and median and interquartile range. Analysis of quantitative data between a qualitative variable with two subgroups was done using unpaired t-test if data passes “normality test” and by Mann–Whitney test if data fails “normality test.” Diagnostic efficacy was calculated through

sensitivity, specificity, positive and negative predictive value, positive likelihood measurements.

RESULTS

In the present study, 4 patients (26.66%) underwent upper limb arteriography and 11 patients (73.33%) underwent lower limb arteriography (Table 1).

In the present study, maximum numbers of patients were in the age group of 20-29 years (53.33% of patients). The next age group affected was 30-39 years (20% of patients) (Graph 1).

The present study included 13 male patients (86.67%) and 2 female patients (13.33%). The present study had more number of male patients as compared to females (Table 2).

Color Doppler confirmed the findings in 9 patients (60%).

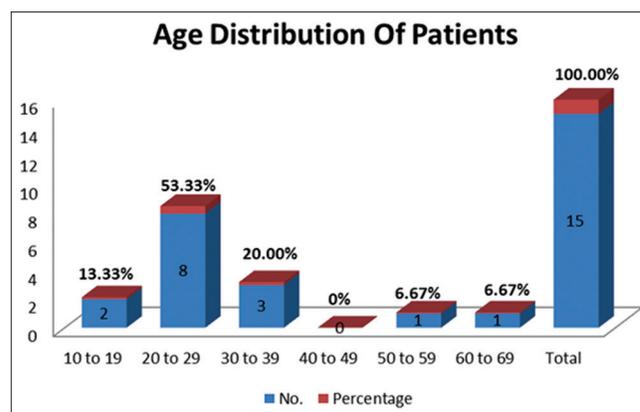
In the present study, injury to small arteries of lower limbs (anterior tibial, posterior tibial, peroneal and dorsalis pedis arteries) is the commonest observation. Whereas the brachial artery involvement is the commonest observation in upper limb injuries (Figures 1 and 2). Overall findings of 14 patients (93.33%) were confirmed on CTA while in 1 patient (6.67%)

Table 1: Limbwise distribution of studies

Study	N (%)
Lower limb arteriography	11 (73.33)
Upper limb arteriography	4 (26.66)
Total	15 (100.0)

Table 2: Sex distribution of patients

Sex	N (%)
Female	2 (13.33)
Male	13 (86.67)
Total	15 (100.0)



Graph 1: Age distribution of patients

findings were not confirmed. In this study, CTA findings of patients confirmed on surgery and conventional angiography were 10 and 4 patients respectively. CTA findings were not confirmed in 1 patient (Tables 3-5).

The CTA had 88.89% sensitivity and 100% specificity in the evaluation of patients with vascular injury of upper and lower extremities in the patients of trauma (Table 6).

Table 3: Distribution of patients based on findings of CTA

CTA findings	Number of patients
Non-opacification of artery at and distal to the site of injury	7
Arterial laceration	1
Normal study	7
Total	15

CTA: Computed tomography arteriography

Table 4: Segmental arterial involvement in patients with trauma to lower extremity

Segments	Number
Aortoiliac	1
Common femoral artery	0
Superficial femoral artery	1
Popliteal artery	1
Small arteries of lower limbs	2

Table 5: Segmental arterial involvement in patients with trauma to upper extremity

Segments	Number
Subclavian artery	0
Axillary artery	1
Brachial artery	2
Small arteries (radial and ulnar)	1

Table 6a: Diagnostic accuracy of CTA in trauma

CT findings	Final diagnosis		Total
	Disease	No disease	
Disease N (%)	8 (88.9)	0 (0.0)	8 (88.9)
No disease N (%)	1 (11.1)	6 (66.7)	7 (77.8)
Total	9 (100.0)	6 (66.7)	15 (166.7)

CTA: Computed tomography arteriography

Table 6b: Diagnostic accuracy of CTA in trauma

Variables	Value	95% CI	
		Lower	Upper
Sensitivity	88.89%	51.75%	99.72%
Specificity	100.00%	54.07%	100.00%
PPV	100.00%	63.06%	100.00%
NPV	85.71%	42.13%	99.64%
Positive likelihood ratio			
Negative likelihood ratio	0.11	0.02	0.71

PPV: Positive predictive value, NPV: Negative predictive value, CTA: Computed tomography arteriography, CI: Confidence interval

DISCUSSION

Arterial injury³ in the form of laceration or vessel contusion is particularly common after fracture of the extremity or after body injury as can be sustained from a bullet or shrapnel fragments (Figures 3 and 4). The distal superficial femoral artery is frequently the site of injury after a fractured femur due to its relatively fixed position in the adductor canal. The arterial injury is usually caused by the sharp bone fragments from the fracture site. Blunt trauma occasionally may cause arterial contusion through the mechanism of arterial tear. Arterial injury may be complicated by vessel spasm, hemorrhage into the surrounding soft tissue, and venous thrombosis. Complete laceration of the artery transecting the vessel is usually readily appreciated because of prompt clinical evidence of acute arterial insufficiency in the distal portion of the extremity. Incomplete laceration and contusion may cause delayed vessel occlusion and early clinical signs of arterial insufficiency are not apparent. Prompt recognition and repair of the arterial injury is important because a high incidence of gangrene and ultimate amputation of the limb result from failure to establish arterial continuity.^{4,5}

In acute injury only the site of obstruction is usually evident. The development of collateral circulation requires time. Therefore these vessels are shown in late post trauma follow-up studies. The CT angiography has emerged as a non-invasive accurate technique for fast evaluation of vascular pathologies in patients of trauma. In a study by Inaba *et al.*, which reviewed all patients at a trauma center who sustained lower extremity trauma and underwent initial evaluation by multi-detector CTA, its accuracy was tested against a gold standard of operative intervention, duplex ultrasonography, catheter-based angiography, or clinical follow-up. 63 CTA examinations were performed in 59 patients. It was diagnostic in 62 of the 63 scans (98.4%). It achieved 100% sensitivity and 100% specificity in detecting clinically significant arterial injury.⁶ Similarly another study retrospectively reviewed all adult patients undergoing CTA for evaluation of traumatic injuries to the extremities. A total of 97 studies were performed. It adequately demonstrated the nature and location of all the arterial injuries when compared with conventional arteriography or surgical exploration.⁷ Another study in which helical CTA was performed on 45 consecutive patients referred for conventional angiography for evaluation of suspected arterial injuries after sustaining trauma to the extremities (13 upper, 32 lower), two radiologists interpreted the helical CTA studies independently.⁸ Conventional angiography was used as the standard of reference for determination of final diagnoses. Forty-three of 45 patients (96%) had diagnostic helical CTA examinations. Sensitivity and

specificity were 90% (95% confidence interval [CI], 80-99) and 100% (95% CI, 99-100), respectively, for Reader 1 and 100% (95% CI, 99-100) and 100% (95% CI, 99-100), respectively, for Reader 2. Receiver operating characteristic curve analysis revealed high diagnostic performance, with areas under the curve of >0.9 for both readers. Interobserver agreement was 0.9.⁷ Soto *et al.*, evaluated 142 arterial segments in the proximal portions of the extremities of 139 patients with trauma with helical CTA. CTA were interpreted on site by the radiologist in charge of emergency procedures and retrospectively with consensus interpretation between two radiologists. CT study quality and the presence of arterial injuries were noted. CTA findings were compared with those of surgery, conventional arteriography, and/or clinical follow-up. The sensitivity of CTA was found to be 95.1%, and the specificity was 98.7%.⁹ In a study by Zaiton *et al.*, which included nineteen patients with

previous trauma history, with clinically suspected vascular lesion, CTA was done for every patient and followed by surgical treatment. The accuracy of CTA in detecting vascular lesion in the examined patients was 94.7% with sensitivity and specificity of 94.4% and 100%, respectively.¹⁰ The present study included 15 patients with history of trauma. In 8 patients CTA accurately diagnosed the arterial involvement. It accurately diagnosed 6 patients without any vascular involvement (Figure 5). It failed to diagnose arterial involvement in 1 patient. In this study, CTA findings were confirmed on surgery in 10 patients and on conventional angiography in 4 patients. CTA findings were not confirmed in 1 patient having crush injury to right leg with fracture of tibia-fibula. He had short segment thrombosis of right anterior tibial artery in mid portion on conventional angiography. CTA of this patient was reported as normal. Multiple metallic artefacts



Figure 1: Coronal maximum intensity projection image showing laceration of right brachial artery with extravasation of contrast

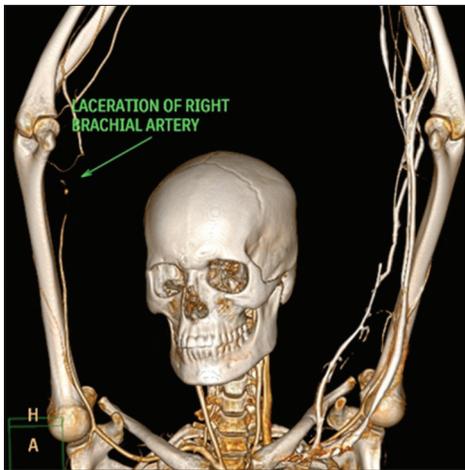


Figure 2: Coronal volume rendered three dimensional image showing laceration of right brachial artery

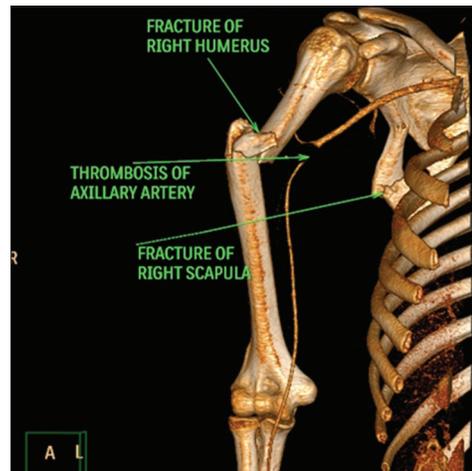


Figure 3: Coronal volume rendered three dimensional image showing fracture of right humeral shaft, scapula and thrombosis of right axillary artery

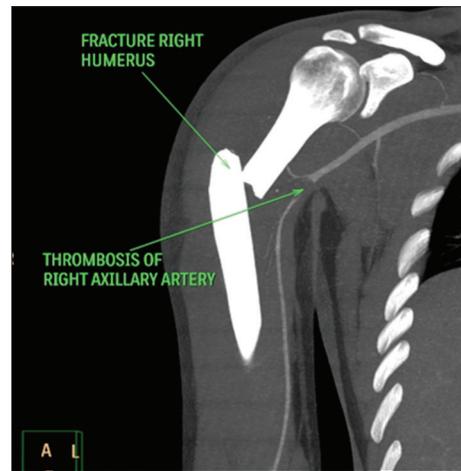


Figure 4: Coronal maximum intensity projection image showing thrombosis of right axillary artery and fracture shaft of right humerus



Figure 5: Coronal volume rendered three dimensional image showing normal left common iliac, external and internal iliac, common and superficial femoral arteries in a post-operative case of left femoral fracture

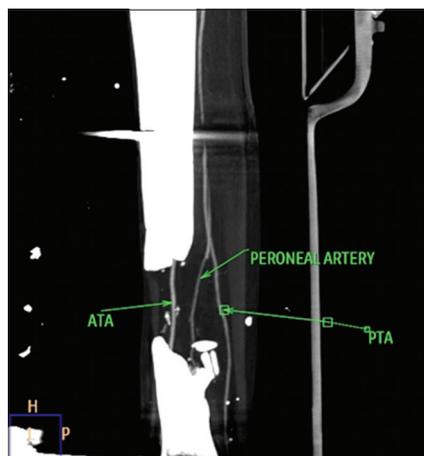


Figure 6: Sagittal maximum intensity projection image showing normal left anterior tibial, posterior tibial and peroneal arteries in a postoperative case of comminuted fracture of shaft of left tibia and fibula

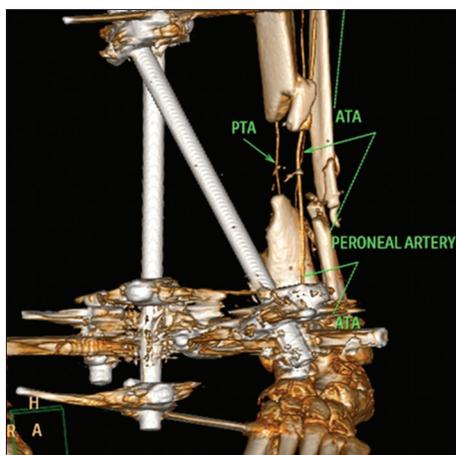


Figure 7: Coronal volume rendered three dimensional image showing normal left anterior tibial, posterior tibial and peroneal arteries in a post-operative case of comminuted fracture of shaft of left tibia and fibula

were present due to trauma (Figures 6 and 7). This might be the cause of missing the thrombosis on CTA. Thus the sensitivity and specificity of CTA in trauma cases in the present study was 88.89% and 100% respectively. At present, conventional angiography is considered as the gold standard for investigating vascular diseases and trauma. But it is invasive as it requires arterial puncture with its attendant complications. Furthermore, it can fail to demonstrate eccentric stenosis. Arterial puncture is not required and eccentric stenosis is well demonstrated in CTA. Multi-detector CTA in contrast to Conventional angiography can depict extravascular structures. When compared to CTA the radiation dose given in conventional angiography is almost four times greater.¹¹ As CTA had good sensitivity and specificity it can be used as primary diagnostic modality in the evaluation of peripheral vascular diseases and trauma.

CONCLUSION

Multi-detector CTA is a comprehensive, non-invasive and safe diagnostic modality for delineation of vascular anatomy and diagnosis of vascular injuries in the patients of trauma. It is fast and accurate, hence operative intervention can be planned earlier thereby improving chances of limb survival. CTA had overall good sensitivity and specificity of 88.89% and 100%, respectively. Hence, it can be used as primary diagnostic modality and can replace the conventional angiography in the evaluation of vascular injuries in the patients of trauma.

REFERENCES

1. Caps MT. The epidemiology of vascular trauma. *Semin Vasc Surg* 1998;11:227-31.
2. Rubin GD, Shiau MC, Schmidt AJ, Fleischmann D, Logan L, Leung AN, et al. Computed tomographic angiography: Historical perspective and new state-of-the-art using multi detector-row helical computed tomography. *J Comput Assist Tomogr* 1999;23 Suppl 1:S83-90.
3. Bassett FH 3rd, Silver D. Arterial injury associated with fractures. *Arch Surg* 1966;92:13-9.
4. Fraser GA. Closed traumatic rupture of common femoral artery. *Ann Surg* 1965;161:539-44.
5. Debakey ME, Simeone FA. Battle injuries of the arteries in World War II; an analysis of 2,471 cases. *Ann Surg* 1946;123:534-79.
6. Inaba K, Potzman J, Munera F, McKenney M, Munoz R, Rivas L, et al. Multi-slice CT angiography for arterial evaluation in the injured lower extremity. *J Trauma* 2006;60:502-6.
7. Busquets AR, Acosta JA, Colón E, Alejandro KV, Rodriguez P. Helical computed tomographic angiography for the diagnosis of traumatic arterial injuries of the extremities. *J Trauma* 2004;56:625-8.
8. Soto JA, Múnica F, Cardoso N, Guarín O, Medina S. Diagnostic performance of helical CT angiography in trauma to large arteries of the extremities. *J Comput Assist Tomogr* 1999;23:188-96.
9. Soto JA, Múnica F, Morales C, Lopera JE, Holguín D, Guarín O, et al. Focal arterial injuries of the proximal extremities: Helical CT arteriography as the initial method of diagnosis. *Radiology* 2001;218:188-94.
10. Zaiton F, Ahmed AF, Samir AM. Value of multislice computed tomography angiography (MCTA) in neglected post traumatic vascular injuries of the

extremities. Egypt J Radiol Nucl Med 2013;44:539-46.
11. Katz DS, Hon M. CT angiography of the lower extremities and aortoiliac

system with a multi-detector row helical CT scanner: Promise of new opportunities fulfilled. Radiology 2001;221:7-10.

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Comparative Evaluation of Extraoral and Intraoral Periapical Radiographic Technique in Children

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Abstract

Background: One of the most challenging tasks for the pediatric dentist is to obtain diagnostic quality radiograph on a young child without psychological trauma. In 2003, Newman and Friedman introduced a novel technique known as extraoral periapical (EOPA) radiography. EOPA radiography is a technique where the film is placed extraorally overlying the tooth of interest, and the X-ray beam is directed from the opposite side of the face.

Aims and Objectives: The purpose of this study was to evaluate the diagnostic value of EOPA technique in children and to compare it with conventional intraoral periapical (IOPA) technique.

Materials and Methods: A total of 30 patients aged between 3 and 8 years were selected. Two images were obtained from each patient, the first image was taken by IOPA technique and second by EOPA technique. Radiographs obtained were compared with each other by a pediatric dentist and an oral radiologist using questionnaire. The questionnaire consisted of parameters like area of interest, presence of succedaneous tooth bud, visibility of periapical area, density and contrast of radiograph, distortion of image (foreshortening/elongation) and diagnostic quality of radiograph.

Results: All the patients tolerated the extraoral radiographic procedure well, preferring it to conventional intraoral radiography. The advantage of this technique is the increased patient compliance providing images with adequate details and diagnostic quality. However, a slight decrease in resolution was noted.

Conclusion: EOPA radiographic technique can be used as an alternative to the conventional technique when placement of intraoral film is difficult which is particularly encountered in children. Although, it cannot replace IOPA radiographic technique.

Key words: Children, Diagnostic value, Extraoral periapical technique, Intraoral periapical technique

INTRODUCTION

Radiographs are valuable aids in the oral health care of infants, children, adolescents and persons with special health care needs. They are used to diagnose oral disease, to monitor dentofacial development and the progress of therapy.¹ One of the most challenging tasks for the pediatric dentist is to obtain diagnostic quality radiograph on a young child without psychological trauma. Pediatric patients are generally reluctant and apprehensive to dental radiographs.

The main difficulty encountered in children is placing the film packet/sensor intraorally.

Panoramic radiography may overcome some of the limitations of intraoral periapical (IOPA) radiography, but has certain disadvantages like higher radiation dose, limited availability in dental offices, greater cost and often it becomes impossible to make young patient stand still for panoramic radiograph.²

In 2003, Newman and Friedman introduced a novel technique known as extraoral periapical (EOPA) radiography. EOPA radiography is a technique where the film is placed extraorally overlying the tooth of interest, and the X-ray beam is directed from the opposite side of the face.³

This technique was useful in patients who could not tolerate intraoral films due to various reasons

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including developmentally disabled patients, patients with exaggerated gag reflex, pediatric dental patients, dental phobic patients, patients with trauma and patients with limited mouth opening.⁴ The technique could also be used for determination of working length with rubber dam/endodontic instruments in place.⁵

As per available literature, very few studies documenting the use of this technique have been reported. Hence, in the present study, usefulness of EOPA radiography in pediatric age group is evaluated by comparing it with conventional intraoral technique.

Aim of the Study

The purpose of this study was to evaluate diagnostic value of EOPA technique in children and to compare it with conventional IOPA technique.

MATERIALS AND METHODS

The study was conducted in the Department of Pedodontics & Preventive Dentistry of V.S Dental College & Hospital, Bangalore. A total of 30 patients aged between 3 and 8 years were selected. Institutional ethical clearance was obtained and signed written informed consent was obtained from the parents. Totally 60 radiographs were taken two for each patient. First image was taken by intraoral bisecting angle technique (Technique A) and second by EOPA technique (Technique B).

Dental X-ray unit was set at 70 kVp, 8 mA with exposure time of 0.7 s for both extraoral and intraoral technique, the radiographic film used was 22 mm × 35 mm (size No. 0) E-speed film.

Procedure of Taking Radiograph for Maxillary Teeth

The patient was positioned upright. He/she was asked to open mouth as wide as possible. This allows the X-ray beam to pass to the film unobstructed from the opposite side of the mouth. Consequently, superimposition of the contralateral tissues on the image is avoided. Frankfort plane was kept parallel to the floor, and the head was tilted approximately 10° toward the side in question. The film was placed on the external surface of the cheek, directly buccal to the tooth. A cotton roll was placed between the sensor and the cheek to parallel the film with the buccal surface of the tooth. The center of the film was placed on the intersection of ala-tragus and parasagittal line, and the upper border of the film was placed parallel to canthomeatal line (Figure 1).⁶ The X-ray cone was angled approximately -20° from the horizontal plane and was directed midway between maxillary and mandibular posterior teeth on the opposite side (Figure 2) Then the resultant images were obtained (Figure 3).

Procedure of Taking Radiograph for Mandibular Teeth

Patient was made to sit upright and asked to open his/her mouth wide. Frankfort's horizontal plane was kept parallel to the floor. Film was placed against cheek on the side of interest and its lower border was kept parallel and approximately 2 cm above the inferior border of mandible (Figure 4).⁶ The X-ray cone was aligned +15° from horizontal plane while central beam was directed from opposite side between maxillary and mandibular posterior teeth (Figure 5). Then the resultant images were obtained for mandibular teeth (Figure 6).

For both maxillary and mandibular teeth, one factor which was considered is, mounting of the radiograph. As the film was placed extraorally, the side of the film which captures the image was placed facing cheek, which is opposite to the placement of film in the intraoral technique. Same factor was kept in mind while reading the EOPA. Incorrect mounting and labeling of the reverse radiograph can result in misdiagnosis and treatment of the wrong tooth.

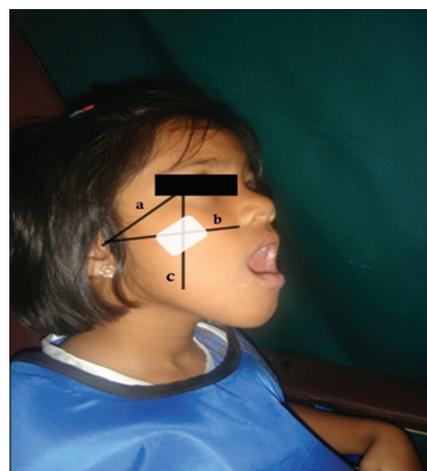


Figure 1: Location of film for maxillary posterior teeth, (a) Canthomeatal line, (b) ala-tragus plane, (c) para-sagittal line



Figure 2: Angulation for maxillary posterior teeth

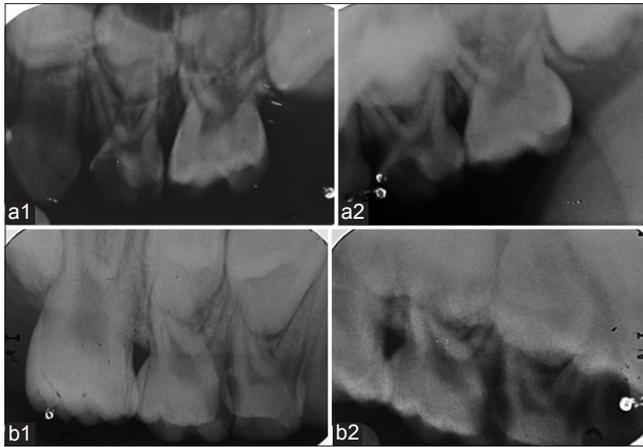


Figure 3: Resultant image of maxillary posterior teeth, (a1) Intraoral technique, (a2) extraoral technique, (b1) intraoral technique, (b2) extraoral technique



Figure 5: Angulation for mandibular posterior teeth



Figure 4: Location of film for mandibular posterior teeth (parallel and 2 cm above inferior border of mandible)

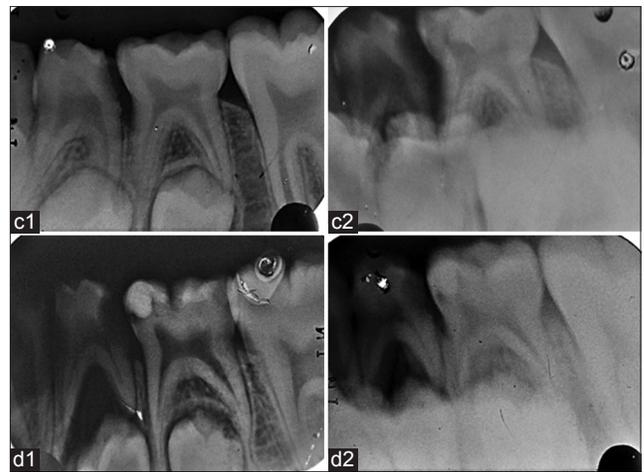


Figure 6: Resultant image of mandibular posterior teeth, (c1) Intraoral technique, (c2) extraoral technique, (d1) intraoral technique, (d2) extraoral technique

All parameters used in the EOPA technique were kept same for IOPA technique (i.e. kVp, mA, exposure time). Angulation used in intraoral bisecting angle technique for maxillary primary teeth was +30 and for mandibular primary teeth was -10° .

To evaluate the diagnostic value of the EOPA and IOPA, the radiographs along with a questionnaire were examined by a pediatric dentist (Examiner 1) and an oral radiologist (Examiner 2). Both examiners were blinded regarding the groups. The questionnaire consisted of parameters like area of interest, presence of succedaneous tooth bud, visibility of periapical area, density and contrast of radiograph, distortion of image (foreshortening/elongation) and diagnostic quality of radiograph.

Data Analysis

Data were analyzed using SPSS version 13.0. Comparative analysis was performed between both the groups.

Agreement between the two examiners was checked using Kappa-test.

RESULTS

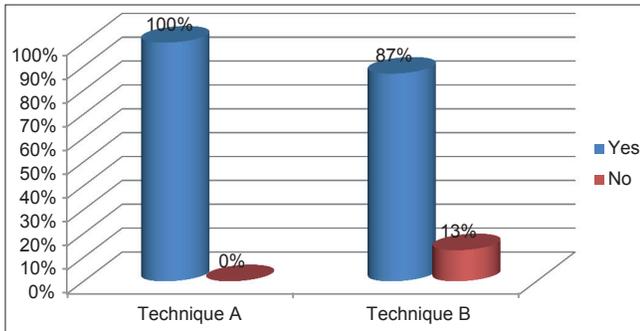
Out of all the 30 intraoral radiographs examined (Technique A); area of interest was visible in all 30 (100%) radiographs. While in EOPA technique, the area of interest was visible only in 26 (87%) radiographs (Graph 1).

Presence of succedaneous tooth bud was visible on 29 (97%) intraoral radiographs whereas only 13 (43%) extraoral radiographs showed succedaneous tooth bud (Graph 2).

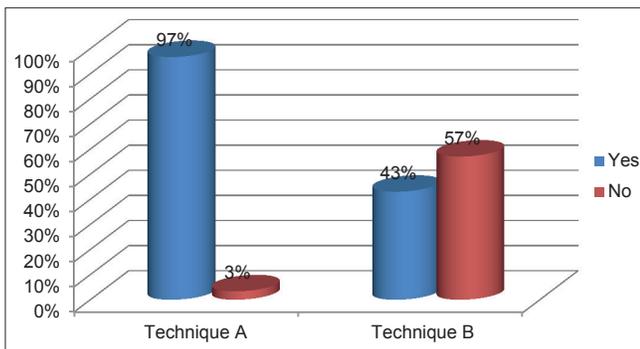
3 (10%) out of 30 intraoral radiographs showed overlapping. While in EOPA technique 14 (47%) radiographs showed overlapping of contra lateral or adjacent structures

which greatly affected the diagnostic value of radiograph (Graph 3). Blurring of image was visible in 6 (20%) intraoral radiographs, while in EOPA technique blurring was visible in 24 (80%) radiographs (Graph 4).

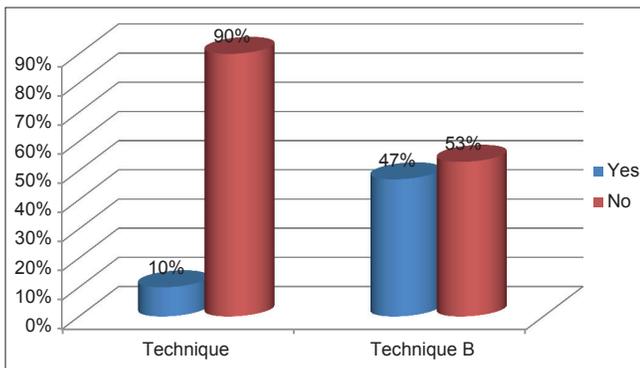
To assess the diagnostic quality of both the techniques, pediatric dentist (Examiner 1) observed that 24 (80%) intraoral radiographs and 22 (73%) extraoral radiographs had diagnostic value. Whereas according to oral radiologist (Examiner 2) 24 (80%) intraoral radiographs and 17 (57%) extraoral radiographs had diagnostic value (Graphs 5 and 6).



Graph 1: Comparison of “area of interest” visible on radiographs (Technique A: Intraoral technique, Technique B: Extraoral Technique)



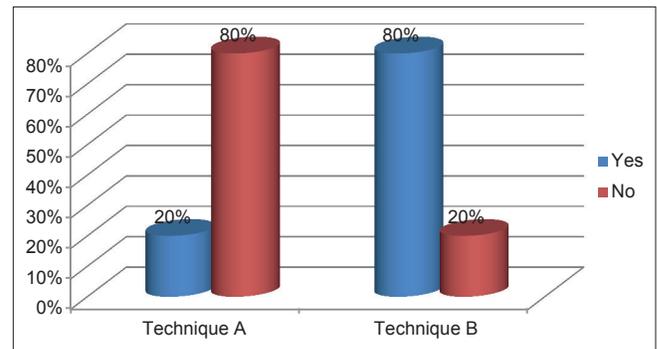
Graph 2: Comparison of “presence of succedaneous toothbud” visible on radiographs (Technique A: Intraoral technique, Technique B: Extraoral Technique)



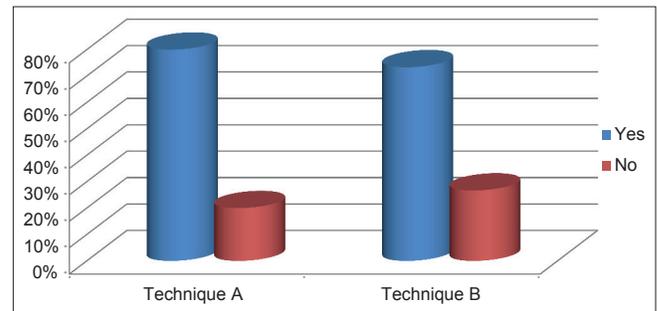
Graph 3: Comparison of “overlapping of structures” on radiographs (Technique A: Intraoral technique, Technique B: Extraoral technique)

Kappa test was used to check inter-examiner response. “Almost perfect” agreement was found between both the examiners regarding parameters like area of interest, presence of succedaneous tooth bud, visibility of periapical area, density and contrast of radiograph and distortion of image (foreshortening/elongation) with κ -value of more than 0.81. Diagnostic value of extraoral radiograph had moderate agreement with κ -value of 0.4872 (0.41-0.60) (Table 1).

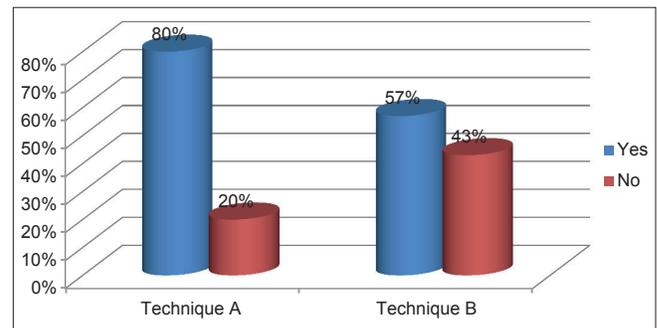
Almost same results were found for both techniques regarding parameters like visibility of periapical area (Technique A - 97%, Technique B - 80%), distortion of image (Technique A - 20%, Technique B - 33%), image



Graph 4: Comparison of “blurring” visible on radiographs (Technique A: Intraoral technique, Technique B: Extraoral technique)



Graph 5: Diagnostic quality of radiographs according to pediatric dentist (Technique A: Intraoral technique, Technique B: Extraoral technique)



Graph 6: Diagnostic quality of radiographs according to oral radiologist (Technique A: Intraoral technique, Technique B: Extraoral technique)

Table 1: Interexaminer reliability using Kappa test

Question	No. of examined	No. of matched	% match	Kappa (κ)
Area of interest	30	30	100.00	1.0000
Image partial/complete	30	28	93.33	0.8643
Periapical area	30	30	100.00	1.0000
Succedaneous tooth bud	30	30	100.00	1.0000
Blurring of image	30	21	70.00	0.3068
Density	30	30	100.00	1.0000
Distortion	20	20	100.00	1.0000
Contrast	30	26	86.67	0.7222
Distinct outline	30	30	100.00	1.0000
Overlapping	30	20	66.67	0.3304
Anatomical landmark	30	30	100.00	1.0000
Diagnostic value	30	23	76.67	0.4872

contrast (Technique A - 67%, Technique B - 60%) and density (Technique A - 70%, Technique B - 60%).

DISCUSSION

The present study compared the conventional IOPA radiographic technique with EOPA radiographic technique. As per available literature, there is no study documenting the use of EOPA radiographic technique in pediatric age group. This is the first study comparing extraoral and IOPA radiography in children.

Radiographs play vital role in diagnosis and treatment planning. Taking radiograph in young children is always challenging.⁴ This alternative technique can be used wherever intraoral radiographs are not possible. The advantage of this technique is the increased patient compliance providing images with adequate details and diagnostic quality.

In this study, voltage of 70 kVp, current of 0.8 mA for 0.7 s was used. In 1974, Fisher proposed an extraoral radiographic technique for obtaining images of third molar using occlusal film.⁷ This technique requires high kVp (as high as 90 kVp) and had limitation in its daily application. It was found that, for EOPA technique, 70 kVp was sufficient to produce diagnostic quality image comparable with conventional intraoral technique.

Out of 30 IOPA radiographs examined, area of interest was visible in all radiographs (100%). However, only 26 (87%) extraoral radiographs showed area of interest properly. This difference suggests that EOPA technique is a reliable technique as far as an area of interest is concerned. Succedaneous tooth bud was visible on 29 (97%) intraoral radiographs, whereas only 13 (43%) extraoral radiographs showed succedaneous tooth bud. This observation shows that extraoral radiographs cannot be used to determine the stage of tooth development. Blurring of image was visible in 6 (20%) intraoral radiographs, while in EOPA technique

blurring was visible in 24 (80%) radiographs. As the X-ray beam travels longer distance in EOPA technique most of the extraoral radiographs showed blurring.

When overlapping of the images in radiographs was compared, 3 out of 30 (10%) intraoral radiographs showed overlapping, whereas with extraoral technique 14 (47%) radiographs showed overlapping. The periapical regions of few radiographs were overlapped by images of teeth from contralateral side. Overlapping of the structure was a major disadvantage of EOPA technique. This disadvantage can be overcome by proper placement of film and positioning of X-ray cone. Newman and Friedman used the angulations of -55° for maxillary teeth and -35° for mandibular teeth in adult population.³ Chen *et al.* advocated the use of lesser angulations than that given by Newman and Friedman (-20 – -30° for maxillary teeth; -10 – -15° for mandibular teeth).⁸ Sujatha *et al.* suggested the angulations of -20° for maxillary teeth and $+15^\circ$ for mandibular teeth.⁹ Same angulations were used in the present study. Zafar and Javed have also documented the use of EOPA technique for endodontic working length determination particularly where use of intraoral radiography is difficult or impossible.⁵

Diagnostic quality of periapical radiographic technique had moderate agreement between Examiner 1 and Examiner 2. Both the examiners observed that 24 (80%) out of 30 intraoral radiographs had diagnostic value. Whereas for EOPA technique, according to pediatric dentist 22 (73%) radiographs and according to oral radiologist 17 (57%) radiographs had diagnostic value. This is because oral radiologists are more concerned with radiographic details such as bone trabecular pattern, periodontal ligament space, image distortion, contrast, and density.

However, EOPA technique has few limitations. This technique cannot be used to obtain radiographs of anterior maxillary and mandibular region due to the curvature of arch and difficulty in positioning of the X-ray cone. Procedure is technique sensitive and requires proper knowledge and experience. Radiographs obtained from extraoral technique have lower image resolution compared with intraoral radiographs.⁴

CONCLUSION

Although, EOPA radiographic technique cannot replace IOPA radiographic technique, it can be used as an alternative to the conventional technique when placement of intraoral film is difficult, which is particularly encountered in children. Further standardization of this technique for better image quality is recommended.

REFERENCES

1. Whaites E. Periapical radiography. *Essentials of Dental Radiography and Radiology*. Vol. 3. London: Churchill Livingstone; 2002. p. 161-76.
2. Sujatha SR, Atul K, Shrilekha R, Kunal A. Clinical applications of reverse panoramic radiography. *Dent Hypotheses* 2011;2:190-8.
3. Newman ME, Friedman S. Extraoral radiographic technique: An alternative approach. *J Endod* 2003;29:419-21.
4. Kumar R, Khambete N, Priya E. Extraoral periapical radiography: An alternative approach to intraoral periapical radiography. *Imaging Sci Dent* 2011;41:161-5.
5. Zafar MS, Javed E. Extraoral radiography: An alternative to intraoral radiography for endodontic (root canal system) length determination. *Eur Sci J* 2013;9:51-61.
6. Eshagali S, Ladan H, Narges F. Modified Newman & Friedman extra oral radiographic technique. *Iran Endod J* 2012;7:74-8.
7. Fisher D. Extraoral radiographic technique for third molars. *Aust Dent J* 1974;19:306-7.
8. Chai HC, Shui HL, Hui LC, Yu JL, Yuk KC, Li ML. An aiming device for an extra oral radiographic technique. *J Endod* 2007;33:758-60.
9. Sujatha SR, Atul K, Shrilekha R, Kunal A. Extraoral periapical radiography: A technique unveiled. *J Indian Acad Oral Med Radiol* 2011;23:336-9.

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Is Misoprostol Alone, Administered 24 h a Valid Option for Medical Abortion?

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Abstract

Background: Medical abortion with misoprostol alone has been established as a safe and effective alternative to combined therapy with mifepristone with misoprostol.

Aims and Objectives: The objective of this study was to evaluate the safety and efficacy of three doses of 1000 µg misoprostol administered at 24 h interval, for medical abortion.

Materials and Methods: A total of 60 prospective patients are attending our outpatient department for termination of pregnancy who fulfilled the inclusion criteria were included in this study after informed consent. Outcomes measured were: (1) Successful abortion (complete abortion without requiring additional procedure), (2) side-effects, (3) mean time of onset of cramping, (4) mean time of onset of bleeding, (5) mean duration of bleeding, (6) mean decrease in hemoglobin and, (7) mean time of menstruation returning. Medical abortion was successful in 54 of 60 (90%) patients.

Results: The mean change in hemoglobin was 0.7 ± 0.4 g/dl. Cramping began at 5.1 ± 3.4 h and lasted 3.7 ± 1.9 h. Vaginal bleeding started at 6.46 ± 1.6 h and lasted 7.0 ± 4.6 days. Time to return of menstruation was 37 ± 7.1 days.

Conclusions: The present study suggests that 1000 µg misoprostol administered vaginally at 24 h intervals could be a more economical and viable option in situations where financial constraints restrict the use of mifepristone. Moreover, the 24 h interval improves patient compliance and allows outpatient management.

Key words: First trimester pregnancy, Medical abortion, Termination, Vaginal misoprostol

INTRODUCTION

Medical abortion has become the method of choice for termination of pregnancy and has superseded surgical evacuation due to ease, convenience and decreased complication rates.¹ Mifepristone followed by misoprostol has a high success rate and is the pharmacological agent of choice for the procedure.^{2,3} Though Asian manufacturers have provided the drug at comparative low cost, non-availability of the drug in some countries and economic constraint of the large populations in developing countries is a major concern when it comes to providing affordable medical termination of pregnancy (MTP) to the needful

leading to an increase in unsafe abortions.⁴ A growing body of evidence has now shown that misoprostol can be used as a single agent to induce an early abortion.⁵⁻⁷ Multiple modifications of the dose and interval in which misoprostol may be administered have provided additional options while improving acceptability and efficacy.^{3,5,8,9}

The objective of this study was to confirm the effectiveness and safety to achieve a complete abortion by giving misoprostol 1000 µg at 24 h intervals. This is more economical, and the interval between doses ensures better compliance by not interfering in the day to day activities. Not hospitalizing patients would allow better acceptability, increase confidentiality and lower the burden on health care facilities.

MATERIALS AND METHODS

This study was conducted in a teaching institution where 60 consecutive patients fulfilling the inclusion criteria were enrolled after written informed consent (Table 1). The protocol was approved by the local ethics committee.

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The inclusion criteria were: (1) Women seeking MTP up to 49 days gestation as counted from the 1st day of the last menstrual period; (2) informed consent; (3) access to a telephone; (4) residence within 1 h distance from the hospital; (5) voluntary permission for surgical intervention if medically advised or in cases of failure.

Women were excluded from the study if they had, (1) A known allergy to prostaglandins; (2) a history of cardiac, respiratory renal, hepatic or adrenal disease; (3) a history of thromboembolism, hypertension, coagulopathy and diabetes mellitus; (4) history or sonographic evidence of uterine pathology; (5) active genital infection; (6) previous uterine surgery; and (7) prior uterine bleeding.

The patients were informed of the nature of the study, risks benefits, visiting schedule and the possible requirement of suction and evacuation if incomplete abortion or failure occurred. The patient was instructed to report to the hospital immediately in case of excessive bleeding, cramps or any other side effects. The patient was advised to keep a diary of the symptoms experienced.

Drug Protocol

At the first visit, the patient was given a tablet of paracetamol. After ½ h five tablets of misoprostol (200 µg each) were inserted in the posterior fornix. The patient was instructed to lie in the lateral position for ½ h and then allowed to go home. On day 2, the patient was asked about bleeding and side-effects experienced. Pulse and blood pressure were noted, and a p/s and p/v were done. The same dose of misoprostol was repeated. On day 3, the same procedure was carried out as on day 2.

Patients were called for follow-up on day 7 or earlier in case of excessive bleeding or severe side effects experienced. On day 7, an ultrasound examination was conducted for the presence of the gestation sac, retained products of conception or increased endometrial thickness (>16 mm significant).

The next follow-up was scheduled on day 14 for assessment of amount and duration of bleeding, pelvic examination, repeat hemoglobin and for surgical evacuation in case of incomplete abortion or failure. The patient was then advised to report back after the next menses or earlier in case she experienced bleeding, fever or abdominal pain.

The principal outcomes assessed were successful abortion, side effects, mean expulsion time and mean decrease in hemoglobin. Secondary outcomes assessed were mean duration of bleeding, mean time of onset of cramping, mean time of onset of bleeding and mean time of menstruation returning. Side effects assessed

included chills, nausea, dizziness, fever, vomiting, diarrhea and pelvic pain.

Success was defined as complete evacuation of the products of conception without the need for surgical intervention. Failure was defined as recourse to surgical abortion for decision to drop out, doctors decision as a result of complications (such as excessive bleeding, pain, retained products or infection) or failure due to inefficiency of the method itself that is when the gestational sac was not expelled.

Statistical analysis was performed using SPSS software. A paired *t*-test was used for comparisons and a probability (*P*) level of <0.05 was considered as significant.

RESULTS

The trial included 60 women who requested a pregnancy termination and who complied with the inclusion criteria. The patient characteristics are mentioned in Table 1. It was observed that 86.7% patients who underwent medical abortion were of urban residence and 100% were educated. Also, 70% of patients undergoing abortion were of parity 2 and more.

Cramping began at 5.1 ± 3.4 h and lasted 3.7 ± 1.9 h. The duration of cramping pain was <5 h in 90% of patients, and 70% did not require any analgesics. Vaginal bleeding started at 6.46 ± 1.6 h and lasted 7.0 ± 4.6 days. The most common side-effects noted (Table 2) were cramping pain (100%), nausea (70%), diarrhea

Table 1: Characteristics of the patients (n=60)*

	N (%)
Age	
<30	38 (63.3)
31-40	20 (33.3)
>40	2 (3.3)
Marital status	
Married	58 (96.7)
Single	2 (3.3)
Education	
Uneducated	0 (0)
Educated	60 (100)
Parity	
0	2 (3.3)
1	16 (26.7)
2	30 (50)
3	12 (20)
Previous abortions	
0	36 (60)
1	18 (30)
2	6 (10)
Residence	
Urban	52 (86.7)
Rural	8 (3.3)

(46.7%), chills (46.7%) and fever (23.3%). Onset of bleeding was after the first dose of misoprostol in 95% and after the second dose in 5% (Table 3). The duration of bleeding was <5 days in 46.7% of patients. The mean change in hemoglobin was 0.7 ± 0.4 g/dl. Time to return of menstruation was 37 ± 7.1 days. The success rate was 90%. Six women were classified as failure (Table 4), according to protocol criteria. Of these, four patients (66.7% of failures) had excessive bleeding, and two (33.3% of failures) had retained products of conception on ultrasound. There was no case of failure due to the continuation of pregnancy.

DISCUSSION

MTP was liberalized in India through the MTP Act 1971.¹⁰ Initially, surgical procedures were the mainstay of termination of pregnancy, however, there was need for better methods since complications such as perforation, synechiae formation, cervical injury and infections associated with surgical methods were unacceptable.

Table 2: Side-effects

Symptom	Number of cases	Percentage
Chills	28	46.7
Dizziness	12	20.0
Nausea	42	70.0
Vomiting	12	20.0
Abdominal cramps	60	100.0
Diarrhea	28	46.7
Fever	14	23.3
Flushing	12	20.0
Headache	12	20.0
Rash	0	0.0
Itching	0	0.0
Redness	0	0.0

Table 3: Bleeding after each dose of misoprostol

Dose	Number of cases	Percentage
1 st	57	95
2 nd	3	5
3 rd	0	0
No bleeding	0	0
Total	60	100

Table 4: Outcome of treatment by gestation

Outcome	N (%)		
	<35 days	36-42 days	43-49 days
Success	20 (100)	24 (88.9)	10 (76.9)
Incomplete	0 (0)	1 (3.7)	1 (7.7)
Excessive bleeding	0 (0)	2 (7.4)	2 (15.4)
Missed	0 (0)	0 (0)	0 (0)
Continuing pregnancy	0 (0)	0 (0)	0 (0)
Total	20	27	13

The rate of major morbidity was 1%, and that of minor morbidities was 10%.¹¹ The 2003 amendment to the MTP act permitted medical abortions up to a gestation of 49 days.¹⁰ Medical abortions are more acceptable to women since it provides a natural way of termination of pregnancy that is safe, effective and non-invasive, and does not require hospitalization thus minimizes inference with day to day activities.¹²

Mifepristone followed by misoprostol has become standard regime for MTP,^{3,8,9,13} however the non-availability of mifepristone in number of countries and high cost has limited its scope. Misoprostol alone is a valid alternative to this regime which is reported to be safe and effective.^{1,4,5,7} Various dosage schedules from 600, 800, 1000 µg administered at 3 h, 6 h and 12 h interval^{6,7} have been documented. Though outcomes improved at 3 h intervals from 6 h interval of misoprostol, no difference was noticed between 6 h and 12 h intervals.

Success rate in the present study was 90%. Pre-treatment with mifepristone before the administration of misoprostol has efficacy rates of 97-98%.^{3,8,9} Medical abortion with the use of misoprostol as a single agent has success rates of 88.7-93%. Increasing the dose of misoprostol from 800 µg to 1000 µg was shown to improve the success rate.⁷ Success rates were higher with less when the patients presented earlier (Table 4), which is consistent with previous studies.³⁻⁹

Bleeding lasted 7.0 ± 4.6 days, which was less than that observed in previous studies. Side-effects noted were similar to those of various studies using misoprostol in repeated doses.³⁻⁶

In the present study, we increased the dosage interval to 24 h with aim to make it an outpatient department regime thus eliminating the need of hospitalization for induction of abortion. Administration of doses at home by either self administration or by mid-level health providers can improve compliance and acceptability.¹³⁻¹⁸

The reduction in cost of treatment by more than 50% compared to the present recommendations has a major impact in an economically constrained setting. Onset of bleeding was after the first dose of misoprostol in 95% which suggests that possibly many patients would not require repeated doses thus further cutting the price by more than 80%.

The reduction of economic burden of unwanted pregnancies, improved accessibility of safe abortion methods in remote areas, regimens that are acceptable to the patients by complying with their need for discretion and

convenience will have a major impact in reducing morbidity and mortality rates. It could, in most cases, dispense with the need for a surgical procedure for MTP and at the same time make termination of pregnancy at a very early stage of embryogenesis possible thus minimizing, if not eliminating, the ethical reservations on the issue. Medical abortion thus provides women with a choice in method and saves lives.

CONCLUSION

The drug amount of 1000 µg misoprostol administered vaginally at 24 h intervals could be a more economical and viable option in situations where financial constraints restrict the use of mifepristone. Moreover, the 24 h interval improves patient compliance and allows out patient management.

REFERENCES

- Paçarada M, Zeqiri F, Kongjeli N, Kongjeli G, Obërtinca B. Misoprostol-induced abortions in Kosovo. *Int J Gynaecol Obstet* 2011;112:116-8.
- Creinin MD. Current medical abortion care. *Curr Womens Health Rep* 2003;3:461-9.
- Wedisinghe L, Elsandabesee D. Flexible mifepristone and misoprostol administration interval for first-trimester medical termination. *Contraception* 2010;81:269-74.
- Manouana M, Kadhel P, Koffi A, Janky E. Illegal abortion with misoprostol in Guadeloupe. *J Gynecol Obstet Biol Reprod (Paris)* 2013;42:137-42.
- Tang OS, Schweer H, Lee SW, Ho PC. Pharmacokinetics of repeated doses of misoprostol. *Hum Reprod* 2009;24:1862-9.
- Salakos N, Kountouris A, Botsis D, Rizos D, Gregoriou O, Detsis G, *et al.* First-trimester pregnancy termination with 800 microg of vaginal misoprostol every 12 h. *Eur J Contracept Reprod Health Care* 2005;10:249-54.
- Carbonell JL, Rodriguez J, Aragón S, Velasco A, Tanda R, Sánchez C, *et al.* Vaginal misoprostol 1000 microg for early abortion. *Contraception* 2001;63:131-6.
- Li CL, Chen DJ, Sheng XJ, Liu MX, Weng HN, Du PL, *et al.* The lowest dosages of mifepristone and misoprostol to terminate ultra-early pregnancy. *Zhonghua Fu Chan Ke Za Zhi* 2012;47:764-8.
- Ngoc NT, Blum J, Raghavan S, Nga NT, Dabash R, Diop A, *et al.* Comparing two early medical abortion regimens: Mifepristone+misoprostol vs. misoprostol alone. *Contraception* 2011;83:410-7.
- Mohfw.com [Homepage on the internet] Ministry of Health and Family Welfare. Available from: <http://mohfw.nic.in/index1.php?sublinkid=3618&level=4&lid=2602&lang=1>. [Last accessed on 2014 Nov 20].
- Hern WM. Surgical abortion: Management, complications, and long-term risks. Available from: <http://www.drhern.com/surgicalabrisks.htm>. [Last accessed on 2014 Nov 20].
- Ho PC. Women's perceptions on medical abortion. *Contraception* 2006;74:11-5.
- Warriner IK, Wang D, Huong NT, Thapa K, Tamang A, Shah I, *et al.* Can midlevel health-care providers administer early medical abortion as safely and effectively as doctors? A randomised controlled equivalence trial in Nepal. *Lancet* 2011;377:1155-61.
- Kopp Kallner H, Fiala C, Stephansson O, Gemzell-Danielsson K. Home self-administration of vaginal misoprostol for medical abortion at 50-63 days compared with gestation of below 50 days. *Hum Reprod* 2010;25:1153-7.
- Chen AY, Mottl-Santiago J, Vragovic O, Wasserman S, Borgatta L. Bleeding after medication-induced termination of pregnancy with two dosing schedules of mifepristone and misoprostol. *Contraception* 2006;73:415-9.
- Blum J, Raghavan S, Dabash R, Ngoc Nt, Chelli H, Hajri S, *et al.* Comparison of misoprostol-only and combined mifepristone-misoprostol regimens for home-based early medical abortion in Tunisia and Vietnam. *Int J Gynaecol Obstet* 2012;118:166-71.
- Yilmaz B, Ertas IE, Kelekci S, Sut N, Mollamahmutoglu L, Danisman N. Moistening of misoprostol tablets with acetic acid prior to vaginal administration for mid-trimester termination of anomalous pregnancy: A randomised comparison of three regimens. *Eur J Contracept Reprod Health Care* 2010;15:54-9.
- Coeytaux F, Hessini L, Ejano N, Obbuyi A, Oguttu M, Osur J, *et al.* Facilitating women's access to misoprostol through community-based advocacy in Kenya and Tanzania. *Int J Gynaecol Obstet* 2014;125:53-5.

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Comparative Study between Herniorraphy and Meshplasty - 500 Inguinal Hernia Surgeries

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Abstract

Introduction: Hernia needs always surgical procedure for the treatment. There are various procedures, out of which commonly procedures followed are heriotomy, herniorraphy and meshplasty for inguinal hernia. Even though meshplasty is considered as the gold standard in the treatment of inguinal hernia repair, herniorraphy is followed in various centers.

Aim: This study was conducted to analyze long-term result of meshplasty and herniorraphy in middle-aged people.

Materials and Method: A 500 cases were operated for hernia and out of these cases 84% of cases were operated by meshplasty using Prolene mesh and 16% of cases are operated with herniorraphy.

Result: Inguinal hernias are more common in males (99.2%) than in females (0.8%) and incidence of hernia is increasing with the advance of age. Chronic cough (smoking habit) 30.60%, occupational (lifting heavy weights) 21.80%, followed by urinary (benign prostatic hyperplasia, Stricture urethra) 17% of cases are the precipitating factors for hernia formation. Hernia surgery can be done under any anesthesia, but spinal anesthesia is preferred as it has got less post op complications. Among all post-operative complications scrotal swelling accounts for 16.8%, followed by wound infection 11.2%. In meshplasty recurrence rate is found to be 1.14% when compared with 2.5% in herniorraphy, which is significantly less.

Conclusion: Hernia is more common in males and surgery is the only treatment of choice, and there are various procedures. Of which we were comparing herniorraphy and meshplasty. Definitely meshplasty is more popular as well as it has got less recurrence rate.

Key words: Complications, Herniorraphy, Inguinal hernia, Meshplasty, Recurrence

INTRODUCTION

Surgery is the mainstay in the treatment of hernia and most common surgery done in the department of surgery.¹ In our institution, hernia surgery accounts for 30% of cases. Hernia surgery is one of the earliest forms of surgery and various techniques of hernia repair have been described. Tension free techniques for hernia repair have enjoyed widespread use for many years, with excellent results, few recurrences, and little postoperative morbidity.^{2,3} The use of polypropylene mesh in hernia surgery has become increasingly popular. The use of synthetic mesh for

achieving a tension free repair has resulted in a significant reduction in postoperative recurrences.⁴ Polypropylene meshes have a mild reactivity upon implantation, in-growth, tensile strength, which is retained for indefinite periods of time. The recurrence rate is high varies from 1.5% to 3.5% in various institutions.^{2,5} Risk factors that are useful in predicting complications in an adult patient with a groin hernia include old age, chronic cough, bladder outlet obstruction or chronic constipation.

MATERIALS AND METHODS

The study was approved by the Ethics Committee of the Belgaum Institute of Medical Sciences, Belgaum. A 5-year study of 500 hernia cases was done from 2003 to 2008. In all, 410 cases of meshplasty and 90 cases of herniorraphy were operated in District Hospital Belgaum attached to Belgaum Institute of Medical Sciences, Belgaum. The details of patients were collected from medical record

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section and follow-up of cases was done, and personal questionnaire were used. We have included only meshplasty and herniorraphy cases.

All cases have received single dose of injection ceftriaxone (1 g) at the onset of anesthesia. Under anesthesia, skin incision was made in the line of Langer's line and incision deepened till external oblique aponeurosis. With peanut swab and finger, we made the plane above conjoint tendon and inguinal ligament. The cremasteric fascia incised which help easy mobilization of cord structures.

A direct sac was pushed back and indirect sac opened and transected at its neck after ligation. Mesh was slit to accommodate spermatic cord and fixed to the pubic tubercle, superiorly to conjoint the tendon above and inferiorly to the inguinal ligament with a continuous suture with prolene (1-0).⁴

In herniorraphy⁶ prolene, (1-0) suture was used to repair the posterior wall of the inguinal canal, wherein conjoint tendon and conjoint muscle was sutured to inguinal the ligament, taking first suture to the pubic tubercle to prevent recurrence. Tanner's sliding incision was made to prevent tension over the suture line in some cases. The external oblique aponeurosis was closed with a continuous suture with prolene (1-0). The skin was closed with an interrupted monofilament silk. Operative time was recorded in all cases.

Postoperatively in all cases injection antibiotics and analgesics were given for 1 day and orally till 5 days. Patients were discharged after 3-4 day. Sutures were removed after 7th day. Follow-up was done 15th day, 1, 3, 6 month, 2nd and 3rd year. All post-operative complications were noted.

RESULTS

A series of 500 cases were operated for hernia surgery between 2003 and 2008. In our study, it was found that 99.2% (496) were male, 0.8% (4) were female. Among that 68.8% (344) are direct hernias and 32.2% (156) indirect hernias. Out of which 67.8% (339) were unilateral and rest 32.24% (161) were bilateral (Table 1).

The age distribution is showing that the incidence of hernia is increasing with advancing of age and rate is more after age of 45 years (Table 2).

In the study of precipitating factors of hernia there were 109 (21.8%) due to occupational cause like heavy work lifting, 153 (30.6%) cases due to chronic coughs, 260 (17.33%) due to urinary problems like benign prostatic hyperplasia (BPH), Urethral stricture, 12 (2.4%) due to

post-surgical, and in 183 (36.6%) there were non-specific cause were identified (Table 3).

Spinal anesthesia was used in 469 (93.80%) cases, whereas 31 (6.2%) were operated under local anesthesia. Mean operative time were 45 min in Meshplasty and 35 min in herniorraphy. And mean hospitalization time was 4-5 days in both cases (Table 4).

In our meshplasty cases, we found complication of erythema in 5.77% (24) cases, seroma in 11.66% (49) cases, hematoma in 1.66% (7) cases, scrotal swelling in 16.90% (71) cases, wound infection in 11.90% (50) cases, urinary retention in 6.42% (27) cases, recurrence in 2.14% (9) cases and funiculitis in 6.19% (26) cases. While in our herniorraphy

Table 1: Pre-operative status

Type of Case	Meshplasty	Herniorraphy	Total
Total cases	420	80	500
Male	420 (100.0)	76 (95.0)	496 (99.2)
Female	0 (0)	4 (5.0)	4 (0.8)
Direct	294 (70.0)	50 (62.5)	344 (68.8)
Indirect	126 (30.0)	30 (37.5)	156 (32.2)
Unilateral	280 (66.66)	59 (73.75)	339 (67.8)
Bilateral	140 (33.33)	21 (26.25)	161 (32.2)

Table 2: Age distribution

Age in years	Meshplasty (420)	Herniorraphy (80)	Total (500)
15-25	70 (7.77)	25 (4.16)	95 (6.33)
26-35	96 (10.66)	33 (5.50)	129 (8.60)
36-45	98 (10.88)	66 (11.00)	164 (10.93)
46-55	186 (20.66)	96 (16.00)	282 (18.80)
56-65	252 (28.00)	188 (33.00)	440 (29.33)
>65	198 (22.00)	192 (32.00)	390 (26.00)

Table 3: Precipitating factor analysis

Factors	Meshplasty (420)	Herniorraphy (80)	Total (500)
Occupational (Heavy work lifting)	75 (15.00)	34 (6.80)	109 (21.80)
Chronic cough	126 (30.00)	27 (33.75)	153 (30.60)
Urinary	70 (16.66)	15 (18.75)	85 (17.00)
BPH, urethral stricture			
Post-surgical	10 (2.38)	2 (2.50)	12 (2.40)
Non-specific reason	148 (35.23)	35 (43.75)	183 (36.6)

BPH: Benign prostatic hyperplasia

Table 4: Perioperative data

Type of anesthesia	Meshplasty (420)	Herniorraphy (80)	Total (500)
Spinal anesthesia	394 (93.80)	75 (93.75)	469 (93.80)
Local anesthesia	26 (6.19)	5 (6.25)	31 (6.20)
Mean operative time	45 min (35-75)	35 min (30-65)	
Average hospital stay		4-5 days	4-5 days

Table 5: Type of complication

Type of Case	Meshplasty	Herniorrhaphy	Total cases
Number of cases	420	80	500
Erythema	24 (5.71)	3 (3.75)	27 (5.40)
Seroma	49 (11.66)	4 (5.00)	53 (10.60)
Hematoma	7 (1.66)	2 (2.50)	9 (1.80)
Scrotal swelling	71 (16.90)	13 (16.25)	84 (16.80)
Wound infection	50 (11.90)	6 (7.50)	56 (11.20)
Urine retention	27 (6.42)	3 (3.75)	30 (6.00)
Recurrence	6 (1.42)	2 (2.50)	8 (1.60)
Funiculitis	26 (6.19)	6 (7.50)	32 (6.40)

the complication of erythema in 3.75% (3) cases, seroma in 5.0% (4) cases, hematoma in 2.50% (2) cases, scrotal swelling in 16.25% (13) cases, wound infection in 7.50% (6) cases, urinary retention in 3.75% (3) cases, recurrence in 2.5% (2) cases and funiculitis in 7.50% (6) occurred (Table 5).

DISCUSSION

Inguinal hernia is more common in males as compared to females. This is because of patent processes vaginalis.³ The incidence of direct hernia is more common than the indirect inguinal hernia in our study. This may be due to a large number of old age patients and because of age weakening of muscles and transversalis fascia takes place. Hernia occurs due to weakness of posterior wall of the inguinal canal. In 42.2% of cases no obvious precipitating factor was detected. This confirms the importance of metabolic factor i.e. change in collagen type I and II in development of hernia.⁷ Precipitating factors in the present study was chronic cough (34%) that increases intra-abdominal pressure and development of hernia. urinary obstruction BPH (30%).

Under spinal anesthesia in 469 (93.8%) cases and under local anesthesia in 31 (6.2%) cases was operated. However, one study suggests no major difference of using any anesthesia and patients should be offered a choice of anesthesia.⁶ Mean operative time in Meshplasty was 45 min (35-75) and for herniorrhaphy was 35 min (30-65) and Mean hospital stays of in both methods were 4-5 days which was obviously insignificant. We have compared our post-operative complication with Harjai's series of 216 cases. In our series, we found that scrotal swellings in 16.46% and wound infection in 10.26% cases are most common

complication. And our result confirms reported rates of wound infection vary from 1% to 14%.⁸⁻¹²

The total recurrence rate is 1.86% which is very low in compare to other series. While the difference of recurrence rate between Meshplasty (2.11%) and in Modified Basini's repair (1.5%) were insignificant. The average per operative cost in Modified Basini's repair is Rs. 1200-1400 which is very less than Meshplasty and so it remain equally helpful to poor patients of India with similar benefits of other hernia repair method.

CONCLUSION

The hernia is most common disease in male and the Meshplasty is definitely more popular procedure being in use but in India where cost factor still plays a part, herniorrhaphy is equally effective to prevent complication like recurrence.

REFERENCES

- Rutkow IM. Surgical operations in the United States. Then (1983) and now (1994). *Arch Surg* 1997;132:983-90.
- Nilsson E, Kald A, Anderberg B, Bragmark M, Fordell R, Haapaniemi S, *et al.* Hernia surgery in a defined population: A prospective three year audit. *Eur J Surg* 1997;163:823-9.
- Grace RV, Vansel S. Result of herniotomy in patients of more than 50 years of age. *Ann Surg* 1937;106:347-62.
- Amid PK, Shulman AG, Lichtenstein IL. Open "tension-free" repair of inguinal hernias: The Lichtenstein technique. *Eur J Surg* 1996;162:447-53.
- Holmes J, Readman R. A study of wound infections following inguinal hernia repair. *J Hosp Infect* 1994;28:153-6.
- Amid PK, Lichtenstein IL, Shulman AG, Hakakha M. Biomaterials for "tension-free" hernioplasties and principles of their applications. *Minerva Chir* 1995;50:821-6.
- Kling U, Zheng ZY, Bhardwaj R, Klosterhalfen B, Schumpelick V. Altered collagen synthesis fascia transversalis of patients with inguinal hernia. *Hernia* 1999;3:181-7.
- Schumpelick V, Treutner KH, Arlt G. Inguinal hernia repair in adults. *Lancet* 1994;344:375-9.
- Simchen E, Rozin R, Wax Y. The Israeli Study of Surgical Infection of drains and the risk of wound infection in operations for hernia. *Surg Gynecol Obstet* 1990;170:331-7.
- Bailey IS, Karran SE, Toyn B, Brough P, Ranaboldo C, Karran SJ. Community surveillance of complications after hernia surgery. *BMJ* 1992;304:469-71.
- Santos KR, Bravo Neto GP, Fonseca LS, Gontijo Filho PP. Incidence surveillance of wound infection in hernia surgery during hospitalization and after discharge in a university hospital. *J Hosp Infect* 1997;36:229-33.
- Medina M, Sillero M, Martínez-Gallego G, Delgado-Rodríguez M. Risk factors of surgical wound infection in patients undergoing herniorrhaphy. *Eur J Surg* 1997;163:191-8.

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Comparative Study between Intralesional Steroid Injection and Oral Lycopene in the Treatment of Oral Submucous Fibrosis

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Abstract

Introduction: Oral submucous fibrosis (OSMF) is a premalignant condition with rising incidence due to increase in addictive habits like arecanut and tobacco chewing. Various treatment modalities have been tried including steroid injections though new interest in use of natural plant pigments like lycopene has occurred.

Aim: The aim was to compare the efficacy of intralesional steroid injection with oral lycopene in the treatment of OSMF.

Methodology: A randomized prospective study of 75 patients of OSMF who were divided into three groups of 25 each. Group A patients received weekly intralesional triamcinolone (40 mg/ml) injections, Group B received oral lycopene 6 mg daily, and Group C received both weekly steroid injection and oral lycopene for 2 months respectively. Mouth opening as inter-incisor distance (mm) and burning sensation in the mouth using visual analog scale were recorded weekly.

Results: Mouth opening values for the patients showed a mean increase of 6.56 mm, 3.04 mm and 7.56 mm in Groups A, B and C, respectively. Lycopene showed an early reduction in the burning sensation with a mean score of 4.8 in group B by the 1st week itself which was highly significant ($P < 0.001$).

Conclusion: Lycopene can be used as a first-line drug in the management of OSMF or even as an adjuvant with steroids giving excellent results.

Key words: Lycopene, Mouth opening, Oral submucous fibrosis, Steroid, Triamcinolone

INTRODUCTION

Oral submucous fibrosis (OSMF) is a chronic, debilitating, premalignant condition affecting all ages and both sexes in the Indian subcontinent. Although thought to be multifactorial, various risk factors like areca nut chewing, chilli consumption, nutritional deficiency states, genetic susceptibility and collagen disorders have been suggested. It is a chronic condition characterised by mucosal rigidity of varying intensity due to fibro-elastic transformation of juxta-epithelial layer. Predominantly Type I collagen with

variable amounts of other types of collagen constitute fibrosis.¹ It occurs when the synthesis of new collagen by myofibroblasts exceeds the rate at which it is degraded, such that the total amount of collagen increases over time.² This leads to restricted mouth opening and burning sensation of the oral mucosa aggravated by spicy food. However, a more serious complication is the risk of developing oral malignancy that may be as high as 3-7.6%. Most important aspect of treatment is cessation of habit of chewing betel quid, areca nut, other local irritants, spicy and hot food, alcohol intake and smoking. Various modalities of treatment ranging from conservative treatment to surgical procedures have been attempted. Intra-lesional injections of steroids has been used in its treatment since quite long as a drug of choice.

Other medical therapy include injection of placental extract, hyaluronidase, trypsin, collagenase, intralesional interferon- γ , oral zinc and pentoxiphylline. But there has

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been new interest in use of natural pigments in plants like lycopene, found to reverse the pathogenesis of OSMF.³

Carotenoids have been known to decrease the incidence of oral premalignant lesions and cancer.⁴ Lycopene is a carotenoid in tomatoes (0.9-4.2 mg per 100 g) having high singlet oxygen quenching property.⁵ It has several potent anti-carcinogenic and anti-oxidant properties and has demonstrated profound benefits in precancerous lesions such as leukoplakia and OSMF. It has also shown benefits in cancers of the prostate, pancreas and oesophagus.⁶

Lycopene has been found to inhibit hepatic fibrosis in rats as well as human fibroblast *in vitro*, and hence tried in treatment of OSMF.

MATERIALS AND METHODS

This was a clinical prospective study conducted between July 2011 and July 2013 in otorhinolaryngology department of Jagadguru Jayadeva Murugarajendra medical college. 75 consecutive patients of clinical OSMF aged between 18 years and 55 years were inducted into the study. Detailed history including symptoms, habits of areca nut chew, gutkha, pan masala, smoking, alcohol intake was taken. General and ENT examination were performed. Patients with systemic diseases, active oral infections and mouth opening grades 3 and above according to clinical staging by Ranganathan *et al.* were excluded.

All patients were properly explained about the study and their written consent was taken. The study was cleared by the hospital ethical board. The cases were randomly divided into three groups subsequently. Group A patients received intra-lesional triamcinolone injections (40 mg/ml) once weekly, Group B patients received 6 mg oral lycopene daily in divided doses and Group C received weekly steroid injections along with daily oral lycopene tablets combined for a total duration of 2 months each. The main parameters assessed were improvements in mouth opening as inter-incisor distance in mm and burning sensation by visual analog scale (VAS) from 1 to 10. The two parameters were recorded weekly for 2 months. One-way ANOVA followed by *post hoc* Tukey's test for group-wise comparisons were used.

RESULTS

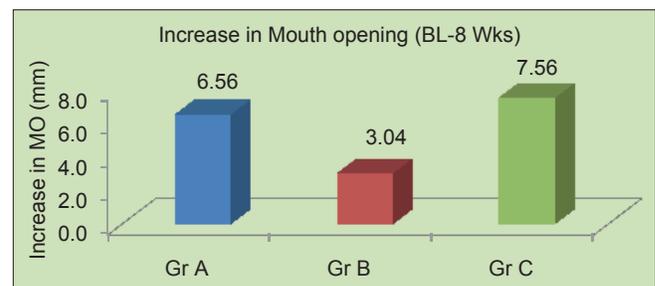
Seventy-five patients participated in our study (25 in each Group A, B and C) aging between 18 years and 55 years with a mean age of 28.6 years. In group A, 33.3% were males and 66.6% were females. In Group B, 55.5% were males and 44.4% were females and in Group C, 52% were males and 48% were females. Trismus was the most common

symptom, followed by burning sensation in the mouth on eating spicy food, dryness of mouth and ulceration. The average baseline mouth opening in Groups A, B and C were 25.84 mm, 23.76 mm and 23.08 mm, respectively. The inter-incisor distance at the end of the study was 32.4 mm, 26.8 mm and 30.64 mm in Groups A, B and C with mean increase in mouth opening of 6.56 mm, 3.04 mm and 7.56 mm respectively as shown in Table 1 and Graph 1.

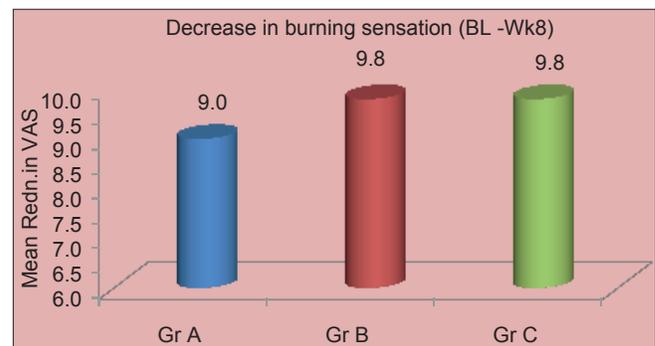
The average baseline VAS score of burning sensation in all the three groups was 10 at the beginning of the study. The score at end of study were 1, 0 and 0 in Groups A, B and C with a mean decrease in burning sensation of 9, 9.8 and 9.8 respectively over the study period as shown in Table 2 and Graph 2. Lycopene showed an early reduction in the burning sensation with a mean score of 4.8 in Group B by 1st week itself which was highly significant ($P < 0.001$). There were no local or systemic side effects due to the treatment in any of the groups.

DISCUSSION

OSMF was defined by Schwartz as 'a chronic disease affecting any part of the oral cavity and sometimes the pharynx, associated with juxta-epithelial inflammatory reaction followed by a fibro-elastic change of the lamina propria leading to stiffness of oral mucosa and causing trismus. Although various risk factors are implicated, most important factor is areca nut chewing in various forms such as gutkha, pan masala etc. The active ingredients in areca



Graph 1: Increase in mouth opening (baseline-8 week)



Graph 2: Decrease in burning sensation (baseline-week8)

Table 1: Improvement in mouth opening (mm)

Group	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
A	25.84	27.04	27.76	28.84	29.68	30.36	31.6	32.4	32.4
B	23.76	23.88	24.24	24.64	25	25.52	26.04	26.52	26.8
C	23.08	24.56	25.44	26.92	27.8	28.6	29.92	30.56	30.64

Table 2: Improvement in burning sensation (VAS score)

Group	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
A	10	7.2	6.1	5.2	4.5	3.7	2.7	2.1	1.0
B	10	4.8	2.4	1.5	0.9	0.5	0.2	0.2	0.2
C	10	5.6	4.0	2.4	1.8	1.0	0.4	0.2	0.2

VAS: Visual analog scale

nut include arecoline, arecaidine and tannins which stimulate fibroblast proliferation and dysregulate collagen synthesis. Intra-lesional steroids benefit by immunosuppression and inhibition of fibroblast proliferation and collagen synthesis.⁷

Among the steroids, triamcinolone acetonide was selected for the study as it has better local potency, longer duration of action and lesser systemic side effects.⁸ Lycopene is a 40 carbon acyclic carotenoid containing 11 conjugated double bonds, with a molecular mass of 536. It has anti-oxidant, anti-fibroblast and anti-carcinogenic properties.⁹ In our study, there was a significant difference in improvement of mouth opening between Groups A and B, with steroid showing better improvement in mouth opening. The effect of steroid injection in improvement of mouth opening is comparable to the study by Ameer *et al.*¹⁰ However, maximum improvement in mouth opening and decrease in burning sensation was recorded in the group C where a combination of steroid and lycopene were given to the patients. A possible explanation could be increased blood perfusion due to lycopene which increased the local bioavailability of steroid in the fibrotic buccal mucosa. Definite reduction in the burning sensation and an increase in the mouth opening were noted with oral lycopene in the study by Kumar *et al.*¹¹ Bhagavan *et al.* also found encouraging results with lycopene therapy and added that long term maintenance therapy may be needed to have an impact on oral cavity cancer incidence.¹²

CONCLUSION

Combination of intra-lesional steroid injection and oral lycopene therapy has great benefits in alleviating the

symptoms of OSMF patients and can be tried out as a first-line treatment in selected patients suffering from the disease.

REFERENCES

- Borle RM, Borle SR. Management of oral submucous fibrosis: A conservative approach. *J Oral Maxillofac Surg* 1991;49:788-91.
- Wynn TA. Cellular and molecular mechanisms of fibrosis. *J Pathol* 2008;214:199-210.
- Singh M, Krishanappa R, Bagewadi A, Keluskar V. Efficacy of oral lycopene in the treatment of oral leukoplakia. *Oral Oncol* 2004;40:591-6.
- Maserejian NN, Giovannucci E, Rosner B, Joshipura K. Prospective study of vitamins C, E, and A and carotenoids and risk of oral premalignant lesions in men. *Int J Cancer* 2007;120:970-7.
- Erdman JW Jr, Ford NA, Lindshield BL. Are the health attributes of lycopene related to its antioxidant function? *Arch Biochem Biophys* 2009;483:229-35.
- Gerster H. The potential role of lycopene for human health. *J Am Coll Nutr* 1997;16:109-26.
- Singh M, Niranjana HS, Mehrotra R, Sharma D, Gupta SC. Efficacy of hydrocortisone acetate/hyaluronidase vs triamcinolone acetonide/hyaluronidase in the treatment of oral submucous fibrosis. *Indian J Med Res* 2010;131:665-9.
- Aziz SR. Oral submucous fibrosis: An unusual disease. *J N J Dent Assoc* 1997;68:17-9.
- Kitade Y, Watanabe S, Masaki T, Nishioka M, Nishino H. Inhibition of liver fibrosis in LEC rats by a carotenoid, lycopene, or a herbal medicine, Sho-saiko-to. *Hepatol Res* 2002;22:196-205.
- Ameer NT, Shukla RK. A cross sectional study of oral submucous fibrosis in central India and the effect of local triamcinolone therapy. *Indian J Otolaryngol Head Neck Surg* 2012;64:240-3.
- Kumar A, Bagewadi A, Keluskar V, Singh M. Efficacy of lycopene in the management of oral submucous fibrosis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007;103:207-13.
- Gowda BB, Yathish TR, Sankappa SP, Kumar Naik H, Somayaji P, Anand D. Response of oral submucous fibrosis to lycopene- A carotenoid antioxidant: A clinicopathological study. *J Clin Diagn Res* 2011;5:882-8.

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Evaluation of the Effectiveness of Oral Tablet Clonidine as a Premedicant Drug: A Prospective Study of 100 Cases

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Abstract

Introduction: Premedication is used to provide sedation and anxiolysis and to enhance the quality of induction; maintenance and recovery from anesthesia. The ideal pre-medicant should be orally effective has sedative; analgesic, anti-anxiety, anti-sialagogue and anti-emetic properties. And maintain cardiovascular stability and normal respirations.

Objectives: To evaluate the effectiveness of oral clonidine as a preanesthetic medicant and as a drug, to attenuate the hemodynamic responses associated with laryngoscopy and endotracheal intubation.

Materials and Methods: Study was performed on 100 patients of the age group 18-65 years in whom 4 µg/kg body weight of oral clonidine (max 0.2 mg) was administered 90 min prior to induction of anesthesia. Degree of sedation, anxiolysis, antisialagogue effect and changes in heart rate, systolic blood pressure (BP), diastolic BP, mean arterial pressure and electrocardiogram changes before and after premedication with oral clonidine was noted. Descriptive statistical analysis was done using statistical software namely SPSS 15.0, Stata 8.0, MedCalc 9.0.1 and Systat 11.0 were used for the analysis of the data and Microsoft word and Excel are used to generate graphs, and tables.

Results: Clonidine produced significant sedation with a $P < 0.05$, before premedication 61% of patients had anxiety score of 1 and 27% had a Score of 2 and after premedication 77% had a Score of zero and 19% had Score 1, which is significant anxiolysis. The association that is observed between clonidine as anti-sialagogue is mildly significant statistically. Premedication with clonidine produced decrease in pulse rate, decrease in systolic, diastolic and mean arterial pressure was highly significant statistically $P < 0.001$. These values remained lower than the basal value after 1 min up to 5 min after intubation.

Conclusion: The premedication with oral clonidine produces significant sedation, anxiolysis, mild anti-sialagogue effect and hemodynamic stability during laryngoscopy and endotracheal intubation with no adverse effects. Thus, oral clonidine may be used as an ideal pre-anesthetic medication.

Key words: Hemodynamic response, Oral clonidine, Premedication

INTRODUCTION

Pre-anesthetic medication forms, an integral part of anesthetic management and universally administered before any anesthesia. The ideal premedicant should be effective and pleasant to be taken orally; have sedative, analgesic and

anti-emetic, anti-sialagogue, anti-anxiety properties. Should not impair cardiovascular stability or depress respiration.¹

Clonidine is a mixed alpha-1 and alpha-2 adrenoceptor agonist with a predominant alpha-2 action (alpha-2:alpha-1 = 220:1) which is mainly used as an anti-hypertensive agent, but has many properties of an ideal premedicant and also has beneficial effects by blunting hemodynamics response to laryngoscopy and intubation.^{2,3}

Laryngoscopy and intubation is a noxious stimulus which provokes a sympathoadrenal response. Characterized by rise in arterial blood pressure (BP) and pulse rate which is attenuated by clonidine. This study was undertaken to evaluate

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the effectiveness of oral clonidine as a preanesthetic medicant and as also a drug to attenuate the hemodynamic responses associated with laryngoscopy and endotracheal intubation.⁴

MATERIALS AND METHODS

Totally 100 patients of both sexes between 18 and 65 years scheduled for various elective surgeries under general anesthesia will be taken in the study after ethical clearance, and informed consent will be taken from the patients. Patients with central nervous system disorders (upper motor neuron lesions, lower motor neuron lesions) and patients taking drug treatments known to affect heart rate (HR), BP or hormonal stress responses were excluded.

All patients scheduled for the study are kept nil by mouth, and neither premedicated the previous night nor on the morning of surgery. Tablet clonidine 4 µg/kg body weight (maximum 0.2 mg) is given 90 min prior to induction of anesthesia with sips of water. No anticholinergic drug was given either before or at the time of induction of anesthesia. Assessment done just before and 90 min after administration of the drug. Assessment of degree of sedation is evaluated by Sedation score (0 - Patient awake and talkative, 1 - Patients awake but not communicative, 2 - Patients drowsy, quiet and easily arousable, 3 - Patient asleep). Assessment of degree of anxiolysis and dryness of tongue is evaluated by anxiety scoring (0 - Patient quiet and comfortable, 1 - Patient uneasy, 2 - Patient worried and anxious, 3 - Patient very worried or very upset, 4 - Patient frightened or terrified) status of tongue: Moist/dry.

Baseline HR, BP (systolic and diastolic and mean arterial pressure) and electrocardiogram (ECG) recorded by non-invasive monitor (Datex) in preanesthetic room. On arrival in OT, an intravenous (IV) line with appropriate fluid is started. General anesthesia was induced by injection of thiopentone 2.5%, 4-6 mg/kg body weight followed by injection succinylcholine 2 mg/kg body weight is given intravenously. Once there is cessation of fasciculation induced by succinylcholine, laryngoscopy is performed and appropriate size endotracheal tube is passed.

During laryngoscopy, and intubation HR, BP (systolic, diastolic and mean arterial pressure) with continuous ECG recording done at a time interval of 1 min continuously for 5 min thereafter. Any patient who strained or took more than 15 s for intubation or required second attempt to laryngoscopy and intubation were excluded from the study. Anesthesia was maintained with O₂ and N₂O only (without narcotic and inhalation agent) up to 5 min after endotracheal intubation. After 5 min of monitoring, NDMR (injection atracurium) and inhalation anesthetic

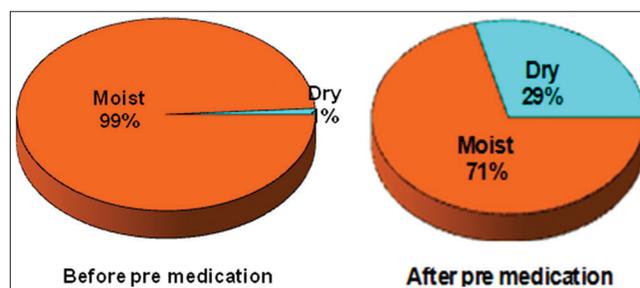
(halothane) were supplemented uniformly to all the cases. After completion of surgery, NDMR antagonized by neostigmine and glycopyrolate. Once the patient satisfied extubation criteria – extubation done and shifted to recovery room. Drugs like injection atropine and injection ephedrine diluted and loaded, kept ready in case of the patient developed complications like bradycardia or hypotension during the study. Any complications like undesirable effect or rebound phenomenon or untoward hemodynamic event is noted and treated.

RESULTS

In our study, maximum patients were in the age group of 31-40 years followed by 41-50 years (mean ± standard deviation of 41.04 ± 12.61). Before premedication all 100 patients were of sedation Score 0 and after premedication 45% had Score 0, 50% had Score 1, 3% had Score 2 and 2% had Score 3 showing a statistically significant sedation with clonidine premedication, $P < 0.05$ (Table 1).

Before premedication 61% of patients had anxiety Score of 1 and 27% had a Score of 2 and after premedication 77% had a score of zero and 19% had Score 1. $P < 0.001$ thereby concluding that premedication with clonidine had very significant antianxiety effect (Table 2).

Before premedication 99% of patients had moist tongue and 1% dry tongue. But after premedication with clonidine 71% remained to have moist tongue and 29% had dry tongue. This shows that though there is anti-sialagogue effect, it is not very significant.



From the Tables 3 and 4, it can be concluded that after premedication with clonidine, the decrease in the pulse rate is statistically highly significant. However, the rise in pulse rate during laryngoscopy and endotracheal intubation from basal value is not significant clinically though some significance is seen statistically. After 1 min of intubation pulse rate returned to basal value and remained lower than the basal value up to 5 min of intubation.

After premedication with clonidine there is decrease in systolic, diastolic and mean arterial pressure (Figures 1-4).

But, the rise in systolic, diastolic and mean arterial pressure during laryngoscopy and endotracheal intubation from basal value is not significant clinically though some significance is seen statistically. These values remained lower than the basal value up to 5 min of intubation.

Table 1: Sedation scoring

Sedation score	Sedation score				Mean±SD
	0	1	2	3	
Before premedication	0	0	0	0	-
After premedication (%)	45 (45)	50 (50)	3 (3)	2 (2)	0.74±0.58
Inference	Sedation score is significantly increased after pre medications with $P<0.05$				

SD: Standard deviation

Table 2: Anxiety scoring

Anxiety score	Anxiety score (%)					Mean±SD
	0	1	2	3	4	
Before premedication	10 (10.0)	61 (61.0)	27 (27.0)	2 (2.0)	0	1.21±0.64
After premedication	77 (77.0)	19 (19.0)	4 (4.0)	0	0	0.27±0.52
Inference	Anxiety score is significantly reduced after pre medications with $P<0.001$					

Table 3: Mean values of heart rate, systolic, diastolic and mean arterial pressure at various intervals

Events	HR	SBP (mm Hg)	DBP (mm Hg)	MAP (mm Hg)
Before premedication	80.29±6.69	127.34±9.27	81.04±5.71	96.47±6.37
After premedication	74.39±6.67	119.66±9.07	73.82±5.91	89.09±6.43
Laryngoscopy and endotracheal intubation				
I ₀ min	87.58±7.07	128.17±7.79	82.12±5.21	97.04±6.28
I ₁ min	80.87±6.44	125.47±7.94	79.53±5.07	94.46±6.32
I ₂ min	79.03±6.14	122.59±7.79	77.13±5.18	91.79±6.16
I ₃ min	77.42±6.29	119.33±7.76	74.38±5.21	88.97±6.23
I ₄ min	75.76±6.05	116.38±7.59	71.52±5.32	86.06±6.15
I ₅ min	73.89±6.11	113.26±7.61	68.43±5.27	83.07±6.02
% change from basal value				
Before premedication - After premedication	-7.3%	-6.1%	-8.9%	-7.7%
Before premedication - I ₀ min	+9.1%	+0.6%	+1.3%	+0.6%
Before premedication - I ₁ min	+0.8%	-1.5%	-1.9%	-2.1%
Before premedication - I ₂ min	-1.5%	-3.7%	-4.8%	-4.9%
Before premedication - I ₃ min	-3.5%	-6.3%	-8.2%	-7.8%
Before premedication - I ₄ min	-5.6%	-8.6%	11.7%	-10.8%
Before premedication - I ₅ min	-7.9%	-11.1%	-15.6%	-13.9%

MAP: Mean arterial pressure, HR: Heart rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

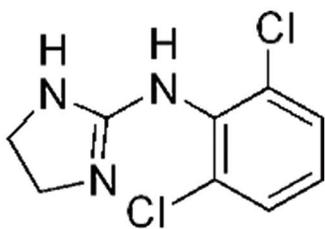
Table 4: Statistical significance

	Significance			
Before premedication - After pre med	$t=18.02; P<0.001^{**}$	$t=22.88; P<0.001^{**}$	$t=26.52; P<0.001^{**}$	$t=28.89; P<0.001^{**}$
Before premedication - I ₀ min	$t=34.47; P<0.001^{**}$	$t=1.25; P=0.212$	$t=1.52; P=0.108$	$t=0.86; P=0.390$
Before premedication - I ₁ min	$t=2.80; P<0.001^{**}$	$t=2.74; P=0.007$	$t=2.46; P=0.016^*$	$t=3.03; P=0.003^{**}$
Before premedication - I ₂ min	$t=5.68; P<0.001^{**}$	$t=6.68; P<0.001^{**}$	$t=6.16; P<0.001^{**}$	$t=7.27; P<0.001^{**}$
Before premedication - I ₃ min	$t=10.57; P<0.001^{**}$	$t=11.90; P<0.001^{**}$	$t=10.50; P<0.001^{**}$	$t=11.391; P<0.001^{**}$
Before premedication - I ₄ min	$t=16.13; P<0.001^{**}$	$t=15.70; P<0.001^{**}$	$t=14.95; P<0.001^{**}$	$t=15.79; P<0.001^{**}$
Before premedication - I ₅ min	$t=21.13; P<0.001^{**}$	$t=19.47; P<0.001^{**}$	$t=20.37; P<0.001^{**}$	$t=20.50; P<0.001^{**}$

DISCUSSION

The alpha-2 agonists are assuming greater importance as anesthetic adjuvant and analgesics. Their primary effect is sympatholytic. They reduce peripheral noradrenaline release by stimulation of prejunctional alpha-2 inhibitory adrenoceptors. They inhibit central neural transmission in the dorsal horn by presynaptic and postsynaptic mechanisms and directly in spinal pre-ganglionic sympathetic nerves. Traditionally, they have been used as antihypertensive drugs, but doses based on sedative, anxiolytic, and analgesic properties are being developed.

Clonidine hydrochloride is an imidazole derivative. It was synthesized in early 1960's; as a derivative of the known alpha sympathomimetic drug naphazoline and talazoline. It was originally developed as a nasal vasoconstrictor. During clinical trial it was found to cause hypotension; sedation and bradycardia. It was introduced as an antihypertensive first in Europe in 1966 and subsequently in the United States of America. It was the first antihypertensive known to act on the central nervous system. Clonidine is chemically 2[(2-dichlorophenyl) Imino] imidazole monohydrochloride.



Alpha-2 adrenergic receptors are G proteins, when activated to inhibit adenylate cyclase. The result in decrease in accumulation of cyclic adenosine monophosphate (AMP) attenuates the stimulation of cyclic AMP dependent protein kinase. And hence the phosphorylation of target regulatory proteins. Efflux of potassium through an activated channel can hyper polarize the excitable membrane and provide an effective means of suppressing neuronal firing. Alpha-2 adrenoreceptor stimulation also suppresses calcium entry into nerve terminals which may be responsible for its inhibitory effect on secretion of neuro transmitters. Alpha-2 adrenergic agonists produce clinical effects by binding to alpha-2 receptors of which there are three subtypes: alpha-2a, alpha-2b and alpha-2c. Alpha-2a receptors mediate sedation, analgesia and sympatholysis. Alpha-2h receptors mediate vasoconstriction and possibly anti-shivering mechanisms. The startle response reflects activation of alpha-2c receptors.⁵

Clonidine is rapidly and almost completely absorbed from gastro intestinal tract. After oral intake, onset of action starts within 30-60 min and peak plasma concentration is reached within 60-90 min. The elimination half-life ranges from 6 to 24 h with a mean of about 12 h. Clonidine is metabolized mainly by the liver to produce P-hydroxy clonidine which subsequently undergoes glucuronidation to produce O-glucuronide and is excreted in urine. 40-60% of an orally administered dose is excreted unchanged in urine within 24 h.

Effects of Clonidine on Different Systems

There is no pre junctional alpha-2 receptor in the myocardium. Hence a direct effect on heart is unlikely. It causes hypotension due to centrally mediated reduction in sympathetic flow. Clonidine exerts vagomimetic effect on heart by stimulating nucleus tractus solitarius which can be attenuated completely by highly selective muscarinic M₂ receptor antagonists. It can cause bradycardia and reduction in cardiac output without affecting the cardiac contractility and peripheral vascular resistance. Clonidine effectively inhibits the firing rate of locus ceruleus which mediates the normal response; and exerts its hypotensive action by a net reduction in central sympathetic outflow. The alpha-2 agonists hyperpolarize and depress the locus ceruleus through potassium channel and markedly reduce the nor adrenaline concentration. It causes vasodilatation by its release of endothelium derived relaxing factors.

Alpha-2 receptors are found densely in the pontine locus coeruleus, which is an important source of sympathetic nervous system innervations. The sedative effects evoked by alpha-2 agonists most likely reflect inhibition of this nucleus. Clonidine causes dose related sedation, in small doses it causes anxiolysis almost comparable to that of seen with benzodiazepines. It has a powerful analgesic action both at supra spinal and spinal levels. Its potency is enhanced synergistically by opioids, acting through independent receptors. Clonidine by its action on alpha-2 receptors reduces the anesthetic requirements. It reduces the minimum alveolar concentration of halothane and isoflurane.

Clonidine is devoid of respiratory depressant action and lacks the negative effects on cognition, memory and behavior as seen with midazolam. Thus it may be substituted for premedication.^{6,7} It does not potentiate the respiratory depression caused by opioids.

Clonidine inhibits the centrally mediated sympathoadrenal outflow as seen by the decreased levels of catecholamines in circulation and decreased level of metabolites in urine.

Clonidine has a prominent antisialogogue effect by a direct action. While activation of prejunctional alpha-2 adrenoreceptors inhibit the vagally mediated release of gastric acid from the parietal cells and also reduces the gastric motility. It does not alter the gastric pH significantly.

The most commonly seen adverse effects are dry mouth, drowsiness, hypotension and bradycardia, if large doses are used. Withdrawal phenomenon is reported after chronic clonidine treatment. There is no evidence of sympathetic over reactivity after single dose therapy. It probably takes about 6 days of continuous therapy to produce adaptive changes. In single dose perianesthetic therapy such rebound phenomenon are not seen. The hypertensive rebound, if occurs is effectively treated with labetalol.⁸⁻¹²

Several studies have shown the efficacy of clonidine as a premedicant and also to suppress the hemodynamic responses to intubation.

A K Das, studied clinical efficacy of oral clonidine as preanesthetic medicant and found that the central action of clonidine reduces sympathetic outflow and produces sedation, anxiolysis and smooth induction of anesthesia. It also reduces salivation, sleep dose of IV anesthetics, requirements of inhalation anesthetics and post-operative shivering moreover it provides cardiovascular stability.¹³

Nishikawa studied the effects of oral clonidine on the hemodynamic changes associated with laryngoscopy

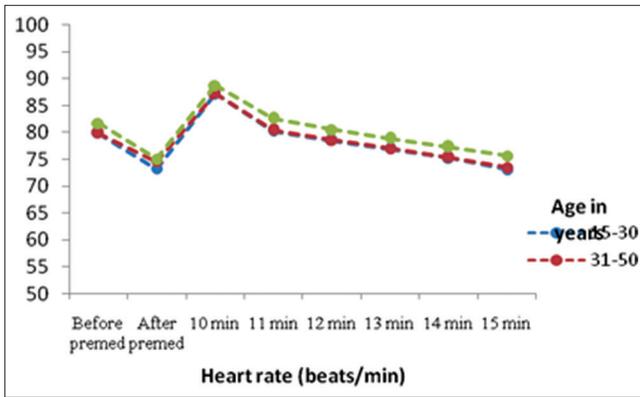


Figure 1: Mean values (beats/min) of pulse rate at various intervals

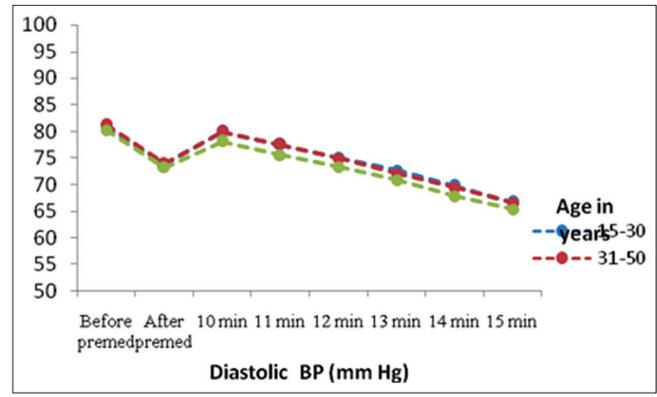


Figure 3: Mean values of diastolic arterial pressure (mm of Hg) at various intervals

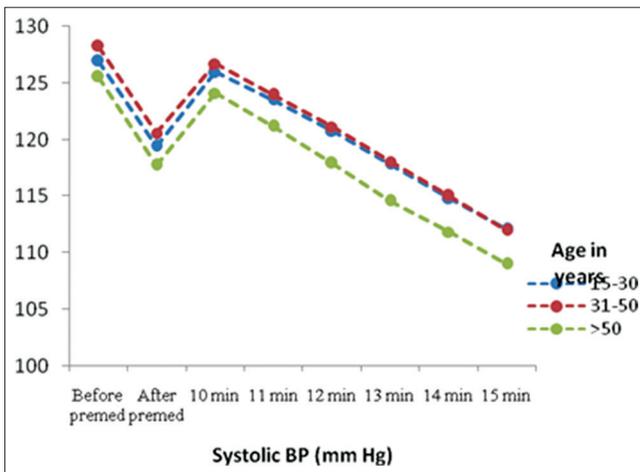


Figure 2: Mean values of systolic arterial pressure (mm of Hg) at various intervals

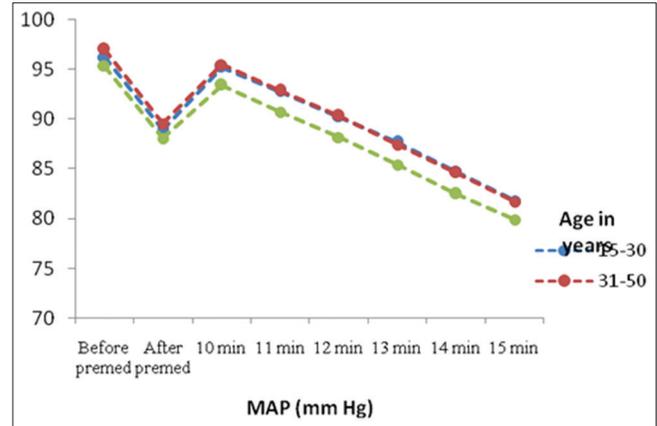


Figure 4: Mean values of mean arterial pressure (mm of Hg) at various intervals

and endotracheal intubation. They observed that when clonidine was given in a dose of 5 µg/kg orally, the increase in mean BP was significantly smaller as compared to that in the control group.³

Sympathoadrenal activation associated with laryngoscopy and endotracheal intubation cause rise in arterial BP and tachycardia. Carabine *et al.* suggested that cardiovascular responses by short lasting laryngoscopies can be attenuated with very low doses of oral clonidine.¹⁴

Study conducted by Orko *et al.* to evaluate the effect of clonidine on hemodynamic responses to endotracheal tube intubation and on gastric acidity found that the means of the systolic and diastolic arterial pressures just before and immediately after tracheal intubation were lower in the clonidine group ($P < 0.001$). The maximal increase in HR at intubation was lower in the clonidine group ($P < 0.01$).¹⁵

Study done to evaluate the effect of clonidine as preanesthetic medication by Wright *et al.*,¹⁶ found that

clonidine produced a significant reduction in anxiety ($P < 0.05$) and sedation. Tachycardia in response to intubation was attenuated by clonidine ($P < 0.05$).

Study done to evaluate the low-dose oral clonidine as premedication before intraocular surgery in retrobulbar anesthesia by Weindler *et al.*¹⁷ found that after clonidine 86% of the patients showed sedation. Clonidine produced effective anxiolysis before the operation ($P < 0.01$).

By the present study conducted, it can be concluded that tab clonidine can be used as an effective premedicant drug as it produces good sedation, anxiolysis and also blunts the cardiovascular response to laryngoscopy and intubation significantly. However the antisialogogue effect is not significant in our dosage.

REFERENCES

1. Raval DL. Oral clonidine premedication for the attenuation of haemodynamic response to laryngoscopy and intubation. *Indian J Anaesth* 2002;46:124-9.
2. Ghignone M, Quintin L, Duke PC, Kehler CH, Calvillo O. Effects of clonidine on narcotic requirements and hemodynamic response

- during induction of fentanyl anesthesia and endotracheal intubation. *Anesthesiology* 1986;64:36-42.
3. Nishikawa T, Taguchi M. Effects of clonidine premedication upon haemodynamic changes associated with laryngoscopy and tracheal intubation. *Br J Anaesth* 1991;40:1083-8.
 4. Corbett JL, Kerr JH, Prys-Roberts C. Cardiovascular responses to aspiration of secretions from the respiratory tract in man. *J Physiol* 1969;201:51P-2.
 5. Stoelting RK, Hillier SC, editors. Antihypertensive drugs. In: *Pharmacology & Physiology in Anesthetic Practice*. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2006. p. 338-51.
 6. Bergendahl H, Lönnqvist PA, Eksborg S. Clonidine: An alternative to benzodiazepines for premedication in children. *Curr Opin Anaesthesiol* 2005;18:608-13.
 7. Bergendahl H, Lönnqvist PA, Eksborg S. Clonidine in paediatric anaesthesia: Review of the literature and comparison with benzodiazepines for premedication. *Acta Anaesthesiol Scand* 2006;50:135-43.
 8. Morgan GE, Michael MS, Murray MJ. Adrenergic agonists and antagonists. In: *Clinical Anesthesiology*. 3rd ed. New York: McGraw Hill; 2002. p. 216-7.
 9. Collins VJ. Principles of pre anesthetic medication. In: *Principles of Anesthesiology*. 3rd ed. Malvern: Lea & Febiger; 1993. p. 292.
 10. Stoelting RK, Hillier SC, editors. Antihypertensive drugs. In: *Pharmacology and Physiology in Anesthetic Practice*. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2006. p. 340-3.
 11. Moss J, Glick D. The Autonomic nervous System. In: Miller RD, editor. *Miller's Anesthesia*. 6th ed. Philadelphia: Churchill Livingstone; 2005. p. 650-1.
 12. Maze M, Tranquilli W. Alpha-2 adrenoceptor agonists: Defining the role in clinical anesthesia. *Anesthesiology* 1991;74:581-605.
 13. Das AK. Clinical efficacy of oral clonidine as preanaesthetic medicant. *Indian J Anaesth* 1995;43:133.
 14. Carabine UA, Wright PM, Howe JP, Moore J. Cardiovascular effects of intravenous clonidine. Partial attenuation of the pressor response to intubation by clonidine. *Anaesthesia* 1991;46:634-7.
 15. Orko R, Pouttu J, Ghignone M, Rosenberg PH. Effect of clonidine on haemodynamic responses to endotracheal intubation and on gastric acidity. *Acta Anaesthesiol Scand* 1987;31:325-9.
 16. Wright PM, Carabine UA, McClune S, Orr DA, Moore J. Preanaesthetic medication with clonidine. *Br J Anaesth* 1990;65:628-32.
 17. Weindler J, Kiefer RT, Ripa A, Wiech K, Ruprecht KW. Low-dose oral clonidine as premedication before intraocular surgery in retrobulbar anesthesia. *Eur J Ophthalmol* 2000;10:248-56.

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Clinical Spectrum of Flank Pain and ITS Association with Urolithiasis

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Abstract

Introduction: Flank pain is one of the most painful and it is one of the most common presentation in surgical outpatient department (OPD) inpatient of pain abdomen, its incidence has increased considerably during century Management of patients suspected for renal colic is often delayed in the emergency, because of time consuming laboratory examinations.

Aims and Objectives: The aim was to determine the clinical spectrum of flank pain and its association with urolithiasis, to find appropriate diagnostic modality for flank pain to exclude extra urinary causes requiring emergency interventions.

Methodology: A total of hundred patients of flank pain were studied prospectively. Patients are suffering from flank pain, coming to the OPD of general surgery, Orthopedics and obstetrics and gynecology over a period 12 months.

Result: 54 patients presented with renal pathology in hundred patients of flank pain out of which 47 had urolithiasis and seven had renal problems such as renal abscess, renal tuberculosis and pelvic-ureteric junction obstruction. By chi-square test application, statistically highly significant association ($P = 0.0000$) was seen between flank pain and urolithiasis. Main renal pathology causing flank pain was renal calculi 47% in my study. Among the urinary complaints most common complaints were of burning micturition. In my study second most common cause of flank pain, was spinal pathology 32%. X-ray showed a sensitivity of 83% in diagnosing urolithiasis in patients of flank pain. Ultrasonography showed a sensitivity of 91% in diagnosing urolithiasis while intravenous urogram was sensitive in 100% cases. Computed tomography was shown to have a sensitivity of 94-100%.

Conclusion: Urolithiasis constituted maximum number of flank pain patients, most patients presented with burning micturition which shows the presence of infection. Second most common cause of flank pain was spinal pathology while other pathology like related with abdominal, ovarian and other also contributes in few patients.

Key words: Diagnostic modalities, Flank pain, Urolithiasis

INTRODUCTION

Flank pain is one of the most painful and it is one of the most common presentation in surgical outpatient department (OPD) inpatient of pain abdomen, its incidence has increased considerably during 20th century.¹ It is estimated that approximately 12% of the population will have a renal stone at some point in their lives. Management of patients suspected for renal colic is often delayed in

the emergency, because of time-consuming laboratory examinations. Furthermore, requesting advanced tests and imaging for non-complicated renal colic in the emergency may not be cost-effective. Simple ultrasonography (USG) in emergency has a high yield. The incidence of renal disease appears to be gradually increasing hence the present study was taken up. 12% of men and 5% of women will suffer from renal stones by the age of 70 years. Patients with a history of stones have 50% risk of developing another stone within 5-10 years.²

Aims and Objectives

To determine the clinical spectrum of flank pain and its association with urolithiasis. To find appropriate diagnostic modality for flank pain to exclude extra urinary causes requiring emergency interventions.

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To find out the sensitivity of different diagnostic procedure for cause of flank pain.

To find out the specificity of different investigations in cause of flank pain.

METHODOLOGY

Inclusion criteria: All patients of flank pain were included in the study.

Exclusion criteria:

- 1) Patients of trauma.
- 2) Patients operated for renal diseases.

A total of hundred patients of flank pain were studied prospectively.

Study Design: A hospital-based study, Follow Up study.

Study Area: Patients attending Surgery, Orthopedics and Gynae OPD.

Study Period: For the period of 1 year.

Study Subjects: Patients with flank pain.

Selection of study subjects: All the patients suffering from flank pain, coming to the OPD of general surgery, Orthopedics and obstetrics and gynecology over a period 12 months.

OBSERVATIONS AND RESULTS

Among the radiology modalities X-ray shows the sensitivity of 83% and specificity is 100% USG had 91% sensitivity and intravenous urography (IVU) 100% sensitivity in diagnosing urolithiasis.

By chi-square test application, statistically high significant association was seen between flank pain and urolithiasis.

Fifty-four patients presented with renal pathology in hundred patients of flank pain out of which 47 had urolithiasis and 7 had renal problems such as renal abscess, renal tuberculosis and pelvic-ureteric junction obstruction (Table 1).

A total of 100 patients of flank pain were studied prospectively. Flank pain is more common in male patients (59%). Most common urinary complaints in patients of flank pain was burning micturition 70.9%, followed by gross hematuria (12.7%) in patients of flank pain. Renal Pathology was most common cause of flank pain 54%,

followed by spinal causes 32%. Urolithiasis was most common cause of flank pain in the study, 47% patient had urolithiasis as a cause of flank pain with a $P = 0.000000$. Second common cause of flank pain was spinal pathology. Spinal cord compression and degenerative diseases of the spine were most common among spinal pathology. Other less common causes of flank pain include, ovarian diseases and pelvic inflammatory diseases which were seen in few female patients of flank pain. And also acute appendicitis and psoas abscess were found in few patients of flank pain. X-ray showed a sensitivity of 83% in diagnosing urolithiasis in patients of flank pain. USG showed a sensitivity of 91% in diagnosing urolithiasis while Intravenous urogram was sensitive in 100% cases. In my study X-ray kidneys, ureters, bladder (KUB) after bowel preparation was used as primary radiological modality to diagnose urolithiasis in patients of flank pain. X-ray KUB helped in making diagnosis of 83% patients of calculi, which is much higher as compared to recent studies which shows a sensitivity of only 77%. Therefore, in this study X-ray KUB is an important modality for diagnosing cause of flank pain on OPD basis. USG KUB region was done in patients with flank pain where renal calculi was strongly suspected which shows a sensitivity of 91%. Middleton *et al.* showed that US has a sensitivity of 96% for renal calculi and a sensitivity of nearly 100% when calculi are larger than 5 mm. IVU was also done in patients with flank pain which shows a sensitivity of 100% for diagnosing. In studies comparing non-enhanced computed tomography (CT) with IVU, CT was shown to have a sensitivity of 94-100% and a specificity of 92-100%, while IVU was shown to have a sensitivity of 64-97% and a specificity of 92-94%. CT scan helps to diagnose flank pain in a better way but the cost factor is confounding factor in developing countries (Tables 2-4).

DISCUSSION

As urolithiasis constituted maximum number of flank pain patients, Pearle *et al.* also observed renal disease typically affects adult men more commonly than adult women has been attributed to the protective effect of estrogen against stone formation in premenopausal women.³ Most common associated complaints in patients of flank pain were fever 50% of patients. Urolithiasis has a strong association with

Table 1: Pathology in patients of flank pain (n=100)

Pathology	Number of patients
Renal	54
Spinal	32
Ovarian	3
Abdominal	1
Others	10
Total	100

Table 2: Radiological modality used for diagnosis of urolithiasis (n=47)

Investigations	Number of patients	Sensitivity (%)	Specificity	PPV	NPV	NLR	PLR
X-ray	39	83	100	32.7	86.8	1.19	0.84
USG	43	91	100	100	92.98	1.08	0.9
IVU	47	100	100	100	-	0.99	1.01

PPV: Positive predictive value, NPV: Negative predictive value, NLR: Negative likelihood ratio, PLR: Positive likelihood ratio, USG: Ultrasonography, IVU: Intra venous urography

Table 3: Association of urinary symptoms with urolithiasis

Symptoms	Urolithiasis present	Urolithiasis absent
Burning micturition	26	21
Hematuria	4	43
Urgency of micturition	2	45

Chi-square=43.01, P=0.00000000

Table 4: Renal pathology in patients of flank pain (n=54)

Renal pathology	Number of patients
Urolithiasis	47
Others	7
Total	54

infection. About 10-15% of renal calculi are associated with urinary tract infection and main bacteria isolated *Escherichia coli* (32%) followed by *Pseudomonas* (22%).¹ In my study flank pain patients urinary complaints was a common association, most patients presented with burning micturition 39 patients, burning micturition shows presence of infection, Hizbullah *et al.* also shows infection in 19% of patients of renal calculi.¹ Main renal pathology causing flank pain was renal calculi 47% in my study. In my study X-ray KUB after bowel preparation was used as primary radiological modality to diagnose urolithiasis in patients of flank pain, X-ray KUB helped in making diagnosis of 83% patients of calculi, which is much higher as compared to recent studies which shows a sensitivity of only 77%. Therefore in this study X-ray KUB is an important modality for diagnosing cause of flank on OPD basis.

USG KUB region was done in patients with flank pain where renal calculi was strongly suspected, which shows a sensitivity of 91%. Middleton *et al.* showed that US has a sensitivity of 96% for renal calculi and a sensitivity of nearly 100% when calculi are larger than 5 mm. IVU was also done in patients with flank pain which shows a sensitivity of 100% for diagnosing urolithiasis as an etiological factor for flank pain, it also helped to assess renal function. In studies comparing non-enhanced CT with IVU, CT was shown to have a sensitivity of 94-100% and a specificity of 92-100%, while IVU was shown to have a sensitivity of 64-97% and a specificity of 92-94%. CT the scan helps to diagnose flank pain in a better way as renal, and extra-renal pathology are

better visualized, but the cost factor is confounding factor in developing countries. In my study, urinary complaints were main associated complaints along with flank pain in patients of urolithiasis, 70% of patients of renal calculi had urinary complaints. Among the urinary complaints most common complaints were of burning micturition. In other studies, urolithiasis was associated with urinary complaints in 6% patients. Higher urinary complaints in my study may be due to late presentation of patients in the hilly region, leading to development of renal infection and increased urinary complaints in study group.² In my study, microscopic hematuria was present in only 12% patients of urolithiasis. In a study done at Chicago by Elaine. Worcester shows that hematuria is always present in patient of urolithiasis, but may be microscopic.⁴ In my study, 7% of patients had renal cause other than urolithiasis as a cause of flank pain. Most of them were of renal abscess and renal tuberculosis. In my study second most common cause of flank pain, was spinal pathology 32%. Flank pain may also be confused with pain resulting from irritation of the costal nerves, most commonly T10-T12. Such pain has a similar distribution from the cost vertebral angle across the flank toward the umbilicus. However, the pain is not colicky in nature in my study most of the patients of flank pain were heaving urolithiasis as a cause of pain, 47% patients of flank pain had urolithiasis ($P = 0.0000$).

Statistically high significant association between flank pain and urolithiasis is seen. A study was done by Kartal *et al.* shows a high association between flank pain and urolithiasis 49% ($P = 0.024$). Flank pain of urolithiasis origin has a colicky character, with radiation along the course of ureter.⁵

CONCLUSION

Urolithiasis constituted maximum number of flank pain patients, most patients presented with burning micturition that shows the presence of infection. Second most common cause of flank pain was spinal pathology while other pathology like related with abdominal, ovarian and other also contributes in few patients. After proper bowel preparation X-ray KUB is still an important modality for diagnosing cause of flank on OPD basis, USG shows high sensitivity in differential diagnosis of flank pain beside urolithiasis as far as IVU is concerned shows 100% sensitivity in diagnosing urolithiasis along with renal function while CT scan helps

to diagnose flank pain in better way as renal and extra renal pathology are better visualized.

REFERENCES

1. Jan H, Akbar I, Kamran H, Khan J. Frequency of renal stone disease in patients with urinary tract infection. *J Ayub Med Coll Abbottabad* 2008;20:60-2.
2. Serinken M, Karcioğlu O, Turkcuer I, Ozkan HI, Keysan MK, Bukiran A. Analysis of clinical and demographic characteristics of patients presenting with renal colic in the emergency department. *BMC Res Notes* 2008;1:79.
3. Kartal M, Eray O, Erdogru T, Yilmaz S. Prospective validation of a current algorithm including bedside US performed by emergency physicians for patients with acute flank pain suspected for renal colic. *Emerg Med J* 2006;23:341-4.
4. Worcester EM, Coe FL. Nephrolithiasis. *Prim Care* 2008;35:369-91.
5. Pearle MS, Calhoun EA, Curhan GC, Urologic Diseases of America Project. Urologic diseases in America project: Urolithiasis. *J Urol* 2005;173:848-57.

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Ondansetron Pretreatment to Alleviate Pain Produced by Propofol: A Randomized Controlled Double Blind Study

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Abstract

Introduction: Propofol is a popular drug for the induction of anesthesia. It has the disadvantage of causing pain or discomfort on injection. Many methods were used to alleviate the pain by using larger veins, and various drugs have been used to nullify the pain. We conducted randomized, double-blind study of injection ondansetron pretreatment to know whether it reduces pain produced by propofol injection.

Materials and Methods: 100 American Society of Anaesthesiologists I and II patients posted for minor obstetric procedures were randomly divided into two groups and one group receiving injection ondansetron. 4 mg (2 ml) and the second group receiving 0.9% saline intravenously. The venous drainage was blocked at mid arm manually. One-fourth of the total dose of propofol was injected over a period of 5 s. Pain scores of 0-3 which correspondence to no pain, mild pain, moderate and severe pain were assessed by blind investigator.

Results: Pain was significantly reduced in the ondansetron group with no significant side effects. The results can be compared with studies conducted by others.

Conclusions: We concluded that injection of ondansetron 4 mg as pretreatment was effective in alleviating the pain produced by propofol injection. Ondansetron has got the added advantage of reducing chances of nausea and vomiting.

Key words: Intravenous injection, Injection propofol, Ondansetron, Pain

INTRODUCTION

Propofol is an induction agent for short cases, day care surgeries and sedation in the intensive care units. It is widely accepted as common intravenous (IV) anesthetic drug, used for induction and maintenance during general anesthesia with rapid onset and short duration of action. It produces a good quality of anesthesia with rapid recovery. It has got the disadvantage of causing pain or discomfort on injection. However, the incidence of pain following propofol injection is seen in almost 70% of patients, in the absence of other pretreatments.^{1,2} Pain produced by injection of IV drugs

is not a serious complication of anesthesia, but the pain is distressing to the patients and can reduce the acceptability of anesthesia. The mechanism by which propofol induces pain on injection is not clear, although, number of different interventions have been used to alleviate pain produced by IV injection of propofol,¹ by selecting larger veins,^{1,3-5} but the site may be inconvenient. Another popular method of modifying the pain is to use a local anesthetic drug. Tramadol is a centrally acting weak μ -receptor agonist and inhibits nor-adrenaline re-uptake likewise promotes serotonin release.⁶ Wong and Cheong reported that pretreatment with tramadol was as effective as lidocaine in alleviating pain on propofol injection.⁷ Ye *et al.* demonstrated that ondansetron, a specific 5-HT antagonist, blocks Na channels in rat brain neurons. They also found that ondansetron is 15 times more potent than lidocaine in causing numbness when injected under the skin.⁸ Ondansetron has been showed to be an effective alternative.^{9,10} Recently, some studies demonstrated that ondansetron is a well-established agent for prevention of post-operative nausea and vomiting.¹¹⁻¹⁴ We conducted

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randomized, double-blind study of injection ondansetron pretreatment to know whether it reduces pain produced by propofol injection.

MATERIALS AND METHODS

After obtaining clearance from the Ethical Committee the study was conducted. 100 American Society of Anaesthesiologists I and II grade patients who were undergoing minor obstetric procedures like D and C, tubectomy under general anesthesia, suction evacuation, check curettage, were included in the present study. Patients with known hypersensitivity to propofol, ondansetron, concomitant use of analgesic or sedative medication, presence of infection on the dorsum of the left hand, presence of cardiac conduction defects, epilepsy, and use of antiarrhythmic medications, thin dorsal veins, and uncooperative patients were excluded. A written consent was taken, and all patients were made aware of verbal pain score. The intensity of pain was assessed by blind investigator.

The patients were randomly divided into two groups. Group I consisted of 50 patient's received 4 mg of ondansetron injection and Group II having 50 patients received 2 ml of 0.9% saline IV. The solutions were prepared by an independent anesthesiologist, and the investigator did not know the content of the solution. A 20 gauge cannula was placed into the largest vein on the dorsum of the hand after placing the routine monitors include lead II electrocardiogram, noninvasive blood pressure and pulse oximeter. Tourniquet was closed to the arm above the cannula and inflated to 70 mmHg and then drug was injected. After 20 s, the tourniquet deflated, and one-fourth of the total dose of propofol was injected IV over a period of 10 s. The level of pain was categorized into none, mild, moderate and severe¹⁵ (Table 1), which was assessed by blind investigator at 0, 1 and 2 min and recorded (Tables 2-4). Any adverse effects were also noted. Induction of anesthesia was completed with remaining dose of propofol. The collected data were compiled, and paired *t*-test was used to assess variance between pre-operative and intraoperative values in the respective groups. Unpaired *t*-test was used to assess the difference between the two groups. $P < 0.05$ was considered as statically significant.

RESULTS

Pain scores at different times were shown in Tables 2-4 for both groups.

At 0 min the overall difference of pain in the saline group was 94% as compared to 13 (26%) patients in the ondansetron group ($P < 0.001$). No patient in the ondansetron group experienced severe pain as compared

Table 1: Assessment of pain during injection of propofol

Pain score	Degree of pain	Response
0	None	Negative response to questioning
1	Mild	Pain reported in response to questioning only, without any behavioral signs
2	Moderate	Pain reported in response to questioning and accompanying by behavioral sign or pain reported spontaneously without questioning
3	Severe	Strong vocal response or response accompanied by facial griming, arm withdrawal or, tears

Table 2: Pain score

Group	Pain score			
	0	1	2	3
A (n=50)	32 (64)	10 (20)	4 (8)	4 (8)
B (n=50)	16 (32)	5 (10)	14 (28)	15 (30)
P value	<0.001	<0.001	<0.001	<0.001

Group A: Received 4 mg ondansetron Group B: Received normal saline

Table 3: Pain score at 1 min

Group	Pain score			
	0	1	2	3
A (n=50)	40 (80)	6 (12)	2 (4)	2 (4)
B (n=50)	2 (4)	5 (10)	12 (24)	31 (62)
P value	<0.001	<0.005	<0.001	<0.001

Group A: Received 4 mg ondansetron Group B: Received normal saline

Table 4: Pain score at 2 min

Group	Pain score			
	0	1	2	3
A (n=50)	43 (86)	3 (6)	3 (6)	1 (2)
B (n=50)	2 (4)	5 (10)	22 (44)	21 (42)
P value	<0.001	>0.05	<0.001	<0.001

Group A: Received 4 mg ondansetron, Group B: Received normal saline

to 26 patients in the saline group ($P < 0.001$). The number of patients who experienced mild to moderate pain was 21 (42%) and 13 (26%) in the saline and ondansetron groups, respectively. In both groups, no patients experienced pain or discomfort during injection of pretreatment.

At 1 min incidence of pain, was 96% in the saline group as compared to 20% in ondansetron group ($P < 0.001$). In ondansetron Group 2 (4%) patients experienced severe pain compared to 31 (62%) patients in the saline group ($P < 0.001$). The number of patients experienced mild to moderate pain was 17 (34%) and 8 (16%) in the saline and ondansetron groups respectively.

The overall incidence of pain in the saline group was 96% as compared to 14% in the ondansetron group ($P < 0.001$).

One patient in the ondansetron group had severe pain as compared to 21 patients in the saline group ($P < 0.001$). Number of patients experiencing mild to moderate pain was 27 (54%) and 6 (12%) in the saline and ondansetron groups respectively. After propofol 6 (12%) patients in ondansetron group and 13 (26%) in saline group had myoclonic movements. No active intervention was required. Only in four cases skin rashes were found. There were no reactions like hallucinations, delayed recovery and dissociated from surroundings in both groups.

DISCUSSION

Propofol is an induction agent for short cases, day care surgeries. It is widely accepted common IV anesthetic drug, used for induction and maintenance during general anesthesia with rapid onset and short duration of action. It produces a good quality of anesthesia with rapid recovery. It has got the disadvantage of causing pain or discomfort on injection. The study reported incidence is 28-90% in adults and 28-85% in children. Propofol chemically belongs to sterically hindered phenols. Like other phenols, it irritates skin, mucous membrane and venous intima and could immediately stimulate nociceptors and free nerve endings.⁹ On injection of propofol pain was produced and this is an important limitation of propofol.¹ Even though it is not a serious side-effect, the acceptance by the patient was not good and hence various studies were conducted to reduce the severity of pain. Studies like using larger veins,¹ slow injection of propofol and fast running of IV fluids,^{1,16} diluting with 5% glucose or 10% intralipid,⁵ mixing lidocaine in propofol,¹⁷ venous occlusion,¹⁸ retreating with meperidine, tramadol metachlorpropamide,¹⁹ alfentanil,^{20,21} pentathol,²² cooling saline to 4°C before propofol,^{23,24} and preparation of skin with nitroglycerine ointment.²⁵ The mechanism of production of pain following injection of propofol is not established. The free fraction of propofol has been blamed for the production of pain, which can be explained by slight delay before pain is experienced.²⁶ Incidence of pain on injection of propofol using dorsal hand veins was reported to be 39% as compared to 3% incidence in the forearm veins,⁵ whereas injecting propofol at 4-5°C results in a decrease in the incidence of pain from 46% to 23%.²³ The incidence of pain was reduced in lidocaine pretreatment to 32%.¹⁷ Ondansetron is commonly used as an antiemetic drug.²⁷ In animal study, demonstrated that ondansetron administered intrathecally reduces the nociceptive responses of dorsal horn neurons.²⁸ Ye *et al.*, showed that ondansetron is about 15 times more potent as local anesthetic than lidocaine, and this property probably contributes to its antiemetic action. Ondansetron also results in numbness when injected under the skin.⁸ Ondansetron has the ability to block sodium

channels. Peripheral 5-HT₃ receptors involve nociceptive pathways.⁸ Ondansetron binds to the opioid μ -receptors in humans and exhibit agonist activity.²⁹ As a result of its multifaceted actions as a Na channel blocker, a 5-HT₃ receptor antagonist, and μ -opioid agonist, ondansetron may potentially be used to alleviate pain produced by a drug similar to propofol.

In our study, we used ondansetron in the dose of 4 mg/kg which is much lower than the dose for producing central analgesic effect. It seems that the reduction in the pain produced by injection of propofol was the result of a peripheral action, which attenuated the efferent pain pathway. This study was designed to know whether the low dose of ondansetron pretreatment could reduce pain produced by propofol injection and 1 min was allowed for its action to begin.

The incidence of pain in the present study was also comparable to previous studies with reduction of pain from 94% to 26%.

CONCLUSION

We concluded that injection of ondansetron 4 mg as pretreatment was effective in alleviating the pain produced by propofol injection. Ondansetron has got the added advantage of reducing chances of nausea and vomiting.

REFERENCES

1. Johnson RA, Harper NJ, Chadwick S, Vohra A. Pain on injection of propofol. *Anaesthesia* 1998;53:468-76.
2. Sebel PS, Lowdon JD. Propofol: A new intravenous anesthetic. *Anesthesiology* 1989;71:260-77.
3. Bryson HM, Fulton BR, Faulds D. Propofol. An update of its use in anaesthesia and conscious sedation. *Drugs* 1995;50:513-59.
4. McCulloch MJ, Lees NW. Assessment and modification of pain on induction with propofol (Diprivan). *Anaesthesia* 1985;40:1117-20.
5. Doenicke AW, Roizen MF, Rau J, Kellermann W, Babl J. Reducing pain during propofol injection: The role of the solvent. *Anesth Analg* 1996;82:472-4.
6. Hennies HH, Friderichs E, Wilsmann K, Flohe L. Effect of the opioid analgesic tramadol on inactivation of norepinephrine and serotonin. *Biochem Pharmacol* 1982;31:1654-5.
7. Wong WH, Cheong KF. Role of tramadol in reducing pain on propofol injection. *Singapore Med J* 2001;42:193-5.
8. Ye JH, Mui WC, Ren J, Hunt TE, Wu WH, Zbuzek VK. Ondansetron exhibits the properties of a local anesthetic. *Anesth Analg* 1997;85:1116-21.
9. Ambesh SP, Dubey PK, Sinha PK. Ondansetron pretreatment to alleviate pain on propofol injection: A randomized, controlled, double-blinded study. *Anesth Analg* 1999;89:197-9.
10. Reddy MS, Chen FG, Ng HP. Effect of ondansetron pretreatment on pain after rocuronium and propofol injection: A randomised, double-blind controlled comparison with lidocaine. *Anaesthesia* 2001;56:902-5.
11. Ebrahim Soltani A, Mohammadinasab H, Goudarzi M, Arbabi S, Mohtaram R, Afkham K, *et al.* Acupressure using ondansetron versus metoclopramide on reduction of postoperative nausea and vomiting after strabismus surgery. *Arch Iran Med* 2010;13:288-93.

12. Peroutka SJ, Snyder SH. Antiemetics: Neurotransmitter receptor binding predicts therapeutic actions. *Lancet* 1982;1:658-9.
13. Boehler M, Mitterschiffthaler G, Schlager A. Korean hand acupressure reduces postoperative nausea and vomiting after gynecological laparoscopic surgery. *Anesth Analg* 2002;94:872-5.
14. Bhardwaj N, Bala I, Kaur C, Chari P. Comparison of ondansetron with ondansetron plus dexamethasone for antiemetic prophylaxis in children undergoing strabismus surgery. *J Pediatr Ophthalmol Strabismus* 2004;41:100-4.
15. White PF, Way WL, Trevor AJ. Ketamine – Its pharmacology and therapeutic uses. *Anesthesiology* 1982;56:119-36.
16. Scott RP, Saunders DA, Norman J. Propofol: Clinical strategies for preventing the pain of injection. *Anaesthesia* 1988;43:492-4.
17. King SY, Davis FM, Wells JE, Murchison DJ, Pryor PJ. Lidocaine for the prevention of pain due to injection of propofol. *Anesth Analg* 1992;74:246-9.
18. Mangar D, Holak EJ. Tourniquet at 50 mm Hg followed by intravenous lidocaine diminishes hand pain associated with propofol injection. *Anesth Analg* 1992;74:250-2.
19. Martin SM, Pang WW, Hwang MH. The analgesic effect of tramadol, metoclopramide, meperidine and lidocaine in ameliorating propofol injection pain: A comparative study. *J Anaesth Clin Pharmacol* 1999;15:37-42.
20. Fletcher JE, Seavell CR, Bowen DJ. Pretreatment with alfentanil reduces pain caused by propofol. *Br J Anaesth* 1994;72:342-4.
21. Clarke RS, Dundee JW, Garrett RT, McArdle GK, Sutton JA. Adverse reactions to intravenous anaesthetics - A survey of 100 reports. *Br J Anaesth* 1975;47:575-85.
22. Lee TW, Loewenthal AE, Strachan JA, Todd BD. Pain during injection of propofol. The effect of prior administration of thiopentone. *Anaesthesia* 1994;49:817-8.
23. McCrirrick A, Hunter S. Pain on injection of propofol: The effect of injectate temperature. *Anaesthesia* 1990;45:443-4.
24. Parmar AK, Koay CK. Pain on injection of propofol. A comparison of cold propofol with propofol premixed with lignocaine. *Anaesthesia* 1998;53:79-83.
25. Wilkinson D, Anderson M, Gauntlett IS. Pain on injection of propofol: Modification by nitroglycerin. *Anesth Analg* 1993;77:1139-42.
26. Briggs LP, White M. The effects of premedication on anaesthesia with propofol ('Diprivan'). *Postgrad Med J* 1985;61 Suppl 3:35-7.
27. Deegan R. Ondansetron: Pharmacology of a specific 5HT₃-receptor antagonist. *Am J Med Sci* 1992;304:373-8.
28. Ali Z, Wu G, Kozlov A, Barasi S. The role of 5HT₃ in nociceptive processing in the rat spinal cord: Results from behavioural and electrophysiological studies. *Neurosci Lett* 1996;208:203-7.
29. Gregory RE, Ettinger DS. 5-HT₃ receptor antagonists for the prevention of chemotherapy-induced nausea and vomiting. A comparison of their pharmacology and clinical efficacy. *Drugs* 1998;55:173-89.

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High Resolution Computerized Tomography Evaluation of Influenza H1N1 Infection

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Abstract

Background: H1N1 infection presents with features of predominantly bilateral pneumonia. The findings on plain chest radiograph (CXR) in these patients often fail to correlate with the extensive clinical findings. The study was carried out to bring to light the array of features that can be observed on a computerized tomography (CT) of the thorax.

Methods: All throat swab culture verified H1N1 infected patients admitted to the Department of Medicine, Sassoon General Hospital between August 2012 and April 2013, who underwent frontal CXR within 24 h of presentation were subjected to high resolution CT of thorax (HRCT). There were ten cases in which HRCT of thorax was performed. These cases were analyzed in terms of their clinical, laboratory and radiological findings.

Results: Clinical profile of these patients matched the presentation of acute lower respiratory infection, and seven of ten patients had underlying risk factors such as diabetes, pregnancy, chronic obstructive lung disease and rheumatic valvular heart disease. In all ten patients, HRCT revealed greater number of findings. Lower zones were predominantly involved. Bilateral presentation was seen in eight cases. Consolidation ($n = 7$) and bilateral ground glass opacities ($n = 3$), constituted the most common findings. Pleural thickening ($n = 2$), septal thickening ($n = 2$), air trapping ($n = 2$), mediastinal adenopathy ($n = 1$), pleural effusion ($n = 1$), sub-pleural nodules ($n = 2$) and organizing pneumonia ($n = 1$) were other notable observations. Chest radiograph (in comparison to HRCT), failed to reveal these heterogenous abnormalities.

Conclusion: HRCT of thorax had greater co-relation with clinical findings in H1N1 infection than plain CXR.

Key words: Influenza A virus, H1N1 subtype, Pneumonia, Radiography, Tomography computed

INTRODUCTION

In April 2009, a new global outbreak of a novel Influenza A virus, a swine virus with confirmed human infection, occurred.¹ The virus had a high potential for respiratory involvement and contributed to widespread morbidity and mortality. The typical findings of H1N1 infection were bilateral diffuse lung opacities on chest radiographs (CXR). On computerized tomography (CT), there were patchy ground glass opacities in both lungs.

CXR is the most convenient, inexpensive, easily accessible and a Non-Invasive modality to investigate patients of influenza with respiratory involvement. Initial CXR may have significance in helping predict clinical outcome, but normal initial radiographs cannot exclude unfavorable outcome.

A global H1N1 pandemic was declared in June 2009.² There have been several small outbreaks of Swine Flu since 2009-2010 major epidemic wave. Maharashtra state of India witnessed the maximum number of H1N1 cases and Pune city was a major target of H1N1 influenza.³ We report the findings of high resolution CT (HRCT) evaluation of thorax in 10 cases of swine flu admitted between August 2012 and March 2013 at Sassoon General Hospital (SGH), Pune. We have compared the HRCT findings with those of the plain skiagram of the chest and analyzed the differences.

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MATERIALS AND METHODS

All throat swab culture verified H1N1 infected patients admitted in the Department of Medicine, SGH between August 2012 to April 2013, who underwent frontal CXR within 24 h of presentation were included in the study. The radiographs and CT scans were assessed for the presence of pneumonia and characterized by pattern and distribution. The patients' medical records were analyzed for demographics, underlying medical conditions, the admission to the intensive care unit, initiation of mechanical ventilation or non-invasive ventilation support and death. The study was carried out after permission from 'The Ethics Committee, BJMC and SGH, Pune.'

All those patients, who required ventilator support, were subjected to HRCT thorax only after weaning from the ventilator support. Two pregnant patients underwent CXR with abdominal shield during the antenatal period and in them HRCT was done postpartum.

On chest roentgenography, films were classified into normal and abnormal ones. Major abnormalities were consolidation (opacification obscuring the underlying vessels), ground-glass opacity ([GGO]; increased attenuation without obscuring the underlying vessels) and nodules. The anatomic distribution was characterized as unilateral or bilateral, and as predominantly central, peripheral, or diffuse. Each lung was divided into upper, middle, and lower lung zones, and zonal involvement was assessed. Upper zone was marked from apex up to the anterior end of the second rib, middle zone between 2nd and 4th rib (anterior end) and lower zones below the fourth rib (anterior end). The presence of lymph node enlargement and pleural effusions were recorded.

On HRCT of thorax, lung parenchymal abnormalities were studied in greater details and observations noted.

RESULTS

Total 10 patients were included in this study. Seven patients belonged to the age group of 20-30 years. One was 50-years-old. Two patients were above 60 years of age. There were six male and four female patients. Five patients lived in the urban area and five in a rural area. Out of the ten patients who underwent HRCT, only one was on a ventilator support (non-invasive mechanical ventilation). None of the patients had a history of contact with H1N1 positive case or traveled abroad.

Seven patients had a history suggestive of lower respiratory tract, while three had upper respiratory symptoms. None of

the patients had vomiting or diarrhea. Seven out of the total ten patients had a history of risk factors such as pregnancy (n=2), rheumatic heart disease (n=1), chronic obstructive airway disease (n=1), hypertension (n=2), diabetes mellitus (n=2) and ischemic heart disease (n=2). Both pregnant patients were in their third trimesters.

Fever was present on admission in most of the patients (n=9). All the patients had stable hemodynamics. None was cyanosed at the time of admission, and no bleeding tendencies were observed. Only one patient had a clear chest while all other patients had abnormal findings [crepitations (n=9), bronchial breathing (n=5) or rhonchi (n=2)] on auscultation.

The total leukocyte count and platelet count were normal. The biochemical parameters were normal in all the ten cases studied.

On CXR, lower zone involvement was common in the form of consolidation and noted in eight patients. Pleural effusion and emphysema were noted in two cases each (Table 1).

On HRCT of the thorax, 9 patients out of 10 had abnormal findings (Table 2). Only one study was normal. Out of the abnormal studies, all had bilateral involvement except one patient, who had a predominant unilateral involvement. H1N1 infected patients had multiple findings in each HRCT study. Consolidation was present in seven cases, and bilateral ground glass opacities were noted in three cases. One patient had both findings. In this patient, the ground glass opacities were in the apices, and the patches of consolidation were seen scattered bilaterally in both lung fields.

The distribution of lesions varied in such a way that five patients had both apical and lower zone involvement, three patients had predominant lower zone involvement, and only one patient had selective upper lobe involvement. Thus, lower zone involvement was a notable feature (Figure 1a and b).

Other findings seen were pleural thickening, septal thickening, air trapping, mediastinal adenopathy, pleural effusion. Sub-pleural nodules were observed in 2 cases, and more centrally distributed nodules were noted in one case (Table 3). A 50-year-old male with CXR showing bilateral middle and lower zone consolidation had HRCT finding of bronchiolitis obliterans with organizing pneumonia (BOOP) (Figure 2a and b).

One patient, who had underlying chronic obstructive airway disease, had findings in both upper lobes and lower lobes. This patient turned out sputum positive for acid-fast bacilli. Hence, she had features of pulmonary tuberculosis in addition to H1N1 infection (Figure 3a and b).

Table 1: Radiological features on CXR

Finding	No. of patients with findings
Predominant unilateral involvement	1
Bilateral involvement	8
Ground glass opacities	3
Consolidation	7
Pleural effusion	2
Others (Cardiomegaly)	1
Hilar enlargement	1
Emphysema	2
Zonal involvement	
Selective upper zone	1
Selective lower zone	3
Both upper and lower zones	5

CXR: Chest radiograph

Table 2: Findings of HRCT of Thorax

HRCT findings	No. of patients
Normal	1
Abnormal	9
Unilateral	1
Bilateral	8
Consolidation	4
Ground glass opacities	3
Pleural effusion/fissural effusion	1
Mediastinal adenopathy	1
Predominance	
Both upper and lower lobe	5
Lower lobe	3
Upper lobe	1
Pleural thickening/septal thickening	2
Air trapping	1
Pneumomediastinum	1
Sub-pleural nodules	2
Centrilobular nodules	1
Organizing pneumonia	1

HRCT: High resolution computed tomography

DISCUSSION

Significant differences in the radiological manifestations of H1N1 were found in our study from the earlier study. Findings varied from consolidation to BOOP. From the epidemiological point of view, the patients admitted during the study period were from urban as well as the rural area. The first pandemic showed a trend toward urban involvement. In our study, the patients were from

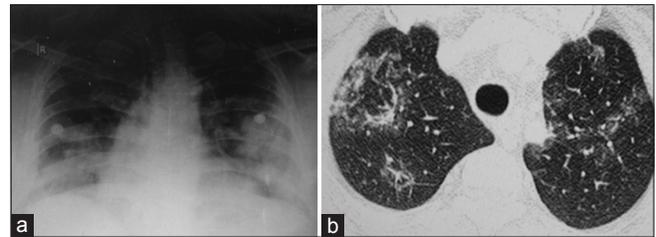


Figure 1: (a) Bilateral lower zone consolidation, (b) high resolution computerized tomography Thorax of above case, ground glass opacities bilateral apices, centrilobular nodules, bilateral interlobular septal thickening, bilateral fissural effusion

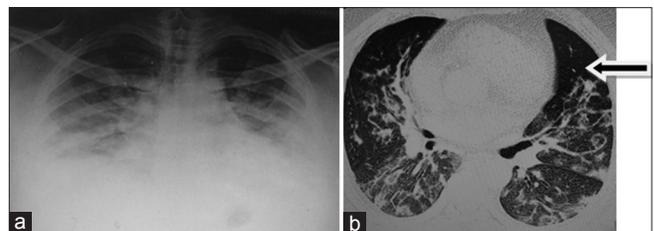


Figure 2: (a) Bilateral middle zone- lower zone consolidation with pleural effusion, (b) high resolution computerized tomography thorax of above patient. Ground glass opacities, consolidation of bilateral lower lobes, cryptogenic organizing pneumonia in a peri-lobular pattern (arrow)

Table 3: A comparison of CXR versus HRCT thorax findings

Patient characteristics	Chest X-ray findings	HRCT chest findings
22 year, female	Bilateral lower zone homogenous opacities	Sub pleural nodules in bilateral basal segments, Right Upper lobe and Right Middle lobe
20 year, female	Right middle zone consolidation, Left atrial enlargement	Air trapping in Right middle and lower lobe cardiomegaly
65 year, female	Bilateral middle zone, lower zone consolidation	Patchy areas of consolidation Ground glass opacities scattered in both lungs Few enlarged mediastinal nodes
23 year, female	Consolidation right lower zone, left middle zone, lower zone rib crowding Right side	Patchy consolidation Left Upper Lobe & middle lobe. Multiple calcified and non-calcified nodules bilateral Cystic bronchiectasis right lower lobe. Features suggestive of tuberculosis
20 year, male	Left pleural effusion. Nodular opacities in the right lower zone	Patchy consolidation in Left lower lobe and apical segments of right lower lobe. Left moderate and right mild pleural effusion
20 year, male	Normal	Normal
62 year, male	Right middle zone consolidation with silhouette sign	Multiple sub-pleural nodules in Right upper lobe, middle lobe and Left upper lobe. Sub-pleural fibrotic strands in both lower lobes. Bilateral pleural thickening
21 year, male	Bilateral patchy consolidation in lower zone	Ground glass opacities bilaterally. Minimum pneumomediastinum
40 year, male	Bilateral lower zone homogenous opacities with pleural effusion	Ground glass opacities bilateral apex Centrilobular nodules. Bilateral interlobular septal thickening. Bilateral fissural effusion
50 year, male	Bilateral middle zone- lower zone consolidation. Bilateral pleural effusion	Ground glass opacities. Consolidation bilateral lower lobes. Cryptogenic organizing pneumonia in a perilobular pattern

HRCT: High resolution computed tomography, CXR: Chest radiographic

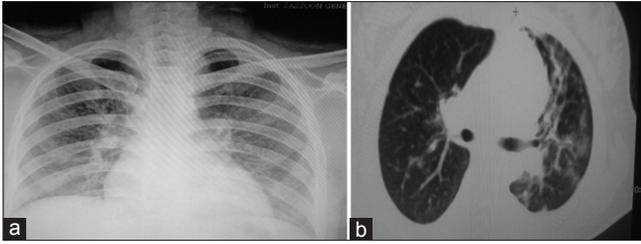


Figure 3: (a) Consolidation right lower zone, Left middle zone, lower zone, rib crowding on right side, (b) high resolution computerized tomography of above patient. 23 year female, multiple calcified and non-calcified nodules, cystic bronchiectasis right lower lobe

predominantly two age groups one between 20 and 40 years and the other above 60 years.⁴ This was in contrast to the earlier study where the young population was affected. Males and females were almost equally affected. Seven out of the ten patients had underlying risk factor, whereas two patients belonged to geriatric age group.

One out of ten patients had a normal scan. All the remaining patients, i.e. 9 (90%) cases had bilateral presentation. Consolidation was seen in 4 cases and the ground glass opacities in 3 cases.

The distribution of opacities was diffuse (upper lobe with lower lobe) in 5 (50%) cases, lower lobe in 3 (30%) cases and 1 case had selective upper lobe involvement. The results were similar to those in a study by Agarwal *et al.*⁵

Nodular findings either as sub-pleural (2 [20%] cases) or centrilobular (1 [10%] case) nodules were noted as also in a study by Ajlan *et al.*⁶ It is worth mention here, that plain CXR failed to demonstrate sub-pleural nodules. Other findings were air trapping and pneumomediastinum in one case each. Thus, the ground glass opacities and consolidation were the commonest findings and correlated with findings of Bux and Marchiori.^{7,8} An interesting finding of BOOP pattern was seen in a 50-year-old patient who had CXR finding of bilateral middle and lower zone consolidation. The BOOP pattern was in the perilobular areas. This emphasizes the role of HRCT in bringing to light some of the uncommon radiological abnormalities that would have otherwise been missed on the plain skiagram of the chest.

In our study, we had no evidence of pulmonary embolism in any of the patients. Other studies report an incidence of embolism in up to 36%.⁵ Mediastinal adenopathy was reported by Ajlan *et al.*;⁶ One elderly female had mediastinal nodes on HRCT in our study.

Our study had few limitations. Patients who were seen on out-patient basis and turned out throat swab positive for H1N1 were not included in the study. HRCT was not performed in these patients and hence subtle findings might have gone un-noticed. Marchiori *et al.* have described the follow-up studies of H1N1 infected patients.⁹ In our study, the patient's HRCT was not repeated at discharge and on follow-up and therefore no comments on resolution findings can be made. Lung biopsy was not performed in any of these patients and therefore the radiological observations could not be corroborated with the histopathological findings.

CONCLUSION

HRCT was valuable in detecting positive findings in the presence of minimal findings on CXRs. Presence of associated respiratory condition could be diagnosed by HRCT, which otherwise would have been missed. HRCT Thorax revealed more extensive pattern of involvement when compared to CXR. Thus, whenever possible to detect subtle abnormalities, CXR should be followed by HRCT of thorax as the investigation in a case of H1N1 infection.

REFERENCES

1. Perez-Padilla R, de la Rosa-Zamboni D, Ponce de Leon S, Hernandez M, Quiñones-Falconi F, Bautista E, *et al.* Pneumonia and respiratory failure from swine-origin influenza A (H1N1) in Mexico. *N Engl J Med* 2009;361:680-9.
2. World Health Organization. Influenza H1N1. Geneva, Switzerland: 2009. Available from: www.who.int/csr/resources/.../h1n1_guidelines_pharmaceutical_mngt. [Last cited on 2009 Dec 08].
3. Mishra AC, Chadha MS, Choudhary ML, Potdar VA. Pandemic influenza (H1N1) 2009 is associated with severe disease in India. *PLoS One* 2010;5:e10540.
4. Siddharth V, Goyal V, Koushal VK. Clinical-epidemiological profile of influenza a H1N1 cases at a tertiary care institute of India. *Indian J Community Med* 2012;37:232-5.
5. Agarwal PP, Cinti S, Kazerooni EA. Chest radiographic and CT findings in novel swine-origin influenza A (H1N1) virus (S-OIV) infection. *AJR Am J Roentgenol* 2009;193:1488-93.
6. Ajlan AM, Quiney B, Nicolaou S, Müller NL. Swine-origin influenza A (H1N1) viral infection: Radiographic and CT findings. *AJR Am J Roentgenol* 2009;193:1494-9.
7. Bux S, Mohd Ramli N, Ahmad Sarji S, Kamarulzaman A. Chest imaging features of patients afflicted with Influenza A (H1N1) in a Malaysian tertiary referral centre. *Biomed Imaging Interv J* 2010;6:e35.
8. Marchiori E, Zanetti G, D'Ippolito G, Verrastro CG, Meirelles GS, Capobianco J, *et al.* Swine-origin influenza A (H1N1) viral infection: Thoracic findings on CT. *AJR Am J Roentgenol* 2011;196:W723-8.
9. Marchiori E, Zanetti G, Mano CM, Hochegger B, Irion KL. Follow-up aspects of influenza A (H1N1) virus-associated pneumonia: The role of high-resolution computed tomography in the evaluation of the recovery phase. *Korean J Radiol* 2010;11:587.

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Influence of Age on the Visual Fields of Normal Subjects: A Clinical Study

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Abstract

Background: Age-related eye diseases are becoming the leading cause of visual impairment, which causes tremendous impact on their mental and social health and affects the overall quality of life. Precise quantification of the relationship between age and the visual function would enable a correct estimate of the level of visual performance expected in a normal subject of a specific age.

Aim: This study aims to examine the rate of decline in retinal sensitivity with respect to ageing using visual field to determine the pattern of decline in relation to age.

Method: A sample of 72 subjects aged between 15 and 74 years were divided into four incremental age-groups with each group having a maximum age variation of 15 years. Visual fields of all the subjects were assessed using Humphrey Field Analyzer Model-720 devised by Allergan Medical Corporation, California. The test strategy adopted was Swedish Interactive Threshold Algorithm and 30-2 program. P value was calculated using *t*-test for equality of means using a significant two-tailed test. Linear regression analysis with Analysis of Variance was applied to determine the pattern of relationship between age and point-wise retinal sensitivity.

Results: The results show an average loss of sensitivity of 0.7 dB/decade up to 60 years of age and profound loss of 1.8 dB/decade after 60 years of age. The decline was greater in the superior field. The pattern of decline was found to be linearly correlated up to 60 years ($r = -0.656$, $R = 42\%$). The decline has been found to be statistically significant ($P = 0.001$).

Conclusion: The study revealed a gradual decline in the retinal sensitivity as the age advances, with a slow decline up to the age of 60 years and an accelerated loss after 60 years. The decline was more marked in males after the age of 60 years.

Key words: Corneal opacity, Intraocular pressure, Manometry, Visual field tests

INTRODUCTION

With an increasing elderly population, age-related eye diseases are becoming the leading cause of visual impairment in the developing world. Many elderly patients are afflicted by more than one aging eye condition, and these have a tremendous impact on their mental and social health and overall quality of life. Enormous strides are being made in understanding and preventing eye diseases. The clinical aim of a psychophysical test, such as the computerized visual field, is to find or exclude pathological

alterations. A prerequisite to recognize pathological changes, therefore, is knowledge on normal patterns. As results of psychophysical tests vary for a single normal subject and also among normal subjects, normal values may only be established based on statistical calculations, which represent sample values in healthy populations being demonstrated by means of averages and standard deviations.¹

Considering the fact that the detection of early injuries is particularly important in glaucomatous eyes, one should be cautious about minor changes in normal values.² Computerized perimetry enables more sensitive and reproducible ways of measuring the visual field. The natural quality of vision gradually declines with anatomical and physiological processes that occur with ageing of the human eyes and visual system. This study was focused on findings regarding alterations of visual field sensitivity during the normal aging process. The purpose of this study is to re-examine the effect of age on visual field sensitivity

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of clinically normal subjects examined with Full Threshold Standard Automated Perimetry. In this study, patients of different ages had visual fields measured with the Humphrey Field Analyzer (HFA) in order to ascertain the appearance of the normal visual field. Precise quantification of the relationship between age and visual function is valuable as it provides an estimate of the level of visual performance expected for a normal subject of a known age. This information may be used by clinicians as a guide to determine whether a subject's function is above or below that expected for an average age-matched, normal control.

MATERIALS AND METHODS

The present study "Influence of age on the visual fields of normal subjects" was conducted at the Government Regional Eye Hospital, Visakhapatnam, from November, 2009 to June, 2010. The study was undertaken with the due clearance of the Institutional Ethical Committee. This study included a total of 72 subjects consisting of 41 females and 31 males ranging in age between 15 years and 74 years who gave their consent for voluntary participation. After careful clinical examination, only those, who satisfied the inclusion criteria, were chosen for the study. 72 subjects were divided into four incremental age-groups with a maximum age variation of 15 years within the group. The first group consisted of 18 subjects in the range of 15-29 years of age. The second group consisted of 20 subjects in the range of 30-44 years of age. The third group consisted of 18 subjects in the range of 45-59 years of age. And the fourth group consisted of 16 subjects in the range of 60-74 years of age.

Visual fields of all the subjects who satisfied the inclusion criteria were assessed using HFA Model 720 using program 30-2 and the test strategy adopted was Swedish Interactive Threshold Algorithm and 30-2 program. Stimulus chosen was Size-III and of white color normal pupil size for all the subjects. Visual field testing in clinical setting typically does not control for pupil size. This study aims at examining the characteristics of ageing under standard test conditions.³ The 56 locations common to both examination program (24-2), (30-2) were included in the further analysis except for two locations likely to fall within the physiological blind spot which were excluded. The matrix of 56 point is examined in an area of the field of vision extending 30° in all directions from the fixation point. Points are separated by 6° in the horizontal and vertical direction. No points are measured on the horizontal or vertical axes, points are placed three degrees on either side of these axes. The background illumination was 31.5 apostilbs, testing distance 33 cm and stimulus diameter 0.43°. Retinal sensitivity was measured in decibels (dB); 1 dB corresponding to a step of 0.1 log unit of stimulus luminance. Test is considered unreliable if the fixation losses are >20%; false negative

error >20%; false positive error >20%. Unreliable tests are not taken into consideration for study, and the test is again repeated. Subject is also allowed to pause whenever required, during the test to eliminate the effect of fatigue. Point-wise threshold data were collected and analyzed. Figure 1 below shows the 30-2 central threshold test pattern.

Figure 1: 30-2 central threshold test pattern.

Data of each subject were analyzed for the following aspects:

- Mean sensitivity of all the threshold sensitivity (56 points in 24-2 program) points in the whole field excluding the blind spot.
- Mean sensitivity of the threshold sensitivity of central 20° (16 point around the center of the field).
- Mean sensitivity of superior and inferior quadrants of the field in the central is 20°.
- Foveal sensitivity.

Statistical Tools used for Analysis of the data:

- t*-test for equality of means is applied to compare the averages of sensitivity between different age groups.
- t*-test to compare the averages of sensitivity in all quadrants of the field within central 10° with respect to age and gender.
- P* value using *t*-test for equality of means using a significant two-tailed test to determine any significant difference in variation sensitivity with respect to age and gender.
- Linear Regression Analysis with Analysis of Variance to find any pattern of relationship between age and point-wise retinal sensitivity.

Inclusion Criteria

- Normal anterior segment (slitlamp) and posterior segment (direct or indirect ophthalmoscopic) examinations. Intraocular pressure of <20 mmHg in both eyes with a difference <3 mmHg as measured by Goldmann Applanation Tonometry.
- Negative family history of glaucoma.

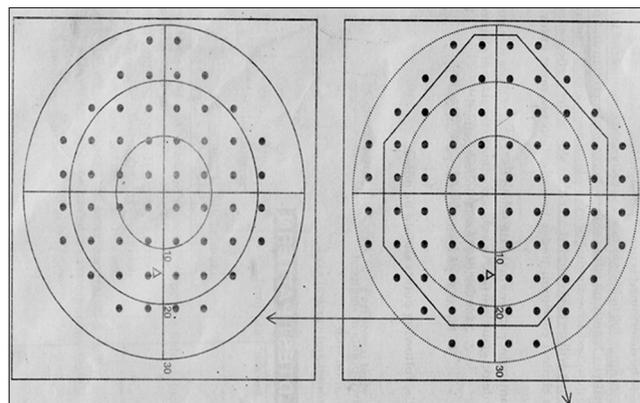


Figure 1: 30-2 central threshold test pattern

Exclusion Criteria

1. History of ocular abnormality. For example Ptosis cataract, corneal opacity, injury, ocular surgery, family history of glaucoma, systemic diseases affecting vision such as diabetes, hypertension.
2. Visual acuity worse than 20/30 (6/9), intraocular pressure >22 mmHg, spectacle refraction > ±5.00 DS and >±2.00 DC, and unreliable visual field test results.
3. History of drug intake, beta-blocks, Phenobarbital, etc.

OBSERVATION AND RESULTS

Totally 72 subjects were divided into four age-groups as shown below:

- Group-I : 15-29 years
- Group-II : 30-44 years
- Group-III : 45-59 years
- Group-IV : 60-74 years

Group-I

18 subjects with an average age of 21.56 ± 2.91 years. The group comprised of 14 female subjects with an average age of 21.29 ± 2.87 years and 4 male subjects with an average age of 22.5 ± 3.32 years. Table 1 shows the average sensitivities of the subjects in Group-I.

Group-II

A total of 20 subjects with a mean age of 37.45 ± 4.29 years, of which 14 female subjects had an average age of 36.57 ± 4.45 years and 6 male subjects had an average of 39.50 ± 3.33 years. Table 2 shows the average sensitivities of Group-II

Group-III

18 subjects with an average age of 51.56 ± 5.11 years, of which 8 female subjects had an average age of 51.50 ± 4.11 years and 10 male subjects had an average 51.60 ± 6.02. Table 3 shows the average sensitivities of Group-III.

Group-IV

Sixteen subjects with an average age of 66.38 ± 5.25 years, of which 5 female subjects had an average of 64.80 ± 4.44 years and 11 male subjects had an average age of 67.09 ± 5.63 years. Table 4 shows the average sensitivities of Group-IV.

Table 5 shows the regression analysis of the total sensitivity of the field.

The present study showed that there was a gradual decline in the retinal sensitivity as the age advances. There was a slow decline up to the age of 60 years and accelerated dB loss after 60 years. The decline was more marked for males after the age of 60 years when compared with females. The decline was greater in the superior field when compared with all the other quadrants in the whole field. Table 6 shows the mean rate of loss in retinal sensitivity.

Figure 2 shows the mean rate of loss per decade in retinal sensitivity in the visual field for each group.

The rate of loss calculated in this study was found to be 0.4 dB/decade in Group-II and the mean rate of loss found

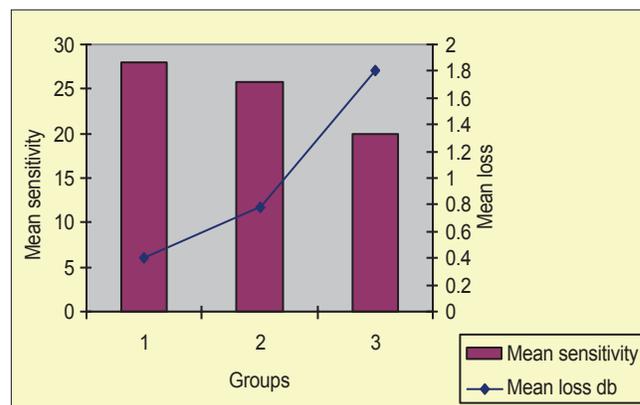


Figure 2: Graph showing the mean rate of loss per decade in retinal sensitivity in the visual field for each age group

Table 1: Average sensitivities of Group-I

Gender	Foveal sensitivity (dB)	Average sensitivity of central field (dB)	Mean±SD sensitivity total field (dB)	Mean±SD sensitivity superior field (dB)	Mean±SD sensitivity inferior field (dB)
Female (n=14)	37.64±1.906	28.232±1.99	28.297±2.086	27.308±3.171	29.761±2.314
Male (n=4)	36.00±1.83	27.46±3.19	27.77±3.110	25.775±3.70	29.213±2.947
Total group	37.28±1.96	28.059±2.218	28.180±2.254	26.967±3.246	29.639±2.384

SD: Standard deviation

Table 2: Average sensitivities of Group-II

Gender	Foveal sensitivity (dB)	Average sensitivity of central field (dB)	Average sensitivity total field (dB)	Average sensitivity superior field (dB)	Average sensitivity inferior field (dB)
Female (n=14)	31.93±4.53	27.834±3.39	26.83±4.31	26.29±6.08	29.66±3.56
Male (n=6)	31.83±2.14	28.34±1.13	27.50±2.67	26.44±3.57	30.42±0.83
Total	32.39±2.38	25.726±2.401	26.01±3.02	26.34±5.36	29.887±2.95

dB: Decibels

Table 3: Average sensitivities of Group-III

Gender	Foveal sensitivity (dB)	Average sensitivity of central field (dB)	Average sensitivity total field (dB)	Average sensitivity superior field (dB)	Average sensitivity inferior field (dB)
Female (n=14)	33±2.07	25.708±2.218	26.58±2.66	24.76±2.45	28.41±2.72
Male (n=6)	31.90±2.60	25.742±2.66	25.56±3.35	26.50±1.44	25.89±4.49
Total	32.39±2.38	25.727±2.40	26.01±3.02	25.727±2.09	27.01±3.93

dB: Decibels

Table 4: Average sensitivities of Group-IV

Gender	Foveal sensitivity (dB)	Average sensitivity of central field (dB)	Average sensitivity total field (dB)	Average sensitivity superior field (dB)	Average sensitivity inferior field (dB)
Female (n=14)	23.0±6.89	24.71±3.21	23.57±4.61	23.95±3.68	27.58±2.187
Male (n=6)	24.64±6.13	17.72±4.87	16.18±4.57	13.66±7.54	23.09±3.53
Total	24.12±6.19	19.90±5.46	18.49±5.66	16.87±8.11	24.49±3.77

dB: Decibels

Table 5: Regression analysis for total sensitivity of the field model summary

Model	R	R square	Adjusted R square	Standard error of the estimate
1	0.656 *	0.430	0.422	3.99412

*Predictors (Constant), age, *Predictors in the Model: (Constant), age, †Dependent Variable: Total

Table 6: Mean rate of loss in retinal sensitivity

Group	Mean age (years)	Mean sensitivity (decibels)	Mean rate of loss (dB/Decade)
I (15-29 years)	21.56	28.0593	-
II (30-44 years)	37.45	27.986	0.4
III (45-59 years)	51.56	25.7267	0.78
IV (60-74 years)	66.38	19.9081	1.8

to be 0.78 dB/decade in Group-III and 1.8 dB/decade in Group-IV.

DISCUSSION

No human physiological function lasts forever. Normal ageing produces characteristic changes in anatomy and physiology of the visual system and also degrades a number of visual functions. Knowledge of physiological ageing effect on visual function is a pre-requisite of any clinical visual function test designed to distinguish between normal subjects and those with pathology. Precise quantification of the relationship between age and visual function is valuable because it provides an estimate of the level of visual performance expected of a normal subject of a known age. The visual sensitivity is known to shrink with age. The decrease in sensitivity may be due to pre-retinal factors namely increased

optical density of the ocular media and position of upper eyelid and globe, a smaller pupil size may contribute to a reduction in retinal image quality and therefore sensitivity.⁴

A second theory states that increased neural loss in the afferent visual pathway may contribute to loss of sensitivity. Further possibility is that an accelerated loss of sensitivity in older age groups may reflect on an increased proportion of sub-clinical pathology among the presumed normal population.

Until date, there are only a few established studies that assess the influence of ageing on visual field data (retinal sensitivity). More than 20 years ago, Haas *et al* reported differential light sensitivity begins to decline in youth, continues to gradually decrease throughout the life at a rate of 0.58 dB per decade. Spry and Johnson from Denver Institute, Portland studied the senescent changes of the normal visual field using HFA retrospectively using the data from 562 normal eyes and found that a significant negative relationship existed between age and mean sensitivity within cross-sectional population data.⁵ The mean loss was found to be 0.43 dB/decade for age group <53.4 years and means loss was 1.02 dB/decade for age group more than 53.4 years. Paul GD Spry and Chris A Johnson proposed that non-linear function provided the best fit to cross-sectional population data.

A study in the University of New South Wales by H. Barry Collins Christine Han and Phaik Chin Khor using HFA with 45 subjects selected randomly revealed that there was a slight overall decrease in the sensitivity in the 40 year old age group and a greater decrease in 60 year age group.⁶ Between 20 and 40 years, the mean rate of loss of sensitivity for each point was 1.01 dB/decade and between 40 and 60 years

it was 1.72 dB/decade. In the present study, mean rate of loss of sensitivity was found to be 0.7 dB/decade before the age of 60 years and 1.8 dB/decade after 60 years which is in agreement with the previous studies. Investigations by H. Barry Collins, Jaffe and Alvarado have found lower sensitivity related to age in superior region of visual field when compared to inferior one, which is also in agreement with the result of the present study.⁷ Whereas in another study conducted by Glen J Jaffe and Jorge A Alvarado used Octopus and claimed that age loss was linear and measured a linear decline with age in the threshold sensitivity, volume and surface area of the visual field.

In the present study, the correlation between age and retinal sensitivity was assessed using linear regression. A coefficient describing the relationship between age and the point-wise sensitivity is used routinely in statistical analysis methodologies to adjust patient data for statistical comparison with age-matched normative distribution. It is, therefore, critical that this coefficient is representative of the effect of age on visual field sensitivity present within the population at large.

The model showed R value of 43 %, adjusted R value of 42 % and $r = -0.656$. In a study conducted by Nassim Calixto, Roberto Marcio, Sebastiao Cronemberg assessed the ratio between age and retinal sensitivity by linear regression.⁸ This model shows R value of 16.5 per cent and $r = -0.41$. To date, no consensus appears to exist between reports of a specific nature of the relationship between the age and visual field sensitivity. Some investigations have reported a linear relationship although others have found that the relationship is better described bilinear or exponential function. In most studies, the effect of age on sensitivity appears to be a constant steady decline in all decades beyond the age of 20 years.⁹ However, others argue that there is a steeper loss after the 6th decade. The pattern of decline in sensitivity in the present study was found to be linearly correlated up to 60 years.

There are four main reasons for decline in luminous sensitivity with age: (1) Changes in the ocular media. (2) Linear reduction in pupil diameter.¹⁰ (3) Decrease in absorbance efficiency of photo-pigments. (4) Neural losses in both retina and retinogeniculostiate pathways. Some investigators have minimized the impact of the ocular media and pupil by using yellow targets, brighter backgrounds, and mydriatic drops in all subjects.¹¹ They still found decline of about 0.8 dB/decade which were, therefore, attributed to neuronal losses. High resolution perimetry which was thought to more accurately assess elements at or above the retinal ganglion cell level has estimated the loss of neural channels funneling information from the retina to cortex at about 9000/year or about 1/h, which is in fact a thought of concern.

Limitations of the study

One important limitation to the present study is the difficulty in determining whether or not worsening of the visual field sensitivity is due to advancing age or sub-clinical ocular disease progression or a combination of both. Further study is needed using larger groups to establish the rate of decline in sensitivity with ageing.

CONCLUSION

The present study is done on seventy-two normal subjects, divided into 4 homogenous groups. There was a general decline in retinal sensitivity in the entire visual field with respect to ageing in the study sample, and it was found to be statistically significant ($P = 0.001$). The average loss of sensitivity was 0.7dB/decade before 60 years and 1.8 dB/decade after 60 years. Males in the age-group >60 years showed marked loss in sensitivity compared to females. The pattern of decline in sensitivity was found to be linearly correlated up to 60 years. The reduction in sensitivity was greater in the superior region of the visual field when compared to other regions with respect to age.

The present study helps to depict the normal pattern of the visual field retinal sensitivity with respect to age and gender and therefore establishes normal values at different ages. This information is expected to be of some use to clinicians as a guide to estimate the level of visual performance expected of a normal subject of a known age to determine the visual function expected for an average age matched normal control.

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REFERENCES

1. Haas A, Flammer J, Schneider U. Influence of age on the visual fields of normal subjects. *Am J Ophthalmol* 1986;101:199-203.
2. Zulauf M, LeBlanc RP, Flammer J. Normal visual fields measured with Octopus-Program G1. II. Global visual field indices. *Graefes Arch Clin Exp Ophthalmol* 1994;232:516-22.
3. Reddy GR. *A Visual Field Evaluation with Automated Devices*. 2nd ed. New Delhi: Jaypee Brothers Publishers; 2006.
4. Zhang C, Hua T, Li G, Tang C, Sun Q, Zhou P. Visual functions decline during normal aging. *Curr Sci* 2008;95:1544-50.

5. Spry PG, Johnson CA. Senescent changes of the normal visual field: An age-old problem. *Optom Vis Sci* 2001;78:436-41.
6. Collins BH, Han C, Khor PC. Age changes in the visual field using Humphrey field analyzer. *Clin Exp Optom* 1988;71:174-8.
7. Jaffe GJ, Alvarado JA, Juster RP. Age-related changes of the normal visual field. *Arch Ophthalmol* 1986;104:1021-5.
8. Calixto N, Santos RM, Cronemberger S. Visual field (Octopus 1-2-3) in normal subjects divided into homogeneous age-groups. *Arq Bras Oftalmol* 2006;69:637-43.
9. Bennett PJ, Sekuler AB, Ozin L. Effects of aging on calculation efficiency and equivalent noise. *J Opt Soc Am A Opt Image Sci Vis* 1999;16:654-68.
10. Borish IM. *Clinical Refraction*. 3rd ed. Chicago: Professional Press; 1970. p. 528-39.
11. Cavallotti C, Artico M, Pescosolido N, Leali FM, Feher J. Age-related changes in the human retina. *Can J Ophthalmol* 2004;39:61-8.

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Pre-operative Oral Bisoprolol Improves the Surgical Field during Functional Endoscopic Sinus Surgery: A Randomized, Controlled, Prospective and Double-Blinded Study

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Abstract

Background: Functional Endoscopic Sinus Surgery (FESS) is a surgical technique performed for indications such as chronic sinusitis, a chronic polypous rhinosinusitis of the nasal mucosa, Hypertrophy of turbinates, etc. Bloodless and clear surgical field is very essential for the success of FESS and decreased operative times. The aim was to study the effects of oral bisoprolol, a longer acting β - Blocker to reduce the blood loss and improve the visual clarity during FESS.

Methodology: In this randomized double-blind controlled study, 50 patients of ASA Class-I and Class-II who were candidates for FESS were included in the study and divided into two groups. The following parameters were assessed and compared between both the Groups (a) Intra-operative blood loss, (b) Surgical field visual clarity, (c) Peri-operative Hemodynamics, (d) Intra-operative requirement of sevoflurane and fentanyl, (e) Post-operative hemoglobin level. To grade the clarity of the surgical field, the surgeon was asked to assess operative field condition according to the quality scale proposed by Fromme Boezaart. Demographic variables were analyzed using Fischer's Exact test continuous variables were analyzed using Student's *t*-test.

Results: The mean estimated blood loss was significantly more in the control Group A than Group B (425 ± 110.6 vs. 145 ± 34.6), $P = 0.0001$. The grading of the operative field by the surgeon according to Fromme-Boezaart grading scale was found to be favorable in Bisoprolol group, $P = 0.005$.

Conclusion: Preoperative single dose of Bisoprolol fumarate 2.5 mg significantly reduced the blood loss during surgery and improved the visualization of the operating field during FESS.

Key words: Adrenergic receptor antagonists, Bisoprolol fumarate, Fentanyl, Operative time

INTRODUCTION

Functional Endoscopic Sinus Surgery (FESS) is a surgical technique performed for indications such as chronic sinusitis, chronic polypous rhinosinusitis of nasal mucosa, Hypertrophy of turbinates etc.¹ Bloodless and clear surgical field is very

essential for the success of FESS and decreased operative times. When FESS is being done under general anesthesia, induction of controlled hypotension provides optimal surgical conditions for the surgeon.² Mucosal bleeding is one of the serious complications of FESS.³ Reduced visibility of surgical field is related to an increased risk of dangerous vascular, orbital and intracranial complications, prolonged duration of intervention and also reduced quality of intervention.⁴ Anesthesia methods and the choice of anesthetic agents also may influence surgical bleeding. Controlled hypotension refers to deliberate lowering of systemic blood pressure to 20% less than the patient's baseline blood pressure. When used judiciously, controlled hypotension has been found to be effective in providing better surgical field without post-

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operative complications.⁵ Pharmacological agents such as vasodilators like glyceryl trinitrate, sodium nitroprusside, β -blockers like metoprolol, esmolol, α -agonists like clonidine, opioids like remifentanyl etc. have been used in various randomized clinical trials to provide controlled hypotension during FESS.^{6,7} Glyceryl trinitrate causes reflex tachycardia and venous oozing, which are undesirable, metoprolol and esmolol have been shown to provide a relatively bloodless field (but because of short duration of action benefit may not last post operatively).⁸ The aim of this study was to study the effects of oral bisoprolol, a longer acting β -blocker to reduce the blood loss and improve the visual clarity during FESS. The requirement of inhalational agent, sevoflurane to maintain the desired blood pressure and the requirement of fentanyl were also compared.

METHODOLOGY

After institutional ethical committee approval and written, informed consent from the patients, 50 ASA I-II pts, aged 15-40 years, scheduled for FESS under general anesthesia were randomly allocated for this double-blind, controlled study. Randomization was done using a computer generated random number tables.

Exclusion Criteria

1. Patients with H/o hypertension, anemia (Hb <10 g%).
 - H/o asthma, chronic obstructive pulmonary disease
 - H/o bleeding disorders,
2. Patients on anti-platelet drugs.
3. Patients on antihypertensives.
4. Patients with Gastrointestinal disorders that effect drug absorption.
5. Patients, who were included in the study, were randomly allocated into two Groups A, B of 25 each.

Group A: Patients received oral bisoprolol fumarate 2.5 mg, 90 min before surgery with a sip of water.

Group B: Patients received placebo tablet orally, 90 min before surgery with a sip of water.

The observer anesthesiologist who made intra-operative and post-operative assessments was blinded to the group allocation. The placebo tablets (vitamin) and the study tablets were provided in sealed envelopes. Baseline parameters like heart rate (HR), noninvasive blood pressure (NIBP), respiratory rate, SPO₂ were noted in all the subjects before giving the oral premedication.

General anesthesia was induced with a standard regimen in all the patients. All patients received premedication

with glycopyrrolate 0.2 mg intravenous (IV), ondansetron 0.1 mg IV, fentanyl 2 mg/kg IV, pre-oxygenated with 100% for 5 min, induced with thiopentone sodium 5 mg/kg IV, intubated with succinylcholine 1.5 mg/kg IV with appropriate sized cuffed polyvinyl chloride endotracheal tube and maintained with vecuronium 0.08 mg/kg IV, followed by increments and O₂:N₂O mixture 40%:60% and sevoflurane 1-1.5%.

- HR, NIBP, SPO₂ were continuously monitored in all patients.
- Mean arterial pressure (MAP) was targeted to maintain around 60-70 mmHg.
- NIBP (systolic blood pressure, MAP) monitored every 5 min before general anesthesia, after giving general anesthesia, throughout the intra-operative period and 2 h during the post-operative period. Likewise HR were also monitored continuously throughout the peri-operative period.
- The following parameters were assessed and compared between both the groups.
 - a. Intra-operative blood loss
 - b. Surgical field visual clarity
 - c. Peri-operative Hemodynamics
 - d. Intraoperative requirement of sevoflurane and fentanyl.
 - e. Post-operative hemoglobin level.

The volume of blood collected in the suction bottle was accounted to the blood lost during surgery. The volume of the irrigating fluid was subtracted from the total volume of fluid collected in the suction bottle. Also, by counting the no. of cotton strips used during surgery, the volume of blood loss was assessed. A fully soaked cotton strip was estimated to contain 5 ml of blood and partially soaked one to contain 2-3 ml of blood. To grade the clarity of the surgical field, the surgeon was asked to assess operative field condition according to the quality scale proposed by Fromme Boezaart (Table 1).

Anesthesia was titrated according to the surgical needs. Any considerable increases in the HR and NIBP were treated with increments of fentanyl 1 μ g/kg and increasing the concentration of sevoflurane by 0.5%. Surgery time was considered from the time of local infiltration of adrenalized lidocaine to nasal mucosa up to the end of surgery.

After surgery, residual neuromuscular blockade was antagonized with appropriate doses of neostigmine and glycopyrrolate and all the patients were shifted to the recovery room. After observation for 2 h in the recovery room, they were shifted to the ward. Postoperative hemoglobin levels were assessed in all the patients immediately after surgery.

Statistically Analysis

Data were analyzed statistically using the software graph pad quick calcs. Demographic variables were analyzed using Fischer’s Exact test. Continuous variables were analyzed using Student’s *t*-test. Data were expressed as mean, standard deviation and percentage. *P* < 0.05 was considered as statistically significant.

RESULTS

A total of 50 patients were enrolled in this study. Of which 49 patients completed the study. One patient was deleted from this study as he had severe bleeding intra operatively, and the surgery was postponed.

Demographic characteristics like Age, weight, gender, ASA grading and mean duration of surgery and preoperative hemoglobin were comparable between the Groups A and B. (Table 2). The mean estimated blood loss was significantly more in the Group A than Group B (415 ± 120.5 vs. 150.55), *P* = 0.0001, statistically highly significant, (Table 3). The postoperative hemoglobin was also significantly lower in the control group when compared to Bisoprolol group, indicating that the blood loss was significant in the control group. (Table 3). The grading of the operative field by the surgeon according to Fromme-Boezaart grading scale was found to be favourable in Bisoprolol group when compared to control group, *P* = 0.005, statistically

significant (Table 1) (Figure 1). The important factor that caused reduction of bleeding in the Group B was Bisoprolol premedication.

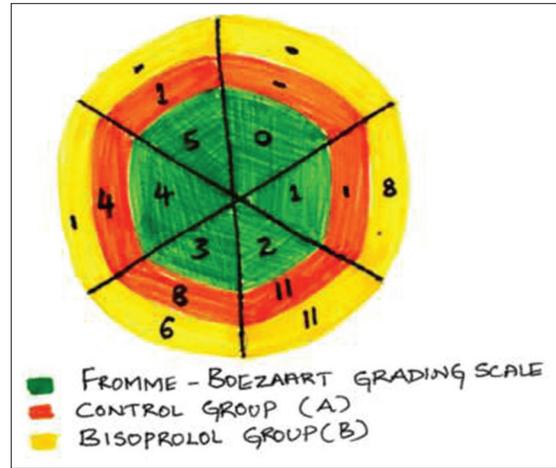


Figure 1: Operative field grading by Fromme Boezaart

Table 1: Fromme-Boezaart scale

Grading	Degree of bleeding
Grade 0	No bleeding
Grade 1	Slight bleeding, no suctioning of blood required
Grade 2	Slight bleeding, occasional suctioning required bleeding does not threaten surgical field
Grade 3	Slight bleeding, frequent suctioning required. Bleeding threatens surgical field a few seconds after suction is removed
Grade 4	Moderate bleeding frequent suctioning required. Bleeding threatens surgical field immediately after suction is removed
Grade 5	Severe bleeding constant suctioning required. Bleeding appears fast than can be removed by suction. Surgical field threatened and surgery not possible

Table 2: Demographic data

Variable	Group A (n=24)	Group B (n=25)	<i>P</i> value*
Age (years)	28±13.9	30±12.6	0.873
Weight (kg)	53.4±5.07	55.6±4.5	0.940
Height (cm)	164.6±15.7	168.4±13.5	0.502
Male: Female	13:12	15:10	0.858
ASA status I/II	15:10	11:14	0.752
Pre-operative hemoglobin (g/dl)	13±1.02	13±1.15	0.199
Duration of surgery (min)	140±25	128±30	0.820

*Fischer’s exact test, Data expressed as mean±SD, *P*>0.05 not statistically significant, SD: Standard deviation

Table 3: Estimated blood loss and post-operative hemoglobin

Variable	Group A (n=24)	Group B (n=25)	<i>P</i> value*
Estimated blood loss (ml)	415±120.5	150±55	0.0001
Postoperative hemoglobin (g/dl)	11.04±0.5	12.50±0.85	0.0001
Difference of pre and post-operative hemoglobin (g/dl)	1.60±0.35	0.55±0.15	0.001

Student’s *t*-test, Data expressed as mean±SD, *P*<0.05 statistically highly significant, SD: Standard deviation

Table 4: Hemodynamic parameters

Parameters	Group A (n=24)	Group B (n=25)	<i>P</i> value*
Baseline			
MAP (mmHg)	74±4.5	73±6.7	0.105
HR (bpm)	97±4.5	98±5.2	0.115
Pre-operative (90 min after premedications)			
MAP	73±3.4	69±5.9	0.112
HR	92±5.8	64±4.8	0.013*
Intra-operative			
MAP	72±3.4	61±2.7	0.036
HR	94±5.8	62±4.3	0.003*
Post-operative (0-2 hrs)			
MAP	74±3.7	63±2.3	0.032
HR	92±4.7	61±3.5	0.008*

**P*<0.05 statistically significant, Data expressed as mean±SD, SD: Standard deviation, MAP: Mean arterial pressure, HR: Heart rate

Table 5: Requirement of sevoflurane and fentanyl

	Group A (n=24)	Group B (n=25)	<i>P</i> value*
Sevoflurane (vol%)	1.5±0.45	0.7±0.23	0.000
Fentanyl (µg/kg)	2.5±0.52	1.1±0.47	0.000

Data expressed as mean±SD, *P*<0.001 statistically highly significant, *independent sample *t*-test, SD: Standard deviation

Hemodynamic Parameters

Baseline hemodynamics were comparable between the two groups. Just before induction of general anesthesia, the MAP was similar between the two groups, but the HR was significantly lower in the Bisoprolol group. The hemodynamic responses (HR, NIBP) to laryngoscopy and intubation was significantly higher in the control group. The hemodynamic response to local infiltration of adrenalized lidocaine into the nasal mucosa was also significantly higher in the control group than Bisoprolol group.

The mean HR and MAP were significantly lower in the Bisoprolol group than the control group (Table 4), throughout the intraoperative period.

The requirement of sevoflurane in volume% and the total dose of fentanyl used intraoperatively was significantly lower in the Bisoprolol group, $P < 0.001$ (Table 5) (Figure 2).

DISCUSSION

The mucosa of nasal and paranasal sinuses is extremely well vascularised. Surgeries involving this anatomical – functional region like functional endoscopic sinus surgery are thus associated with intensive and difficult to stop bleeding from the capillaries.⁹ Bleeding during FESS is a serious impediment increasing the risk of damage to the orbit, optic nerve, unintended penetration of middle cranial fossa or even damage to the internal carotid artery.¹⁰ For this reason several methods were designed to reduce surgical field bleeding, which can be accomplished by:

- Local anemization of the mucosa with vasoconstrictors like adrenaline and by sub-mucosa administration of 1-2% lidocaine with adrenaline in concentrations of 1:80,000-1:200,000.
- Positioning of the patient in anti-trendelenberg position which causes a decrease in the MAP and decreased venous return from lower body reduces cardiac output.¹¹

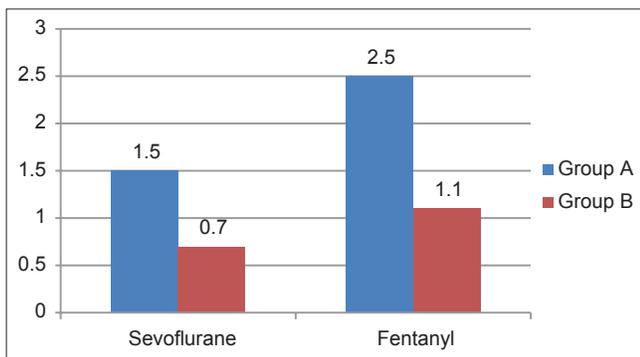


Figure 2: Data expressed as mean ± standard deviation

- Pharmacological cardio-depression with the HR stabilized within lower physiological limits (about 60/min) and the MAP reduced to about 65 mmHg.¹²
- Pre-operative steroids to reduce the inflammation in the paranasal sinuses.¹³
- Administering higher concentrations of inhalational agents or intravenous anesthetic agents to deepen anesthesia and thus maintain the MAP.¹⁴

Of the pharmacological agents like vasodilators, β -Blockers, α_2 -agonists, opioids, ACE-inhibitors etc., studies show that using β -Blockers before surgery reduces long-term cardiovascular complications and intra-operative bleeding.^{15,16} The probable mechanism of β -Blockers in causing hemodynamic control is a reduction and attenuation of the excitatory effect caused by a sudden increase of catecholamines during surgery.¹⁷ Oral Propranolol and oral Metoprolol have been used in previous studies with favorable results.¹⁸ A continuous infusion of Esmolol also have been used, but a single, oral premedication would be more convenient. Our study was undertaken to hypothesize whether a preoperative longer acting β -Blocker, Bisoprolol would reduce bleeding and improve the operating conditions during FESS. Bisoprolol is a selective β adrenergic receptor blocker commonly used in cardiovascular diseases like hypertension, ischemic heart disease, coronary artery disease, arrhythmias and acute M1.

From the observations of our study, it was evident that intraoperative blood loss and the requirements of sevoflurane and fentanyl were significantly lower in the patients of Bisoprolol group. The surgical field grading was also favorable in the Bisoprolol group than the control group. The mean HR and MAP were significantly lower in the Bisoprolol group than the control group. No significant side effects related to Bisoprolol were reported in our study.

The observations of our study were comparable to the results of the study done by Jacob *et al.*, where they also used oral Bisoprolol to improve surgical field during functional endoscopic sinus surgery.¹⁹ The dose of Bisoprolol used in our study was only 2.5 mg which may not cause serious adverse effects.

Nair *et al.*, evaluated the effect of β -Blocker pre-medication on the surgical field during endoscopic sinus surgery and demonstrated lower blood loss in patients with decreased HR and same arterial blood pressures.²⁰

The negative chronotropic action of Bisoprolol caused reduction in the frequency of arteriolar pulsations per unit time into the tissue bed, increases the diastolic period leading to lower venous pressures and thus reduces venous oozing.

Our study also demonstrated that Bisoprolol attenuated the catecholamine response to laryngoscopy and intubation and also attenuated the transient increases in HR and blood pressure due to adrenaline infiltration into the nasal mucosa. This would be very much beneficial in patients with CAD, where tachycardia is undesirable.

The requirements of Sevoflurane and Fentanyl were significantly reduced in Bisoprolol group which is a clinical advantage.

Oral tablets are simple to administer and are cost-effective. According to Boezaart and his colleagues an ideal category scale value for surgical conditions is between 1 and 2.²¹ In our study, the surgical conditions were very much favorable with Bisoprolol group. A correlation between arterial pressure or HR and the Fromme-Boezaart grade of the operative field could not be made.²² Moreover, despite a firm acceptance that decreased arterial pressure reduces bleeding the results of clinical studies were inconclusive and correlation between arterial pressure and bleeding was not always observed.²³ Poupak Rahimzadeh, Seyed Hamid-Reza faiz *et al.* evaluated the effects of premedication with metoprolol on bleeding and induced hypotension in nasal surgery and concluded that appropriate dose of metoprolol improves the operative field condition and reduces undesirable hemodynamic response.²⁴ Although there were a good number of clinical trials demonstrating the usefulness of β -Blockers for controlled hypotension, studies with oral Bisoprolol were very limited. Future research is awaited regarding the optimal use of Bisoprolol for FESS. Because of its longer duration of action, hemodynamic stability persisted few hours post-operatively as well, which is very much desirable.

CONCLUSION

Our study proved that pre-operative single oral dose of Bisoprolol fumarate 2.5 mg significantly reduced the Blood loss during surgery and improved the visualization of the operating field during FESS. The requirements of Sevoflurane and Fentanyl were significantly reduced in the study group.

REFERENCES

1. Feldman MA, Patel A. Anesthesia for eye, ear, nose, and throat surgery. Miller's Anesthesia. 7th ed. Philadelphia, PA: Churchill Living Stone/Elsevier; 2010. p. 2371-2.

2. Simpson P. Perioperative blood loss and its reduction: The role of the anaesthetist. Br J Anaesth 1992;69:498-507.
3. Sivarajan M, Amory DW, Everett GB, Buffington C. Blood pressure, not cardiac output, determines blood loss during induced hypotension. Anesth Analg 1980;59:203-6.
4. Stankiewicz JA. Complications in endoscopic intranasal ethmoidectomy: An update. Laryngoscope 1989;99:686-90.
5. Healy TE, Cohen PJ, editors. Wylie and Churchill-Davidsons, A Practice of Anesthesia. 6th ed. London: A Hodder Arnold Publication; 1995.
6. Leigh JM. The history of controlled hypotension. Br J Anaesth 1975;47:745-9.
7. Pagel P, Kersten J, Farber N, Warltier D. Cardiovascular pharmacology. In: Miller RD, editor. Miller's Anesthesia. Philadelphia: Elsevier, Churchill Livingstone; 2005. p. 201-2.
8. Amr YM, Amin SM. Effects of preoperative oral beta blocker versus intraoperative nitroprusside or esmolol on quality of surgical field during tympanoplasty. J Clin Anesth 2011;23:544-8.
9. Jacobi KE, Bohm BE, Rickauer AJ, Jacobi C, Hemmerling TM. Moderate controlled hypotension with sodium nitroprusside does not improve surgical conditions or decrease blood loss in endoscopic sinus surgery. J Clin Anaesth 2000;12:202-7.
10. Drozdowski A, Sieskiewicz A, Siemiakowski A. Reduction of intraoperative bleeding during functional endoscopic sinus surgery. Anestezjol Intens Ter 2011;43:45-50.
11. Ko MT, Chuang KC, Su CY. Multiple analyses of factors related to intraoperative blood loss and the role of reverse Trendelenburg position in endoscopic sinus surgery. Laryngoscope 2008;118:1687-91.
12. Kerr AR. Anaesthesia with profound hypotension for middle ear surgery. Br J Anaesth 1977;49:447-52.
13. Sieskiewicz A, Olszewska E, Rogowski M, Grycz E. Preoperative corticosteroid oral therapy and intraoperative bleeding during functional endoscopic sinus surgery in patients with severe nasal polyposis: A preliminary investigation. Ann Otol Rhinol Laryngol 2006;115:490-4.
14. Manola M, De Luca E, Moscillo L, Mastella A. Using remifentanyl and sufentanil in functional endoscopic sinus surgery to improve surgical conditions. ORL J Otorhinolaryngol Relat Spec 2005;67:83-6.
15. Rodrigo C. Induced hypotension during anesthesia with special reference to orthognathic surgery. Anesth Prog 1995;42:41-58.
16. Cincikas D, Ivaskevicius J. Application of controlled arterial hypotension in endoscopic rhinosurgery. Medicina (Kaunas) 2003;39:852-9.
17. Mikawa K, Nishina K, Maekawa N, Takao Y, Asano M, Obara H. Attenuation of the catecholamine response to tracheal intubation with oral clonidine in children. Can J Anaesth 1995;42:869-74.
18. Baker AR, Baker AB. Anaesthesia for endoscopic sinus surgery. Acta Anaesthesiol Scand 2010;54:795-803.
19. Jacob SM, Chandy TT, Cherian VT. Oral bisoprolol improves surgical field during functional endoscopic sinus surgery. J Anaesthesiol Clin Pharmacol 2014;30:59-64.
20. Nair S, Collins M, Hung P, Rees G, Close D, Wormald PJ. The effect of beta-blocker premedication on the surgical field during endoscopic sinus surgery. Laryngoscope 2004;114:1042-6.
21. Boezaart AP, van der Merwe J, Coetzee A. Comparison of sodium nitroprusside- and esmolol-induced controlled hypotension for functional endoscopic sinus surgery. Can J Anaesth 1995;42:373-6.
22. Fromme GA, MacKenzie RA, Gould AB Jr, Lund BA, Offord KP. Controlled hypotension for orthognathic surgery. Anesth Analg 1986;65:683-6.
23. Blau WS, Kafer ER, Anderson JA. Esmolol is more effective than sodium nitroprusside in reducing blood loss during orthognathic surgery. Anesth Analg 1992;75:172-8.
24. Rahimzadeh P, Faiz SH, Alebouyeh MR. Effects of premedication with metoprolol on bleeding and induced hypotension in nasal surgery. Anesth Pain Med 2012;1:157-61.

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Comparative Evaluation of Oral Health Status in Children with Acute Lymphoblastic Leukemia

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Abstract

Introduction: Leukemia is the most common childhood malignancies characterized by an excessive proliferation of immature white blood cells and their precursors. Oral complications due to chemotherapy or radiotherapy include increased incidence of dental caries, gingival and periodontal disease, candidiasis, oral mucositis.

Aim: The aim was to evaluate oral health status (OHS) of acute lymphoblastic leukemia (ALL) and to compare OHS with healthy children.

Method: A total of 60 children of both sexes in the age group of 2-14 years in which 30 healthy children and 30 diagnosed children with ALL were selected for the study. The oral cavity was examined for dental caries using def-t and decay-missing-filled teeth (DMF-T) indices, gingival status by using the modified gingival index, oral hygiene by using "oral hygiene index-simplified (OHI-S)." Results of the study were statistically evaluated.

Results: Statistical analysis was performed by using unpaired *t*-test. The mean gingival index in ALL was found to be 1.59 as compared to 0.079 in the control group. About 13% with severe gingivitis and 80% with moderate gingivitis in ALL group when compared to the control group with 3% moderate gingivitis and 26% mild gingivitis. The mean OHI-S value of ALL was found to be 2.29 compared with 0.82 in the control group. 20% of ALL group was found with poor oral hygiene. The def-t of 76% and DMFT of 46% in ALL group when compared with def-t of 66% and DMFT of 13% in the control group. The mean DMFT value of ALL was found to be 5.28 as compared to 1.97 in the control group.

Conclusion: The gingival index, OHI, DMFT index were significantly higher in the ALL group compared to healthy children.

Keywords: Acute lymphoblastic leukemia, Children, Dental caries, Gingival status, Oral hygiene status

INTRODUCTION

Leukemia is the proliferation of a clone of abnormal hematopoietic cells with impaired differentiation, regulation and programmed cell death (apoptosis). Acute lymphoblastic leukemia (ALL) is a neoplastic disease characterized by an excessive proliferation of immature white blood cells and their precursors which can be rapidly fatal. Leukemic cells multiply abnormally resulting in marrow failure, altered blood cell counts and when left untreated,

death occurring in 6 months or less due to infection, bleeding, or both.¹ Mechanism includes aberrant expression of proto-oncogenes, chromosomal translocations, altered transcription factors, and hyperdiploidy involving more than 50 chromosomes.¹ Acute leukemia, the most common childhood cancer represents 24% of all childhood malignancies with a peak incidence at 2-5 years.² Clinical manifestations include flu-like symptoms, pain in the bone or joint caused by malignant marrow expansion. Marrow failure results in thrombocytopenia. Oral features are in the form of gingival enlargement, periodontal disease, dental caries, mucositis, candidiasis, herpes simplex.³ The treatment regimen includes multi-agent chemotherapy in three phases: Induction therapy, intensification therapy, maintenance therapy and radiotherapy.⁴ Children are more prone to infections due to immune suppression caused by disease and its therapy. Any unusual clinical signs in the oral

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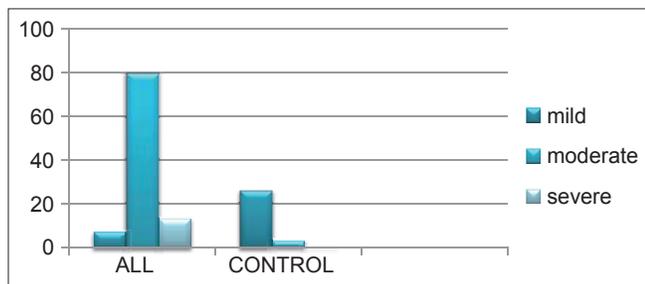
cavity can help in the early diagnosis of ALL. Therefore, the aim of this study was to evaluate oral health status (OHS) of ALL and to compare OHS with healthy children.

MATERIALS AND METHODS

The present study was carried out in 60 children of both sexes in the age group of 2-14 years. 30 healthy children reporting to the Department of Pediatrics and Preventive Dentistry, Vokkaligara Sangha Dental College and Hospital for routine dental checkup and 30 children diagnosed with ALL from the Department of Pediatrics, Indira Gandhi Institute of Child Health, Bangalore, Karnataka were selected for the study. Institutional ethical clearance was obtained. Signed written informed consent was obtained from their parents. The OHS was examined with a sterile mouth mirror, explorer, and disposable sterile gloves. As the probes induce gingival bleeding, these were not used for examination of gingival status. The oral cavity was examined for gingival status by using the modified gingival index, oral hygiene status by using “oral hygiene index-simplified (OHI-S)” and dental caries using def-t and decay-missing-filled teeth (DMF-T) indices. The results of the study were statistically evaluated using unpaired *t*-test.

RESULTS

- Gingival status was assessed by Modified Gingival index given by Loe and Silness which was found to be 13% with severe gingivitis and 80% with moderate gingivitis in ALL group as compared to control group with 3% moderate gingivitis and 26% mild gingivitis. No severe gingivitis was seen in the control group (Graph 1, Table 1). The mean gingival index in ALL was found to be 1.59 when compared to 0.079 in the control group (Table 2). Statistically, significant difference was seen.
- Oral hygiene was assessed by the Modified OHI. 20% of ALL group was found with poor oral hygiene (Graph 2, Table 3). The mean OHI S value of ALL was found to be 2.29 compared to 0.82 in the control group (Table 4), which was statistically significant.



Graph 1: Comparison of gingival index between acute lymphoblastic leukemia group and control group

- Dental caries was assessed by DMFT/deft index. The deft of 76% and DMFT of 46% in ALL group as compared to deft of 66% and DMFT of 13% in the control group (Graph 3, Table 5). The mean DMFT value of ALL was found to be 5.28 as compared to 1.97 in the control group (Table 6). Statistically significant difference was seen.

Table 1: Comparison of Gingival index between ALL group and control group

Group	Mild (%)	Moderate (%)	Severe (%)
ALL	7	80	13
Control	26	3	0

ALL: Acute lymphoblastic leukemia

Table 2: Comparison of mean for gingival index between ALL group and control group

Group	ALL	Control
Mean	1.59379	0.07953
SD	0.73359	0.20091

SD: Standard deviation, ALL: Acute lymphoblastic leukemia

Table 3: Comparison of OHI-S between ALL group and control

Group	Good (%)	Fair (%)	Poor (%)
ALL	0	80	20
Control	80	20	0

ALL: Acute lymphoblastic leukemia, OHI-S: Oral hygiene index-simplified

Table 4: Comparison of mean for OHI-S between ALL group and control

Group	ALL	Control
Mean	2.2931	0.8220
SD	0.6667	0.5265

ALL: Acute lymphoblastic leukemia, OHI-S: Oral hygiene index-simplified, SD: Standard deviation

Table 5: Comparison of DMFT index between ALL group and control group

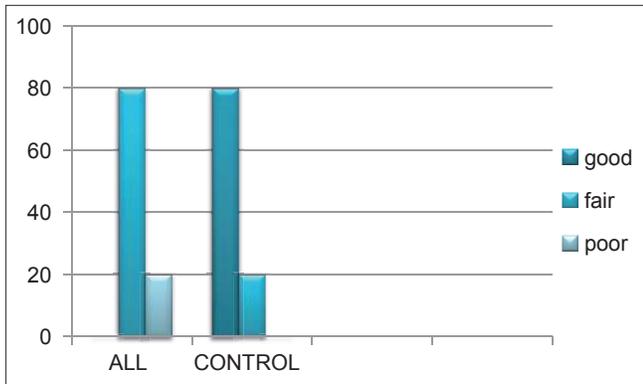
Group	deft (%)	DMFT (%)
ALL	76	46
Control	66	13

ALL: Acute lymphoblastic leukemia, DMFT: Decay-missing-filled teeth

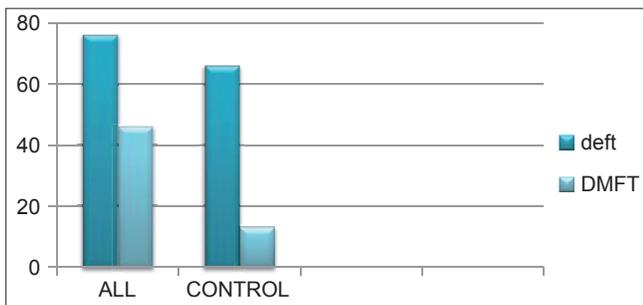
Table 6: Comparison of mean for DMFT index between ALL group and control group

Group (%)	ALL (%)	Control (%)
Mean	5.28	1.97
SD	1.87	1.56

ALL: Acute lymphoblastic leukemia, DMFT: Decay-missing-filled teeth, SD: Standard deviation



Graph 2: Comparison of oral hygiene index-simplified between acute lymphoblastic leukemia group and control



Graph 3: Comparison of decay-missing-filled teeth index between acute lymphoblastic leukemia group and control group

DISCUSSION

In the present study, OHS of ALL group was compared with that of the control group. The level of gingivitis was significantly higher in ALL group. The mean gingival index in ALL was found to be 1.59 as compared to 0.079 in the control group. 13% with severe gingivitis and 80% with moderate gingivitis was seen in ALL group as compared to the control group with 3% moderate gingivitis and 26% mild gingivitis. No severe gingivitis was seen in the control group. The gingiva appeared to be edematous, deep red and may bleed easily. This was in accordance with a study conducted by Javed *et al.* who also found that gingivitis was common in children with ALL as compared to healthy children.⁵ Similarly, Hegde *et al.* reported deterioration in gingival status in leukemic children when compared with control group.⁶ Also, Azher *et al.* showed increase in “Loe and Silness” gingival index in different phases of ALL treatment.⁷ Torres *et al.* reported that 91.84% of the ALL children had gingivitis.⁸ Similarly Nasim *et al.* in his study reported a poor gingival condition in patients undergoing chemoradiation therapy.⁹ Al-Mashhadane *et al.* also found that the chemotherapeutic agents modify the oral health, and there was a significant increase in plaque and gingival indices.¹⁰

The mean OHI- S value of ALL was found to be 2.29 compared to 0.82 in the control group. 20% of children from ALL group showed poor oral hygiene, whereas 80% showed fair oral hygiene. In control group, 80% of children had good oral hygiene whereas only 20% showed fair oral hygiene. There was a significant increase in plaque accumulation since brushing regimen was difficult to be followed in ALL group. Establishing a good oral hygiene was difficult due to their small age and the nature of the disease which was debilitating prevents performance of good oral hygiene. Hegde *et al.* also reported poor OHS in leukemic children when compared with the control group.⁶ However in contrast to this, Pels *et al.* found that oral hygiene was significantly better in children with ALL than in healthy children and the results were attributed to the oral hygiene regimen that the children were following during the cancer treatment protocol.¹¹

The DMFT of 46% and deft of 76% which was found to be significantly higher in the ALL group than in the control group with DMFT of 13% and deft of 66%. The mean value of ALL was found to be 5.28 as compared to 1.97 in the control group. The number of decayed teeth in primary dentition were more than that in permanent dentition, which could be related to inadequacy in manual brushing in these age group and more prolonged time the primary teeth being exposed to the bacterial plaque. Decayed teeth were more in the ALL group since oral pediatric medications contain high amounts of sucrose. Hegde *et al.* and Dens *et al.* have reported high caries prevalence in leukemic children.^{6,12} Furthermore, Azher *et al.* found increased DMFT/def index ALL.⁷ Xerostomia was one of the most frequent effects of radiotherapy which makes them prone for dental caries. Javed *et al.* showed children with ALL had a reduced salivary flow rate, which makes them more susceptible to dental caries as compared to healthy children.⁵

CONCLUSION

- The gingival index, OHI, DMFT index was significantly higher in the ALL group compared to healthy children.
- Maintenance of good oral hygiene and simultaneous caries treatment should be considered mandatory to prevent any dental and periodontal infections in leukemic children.
- Recommended to educate and reinforce the caretaker and child about the importance of oral care, which can compromise child's health and quality of life during the treatment procedure. Therefore, the chances for a successful outcome of oncology treatment can be improved.

REFERENCES

1. Greenberg MS. *Burket's Oral Medicine*. 11th ed. Hamilton: BC Decker; 2008. p. 400-1.
2. Smith MA, Ries LA. *Childhood Cancer: Incidence, Survival, and Mortality*. Philadelphia: Lippincott Williams & Wilkins; 2002. p. 1-12.
3. Mathur VP, Dhillon JK, Kalra G. Oral health in children with leukemia. *Indian J Palliat Care* 2012;18:12-8.
4. Pereira Pinto L, de Souza LB, Gordón-Núñez MA, Soares RC, de Brito Costa EM, de Aquino AR, *et al*. Prevention of oral lesions in children with acute lymphoblastic leukemia. *Int J Pediatr Otorhinolaryngol* 2006;70:1847-51.
5. Javed F, Utreja A, Bello Correa FO, Al-Askar M, Hudieb M, Qayyum F, *et al*. Oral health status in children with acute lymphoblastic leukemia. *Crit Rev Oncol Hematol* 2012;83:303-9.
6. Hegde AM, Joshi S, Rai K, Shetty S. Evaluation of oral hygiene status, salivary characteristics and dental caries experience in acute lymphoblastic leukemic (ALL) children. *J Clin Pediatr Dent* 2011;35:319-23.
7. Azher U, Shiggaon N. Oral health status of children with acute lymphoblastic leukemia undergoing chemotherapy. *Indian J Dent Res* 2013;24:523.
8. Ponce-Torres E, Ruíz-Rodríguez Mdel S, Alejo-González F, Hernández-Sierra JF, Pozos-Guillén Ade J. Oral manifestations in pediatric patients receiving chemotherapy for acute lymphoblastic leukemia. *J Clin Pediatr Dent* 2010;34:275-9.
9. Nasim VS, Shetty YR, Hegde AM. Dental health status in children with acute lymphoblastic leukemia. *J Clin Pediatr Dent* 2007;31:210-3.
10. Al-Mashhadane FA. Oral health status among children receiving chemotherapy. *Dent J* 2007;7:96-100.
11. Pels E, Mielnik-Blaszczak M. Oral hygiene in children suffering from acute lymphoblastic leukemia living in rural and urban regions. *Ann Agric Environ Med* 2012;19:529-33.
12. Dens F, Boute P, Otten J, Vinckier F, Declerck D. Dental caries, gingival health, and oral hygiene of long term survivors of paediatric malignant diseases. *Arch Dis Child* 1995;72:129-32.

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Effect of Intravenous Dexamethasone in Prolonging the Duration of Supraclavicular Brachial Plexus Block with 0.5% Ropivacaine: A Prospective, Randomized, Placebo Controlled Study

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Abstract

Background: Supraclavicular brachial plexus block provides excellent, but time limited analgesia. In this study, we evaluated the effect of intravenous (IV) dexamethasone on the duration of the supraclavicular brachial plexus block with ropivacaine. The primary end points were onset and total duration of sensory and motor block, quality of analgesia and duration of analgesia.

Materials and Methods: After obtaining Institutional Ethical Committee's approval and getting informed consent from the patients, 80 patients were divided into two groups RD and R comprising of 40 each in a randomized, double blinded fashion. Group RD received 30 ml of 0.5% ropivacaine with IV dexamethasone 10 mg (2.5 ml). Group R received 30 ml of ropivacaine with IV 2.5 ml of normal saline. Motor and sensory block onset times, block duration, quality and duration of analgesia were recorded.

Results: Demographic and surgical characteristics were similar in both the groups. The mean duration of analgesia in Group RD was 934 ± 68 min (15.56 h), whereas in Group R, it was 342 ± 48.7 min (5.7 h) ($P < 0.0001$). The mean duration of motor block in Group RD and Group R were 425 ± 38.2 min (11.12 h) and 226 ± 36.4 min (6.2 h), respectively ($P < 0.0001$). Both these data were highly significant statistically.

Conclusion: IV dexamethasone significantly prolongs the analgesic duration of single-shot supraclavicular brachial plexus block with ropivacaine. As dexamethasone is not licensed for perineural use, clinicians should consider IV administration of dexamethasone to achieve increased duration of analgesia.

Key words: Dexamethasone, Ropivacaine, Supraclavicular brachial plexus block

INTRODUCTION

Regional block technique, like brachial plexus block is a popular and widely employed block for peri-operative anesthesia and as analgesia for surgeries of the upper extremity.¹ Now-a-days various drugs have been used with local anesthetics to achieve quick results, dense and prolonged block.² Unwanted effects of the anesthetic

drugs which are used during general anesthesia, stress of laryngoscopy and tracheal intubation with the use of regional nerve block are avoided.³ Along with this other local anesthetics drugs like morphine, epinephrine, clonidine, pethidine, midazolam are used.⁴ However, these may lead to certain side-effects such as sedation, psychomimetic effects, respiratory depression, pruritis, etc.⁵ Drugs having minimal side-effects and prolonged duration of analgesia are always looked for. In literature various studies have proved the efficacy like steroids such as Dexamethasone, which prolongs effects on the duration of regional nerve blocks.⁶ It is very potent and selective glucocorticoid. Usually, this drug is used for anti-inflammatory and immunosuppressant action.⁷ Clinical uses of dexamethasone are also used to treat patients suffering from neuropathic pain and complex regional pain

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syndromes.^{8,9} The systemic anti-inflammatory properties are probably responsible for prolonged analgesia after single shot supraclavicular block. Our aim is to evaluate the efficacy of intravenous (IV) dexamethasone with ropivacaine in prolonging the duration of supraclavicular block compared with ropivacaine with normal saline.

MATERIALS AND METHODS

The present study was conducted from May 2014 to August 2014 in Government General Hospital, Rangaraya Medical College, Kakinada. Ethical clearance was obtained from Ethical Committee approval and informed consent was taken from patient those who were included in study. A total of 80 patients aged between 20 and 45 years posted for elective orthopedic surgeries of upper limb under supraclavicular brachial plexus block, belonging to American Society of Anesthesiologists (ASA) grading I and II of either sexes, weighing 40-75 kg were taken up for this study.

Exclusion Criteria

- Patient whose refused to participate in study
- Patients belonging to ASA III and IV
- Patients having history of allergy to local anesthetics or corticosteroids like dexamethasone
- Coagulopathy, diabetes mellitus
- Local infection at the site of proposed puncture for supraclavicular block
- Systemic use of corticosteroids within 6 months before surgery
- Pre-existing neuropathy involving the surgical limb.

Patients were randomly divided by simple random sampling into two groups, such as RD and R with 40 of them in each group.

In the operation theatre, IV fluid was started and IV access was secured with 18G cannula on the opposite limb. Baseline parameters were recorded by attaching all the basic monitoring devices like oxygen saturation (SpO₂), electrocardiogram (ECG), noninvasive blood pressure (NIBP).

Premedication was given to patient with tablet rantac - 150 mg night before surgery and injection midazolam 0.05 mg/kg intra-muscular (IM) 1 h prior to surgery.

Then later in supine position with head turned 45° to the opposite side and arm placed by the side of chest supraclavicular block was performed using nerve stimulation technique. Then needle insertion site was prepared with by use of antiseptic solution. About 1-1.5 cm above the midclavicular point subclavian artery pulsations

were felt, 50 mm long insulated needle was inserted in caudad, backward and medial direction. When muscle contractions were seen at stimulating current between 0.2 mA and 0.5 mA at 2 Hz frequency with pulse width of 0.1 ms, drugs were injected with intermittent negative aspiration. Group RD received 30 ml of 0.5% ropivacaine with 10 mg (2.5 ml) dexamethasone IV. Group R received 30 ml of ropivacaine with 2.5 ml of IV normal saline.

After institution of the blockade following parameters were assessed:

- Sensory blockade was tested using pin prick method along the distribution of the four nerves (median nerve, radial nerve, ulnar nerve and musculocutaneous nerve)
- The duration of analgesia is defined as the time interval between the end of local anesthetic administration to the time when patient had visual analog scale score of ≥ 4
- Onset of sensory blockade is considered as the time interval between the end of local anesthetic administration and loss of sensation to pin prick
- Motor blockade assessment was done using the modified Bromage scale for upper extremities on a three point scale.

Modified Bromage Scale (Three Point Scale)

- Grade 0 = Normal motor function with full flexion/extension of elbow, wrist and fingers
- Grade 1= Decreased motor strength with ability to move fingers and/or wrist only
- Grade 2= Complete motor blockade with inability to move fingers.
 - Onset of motor blockade is considered as the time interval between the end of local anesthetic administration and inability to move fingers
 - The duration of motor blockade is defined as the time interval between the end of local anesthetic administration and the recovery of complete motor function of the hand and forearm
 - Surgery was allowed to proceed when complete anesthesia was achieved. Intra-operatively heart rate, ECG, NIBP, SPO₂ were monitored
 - The quality of intra operative analgesia was judged by the investigator at the end of surgery.

As excellent (no discomfort or pain) good (mild pain or discomfort, no need for additional analgesics) fair (pain that required additional analgesics) or poor (moderate or severe pain that needed more than 100 µg of fentanyl or general anesthesia.

Post operatively, motor blockade and verbal rating scale score were assessed every hourly. Injection diclofenac 75 mg IM was administered as rescue analgesic.

Statistical Analysis

Data were compiled systematically and Student's *t*-test, Chi-square test were used to analyze the data. $P < 0.05$ was considered as significant and $P < 0.0001$ as highly significant.

RESULTS

The study was conducted on eighty patients.

In both the groups, patient's demographic profiles were comparable with regards to age, sex, weight, ASA status and mean duration of surgery (Table 1).

The mean time to onset of sensory block in minutes was 16.92 ± 4.63 in Group RD and 18.46 ± 3.55 in Group R ($P = 0.19$). Statistically not significant.

The mean time to onset of motor block in minutes in Group RD and Group R was 21.82 ± 3.61 and 23.43 ± 3.89 respectively ($P = 0.1359$). Statistically not significant.

Mean time to onset of sensory and motor blockade were earlier in dexamethasone group compared to the control group, but it is not statistically significant ($P > 0.05$).

Duration of motor block and duration of analgesia were prolonged in dexamethasone group compared to the control group. It is statistically very significant as $P < 0.0001$ (Figure 1).

In our study, the mean duration of analgesia in Group RD was 934 ± 68 min (15.56 h) whereas in Group R it was 342 ± 48.7 min (5.7 h) ($P < 0.0001$), highly significant statistically.

The mean duration of motor block in Group RD and Group R were 425 ± 38.2 min (11.12 h) and 226 ± 36.4 min (6.2 h) respectively ($P < 0.0001$), highly significant statistically.

Interpretation: The pain scores of RD group were significantly less than the ropivacaine group (Figure 2).

Incidence of nausea in Group RD was 4%, in Group R was 16%, which is statistically significant.

Incidence of tingling/numbness in the early post-operative period is 4% in Group RD, 8% in Group R, which is statistically not significant.

DISCUSSION

Regional anesthesia is a simple, safe, effective technique of anesthesia having distinct advantages over general and IV regional anesthesia very particularly for day care surgeries. Hence, regional anesthesia techniques are gaining prominence now-a-days. The main reason is they can be utilized for analgesia during post-operative period besides avoiding all the problems associated with general anaesthesia.¹⁰

Supraclavicular brachial plexus block is also simple to perform, safe and effective technique which produces a reliable block of the upper extremity.¹¹ Several adjuvants like ketamine, epinephrine, opioids, alpha-2 agonists etc. can be added to local anesthetics to prolong the duration of regional blocks and also to intensify the quality of regional blocks.^{12,13} In our study we evaluated the efficacy of IV. Dexamethasone added to ropivacaine for supraclavicular brachial plexus block.¹⁴

Intra operative assessments regarding the onset, duration and quality of both sensory and motor blocks were carried out by an observer anesthetist who was blinded to group allocation and the study drug.

The demographic profiles of the patients in both the groups were comparable with regards to age, sex and weight, ASA status and mean duration of surgery. Statistically not significant ($P > 0.05$).

The mean time to onset of sensory block in minutes was 12.5 ± 2.6 in Group R and 11.9 ± 2.8 in Group RD ($P = 0.875$). Statistically not significant (Table 2).

The mean time to onset of motor block in minutes in Group R and Group RD was 17.3 ± 2.7 and 16.2 ± 1.89 respectively ($P = 0.74$). Statistically not significant.

Steroids are very potent anti-inflammatory and immunosuppressive agents. Perineural/IV injection of

Table 1: Comparison of demographic data

Demographic data	R	RD	P value
Age	51.0±12.6	50.6±14.0	0.959 (>0.05) ^{NS}
Sex (M: F)	15:10	16:9	0.382 (>0.05) ^{NS}
Weight	62.4±6.8	63.3±3.2	0.905 (>0.05) ^{NS}
ASA I/II	22/3	21/4	0.858 (>0.05) ^{NS}
Surgical duration (min)	93±36	98±42	0.569 ^{NS}

Values are expressed as mean±standard deviation, NS: Not significant

Table 2: Comparison of block characteristics in two groups

	R	RD	P value
Onset of sensory block (min)	12.5±2.6	11.9±2.8	0.875 (>0.05)
Onset of motor block (min)	17.3±2.7	16.2±1.89	0.740 (>0.05)
Duration of analgesia (min)	342±48.7	934±68.1	0.0001 (<0.05)
Duration of motor block (min)	226±36.4	425±38.2	0.0001 (<0.05)

steroids is reported to influence post-operative analgesia as well.^{15,16}

IV/perineural use of dexamethasone has an equivalence analgesic effect in a study done by Desmet *et al.*¹⁷ When given systemically after intracellular uptake glucocorticoids will activate cytoplasmatic glucocorticoid receptors which will bind to glucocorticoid response elements in DNA. This leads to both decreased production of inflammatory proteins (Ox-2, iNOS, cytoplasmic phospholipase A2, interleukins [ILs] inflammatory chemokines, etc.) and increased production of anti-inflammatory proteins (lipocortin-1 [IL-1]) receptor antagonist.

Though the safety of perineural dexamethasone has been questioned, the use of dexamethasone at doses between 4 and 12 mg via IV, perineural and epidural routes is described in regional anesthesia and pain medicine text books.¹⁸ However *in vivo* and *in vitro* animal studies also proved that locally applied corticosteroids have no long term effects on the structure, electric properties or function of peripheral nerves.¹⁹

Synthetic glucocorticoid dexamethasone is preferred in various studies because of its potential and lack of mineralocorticoid activity. Dexamethasone is also known for its anti-emetic property. Dexamethasone is the preferred anti-emetic agent in cases of refractory nausea and vomiting.

Limitations of our study are we did not use ultrasound guided block as our experience was insufficient to use US based technique. Analgesics were only administered on request and a post-operative regimen with regular analgesic administration might have impacted our secondary outcomes. Such a regimen is often not easy to implement in an ambulatory setting.

We did not follow up the patients for long periods >3 months for chronic neurological effects of dexamethasone. The dose we used in our study is a safe dose, which was proved in several clinical trials. No significant side-effects were noted in the study group in our study.

Kopacz and Holte *et al.*, found that addition of small amounts of dexamethasone to bupivacaine incorporated in micro capsules prolonged local analgesia compared with microcapsules with plain bupivacaine after subcutaneous administration in humans Pathak *et al.*, showed that there was no significant difference in the onset time to sensory and motor blocks between two groups in their study, which correlated with the findings of our study.²⁰

In our study, the mean duration of analgesia in Group RD was 934 ± 68 min (15.56 h) whereas in Group R it was

342 ± 48.7 min (5.7 h) ($P < 0.0001$), highly significant statistically (Table 3).

The mean duration of motor block in Group RD and Group R were 425 ± 38.2 min (11.12 h) and 226 ± 36.4 min (6.2 h) respectively ($P < 0.0001$), highly significant statistically.

In a previous study by Cummings *et al.*, they reported that dexamethasone prolonged analgesia from interscalene blocks using ropivacaine or bupivacaine, with the effect being stronger with ropivacaine. Dexamethasone with either drug prolonged the duration of analgesia.²¹

In a study by Shrestha *et al.*, the authors found that there was significantly faster onset of action (14.5 ± 2.10 min

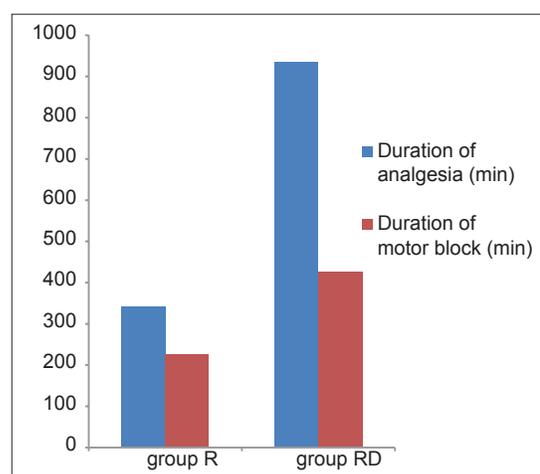


Figure 1: Peri-operative block characteristics

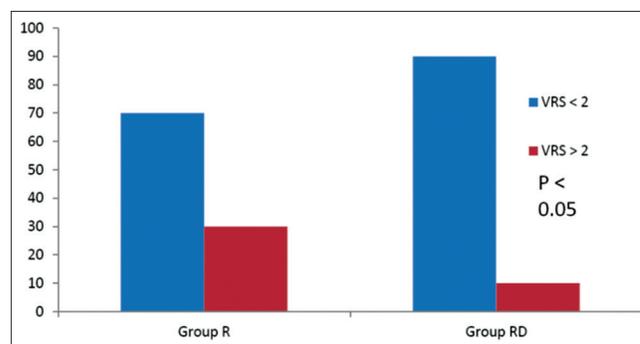


Figure 2: Comparison of verbal rating scale of two groups

Table 3: Quality of analgesia in two groups

	Group-R	Group-RD	P value
Excellent	38	27	>0.05
Good	2	2	
Fair	0	1	
Poor	0	0	
Time to first analgesic request (h)	5.7±0.40	15.56±0.30	<0.0001
Post-operative analgesic consumption during the first 24 h (n [%])	30 (75)	18 (45)	0.0115

Values are expressed as mean±standard deviation, numbers or %

vs. 18.15 ± 4.25 min; $P < 0.05$) and prolonged duration of analgesia (12.75 ± 5.33 h vs. 3.16 ± 0.48 h; $P < 0.001$) in the dexamethasone group than in the other group.²²

Parrington *et al.*, showed that dexamethasone added to mepivacaine prolongs the duration of analgesia (332 min vs. 228 min in control group) after supraclavicular brachial plexus block. The onset time of sensory and motor blocks were similar in both the groups.²³

Several studies have shown that addition of 4-8 mg of dexamethasone to local anesthetics effectively and significantly prolongs the duration of analgesia.

There is no significant hemodynamic variability between the two groups.

Incidence of nausea in Group RD was 4%, in Group R was 16%, which is statistically significant. Lower incidence of nausea is because of antiemetic action of dexamethasone.

Incidence of tingling/numbness in the early post-operative period is 4% in Group RD, 8% in Group R, which is statistically not significant. The tingling/numbness disappeared few hours later post-operatively.

CONCLUSION

Administration of IV dexamethasone along with supraclavicular brachial plexus block with local anesthetics significantly helps in prolonging duration of analgesia in patients undergoing upper limb surgeries and is comparatively safe and cost-effective method of providing post-operative analgesia.

REFERENCES

- Bridenbaugh LD. The upper extremity: Somatic blockade. In: Cousins MJ, Bridenbaugh PO, editors. *Neural Blockade in Clinical Anaesthesia and Management of Pain*. Philadelphia: J.B. Lippincott; 1988. p. 387-416.
- Moore DC. Regional block. *A Hand Book for Use in the Clinical Practice of Medicine and Surgery*. 4th ed. Spring Field: Charles C Thomas; 1975. p. 221.
- Kulenkampff D. Brachial plexus anaesthesia: Its indications, technique, and dangers. *Ann Surg* 1928;87:883-91.
- Neal JM, Hebl JR, Gerancher JC, Hogan QH. Brachial plexus anesthesia: essentials of our current understanding. *Reg Anesth Pain Med* 2002;27:402-28.
- Patrick J. Technique of brachial plexus block anaesthesia. *Br J Surg* 1940;27:734.

6. Benzon HT, Chew TL, McCarthy RJ, Benzon HA, Walega DR. Comparison of the particle sizes of different steroids and the effect of dilution: a review of the relative neurotoxicities of the steroids. *Anesthesiology* 2007;106:331-8.
7. Kopacz DJ, Lacouture PG, Wu D, Nandy P, Swanton R, Landau C. The dose response and effects of dexamethasone on bupivacaine microcapsules for intercostal blockade (T9 to T11) in healthy volunteers. *Anesth Analg* 2003;96:576-82.
8. Yadav RK, Sah BP, Kumar P, Singh SN. Effectiveness of addition of neostigmine or dexamethasone to local anaesthetic in providing perioperative analgesia for brachial plexus block: A prospective, randomized, double blinded, controlled study. *Kathmandu Univ Med J (KUMJ)* 2008;6:302-9.
9. Bani-Hashem N, Hassan-Nasab B, Pour EA, Maleh PA, Nabavi A, Jabbari A. Addition of intrathecal dexamethasone to bupivacaine for spinal anesthesia in orthopedic surgery. *Saudi J Anaesth* 2011;5:382-6.
10. Vieira PA, Pulai I, Tsao GC, Manikantan P, Keller B, Connelly NR. Dexamethasone with bupivacaine increases duration of analgesia in ultrasound-guided interscalene brachial plexus blockade. *Eur J Anaesthesiol* 2010;27:285-8.
11. Kim YJ, Lee GY, Kim DY, Kim CH, Baik HJ, Heo S. Dexamethasone added to levobupivacaine improves postoperative analgesia in ultrasound guided interscalene brachial plexus blockade for arthroscopic shoulder surgery. *Korean J Anesthesiol* 2012;62:130-4.
12. McCartney CJ, Brull R, Chan VW, Katz J, Abbas S, Graham B, *et al.* Early but no long-term benefit of regional compared with general anesthesia for ambulatory hand surgery. *Anesthesiology* 2004;101:461-7.
13. Murphy DB, McCartney CJ, Chan VW. Novel analgesic adjuncts for brachial plexus block: a systematic review. *Anesth Analg* 2000;90:1122-8.
14. De Oliveira GS Jr, Almeida MD, Benzon HT, McCarthy RJ. Perioperative single dose systemic dexamethasone for postoperative pain: a meta-analysis of randomized controlled trials. *Anesthesiology* 2011;115:575-88.
15. Golwala M, Swadia V, Dhimar A, Sridahr N. Pain relief by dexamethasone as an adjuvant to local anaesthetics in supraclavicular brachial plexus block. *J Anaesth Clin Pharmacol* 2009;25:285-8.
16. Castillo J, Curley J, Hotz J, Uezono M, Tigner J, Chasin M, *et al.* Glucocorticoids prolong rat sciatic nerve blockade *in vivo* from bupivacaine microspheres. *Anesthesiology* 1996;85:1157-66.
17. Desmet M, Braems H, Reynvoet M, Plasschaert S, Van Cauwelaert J, Pottel H, *et al.* I.V. and perineural dexamethasone are equivalent in increasing the analgesic duration of a single-shot interscalene block with ropivacaine for shoulder surgery: A prospective, randomized, placebo-controlled study. *Br J Anaesth* 2013;111:445-52.
18. Johansson A, Dahlin L, Kerns JM. Long-term local corticosteroid application does not influence nerve transmission or structure. *Acta Anaesthesiol Scand* 1995;39:364-9.
19. Holte K, Werner MU, Lacouture PG, Kehlet H. Dexamethasone prolongs local analgesia after subcutaneous infiltration of bupivacaine microcapsules in human volunteers. *Anesthesiology* 2002;96:1331-5.
20. Pathak RG, Satkar AP, Khade RN. Supraclavicular brachial plexus block with and without dexamethasone - A comparative study. *Int J Sci Res Publi* 2012;2:2250-3153.
21. Elhakim M, Ali NM, Rashed I, Riad MK, Refat M. Dexamethasone reduces postoperative vomiting and pain after pediatric tonsillectomy. *Can J Anaesth* 2003;50:392-7.
22. Shrestha BR, Maharjan SK, Shrestha S, Gautam B, Thapa C, Thapa PB, *et al.* Comparative study between tramadol and dexamethasone as an admixture to bupivacaine in supraclavicular brachial plexus block. *JNMA J Nepal Med Assoc* 2007;46:158-64.
23. Parrington SJ, O'Donnell D, Chan VW, Brown-Shreves D, Subramanyam R, Qu M, *et al.* Dexamethasone added to mepivacaine prolongs the duration of analgesia after supraclavicular brachial plexus blockade. *Reg Anesth Pain Med* 2010;35:422-6.

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Relationship between Serum Lactate Levels and Fatal Outcome in Critically Ill Patients: A Prospective Study in Intensive Care Unit

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Abstract

Introduction: Blood lactate levels are suggested as more important parameter to evaluate patient condition particularly in critical illness.

Aim: The aim of this study is to find a relation between lactate levels and hospital fatal outcome in critical illness.

Methods: This was a prospective observational study in 125 critical ill-patients admitted in intensive care unit. Serial serum lactate levels were estimated from the time of admission for every 24 h and the results were correlated with Acute Physiology and Chronic Health Evaluation II (APACHE) score and fatal outcome.

Results: Non-survivors ($n = 32$, 25%) had significantly higher lactate levels than survivors at the time of admission (137.5 mg/dl vs. 37.7 mg/dl). Fatal outcome rate was significantly higher in patients with lactate levels 100 mg/dl or higher when compared with lactate levels below 100 mg/dl. A significant positive correlation was observed between APACHE II scores and admission lactate levels in nonsurvivors.

Conclusion: Serum lactate measurement plays a significant role in detection of fatal outcome in critical illness patients.

Keywords: Acute Physiology and Chronic Health Evaluation II, critical illness, fatal outcome, intensive care unit

INTRODUCTION

Lactate is a quantitatively important oxidizable substrate and gluconeogenic precursor, as well as a means by which metabolism in various tissues is coordinated. Assessment of blood lactate is easier and faster, but the use of blood lactate monitoring for risk assessment is still controversial. Hyperlactemia associated with metabolic acidosis is a major predictor of mortality in patients with sepsis or after cardiovascular shock, and the evolution of lactate concentration after therapeutic management can more accurately predict the outcome.¹⁻³ Lactate measurement in

critically ill patients is practical and can provide information on illness severity and prognosis, because a high lactate level is most frequently, but not always, interpreted as resulting from anaerobic metabolism, particularly when associated with metabolic acidosis.⁴ Elevated lactate levels are also associated with multi organ dysfunction post-operatively, following trauma and septic shock⁵⁻⁸ and it has been suggested that hyperlactatemia is associated with worst outcome.⁸⁻¹¹ Persistence of lactate levels above normal is associated with higher mortality rates in patients with severe sepsis, shock and in post cardiac arrest patients.⁹ The present study aims to check whether elevated venous lactate levels show any relation with mortality in critically ill patients.

METHODS

This is a prospective observational study over 125 critically ill patients in intensive care unit (ICU) of NRIGH and

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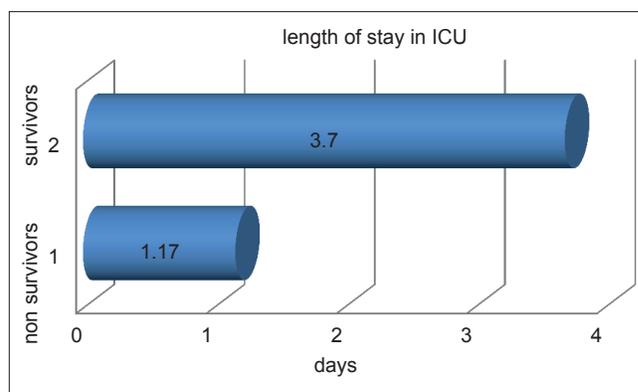
the Institutional ethical committee clearance was obtained to conduct the study. Serial lactate levels were measured from venous blood samples of 125 critically ill patients from the day 1 of their admission into ICU and the next 24 h, 48 h and 72 h of their stay in ICU. A detailed history of reason for ICU admission, mechanical ventilation, Acute Physiology and Chronic Health Evaluation II (APACHE II) score, length of stay (LOS) ICU were taken from all 125 critically ill patients. Serum lactate was measured by enzymatic colorimetric method on Randox daytona automated instrument with reference values 4.5-19.8 mg/dl. All the general characteristics like age, LOS in ICU and lactate levels were analyzed using mean, standard deviation and *P* value. Serum Lactate levels at the time of admission was correlated with fatal outcome and APACHE II scores using Pearson's correlation coefficient.

RESULTS

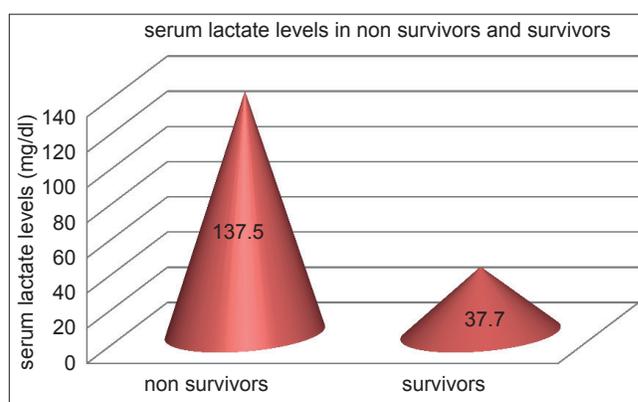
The non-survivors out of 125 patients was 25% (*n* = 32) and was higher in patients with hyper lactatemia during ICU stay when compared with those without hyper lactatemia as shown in Table 1. It was also observed that the LOS in ICU for non-survivors is very less when compared with survivors (1.15 vs. 3.37 days) as shown in Table 1 and Graph 1. The admission mean lactate level was significantly higher in non survivors than hospital survivors (137.5 mg/dl vs. 37.7 mg/dl) which is shown in Table 1 and Graph 2. A significant positive correlation was observed between APACHE II score and admission lactate levels in non survivors (*r* = 0.691) as shown in Graph 3.

DISCUSSION

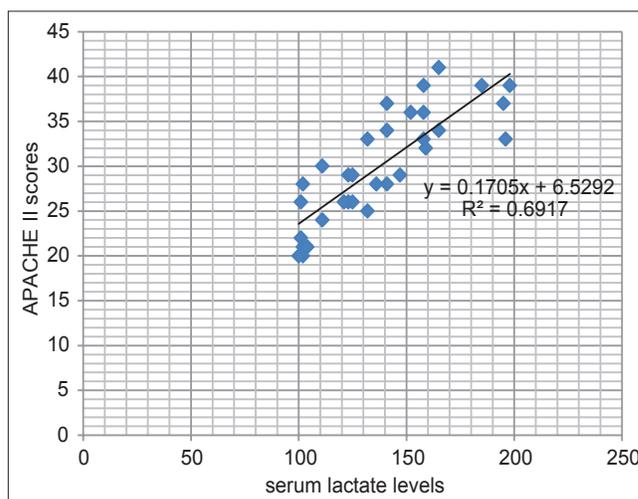
Hyper lactatemia in critically ill-patients may reflect the imbalance between local or systemic oxygen supply and oxygen consumption.¹² Hyperlactatemia may also found in increased aerobic glycolysis in hypermetabolic states from various causes like alkalosis in hyper ventilation, sepsis or low flow rates.^{13,14} The pathologic causes of hyper



Graph 1: Length of stay in intensive care unit. Non survivors had very less stay when compared with survivors in intensive care unit



Graph 2: Admission mean serum lactate levels in non survivors are very high when compared with survivors



Graph 3: A strong positive correlation of serum lactate levels with Acute Physiology and Chronic Health Evaluation II scores in non-survivors

Table 1: General characteristics of all patients, survivors and non survivors

Characteristics	All patients (n=125)	Non survivors (n=32)	Survivors (n=93)	<i>P</i> value
Age (years, ±SD)	60±15	62±14	52±19	<0.001
LOS-ICU (days, ±SD)	5±2	1.15±0.36	3.7±1.3	<0.001
Serum lactate levels, at the time of admission (mg/dl)	86.8±71	137.5±29.8	37.7±13.9	<0.001
APACHE II scores	16.9±9	30±6.1	12.2±5.7	<0.001

LOS: Length of stay, ICU: Intensive care unit, SD: Standard deviation, APACHE II: Acute Physiology and Chronic Health Evaluation II

lactatemia were divided between those with evidence of well-known causes of hypoxia and those with no detectable disturbance in oxygen transport in the usual sense.¹⁵ The body is capable enough to clear large lactate levels from

blood, but several clinical conditions like liver dysfunction, following cardiac surgery and sepsis are associated with impaired lactate clearance.¹⁶ A recent health technology assessment on the use of lactate levels in critically ill patients showed increased lactate levels in blood has a relation to morbidity and mortality both in emergency department and in ICU, indicating the lactate levels has a place in risk stratification.¹⁷ This study of lactate levels in relation with mortality rate helped in assessing the prognosis of the patient. In survivors the admission lactate level, which are elevated but below 100 mg/dl were normalized within 3-4 days showing decreased mortality rate, but in non survivors the admission lactate levels which are more than 100 mg/dl were not normalized and the patients died within 36 h which clearly indicates that lactate levels are very good indicators for mortality. Many other studies have found that elevated lactate levels are associated with mortality rate following cardiothoracic surgery, trauma, major abdominal surgery, sepsis, ventilated neonates,¹⁸⁻²² which are going in accordance with our present study. According to a recent study, patients with hyperlactatemia in ICU admission, lactate-guided therapy significantly reduced hospital fatal outcome which suggests that initial lactate monitoring has much clinical benefit.²³

CONCLUSION

We conclude that hyper lactatemia is having a strong relation with the fatal outcome in critically ill patients; serum lactate level at the time of admission may act as an important predictor for mortality and morbidity in critically ill patients.

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REFERENCES

1. Bakker J, Gris P, Coffernils M, Kahn RJ, Vincent JL. Serial blood lactate levels can predict the development of multiple organ failure following septic shock. *Am J Surg* 1996;171:221-6.
2. Brooks GA. Cell-cell and intracellular lactate shuttles. *J Physiol* 2009;587:5591-600.
3. Stacpoole PW, Wright EC, Baumgartner TG, Bersin RM, Buchalter S,

- Curry SH, et al. Natural history and course of acquired lactic acidosis in adults. DCA-Lactic Acidosis Study Group. *Am J Med* 1994;97:47-54.
4. Handy J. Lactate – The bad boy of metabolism, or simply misunderstood? *Curr Anaesth Crit Care* 2006;17:71-6.
5. Abramson D, Scalea TM, Hitchcock R, Trooskin SZ, Henry SM, Greenspan J. Lactate clearance and survival following injury. *J Trauma* 1993;35:584-8.
6. Donati A, Cornacchini O, Loggi S, Caporelli S, Conti G, Falcetta S, et al. A comparison among portal lactate, intramucosal sigmoid Ph, and deltaCO₂ (PaCO₂ - regional Pco₂) as indices of complications in patients undergoing abdominal aortic aneurysm surgery. *Anesth Analg* 2004;99:1024-31.
7. Callaway DW, Shapiro NI, Donnino MW, Baker C, Rosen CL. Serum lactate and base deficit as predictors of mortality in normotensive elderly blunt trauma patients. *J Trauma* 2009;66:1040-4.
8. Mizok BA. Redox repairs, tissue hypoxia, organ dysfunction and mortality. *Crit Care Med* 2000;28:270-2.
9. Tuschmidt J, Fried J, Swinney R, Sharma OP. Early hemodynamic correlates of survival in patients with septic shock. *Crit Care Med* 1989;17:719-23.
10. Weil MH, Afifi AA. Experimental and clinical studies on lactate and pyruvate as indicators of the severity of acute circulatory failure (shock). *Circulation* 1970;41:989-1001.
11. Bakker J, Coffernils M, Leon M, Gris P, Vincent JL. Blood lactate levels are superior to oxygen-derived variables in predicting outcome in human septic shock. *Chest* 1991;99:956-62.
12. van Beest PA, Brander L, Jansen SP, Rommes JH, Kuiper MA, Spronk PE. Cumulative lactate and hospital mortality in ICU patients. *Ann Intensive Care* 2013;3:6.
13. Druml W, Grimm G, Lagner AN, Lenz K, Schneeweiss B. Lactic acid kinetics in respiratory alkalosis. *Crit Care Med* 1991;19:1120-4.
14. Levraut J, Ciebiera JP, Chave S, Rabary O, Jambou P, Carles M, et al. Mild hyperlactatemia in stable septic patients is due to impaired lactate clearance rather than overproduction. *Am J Respir Crit Care Med* 1998;157:1021-6.
15. Huckabee WE. Abnormal resting blood lactate. I. The significance of hyperlactatemia in hospitalized patients. *Am J Med* 1961;30:840-8.
16. Andersen O, Haugaard SB, Jørgensen LT, Sørensen S, Nielsen JO, Madsbad S, et al. Preanalytical handling of samples for measurement of plasma lactate in HIV patients. *Scand J Clin Lab Invest* 2003;63:449-54.
17. Jansen TC, van Bommel J, Bakker J. Blood lactate monitoring in critically ill patients: A systematic health technology assessment. *Crit Care Med* 2009;37:2827-39.
18. Toraman F, Evrenkaya S, Yuce M, Aksoy N, Karabulut H, Bozkulak Y, et al. Lactic acidosis after cardiac surgery is associated with adverse outcome. *Heart Surg Forum* 2004;7:E155-9.
19. Cerović O, Golubović V, Spec-Marm A, Kremzar B, Vidmar G. Relationship between injury severity and lactate levels in severely injured patients. *Intensive Care Med* 2003;29:1300-5.
20. Husain FA, Martin MJ, Mullenix PS, Steele SR, Elliott DC. Serum lactate and base deficit as predictors of mortality and morbidity. *Am J Surg* 2003;185:485-91.
21. Deshpande SA, Platt MP. Association between blood lactate and acid-base status and mortality in ventilated babies. *Arch Dis Child Fetal Neonatal Ed* 1997;76:F15-20.
22. Park M, Azevedo LC, Maciel AT, Pizzo VR, Noritomi DT, da Cruz Neto LM. Evolutionary standard base excess and serum lactate level in severe sepsis and septic shock patients resuscitated with early goal-directed therapy: Still outcome markers? *Clinics (Sao Paulo)* 2006;61:47-52.
23. Jansen TC, van Bommel J, Schoonderbeek FJ, Sleswijk Visser SJ, van der Klooster JM, Lima AP, et al. Early lactate-guided therapy in intensive care unit patients: A multicenter, open-label, randomized controlled trial. *Am J Respir Crit Care Med* 2010;182:752-61.

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Prevalence and Treatment Adequacy of Migraine Among Semi Urban Population in Chennai

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Abstract

Introduction: Migraine is a common disorder having a significant impact on the quality of daily life. Despite the fact, migraine largely remains an under diagnosed and an undertreated condition. The study aims to assess the prevalence, distribution, treatment patterns and success among migraineurs.

Material and Methods: The study was conducted as a community based study using Kiel headache questionnaire developed based on the International Headache Society criteria for migraine. A visual acuity score chart was be used to establish treatment success. Study population and area: This study was done among adults 18 years and above with history of headaches for more than a year in the field practice area of the Community Medicine Department of TMCH during May to June 2014. Sample size: The sample size calculated was 340 (with the existing prevalence of 22.7% and 20% allowable error). Statistical technique: Data were entered in Excel sheet and analysis were be done using SPSS software.

Results: The prevalence of migraine among the 499 people who were sampled was 32%, while that of classical migraine was 11.2%. There was a female preponderance in the prevalence of migraine. Females accounted for 59.6% of the migraineurs and it was highly prevalent in adults among 31-45 years, who constituted 38% of the migraineurs. Prevalence of migraine was comparatively higher in people of socio-economic class 1 with 39.6% having migraine. Despite the frequency and severity of headaches only 32% of the migraineurs had sought physician consult, 39.6% claimed not taking any medicines and the rest were on self-medication. The treatment success rate was 38.3% and 1% of the study population had migraine prophylactic drugs.

Conclusion: Despite the higher prevalence of migraine in this population than the global prevalence, majority of them do not seek proper medical treatment.

Key words: Headache disorders, Migraine headache, Status migrainosus

INTRODUCTION

Headache is a common disorder of the central nervous system, which is associated with a significant disease burden. Migraine, a type of primary headache is particularly devitalizing, often interfering with and affecting work, social and leisure activities. The nature of the disorder is such that it leads to frequent absenteeism and deters work productivity. The burden of migraine can better be understood by the fact that nearly 4-9% of men and 11-25% of women in western countries and the prevalence rates

vary according to race and geography which was found to be highest in Caucasians, intermediate in African Americans and lowest in Asian Americans.^{1,2} Migraine accounts to about 1.4% of years lost due to disability providing an added financial perspective to the brunt of migraine.³ The impact on the quality of daily life is, therefore, substantial. Headaches during the initial years are usually episodic and mild and so people have qualms in visiting a physician for consult. The reluctance of the public to seek proper care, coupled with the use of analgesics rather than specific anti-migraine treatments predisposes people with episodic migraine to chronic transformed migraine. Health systems across the world continue to underrate, underreport and under-treat migraine. Health systems, therefore, have to acknowledge the multifaceted problems that act as barriers in providing proper care and have to adopt more stringent measures in the diagnosis and management of migraine. Prevalence studies have not been frequently conducted across communities in India. The aim of this study is to

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estimate the prevalence and distribution of migraine and to determine the patterns of treatment and their outcome among the people of a select community.

Aims and Objectives

1. To estimate the magnitude and distribution of migraine among adults in Chennai.
2. To assess the management patterns of migraine.
3. To assess the treatment satisfaction among people with migraine.

MATERIALS AND METHODS

Study Design

This study was conducted as a community based cross-sectional study.

Study Population

Adults 18 years and above. Inclusion criteria: Adults with a history of headaches for more than a year. Exclusion criteria: Family history of psychiatric illness, history of chronic diseases like diabetes, hypertension, Ischemic heart disease, etc.

Study Area

This study was conducted as a community-based survey under rural field practice area Kelambakkam.

Sample Size

Sample size was calculated by global prevalence of migraine study conducted by Todd *et al.*⁴ showing 22.7% from statistics National surveillance studies. The calculated sample size was 340 by using the formula $4 \times p \times q/d^2$ with the allowable error of 20%.

340 (with the existing migraine prevalence of 22.7%) – Allowable error of 20% - $4 \times p \times q$ divided by $d^2 = 4 \times 22.7 \times 77.3/4.54^2 = 340$

Study Period

The study was done during the months of May and July 2014.

Sampling Technique

The study participants were randomly selected from the households of the field practice area of the department of community medicine. Those, who had a history of headaches within the past one month, were administered the questionnaire after getting the informed consent and ensuring confidentiality.

Study Tool and Data Collection

House to house survey using pre-validated questionnaire done in the field practice area of the department of

community medicine after getting the informed consent.

1. Questionnaire: Modified Kiel Headache questionnaire⁵ and VAS chart.
2. Statistical technique: Data were entered in excel sheet and data analysis was done using SPSS 16 software. (Manufacturer details - Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A.).

Ethical Considerations

This research project was presented in the Institutional Committee meeting, and ethical clearance was obtained before the start of the study.

RESULTS

Socio Demographic Profile

A total of 499 people who satisfied the inclusion criteria were included for the study. The study population largely was females (61.1%). People in the age bracket of <45 years formed a major part of the group (76%). Of the 499 people, 40.5% were graduates and about 46.8% were currently employed. Around 8.4% confessed smoking and 16.6% report drinking alcohol (Table 1).

Table 1: Socio demographic profile of the study participants

Variable	Number	Percentage
Gender		
Male	194	38.9
Female	305	61.1
Age group		
<30 years	184	36.9
31-45 years	195	39.1
46-60 years	50	10
>60 years	70	14
Occupation		
Employed	234	46.8
Unemployed	265	53.2
Education		
Primary schooling	30	6.1
Middle schooling	89	17.8
High schooling	101	20.2
Higher secondary schooling	77	15.4
Graduates and PGs	202	40.5
Socio economic status		
Class 1	155	31.1
Class 2	110	22.0
Class 3	134	26.9
Class 4	78	15.6
Class 5	22	4.4
Lifestyle habits		
Smokers	42	8.4
Non-smokers	457	91.6
Alcoholics	83	16.6
Non-alcoholics	416	83.4

Prevalence of Headache and Migraine

Migraine was present in 32% of the study population with around 11.2% reporting symptoms of classical migraine. There was a female preponderance in the prevalence of migraine that is 59.6% and males accounted for 39.1% of all people with migraine. Similarly, the prevalence was high among adults under 45 years of age (68.5%) and was also comparatively higher in people of socio-economic Class 1 with 39.6% reporting migraine (Table 2).

Migraine and its Associated Symptoms

Although migraine headaches by definition are unilateral, around 40.2% of the people satisfying the International Headache Society criteria for migraine reported of experiencing pain in and around the eyes particularly over the frontal region. Approximately, 30.1% of people having migraine complained of experiencing either nausea or vomiting while another 11.3 and 17.6% report photophobia and phonophobia respectively and 45% of the people with migraine, experience headaches of moderate intensity with a Visual Acuity Score between 4 and 7, while another 14% complaint of severe headaches with a VAS of more than 7. Episodes of migraine are aggravated in 58% of cases by any form of exertion. The intensity of the episode comes down in 32% of the people after having sufficient rest. The average duration of an episode is <2 h. Status headaches of migraine were reported by 5% of the people. Nearly 50% of the people lose or either perform with reduced efficiency, in anywhere between a day to five of work days per month as a result of migraine (Table 3).

Duration, Treatment Adequacy and Satisfaction among Migraneurs

Chronic migraine is seen in 9.4% of the people. Despite the frequency and severity of headaches, only 32% of people having migraine had sought physician consult, 39.6% claimed not taking any medicines and the rest were on self-medication. NSAIDs seem to be the drugs of choice irrespective of the severity of the episodes, and the overall treatment success rate of migraine was 38.3%. Although efficient prophylactic treatments are available, they are being used by <1% of the people (Table 4).

DISCUSSION

The study that we undertook in a relatively suburban adult population reporting recurrent headaches for more than a year yielded a migraine prevalence of 32%. However, the global prevalence of migraine among adults is estimated to be about 11% with countries reporting prevalence as low as 1% to as high as 24.9%.⁶ Asians and Africans have in

Table 2: Socio demographic profile versus migraine and classical migraine

Variable	Migraine		Classical migraine	
	Present (159)	Absent	Present (58)	Absent
Age group				
<30 years	49	135	10	174
31-45 years	60	135	26	169
46-60 years	15	35	2	48
More than 60 years	35	35	20	50
Gender				
Male	65	129	31	163
Female	94	211	27	278
Occupation				
Employed	105	129	27	207
Unemployed	54	211	31	234
Education				
Primary schooling	09	21	2	28
Middle schooling	18	71	3	86
High schooling	26	75	10	91
Higher secondary schooling	17	60	4	73
Graduates and PGs	89	113	39	163
Socio economic status				
Class	63	92	27	128
Class II	27	83	9	101
Class III	44	90	13	121
Class IV	22	56	9	69
Class V	03	19	00	22
Lifestyle habits				
Smoker	13	29	5	37
Non-smoker	146	311	53	404
Lifestyle habits				
Alcoholic	24	59	7	76
Non-alcoholic	135	281	51	365

general shown a low prevalence of migraine.⁷ The reason for the comparatively far higher prevalence than the global average can be attributed to be the highly selective nature of our study wherein only people experiencing frequent headaches were questioned. Many studies have shown that females had a higher prevalence of migraine^{8,9} and similarly our study also showed female preponderance. Migraine was highly prevalent in adults under 45 years of age with 68.5% reporting migraine. The above data is in particular, of importance because the early adulthood is usually the more productive of the years and migraine, therefore, greatly affects the productivity during these years. People of socio-economic Class 1 accounted for 39.6% of the people with migraine. This is strange, as earlier studies have shown the prevalence to be more among people of lower socio-economic classes.¹⁰ The question of this being an isolated trend or it being a changing trend worldwide has to be addressed. Another particular factor, which was observed during the course of study, was the variation in the quality and location of pain. Migraine headaches in general are thought to be unilateral. However, a majority of around 40.2% of the study group noted of experiencing pain in and around the eyes particularly over the frontal region. The character of

Table 3: Headache and migraine associated features

Headache (n=499)			Migraine (n=159)		
	Frequency	%		Frequency	%
Age of onset			Age of onset		
<20 years	173	34.6	<20 years	73	46
20-40 years	239	47.8	20-40 years	54	34
>40 years	16	3.2	>40 years	9	5.5
Not sure	71	14.2	Not sure	23	14.5
History			History		
Trauma preceding headache	28	5.6	Trauma preceding headache	13	8.1
No trauma	471	94.4	No trauma	146	91.9
Infection preceding headache	29	94.2	Infection preceding headache	5	3.1
No infections	470	5.8	No infections	154	96.9
Location			Location		
Around the vertex	2	0.4	Around the vertex	1	0.6
Back of head/neck	68	13.6	Back of head/neck	19	11.9
Bilateral	194	38.9	Bilateral	12	7.5
Frontal region	39	7.8	Frontal region	64	40.2
Unilateral	196	39.2	Unilateral	63	39.6
Character			Character		
Band like pain	34	6.8	Band like pain	11	6.9
Dull ache	118	23.6	Dull ache	42	26.4
Pressure sensation	65	13.0	Pressure sensation	23	14.4
Pulsatile	174	34.9	Pulsatile	52	32.7
Exploding	6	1.2	Exploding	1	0.6
Sharp	97	19.4	Sharp	30	18.8
Shock-like	5	1.0	Shock-like	0	0
Associated symptoms			Associated symptoms		
Nausea/Vomiting	156	31.3	Nausea/Vomiting	48	30.1
Photophobia	77	15.4	Photophobia	18	11.3
Phonophobia	87	17.4	Phonophobia	28	17.6
Dizziness	98	19.6	Dizziness	31	19.4
Intensity			Intensity		
Mild	207	41.5	Mild	66	41.5
Moderate	231	46.3	Moderate	71	44.6
Severe	61	12.2	Severe	22	13.8
Aggravating factors			Aggravating factors		
Any exertion	295	59.1	Any exertion	92	57.8
Bending over	79	15.8	Bending over	24	15.1
Ocular strain	5	1.0	Ocular strain	1	0.6
Extreme temperatures	29	5.8	Extreme temperatures	10	6.2
Lying down	5	1	Laying down	5	3.1
Relieving factors			Relieving factors		
Rest	145	29.05	Rest	51	32.1
Vomiting	6	1.2	Vomiting		
Duration			Duration		
<2 h	227	45.4	<2 h	78	49.1
2-6 h	197	39.4	2-6 h	59	37.1
6-12 h	33	6.6	6-12 h	8	5.03
12-24 h	41	8.2	12-24 h	14	8.8
>24 h	1	0.2	>24 h	0	0
Number: of people reported previous status headaches			Number: of people reported previous status headaches		
Number: of lost workdays			Number: of lost workdays		
Nil	261	52.3	Nil	74	46.5
1-5	215	43.08	1-5	80	50.3
6-10	19	3.8	6-10	4	2.5
>10	4	0.8	>10	1	0.6
Number: of episode per month			Number: of episode per month		
1-5	370	74.1	1-5	124	77.9
6-10	73	14.6	6-10	18	11.3
11-15	24	4.8	11-15	2	1.2
>15	32	6.4	>15	15	9.4

pain in most cases was pulsatile (32.7%). Nearly 26.4% of the people with migraine said of experiencing a dull aching

type of pain. This could represent the potential pool of people in whom episodic migraine is slowly transforming

Table 4: Treatment success and satisfaction among migraineurs

Variable	Frequency	Percentage
Treatment sought		
Through physicians	51	32.1
No physician consult	108	67.9
Using OTC medicines	45	28.3
No drugs used	63	39.6
Treatment outcome		
Success	61	38.3
Failure	35	22.01
Drugs used either prescribed or otherwise		
NSAIDS	155	97.4
Triptans	2	1.2
Ergot alkaloids	1	0.6
Alternate medicines	1	0.6
No: of people using prophylactic treatment	2	1.2

to a chronic migraine wherein the pain is generally dull aching in character.¹¹ Approximately 30.1% of people having migraine complained of experiencing either nausea or vomiting while another 11.3 and 17.6% report photophobia and phonophobia respectively. Dizziness is another common associated symptom seen in 19.4% of the people with migraine. As concurrent physical examination was not carried out it is unsure as to what fraction of it was because of vertiginous migraine. Migraine with aura was seen in 11.2% of the people with migraine. Visual aura by far was the more commonly reported, while a significant proportion also complained of experiencing numbness, weakness on one side of the body and difficulty finding words. Trigger factors were also identified within the study population. Stress, missing a meal and changes in sleep pattern were the most common triggers that set up episode which was supported by previous studies which have also established these to be prominent trigger factors.^{12,13} Travel and weather changes were also the cause of headaches in a few people. Menstrual migraine was reported by very few women. Although 10-14% of American women report menstrual migraine¹⁴ comparatively less fewer have reported it in our study. Certain foods that were established triggers in the West¹⁵ were seldom identified as trigger factors for headaches in our study population. The reason most probably is the better sensitization of our guts to different foods and can also be attributed to our different food habits. The intensity of episodes in 44.6% of people with migraine was of moderate intensity defined by a visual acuity score of 4-7 while 13.8% reported severe headaches with a VAS of more than 7. The intensity was further aggravated on any kind of exertion in a large fraction of people with migraine (57.8%). This was the cause for the decreased work productivity even in people with mild headaches. The duration of episodes was between 2 h and 6 h in 37.1% of the population. People usually report taking medicines at the very start of their headaches and

so a duration <2 h were seen in a larger percentage of people (49.1%). Nearly half of the people with migraine report either completely losing or report functioning with significantly reduced efficiency in anywhere between 1 day and 5 days a month. Although we did not make use of disability grading tests like MIDAS to assess the impact of headaches on the quality of daily life the above statement reflects the burden the disease has on a person's daily life. Close to 78% of migraineurs report experiencing 1-5 episodes every month and around 9.4% report experiencing chronic migraine. The prevalence of chronic migraine was less compared to another study.¹⁶ Hence, if proper treatment is initiated in the population the transformation to the chronic form can well be halted. Our study failed to concentrate on a particular fact although it is known that many doctors fail to rightly diagnose migraine.¹⁷ When we compare the data to studies from countries like United States of America¹⁸ we found that our people don't readily consult doctors as people have apprehensions in visiting them for such a self-perceived transient and trivial headache and also fearing financial repercussions. Self medication was a common habit with 28.3% of migraineurs reporting it. Improper treatment over a period of time can cause medication overuse headaches further impairing the quality of daily life.¹⁹ NSAIDs were used in 97.4% of the people with migraine. Triptans are a well-accepted group of drugs for the treatment of migraine²⁰ but were used by only about 1.2% of the people. The treatment success rate was only 38.3% in this study. Hence it is important for health systems to bring awareness to the community regarding migraine and its symptoms, module for the diagnosis and treatment of migraine to the health care providers and also to improve the awareness of the general public to seek proper health care.

CONCLUSION

Our study had explored the higher prevalence of migraine headache disorders among the general population and in spite of its intensity and severity majority of them do not seek proper medical care. Most of the study participants self-medicate and landed up in chronic migraine, which is a major concern with a very low treatment success rate which shows that not only needs awareness but also following up of the proper treatment protocol by the primary care physician becomes mandatory.

REFERENCES

1. Lipton RB, Bigal ME, Scher AI, Stewart WE. The global burden of migraine. *J Headache Pain* 2003;4:S3-11.
2. Stewart WF, Lipton RB, Celentano DD, Reed ML. Prevalence of migraine headache in the United States. Relation to age, income, race, and other sociodemographic factors. *JAMA* 1992;267:64-9.

3. Leonardi M, Steiner TJ, Scher AT, Lipton RB. The global burden of migraine: Measuring disability in headache disorders with WHO's Classification of Functioning, Disability and Health (ICF). *J Headache Pain* 2005;6:429-40.
4. Kalaydjian A, Merikangas K. Physical and mental comorbidity of headache in a nationally representative sample of US adults. *Psychosom Med* 2008;70:773-80.
5. Göbel H. Classification of headache: Criteria and practical implementation. *Z Arztl Fortbild (Jena)* 1993;87:451-8.
6. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A, *et al.* The global burden of headache: A documentation of headache prevalence and disability worldwide. *Cephalalgia* 2007;27:193-210.
7. Stewart WF, Lipton RB, Liberman J. Variation in migraine prevalence by race. *Neurology* 1996;47:52-9.
8. Lipton RB, Bigal ME. The classification of migraine. In: Olesen J, editor. *Classification and Diagnosis of Headache Disorders*. New Delhi: Oxford University Press; 2006. p. 53-61.
9. Ojini FI, Okubadejo NU, Danesi MA. Prevalence and clinical characteristics of headache in medical students of the University of Lagos, Nigeria. *Cephalalgia* 2009;29:472-7.
10. Tepper SJ. A pivotal moment in 50 years of headache history: The first American Migraine Study. *Headache* 2008;48:730-1.
11. Kelman L. Pain characteristics of the acute migraine attack. *Headache* 2006;46:942-53.
12. Andress-Rothrock D, King W, Rothrock J. An analysis of migraine triggers in a clinic-based population. *Headache* 2010;50:1366-70.
13. Sanvito WL, Monzillo PH, Peres MF, Martinelli MO, Fera MP, Gouveia DA, *et al.* The epidemiology of migraine in medical students. *Headache* 1996;36:316-9.
14. Available from: <http://www.migraineresearchfoundation.org/print-friendly/fact-sheet.html>. [Last accessed on 2014 Oct 29].
15. Finocchi C, Sivori G. Food as trigger and aggravating factor of migraine. *Neurol Sci* 2012;33 Suppl 1:S77-80.
16. Manack AN, Buse DC, Lipton RB. Chronic migraine: Epidemiology and disease burden. *Curr Pain Headache Rep* 2011;15:70-8.
17. Sedighi B, Ghaderi-Sohi S, Emami S. Evaluation of self-medication prevalence, diagnosis and prescription in migraine in Kerman, Iran. *Saudi Med J* 2006;27:377-80.
18. Lipton RB, Stewart WF, Simon D. Medical consultation for migraine: Results from the American Migraine Study. *Headache* 1998;38:87-96.
19. Guitera V, Muñoz P, Castillo J, Pascual J. Quality of life in chronic daily headache: a study in a general population. *Neurology* 2002;58:1062-5.
20. McCrory DC, Gray RN. Withdrawn: Oral sumatriptan for acute migraine. *Cochrane Database Syst Rev* 2012;2:CD002915.

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Cautery versus Scalpel: A Study on Surgical Incisions

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Abstract

Introduction: Surgeons used to feel cumbersome with skin bleeding while making Surgical Incisions with scalpel. After invention of diathermy surgeons felt comfort in controlling tissue bleeding. Even though we are traditionally using scalpel for skin incisions, incisions made by High-frequency cautery are of more cosmetic, less time taking, less bleeding, less post-operative pain, no ill effects on wound healing. Present data and literature available suggests that diathermy incisions are better than scalpel Incisions. In the present study, cautery incisions are compared with scalpel incisions.

Materials and Methods: Patients undergoing elective surgeries in surgery Department of Government General Hospital, Kakinada June 2012 to December 2013.

Results: Cautery incisions are more comfortable to the patients and surgeon. Cautery incisions are quick, less bleeding, less post-operative pain, and cosmetic than scalpel incisions.

Conclusion: Diathermy incisions do not increase the chance of wound infection. Diathermy incisions have advantages over the scalpel because of reduced incision time, less blood loss, reduced early post-operative pain, no usage of suture material, more cosmetic.

Key words: Cautery, Electrosurgical unit, Incisions, Scalpel

INTRODUCTION

Skin bleeding is the problem after starting surgery. A continuous skin bleeding may obscure the operating field, and the surgeon feels discomfort, number of gauze pieces, suture material, and precious operating time is also wasted. The usage of diathermy cautery decreases skin bleeding, total operative time also shortens. Electrosurgical Unit is an essential Instrument in Operation Theatres. Electro Surgical Unit (ESU) is the most common electrical equipment in operation theatres. Diathermy incision is quick and has reduced blood loss.¹ Cutting mode Diathermy skin incisions are more comfortable to the patients and the surgeons also. There is so much of the literature that suggests the usage of high-frequency cautery for making surgical incisions. A study to know how cutting

mode electrocautery is superior in making skin incisions than scalpel incisions is reported in this article.

Objective

The main objectives of this study are to evaluate the efficacy of cautery over the scalpel in making skin incisions with regard to time, bleeding, post-operative pain, suture material usage, cosmetic value, and wound infection

MATERIALS AND METHODS

The total sample of 200 patients was taken for this study those who underwent elective surgeries like Appendectomies, Hernia repairs, Laparotomies, Cholecystectomies, Lumbar Sympathectomies in operation theatres Department of surgery department, Rangaraya Medical College, Kakinada, Andhra Pradesh. The study was conducted on patients visiting college from June 2012 to December 2013. The study was approved by Ethical Committee of Hospital (Figure 1).

Inclusion criteria

All elective open Hernia surgeries, all elective open appendectomies, all open cholecystectomies, elective laparotomies, Lumbar sympathectomies are included.

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Exclusion criteria

All emergency laparotomies, complicated hernia surgeries, emergency cholecystectomies, laparoscopic procedures, thyroidectomies, mastectomies, hydrocelectomies, hemorrhoidectomies are excluded.

RESULTS

Totally, 200 cases are taken for study. In 100 cases, incisions are made with a scalpel. In another 100 cases, incisions are made with cutting mode high-frequency diathermy cautery. Each of the 100 cases consists of 45 hernia surgeries, 5 lumbar sympathectomies, 20 elective laparotomies, 20 appendectomies, 10 cholecystectomies. Both groups are compared in Incision time in seconds, blood loss assessment with soakage of gauze pieces and any suture material used, post-operative pain, Incision length, and cosmesis (Figures 2 and 3).

DISCUSSION

Electro Surgical Unit (ESU) is the most common electrical equipment in operation theatres. Diathermy incision is quick and has reduced blood loss.¹ William T. Bovie, a biophysicist, has been credited for producing the first ESU, capable of cutting and coagulating the human tissues.² Surgeons feel comfortable to see ESU in operation theatres.

ESU uses alternating high-frequency current. Frequency is the number of times an AC current reverses its direction in 1 s, and this is measured in cycles per second or hertz (Hz).

Radiofrequency, 10,000 Hz, can pass through the human body without causing stimulation of the muscle or nerve. An ESU uses radiofrequency of 100,000-10,000,000 Hz to cut, coagulate and desiccate the tissues.

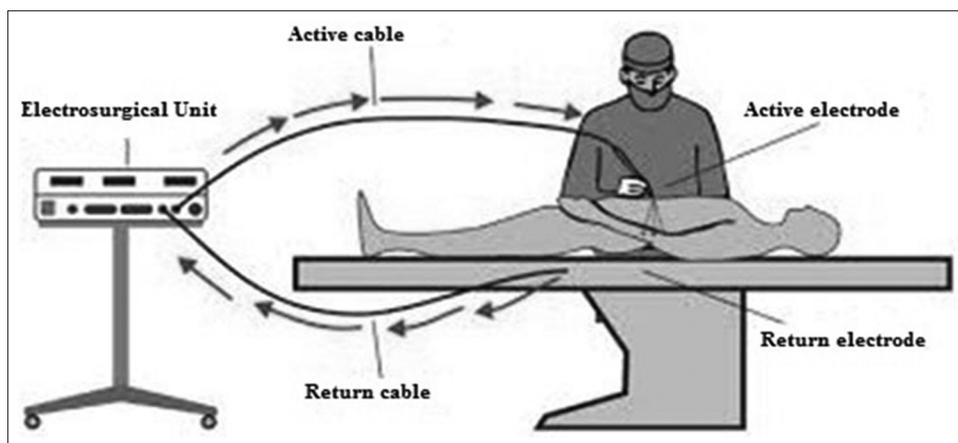


Figure 1: Operating with electro-surgical unit²

Cautery incisions

	Hernia surgeries	Appendectomies	Cholecystectomies	Laparotomies	Sympethectomies
Time in seconds	10-12	10-12	40-50	40-60	40-60
Blood loss (gauze)	Fully soaked	Fully soaked	2 gauze fully soaked	3 gauze fully soaked	3 gauze fully soaked
Usage of suture material	Used	Used	Used	Used	Used
Post-operative pain	1 ampule of tramadol BD	1 ampule of tramadol BD	1 ampule of diclofenac BD	1 ampule of diclofenac BD	1 ampule of diclofenac BD
Incision	5-6 cm	3-4 cm	6-8 cm	8-10 cm	6-8 cm
Cosmesis	Average	Average	Average	Average	Average

Scalpel incisions

	Hernia surgeries	Appendectomies	Cholecystectomies	Laparotomies	Sympethectomies
Time in seconds	4-6	4-6	8-10	10-15	10-12
Blood loss (gauze)	Partly soaked	Partly soaked	Partly soaked	Partly soaked	Partly soaked
Usage of suture material	Nil	Nil	Nil	Nil	Nil
Post-operative pain	1 ampule of tramadol BD	1 ampule of tramadol			
Incision	5-6 cm	3-4 cm	6-8 cm	8-10 cm	6-8 cm
Cosmesis	Good	Good	Good	Good	Good



Figure 2: Cautery incision no bleeding



Figure 3: Scalpel incision with bleeding

In our institute, we have two types of ESU - L and T 400 digital and ARC Surgical diathermy D- 400. In L and T digital 400, the settings are cut (1-9), coagulate (1-9), and we set at cut (3.5-4.5) and coagulate (3.5-4.5). Settings for ARC surgical diathermy D - 400 cut (60-70) and coagulate (55-70).

Diathermy may be either monopolar or bipolar. Monopolar diathermy is the one most commonly used. In this high-frequency current from diathermy machine is delivered to an active electrode held by the surgeon. Density of the current is high where the electrode touches the body tissues, and a pronounced local heating effect occurs. The current subsequently spreads out in the body and then returns to the diathermy machine via the patient plate electrode (a pad which is kept under the patient). Bipolar diathermy avoids the need for a plate and uses less power. The surgeon holds the tissue to be coagulated in a pair of forceps connected to the diathermy machine. The current passes down one limb of the forceps and then back to the machine via the other limb. It cannot be used for cutting tissues.

We have conducted 100 surgeries using high-frequency cautery incisions and 100 surgeries using scalpel incisions. When compared to scalpel incisions, diathermy cutting mode incisions took less time and less bleeding, no need of suture material, post-operative painless and incisions are of more cosmetic.

These patients are followed for 4 weeks for any wound infection, erythema, and stitch abscess with high-frequency electrocautery. The infection rate is nearly 3%.

The conclusion was that the use of electrocautery does not increase the chances of wound infection.³

There is a randomized clinical trial of diathermy versus scalpel incision in elective midline laparotomy, and the authors conclude that electrosurgical incision in elective surgery has significant advantages over scalpel use on the basis of incision time, blood loss, early post-operative pain, and analgesia requirements.⁴

It is concluded that diathermy of skin incisions is safe, blood loss is minimal, and reduces the need for analgesics in the early post-operative period.^{5,6}

Summary

As many authors reported that the surgical incisions by cautery has significant advantages such as less incision time, less blood loss, and reduced post-operative pain, we recommend high-frequency cautery over the scalpel for surgical incisions.

CONCLUSION

Diathermy incisions do not increase the chance of wound infection. Diathermy incisions have advantages over the scalpel because of reduced incision time, less blood loss, reduced early post-operative pain, no usage of suture material, more cosmetic.

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REFERENCES:

1. Ahmad NZ, Ahmed A. Meta-analysis of the effectiveness of surgical scalpel or diathermy in making abdominal skin incisions. *Ann Surg* 2011;253:8-13.
2. Available from: <http://www.micronicsmedical.com/electro-surgical-unit.aspx>. [Last accessed on 2014 Dec 21].
3. Barrett SL, Vella JM, Dellon AL. Historical development of bipolar coagulation. *Microsurgery* 2010;30:667-9.

4. Kumar K, Crawford AH. Role of "Bovie" in spinal surgery: Historical and analytical perspective. *Spine (Phila Pa 1976)* 2002;27:1000-6.
5. Kearns SR, Connolly EM, McNally S, McNamara DA, Deasy J. Randomized clinical trial of diathermy versus scalpel incision in elective midline laparotomy. *Br J Surg* 2001;88:41-4.
6. Chrysos E, Athanasakis E, Antonakakis S, Xynos E, Zoras O. A prospective study comparing diathermy and scalpel incisions in tension-free inguinal hernioplasty. *Am Surg* 2005;71:326-9.

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A Clinical Study on Technique of Subfascial Endoscopic Perforators Surgery: A Recent Advancement

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Abstract

Introduction: Varicose veins are a punishment to the human beings. It usually occurs in a people who work in prolonged standing posture. Varicose veins associated with perforator incompetency may lead to chronic venous insufficiency. Chronic venous insufficiency is the predisposing factor in the development of venous ulcers. Division of incompetent perforators has long been regarded as an appropriate approach for the treatment of venous stasis ulcers. In conventional open techniques, long incisions are required to approach and to divide the incompetent perforators. Subfascial endoscopic perforator surgery (SEPS) is a minimal invasive procedure, which is more comfortable and beneficiary to the patient. The development of endoscopic techniques using standard laparoscopic instrumentation has permitted the application of this therapy without the need for long open incisions and complications. Division of below knee incompetent perforators is possible with very small incisions in SEPS technique. In view of minimal invasive nature, less morbidity, cosmetic reasons, less recurrence rate and less duration of hospital stay, this advanced technique have to be practiced.

Materials and Methods: Surgeries conducted on 15 patients with incompetent below knee perforators. The technique of procedure is SEPS. One and laparoscope, two 10 mm ports are used.

Results: Average of four incompetent perforators are divided in each limb, mean operative time is 1 h. Duration of hospital stay 1.5 days, no thromboembolic complications, all ulcers healed by 6 months, No further bleeding and hyperkeratotic changes in post-operative follow-up periods.

Conclusion: SEPS is a safe, minimally invasive procedure, cosmetic and cost-effective, requires less hospital stay, no need of suture removal, less complications, less recurrence rate and more advantage to the patients than other conventional open techniques.

Key words: Laparoscopy, Minimally invasive, Subfascial endoscopic perforator surgery, Venous ulcer

INTRODUCTION

Varicose veins and venous ulcers occur in people who work in standing posture for hours together. Because of nonhealing nature of these ulcers it disturbs their daily activities. They need to do daily dressings, use antibiotics. Sometimes these varicose veins may complicate and bleed.

Varicose veins may complicate as hyperpigmentation, eczema, ulceration, contractions, and finally malignant transformation. These venous ulcers occur due to chronic venous insufficiency.

Venous ulcer management is a difficult problem to treat as it associated with recurrence. Cutaneous venous hypertension which occurs as a consequence of primary valvular incompetence in up to 60% of patients, deep venous obstruction, or a combination of both, results in a series of cutaneous manifestations which in their most severe forms results in skin breakdown over the medial malleolus. There is clearly a role for a procedure, which can promote ulcer healing and minimize recurrence. Subfascial endoscopic perforator surgery (SEPS) may represent such a procedure.

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Starting with Homans's study,¹ there were new acquisitions in the field of chronic venous insufficiency, underlining the central role of veins communicating between the superficial and deep system. Linton, however, was the first to describe the close association among venous insufficiency, communicating veins and advanced grade of clinical presentation.² After that he suggested a method to interrupt these communicating (as Linton initially defined the perforating) veins by a long medial calf incision in the injured skin. His innovative work lay the foundation for the perforating veins surgery. Thus, he is considered to be the father of this field of surgery. Unfortunately even if the perforator surgery showed to be very effective in selected cases, especially in ulcer healing, it was related to an unacceptable rate of wound complications even when performed in the modified versions suggested by other authors as Felder, Dodd and Cockett^{3,4} later on with advancement of new less invasive surgical techniques showed the feasibility of using an endoscopic approach to perform the subfascial ligation of the perforating veins.^{5,6}

The idea to use this approach was based on the possibility to create, using the laparoscopic instruments, a "virtual space" and seemed to be very interesting since it offered the possibility to avoid further damaging to the scarred tissues surrounding the ulcer and thus to eliminate the wound complications that affected Linton's technique.

It has long been noted that insufficient perforating veins contribute to the development of chronic venous insufficiency and recurrent varicose veins that are complicated by skin ulceration or lipodermatosclerosis. For these conditions, severing of insufficient perforating veins is an effective surgical treatment. However, severing of insufficient perforating veins by a direct approach has become less commonly performed because of the excessive invasiveness of the procedure itself. If insufficient perforating veins can be severed without surgical intervention in the lesion, this will be an extremely useful therapy. For these reasons endoscopic severing of perforating veins was developed. The criteria for insufficiency are reverse flow demonstrated on color Doppler and a caliber more than 3 mm in diameter. However, the two port system SEPS reported here takes full advantage of the low invasiveness of endoscopic surgery by minimal access.

MATERIALS AND METHODS

Patients attended to the out-patient department with a complaint of varicose veins with complications such as venous ulcers, eczema are investigated with color Doppler and ultrasound abdomen. These patients showed findings on color Doppler as saphenofemoral junction

(SFJ) incompetence, saphenopopliteal incompetence and perforators incompetence. Boyd and Cockett perforators are usually affected (Figures 1 and 2). It is a practice to perform Trendelenberg operation for SFJ incompetence and division of perforators in case of below knee incompetent perforators. Ultrasound abdomen is normal.

Technique of SEPS performed to treat incompetent perforators on 20 limbs of 15 patients. Of 15 patients 10 are men and 5 are women. Five of them are having bilateral varicosities.

Laparoscopic CO₂ insufflation is used to create a subfascial space called as "virtual space." Two ports are required. Harmonic scalpel also used in some cases to divide perforators.

TECHNICAL PROCEDURE OF SEPS

Pre-operative Preparation

The course of varicose veins and the insufficient perforating veins are ascertained by color Doppler and



Figure 1: Varicose veins



Figure 2: Venous ulcer

locations are marked with a felt-tip pen on the skin directly above varicose veins and the insufficient perforating veins, those planned to be treated. If the great saphenous trunk is not to be treated, only marking of insufficient perforating veins is carried out.

Anesthesia and Position

Spinal anesthesia is required. Patient to be placed in the supine position, with knee joint of the involved leg slightly flexed and the leg laterally rotated.

Steps of Operation

1. The effected limb is to be cleaned from groin to toes. After draping the effected extremity from groin to toes, an Esmarch bandage is tightly applied, and a sterile tourniquet is inflated high up on the thigh. The Esmarch bandage is then removed, while draping the ulcer baring area has to be covered.
2. The laparoscope is laid on the leg, ensuring that the proposed level of port placement allows the scope to reach below the ulcer level.
3. Leg is positioned as described and a 13 mm skin incision is made 3 cm away from the medial border of the tibia. The given incision is deepened until a deep fascia. Deep fascia is incised less than the skin incision in length, and Small retractors can be used while making incision of deep fascia.
4. A 10 mm first port is introduced through skin incision, then the port is passed up to the subfascial plane and push it forward. Now trochar is removed, and laparoscope is passed through the canula. White fascia and underlying muscle can be seen in the monitor. At this point, the subfascial plane has been reached. A small to and fro and side to side movement of laparoscope can create a space. Now CO₂ can be insufflated up to 30 mm of Hg pressure then a “virtual space” will be created.
5. A 10 mm second port is placed 5-10 cm distally, posteriorly from the first port approximately at the same level, under direct vision (Figure 3).
6. Endoscissors are passed through the second port and subfascial space is easily opened by sharp dissection of all the bridging fascial bands. Harmonic scalpel can also be used for this purpose.
7. Now large perforating veins can be readily identified. By using clip applicator perforating veins are clipped and divided with endoscissors. Harmonic scalpel can also use for this (Figure 4). Dividing the perforating veins further opens the space. The space is opened from the medial tibial border to the midline posteriorly and from the level of the port to as far distally as dissection can proceed.
8. An extension of the fascia frequently extends from the tibia to the deeper fascia which can conceal perforating



Figure 3: Port positions

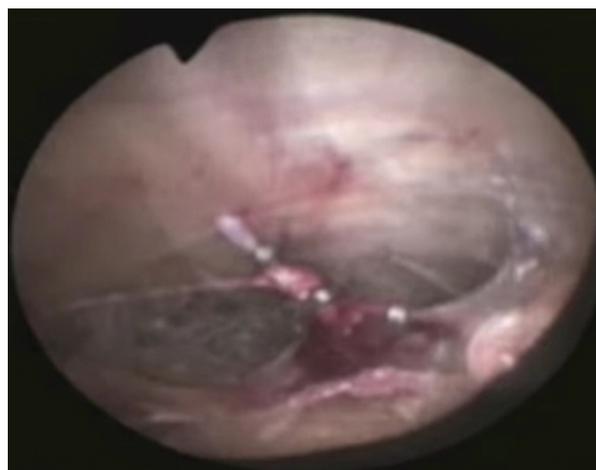


Figure 4: Endoscopy view of perforators

veins. For this reason, the paratibial fossa should be opened sharply so that additional perforating veins can be divided in the deep posterior compartment. Caution must be observed so that the posterior tibial artery and veins and the tibial nerve are not damaged during this part of the procedure.

9. At the completion of the procedure, the ports are removed, the fascial defects are left opened and the skin incision closed using absorbable suture. An elastic bandage is applied to the leg from the foot, prior to deflating the tourniquet.

Post-operative Management

Postoperatively, compression bandages have to be applied for hemostasis and prevention of edema. The limb is elevated and ambulation is allowed on the day after surgery.⁷ The period of follow-up time is 6-24 months.

RESULTS

A total of 20 limbs are operated, 10 of those are men and 5 are women, 5 of them having bilateral varicosities. The clinical presentations were of spontaneous bleeding

from dilated veins in 3 patients, dilated veins with hyperpigmentation in 8 patients and ulcer over the ankle area in 4 patients.

Mean operating time was 1 h. The average number of perforators divided was 4.5. Mean hospital stay was 1.5 days, no intraoperative bleeding, no CO₂ intoxication. No thromboembolic complications occurred. Small incisions closed with absorbable sutures. No need of suture removal. No wound infection is seen, more cosmetic.

With follow-up of 6 months, there was complete healing in all the 4 ulcers. Hyperpigmentation and varicosities are well controlled. No further bleeding and varicosities are reported.

DISCUSSION

Linton proposed that those patients with perforator incompetence could be treated by directly dividing the offending perforators.² Unfortunately, in order to achieve this goal, a long incision through the medial skin from knee to the medial malleolus was necessary. Perforators could then be identified below the fascia and divided. In concept, the procedure was sound. On average, 85% of patients enjoyed ulcer-free recurrence in the long term.⁸ However, wound-related complications such as infection, flap necrosis, and delayed healing occurred in 17% of patients and caused the procedure to fall into disfavor.⁸ Although several modifications of the Linton procedure have been developed to minimize wound morbidity such as the posterior stocking seam incision⁹ and parallel oblique incisions,¹⁰ it was not until the development of minimally invasive procedures, which permitted small remote incisions to be created, that the procedure began to be re-evaluated.

The patients most appropriately treated with SEPS include those with active ulcers, recurrent ulcers, or healed ulcers which were present for greater than 4 months. The underlying pathophysiologic process can be best defined using color flow duplex scanning. This procedure will document the presence of deep venous obstruction and superficial and deep venous reflux as well as localize perforating veins and determine their competency. Of note, perforator vein incompetence can be demonstrated in 15% of patients without lipodermatosclerosis.¹¹

Recently, the North American Subfascial Endoscopic Perforator Study was conducted.¹² This multi-center study on endoscopic perforator interruption reviewed complications and early efficacy in 158 cases. The overall incidence of wound infection was 6%. Neuralgia following SEPS and saphenous vein stripping occurred in ten

patients. The concern of creating further thrombotic or embolic complications by performing procedures in patients with a history of deep venous thrombosis was also addressed. There was no evidence of deep venous thrombosis or pulmonary emboli within the first 30 days of the procedure. Of patients with active ulceration, at the time of surgery, 79% achieved ulcer healing at 180 days.

The SEPS has the advantage of the ease, low invasiveness and low costs compared with the conventional procedures. This technique is safe, reliable, low invasive treatment of insufficient perforating veins.¹²

CONCLUSION

Chronic venous insufficiency due to below knee incompetent perforators can be effectively managed by minimally invasive procedure SEPS.

In Linton's method of the open technique more invasive big incision, is needed, and more post-operative pain and more hospital stay is required.

SEPS is more advanced, and it requires less operating time; hospital stay is less, directly visualized perforators, minimally invasive. This procedure is associated with less morbidity and mortality.

SUMMARY

In view of recurrence and difficulty in management of below knee perforators in chronic venous insufficiency case, many authors are in opinion that minimal invasive procedure is needed. Open conventional technique like Linton's method needs long incisions and much hospital stay. SEPS is minimal invasive with less morbidity, cosmetic and cost effective.

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REFERENCES

1. Homans J. The etiology and treatment of varicose ulcer of the leg. *Surg Gynecol Obstet* 1917;24:300-11.
2. Linton RR. The communicating veins of the lower leg and the operative technic for their ligation. *Ann Surg* 1938;107:582-93.
3. Cockett FB. The pathology and treatment of venous ulcers of the leg. *Br J Surg* 1955;43:260-78.
4. Dodd H. The diagnosis and ligation of incompetent perforating veins. *Ann R Coll Surg Engl* 1964;34:186-96.

5. Hauer G. Endoscopic subfascial discussion of perforating veins – preliminary report. *Vasa* 1985;14:59-61.
6. Jugenheimer M, Junginger T. Endoscopic subfascial sectioning of incompetent perforating veins in treatment of primary varicosis. *World J Surg* 1992;16:971-5.
7. Dohi K, Haruta N, Fukuda Y. Operative treatment of varicose veins. *Surg Ther* 1995;72:887-9.
8. Cikrit DF, Nichols WK, Silver D. Surgical management of refractory venous ulceration. *J Vasc Surg* 1988;2:5-12.
9. Healey PJ, Healey EH, Wong R, Schaberg FJ Jr. Surgical management of the chronic venous ulcer: the Rob procedure. *Am J Surg* 1979;137:556-9.
10. De Palma RG. Surgical therapy for venous stasis. *Surgery* 1974;76:910-7.
11. Sarin S, Scurr JH, Smith PD. Medial calf perforators in venous disease: the significance of outward flow. *J Vasc Surg* 1992;16:40-6.
12. Gloviczki P, Bergan JJ, Menawat SS, Hobson RW 2nd, Kistner RL, Lawrence PF, *et al.* Safety, feasibility, and early efficacy of subfascial endoscopic perforator surgery: a preliminary report from the North American registry. *J Vasc Surg* 1997;25:94-105.

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Sacral Index: Application in Sex Determination of Sacrum

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Abstract

Introduction: Sacrum is often considered while dealing with sex determination of human skeletal remains.

Objective: The study was been carried out with the objective to study the sex-differences using skeletal material and sacral index as criteria and to comparative findings with different races.

Materials and Methods: Totally, 60 adult sacrum bones (30 adult male and 30 adult female) were studied. Measurements of maximum length and maximum breadth of sacrum were taken with sliding vernier calipers.

Results: The mean maximum length of the sacrum was greater in males (106.85) than in females (90.89), and the difference of mean lengths was statistically significant. But the difference was not significant for mean maximum sacral breadth (male - 108.24, female - 106.87). Mean sacral index in females was greater (117.56) as compared to that in males (101.3). Present study showed that according to sacral index method, 66.6% of male and 70% of female sacrum bones were identified reliably.

Conclusion: Sacral index is a reliable criterion for differentiation between sex of sacrum that is useful for forensic and anthropological investigations

Key words: Maximum sacral breadth, Maximum sacral length, Sacrum, Sacral index

INTRODUCTION

Sex determination of human skeletal remains is an integral component of anthropological and forensic investigations, and these should be based on measurements on the entire skeleton material for a meaningful outcome.¹ The human sacrum, which forms postero-superior wall of the pelvic cavity, composed of five fused sacral vertebra and thus have a large triangular shape wedged between hip bones. It is helpful for erect posture by providing stability to pelvis and weight transmission and also allows some mobility of the pelvic cavity during pregnancy. For sex determination of human skeletal remains, sacrum always captured the

attention of forensic science experts and anthropologists. Various researchers in the past have studied sexual dimorphism using sacrum on different races.

Singh and Gangrade² (1968) had reported that even if we are taking parameters within the same general population, mean value of parameters may be significantly different from material obtained from different zones, thus validates racial as well as regional differences. Singh and Singh (1972)³ had shown that the demarking point for an parameter to clearly differentiate between sexes should be calculated separately for different regions of population values of a parameter differs in values in different regions.

The most important criteria for sex determination using sacrum are sacral index. According to Frazer,⁴ female bone is broader than the male and shows a different curve anteriorly; in females, it is marked sharply at the lower part but in males, the curve is more or less uniform from above downward. Comas and Charles⁵ stated that there are wide variations exists between the male and female sacrum in Chinese and Nigros.

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Though sacrum bone is always considered while dealing with sex determination of human skeletal material, there is scarcity of data available. Thus, the present study has been carried out to study the sex-differences in the local population using skeletal material using sacral index as criteria and to comparative findings with different races according to the literature available.

MATERIALS AND METHODS

The material consisted of 60 adult sacrum bones (30 adult male and 30 adult female) available in the Department of Anatomy, Gold Field Institute of Medical Science and Research, Ballabgarh, Faridabad, UP, India. The study permission was obtained from Ethical Committee. As far as it could be ascertained, samples were free of physical and pathological changes or anomalies. The sliding vernier caliper was used for taking maximum length and maximum breadth of the sacrum bone.

Measurement of Parameters: (Figures 1 and 2)

- 1 Maximum length: It is the distance between middle points on the anterior superior margin of the promontory to middle of antero-inferior margin of the last sacral vertebra. For each parameter, measurements were taken for three times and mean calculated to avoid bias in the measurement
- 2 Maximum breadth: It is the most distant points on the sides of ala of the sacrum bone.

Sacral index = Maximum breadth \times 100/maximum length

RESULTS

The mean maximum length of the sacrum was greater in males (106.85) than in females (90.89), and this difference was found statistically significant. But the difference was not

significant for mean maximum sacral breadth (male - 108.24, female - 106.87). Mean sacral index in females was greater (117.56) as compared to that in males (101.3) (Table 1).

In present study, by calculating sacral indexes of sacrum, 20 (66.6%) males and 21 (70%) female vertebra were identified accurately.

DISCUSSION

While performing sex differentiation in human skeletal remains, sacrum should be taken into account. Data were scarcely available to test the validity of the parameters studied to identify the sex of sacra.

Flander had used univariate and multivariate analysis methods for sex determination of sacrum. She used numerous new osteometric measurements (around 15). Flander developed a technique to simultaneously assess sex and race using sacra from American Blacks and Whites.⁷ Strádalová had also used a complex method for sex determination of sacra using 15 dimensions. She used 128 sacra (72 males, 56 females). She found accuracy for sex determination between 86.5% and 88.5%, depending on the number of measurements considered.¹¹

In present study, the mean length of male sacra (106.85 mm) was higher than that of Indians of Rajasthan region and American blacks while lesser than American whites and Indians of Agra region. In females, values were higher than Australians and Indians of Agra region and lower than Americans and Indians of Rajasthan region. Similar variations were also there for sacral breadth and sacral index parameters (Table 1).⁶⁻¹⁰

Davivongs (1963) also stated that mean lengths of Australian aboriginal race is much less than the Indian



Figure 1: Measurement of maximum length of sacrum



Figure 2: Measurement of maximum breadth of sacrum

Table 1: Analysis of measurements of sacrum of the present study and other races

Study	Race	N	Maximum length		Maximum breadth		Sacral index	
			Male	Female	Male	Female	Male	Female
Davivongs ⁶	Australian aborigine	50	96.52	88.12	99.92	101.24	104.16	115.4
Flander ⁷	American White	50	110.2	109.64	116.42	117.62	106.49	108.59
Flander ⁷	American Black	50	105.5	99.98	11.14	111.36	106.49	112.85
Mishra <i>et al.</i> ⁸	Indians (Agra region)	116	107.53	90.58	105.34	105.79	98.21	117.84
Patel <i>et al.</i> ⁹	Indians (Gujarat region)	64	-	-	-	-	96.25	113.25
Kataria <i>et al.</i> ¹⁰	Indians (Rajasthan region)	74	106.7	91.91	110.3	109.88	104.11	120.01
Present study	Indians	60	106.85	90.89	108.24	106.87	101.3	117.56

sacra studied so far.⁶ Thus, all the above findings clearly depict the existence of regional and racial difference in the length of sacrum.

Present study showed that according to sacral index method, 66.6% of male sacra were identified, and 70% of female sacra were identified accurately. Patel *et al.* also showed that 62.5% of male sacra and 68.75% of female sacra were identified using sacral index method.⁹ It shows that a fairer amount of sex determination of human sacrum bone can be done using sacral index method.

CONCLUSION

Present study evidenced that sacral index could differentiate 66.6% of male and 70% of female bones. Findings clearly depict the existence of regional and racial difference in the length of sacrum. Hence, it can be concluded that sacral index is a reliable criterion for differentiation between sex of sacrum that is useful for forensic and anthropological investigations.

REFERENCES

1. Stewart TD. Sex determination of the skeleton by guess and by measurement. *Am J Phys Anthropol* 1954;12:385-9.
2. Singh S, Gangrade KC. Sexing of adult clavicle verification and applicability of demarking point. *J Indian Acad Forensic Sci* 1968;7:20-30.
3. Singh SP, Singh S. Identification of sex from the humerus. *Indian J Med Res* 1972;60:1061-6.
4. Frazer JE. *Anatomy of the Human Skeleton*. 3rd ed. London: Churchill Livingstone; 1933. p. 43.
5. Comas J, Charles C. *Manual of Physical Anthropology*. Illinois, USA: Thomas Springfield; 1961. p. 415-6.
6. Davivongs V. The pelvic girdle of the Australian aborigine; sex differences and sex determination. *Am J Phys Anthropol* 1963;21:443-55.
7. Flander LB. Univariate and multivariate methods for sexing the sacrum. *Am J Phys Anthropol* 1978;49:103-10.
8. Mishra SR, Singh PJ, Agrawal AK, Gupta RN. Identification of sex of sacrum of Agra region. *J Anat Soc India* 2003;52:132-6.
9. Patel MM, Gupta BD, Singel TC. Sexing of sacrum by sacral index and Kimura's base-wing index. *JIAFM* 2005;27:5-9.
10. Kataria SK, Kulhari P, Kataria KR, Potaliya P. A study of the sacral index in western Rajasthan population in comparison with other races. *Int J Anat Res* 2014;2:383-5.
11. Strádalová V. Proceedings: Determination of sex from metrial characteristics of the sacrum. *Folia Morphol (Praha)* 1974;22:408-12.

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Comparison of Automated Refraction with and without Cycloplegia for Detection of Refractory Errors: A Cross-Sectional Study

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Abstract

Background: Refraction is the most common eye problem among children. Refractory assessment is an essential visual assessment tool.

Objectives: To compare the performance of automated refraction with and without cycloplegia for its agreement with conventional cycloplegic retinoscopy.

Methods: A sample of 200 children between the age of 8 and 15 years attending an ophthalmology outpatient department of a government medical college teaching hospital were assessed using conventional cycloplegic retinoscopy, automated refraction with cycloplegia and without cycloplegia and the measurements compared.

Results: There was a tendency toward minus over correction in automated refraction without cycloplegia compared to automated refraction with cycloplegia. There was good agreement between conventional cycloplegic retinoscopy and automated refraction with cycloplegia. Automated refraction with cycloplegia has a reasonable sensitivity (70.2%) and specificity (70.8%) for assessment of refraction among children that is higher than automated refraction without cycloplegia.

Conclusions: Automated refraction with cycloplegia can be used as an easy to use the method for refraction where skilled human resources are not easily available to check for cycloplegic retinoscopy.

Key words: Automated, Ocular refraction, Retinoscopy

INTRODUCTION

Refractory errors are common among children and refraction is a widely developed process because of this.¹ Though the conventional technique of retinoscopic refraction is an excellent method of objective refraction, it is a time consuming procedure and that not every practitioner manages to accomplish accurately.² The refractometry (optometry) is an alternative method of finding out the errors of refraction by use of optical equipment called

refractometer or optometer.³ Over last 200 years or so, attempts have been made to automate the process of refraction but with little success. No reliable substitute could be found for the skilled human refractionist.⁴ Recently, new generation of auto refractometers are designed to substitute the conventional technique of retinoscopic refraction. These new designs are claimed to have good repeatability and validity of both spherical and astigmatic error measurements.⁵⁻⁸

Cycloplegic retinoscopy and subjective refraction are the standard methods of diagnosing refractory errors in children.⁹ The auto refractors are new, easy to use, acceptable and popular in the recent times. However, when using autorefractors, the accommodative effort that is employed can lead to minus over correction. This can lead to wrong diagnosis. If there is a minus overcorrection, it can lead to myopic progression among children.¹⁰⁻¹³

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This study aimed at comparing the performance of automated refraction with and without cycloplegia against the conventional method of subjective refraction among children between 8 and 15 years attending an ophthalmology department of a medical college hospital to assess its performance.

METHODS

This was a cross-sectional study design. Children ages 8-15 years who attended the Ophthalmology Department of a Government Medical College teaching hospital were enrolled in the study. The study was conducted between January 2013 and January 2014. Children who had any anterior or posterior segment pathology were excluded from the study. Informed consent for participation in the study was obtained from the parents of the children. The children gave assent to participate. The study protocol was approved by the Institutional Review Board and Ethics Committee. A total of 200 children were enrolled in the study. This was the sample size obtained for comparing the two methods (cycloplegic and noncycloplegic) with an ability to detect a 10% difference with 95% confidence and 80% power.

Using a Snellen's chart, the visual acuity of the children was first checked. Automated refraction was performed in all children prior to the administration of cycloplegics after testing of visual acuity. This was followed by cycloplegic administration using 1% cyclopentolate eye drops at 0 min, 10 min and after 20 min. After 90 min of instillation of first drop of 1% cyclopentolate, cycloplegic retinoscopy was performed at 1 m distance in a semi darkroom, using self-illuminated streak retinoscope. Retinoscopic values were recorded after deducting 1D for the working distance (i.e. 1 m) and $-0.75D$ for tonus allowance for cyclopentolate. This was followed by, cycloplegic autorefractometer to both eyes using topcon automated refractometer. The settings used for the measurements are as follows:

VD	12.0
Cylinder	±
Increments	0.25
Number of readings	5 (automatic mode)

Fundus examination with 90D lens was performed in all children to exclude posterior segment pathologies. Post-mydratic test (PMT) was performed 3 days after the instillation of 1% cyclopentolate. The spherical and astigmatic measurements obtained by non-cycloplegic autorefractometer, cycloplegic autorefractometer and cycloplegic retinoscopy are compared with values of PMT.

Statistical Package for Social Sciences (SPSS) version 17 (IBM, Chicago) was used for managing the collected data. Each eye was considered independently, this giving us data of 400 eyes from 200 patients for analysis. Spherical equivalent of the power of each eye was calculated using the formula:

$$\text{Spherical equivalence} = (\text{Spherical power} + \text{Cylindrical Power}/2).$$

Bland Altman method was used to compare the agreement between the automated refraction with and without cycloplegia. Using the cycloplegic retinoscopy as the gold standard, the performance of the automated refraction with and without cycloplegia was plotted on a receiver operating characteristic (ROC) curve. The areas under the two curves were assessed to understand the diagnostic performance of the two methods. Further, the optimal sensitivity and specificity of the two methods were also assessed from the ROC curves.

RESULTS

A total of 200 children were assessed by all the methods. Table 1 presents the mean spherical and cylindrical power of this group of children in the right and left eyes using the four methods. It is seen that there is quite a close agreement between the automated refraction with cycloplegia and the conventional cycloplegic retinoscopy. However, there is a significant difference between automated refraction without cycloplegia and conventional cycloplegic retinoscopy. Figure 1 shows the Bland Altman plot of the extent of agreement between conventional cycloplegic retinoscopy and automated refraction without cycloplegia. It reveals poor agreement with wider dispersion. Figure 2 shows the Bland Altman plot of the agreement between conventional cycloplegic retinoscopy and automated refraction with cycloplegia. It reveals narrow dispersion and reasonable agreement.

There were totally 376 of the 400 eyes with some spherical or cylindrical power and only 24 eyes without any power detected by the conventional cycloplegic retinoscopy, which was used as the gold standard method. Using this, the performance of the various readings of the automated refraction with and without cycloplegia was plotted as a ROC curve. This is shown in Figure 3.

The area under the curve (AUC) of the automated refraction with cycloplegia was 0.731 (95% confidence interval [CI] 0.663-0.800) and the AUC of the automated refraction without cycloplegia was 0.614 (95% CI 0.523-0.704). This reveals that the automated refraction with

Table 1: Mean spherical and cylindrical power of the children using the four methods tested

Type of power	Study groups	Eye	Mean	Standard deviation	95% CI for mean	
					Lower bound	Upper bound
Sphere	Automated refraction without cycloplegia	Od	-0.600	1.359	-0.790	-0.411
		Os	-0.49	1.158	-0.651	-0.328
	Automated refraction with cycloplegia	Od	0.437	1.281	0.258	0.615
		Os	0.477	1.206	0.309	0.645
	Conventional cycloplegic retinoscopy	Od	0.451	1.274	0.273	0.628
		Os	0.496	1.183	0.331	0.661
	PMT	Od	0.012	1.291	-0.167	0.192
		Os	0.04	1.216	-0.129	0.209
Cylinder	Automated refraction without cycloplegia	Od	-0.306	0.544	-0.382	-0.230
		Os	-0.305	0.460	-0.369	-0.240
	Automated refraction with cycloplegia	Od	-0.080	0.588	-0.162	0.001
		Os	0.013	0.525	-0.059	0.086
	Conventional cycloplegic retinoscopy	Od	-0.082	0.514	-0.154	-0.010
		Os	-0.021	0.466	-0.086	0.043
	PMT	Od	-0.088	0.485	-0.156	-0.020
		Os	-0.058	0.464	-0.123	0.005

PMT: Post-mydratric test, CI: Confidence interval

Table 2: Sensitivity and specificity of automated refraction with and without cycloplegia

Test	Sensitivity	Specificity
Automated refraction without cycloplegia	60.1%	62.5%
Automated refraction with cycloplegia	70.2%	70.8%

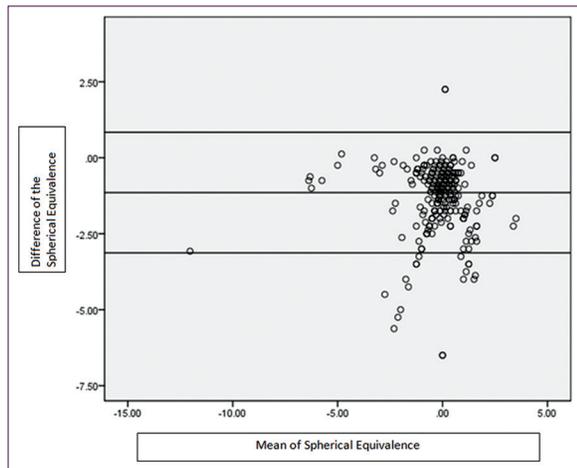


Figure 1: Comparison of conventional cycloplegic retinoscopy and automated refraction without cycloplegia. The readings are widely dispersed and have poor agreement

cycloplegia is a better performing test compared to automated refraction without cycloplegia. Table 2 shows the sensitivity and specificity of the two methods.

DISCUSSION

This study has shown that there is a greater agreement between automated refraction with cycloplegia and the conventional cycloplegic retinoscopy. There is a definite

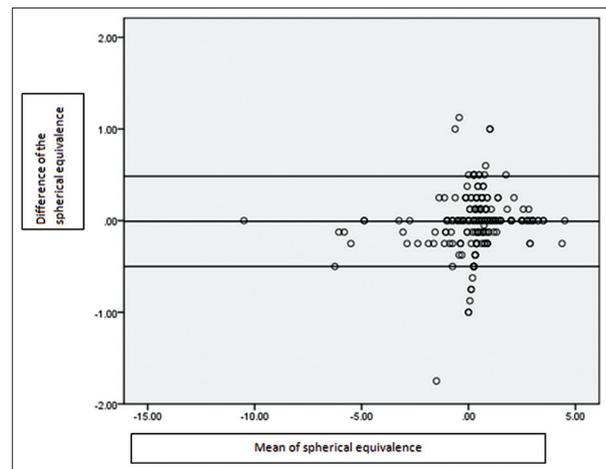


Figure 2: Comparison of conventional cycloplegic retinoscopy and automated refraction with cycloplegia. The readings are narrowly dispersed and have good agreement

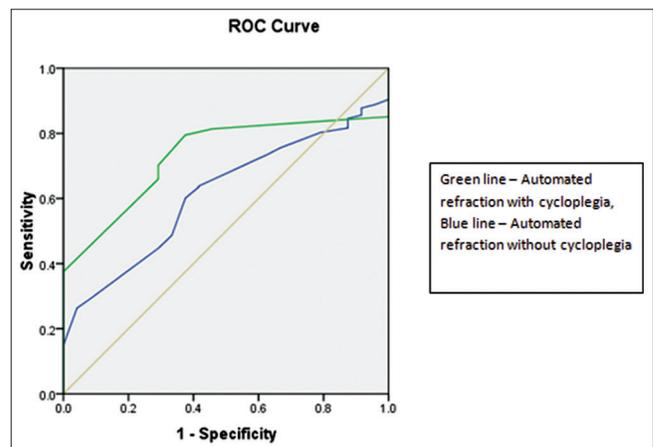


Figure 3: The receiver operating characteristic curve shows that the automated refraction with cycloplegia performs better than the automated refraction without cycloplegia compared to the conventional cycloplegic retinoscopy method

tendency toward minus over correction when automated refraction without cycloplegia is performed. Non-cycloplegic autorefraction is highly unreliable among children because it leads to minus over correction. This could lead to progression of myopia among children.¹⁴⁻¹⁸ A more recent study from Malaysia also showed that autorefractors were more accurate under cycloplegic conditions compared to non-cycloplegic conditions.¹⁸ A more recent study from Tehran also showed that non-cycloplegic autorefraction led to overestimation of myopia and underestimation of hyperopia.¹⁹ Another study from Thailand also showed a higher rate of minus over correction in non-cycloplegic autorefraction.¹¹

With increasing popularity of autorefraction, it is important to understand that cycloplegic autorefraction may be a useful method compared to non-cycloplegic autorefraction. Despite of the cost of equipment, autorefraction with cycloplegia can be comparable or superior to conventional cycloplegic retinoscopy in accuracy in children, can be run by an ophthalmic technician and therefore eliminates the ophthalmologist's examination time required for retinoscopy. Therefore, in resource poor settings like India, it would be very useful to have this practice on a larger scale.²⁰

Autorefraction without cycloplegia cannot substitute for the conventional cycloplegic retinoscopy in young children. This was due to its underestimation of hyperopic refractive errors, overestimation of myopic refractive errors and a high percentage of emmetropic eyes showing false myopic measurements in a significant number of cases.

CONCLUSION

Cycloplegic autorefraction should be promoted as an easy to use and reliable method of refractory error detection where human resources for doing retinoscopy are scarce. There is a clear unequivocal evidence that non-cycloplegic refraction leads to minus over correction and should be avoided in children. Further studies are required to understand the exact correction factor required for accurate assessment of refraction among children when resorting to non-cycloplegic methods.

REFERENCES

1. Abrams D. Duke-Elder's Practice of Refraction. 10th ed. Philadelphia: Elsevier Science; 2002. p. 45-71.
2. Khurana AK. Theory and Practice of Optics and Refraction. India: Elsevier Publisher; 2008. p. 237-53.
3. Ramanjit S, Tandon R. Parsons' Diseases of the Eye. India: Elsevier India; 2011.
4. Myron Y, Duker JS, editors. Ophthalmology: Expert Consult: Online and Print. US: Elsevier Health Sciences; 2013.
5. Elkington AR, Frank HJ, Greaney MJ. Clinical Optics. Oxford: Blackwell Scientific Publications; 1999.
6. Murthy GV, Gupta SK, Ellwein LB, Muñoz SR, Pokharel GP, Sanga L, et al. Refractive error in children in an urban population in New Delhi. Invest Ophthalmol Vis Sci 2002;43:623-31.
7. Dandona R, Dandona L, Srinivas M, Sahare P, Narsaiah S, Muñoz SR, et al. Refractive error in children in a rural population in India. Invest Ophthalmol Vis Sci 2002;43:615-22.
8. Sheer E, Millodot M, Avraham O, Amar S, Gordon-Shaag A. Clinical evaluation of the L80 autorefractometer. Clin Exp Optom 2012;95:66-71.
9. Mohan K, Sharma A. Optimal dosage of cyclopentolate 1% for cycloplegic refraction in hypermetropes with brown irides. Indian J Ophthalmol 2011;59:514-6.
10. Dahlmann-Noor AH, Comyn O, Kostakis V, Misra A, Gupta N, Heath J, et al. Plusoptix Vision Screener: The accuracy and repeatability of refractive measurements using a new autorefractor. Br J Ophthalmol 2009;93:346-9.
11. Funarunart P, Tengtrisorn S, Sangsupawanich P, Siangyai P. Accuracy of noncycloplegic refraction in primary school children in Southern Thailand. J Med Assoc Thai 2009;92:806-11.
12. Jorge J, Queiros A, González-Méijome J, Fernandes P, Almeida JB, Parafita MA. The influence of cycloplegia in objective refraction. Ophthalmic Physiol Opt 2005;25:340-5.
13. Jorge J, Queirós A, Almeida JB, Parafita MA. Retinoscopy/autorefraction: which is the best starting point for a noncycloplegic refraction? Optom Vis Sci 2005;82:64-8.
14. Harvey EM, Miller JM, Dobson V, Tyszko R, Davis AL. Measurement of refractive error in Native American preschoolers: Validity and reproducibility of autorefraction. Optom Vis Sci 2000;77:140-9.
15. Wesemann W, Dick B. Accuracy and accommodation capability of a handheld autorefractor. J Cataract Refract Surg 2000;26:62-70.
16. Williams C, Lumb R, Harvey I, Sparrow JM. Screening for refractive errors with the Topcon PR2000 pediatric refractometer. Invest Ophthalmol Vis Sci 2000;41:1031-7.
17. Celebi S, Aykan U. The comparison of cyclopentolate and atropine in patients with refractive accommodative esotropia by means of retinoscopy, autorefractometry and biometric lens thickness. Acta Ophthalmol Scand 1999;77:426-9.
18. Choong YF, Chen AH, Goh PP. A comparison of autorefraction and subjective refraction with and without cycloplegia in primary school children. Am J Ophthalmol 2006;142:68-74.
19. Fotouhi A, Morgan IG, Iribarren R, Khabazkhoob M, Hashemi H. Validity of noncycloplegic refraction in the assessment of refractive errors: The Tehran Eye Study. Acta Ophthalmol 2012;90:380-6.
20. Zhao J, Mao J, Luo R, Li F, Pokharel GP, Ellwein LB. Accuracy of noncycloplegic autorefraction in school-age children in China. Optom Vis Sci 2004;81:49-55.

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Management of Hollow Viscous Gastric and Duodenal Perforation Cases by Surgical Method versus Non-Operative Management: A Comparative Study

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Abstract

Background: Upper gastrointestinal hollow viscous perforation is multifactorial and not fully understood even today. Hollow viscous perforation of upper gastrointestinal i.e. Gastric and duodenal perforations presents to the causality with acute abdominal pain and distension, hypotension and prostration.

Aims: The purpose of this study is to compare the outcome in patients with gastric or duodenal perforation by non-operative management as against definitive surgery.

Materials and Methods: A prospective study of upper gastrointestinal hollow viscous perforation cases was undertaken in Government General Hospital, Kakinada. 100 cases of perforation of duodenum and stomach have been included in this study. Of them, 70 cases were managed by definitive surgery, and 30 cases were unfit to undergo an anesthetic and surgical line of management. This group was managed by bilateral flank drains. Follow-up regarding recovery was observed.

Results: Maximum age incidence of hollow viscous perforation (gastric and duodenal) is between 35 and 45 years. Maximum sex incidence is in males - 80%. Of these 30 patients was managed by non-operative method. Non-operative management was successful in total recovery in 66.66% of patients, which is very significant. Out of the survived cases maximum number are at the age of 35-45 years.

Conclusions: Non-operative management, by keeping bilateral flank drains, is a formidable line of management as an alternative to surgical management in patients with compromised general condition, unfit for any type of anesthesia.

Key words: Definitive surgery, Hollow viscous perforation, Laparotomy

INTRODUCTION

Hollow viscous perforation of upper gastrointestinal, i.e. Gastric and duodenal perforations presents to the causality with acute abdominal pain and distension,

hypotension and prostration. Usually, there is a prior history of symptoms suggestive of acid peptic disease or analgesic over usage.^{1,2}

On examination, upper abdominal tenderness, guarding, rigidity and obliterated liver dullness are the cardinal clinical features. Plain X-ray abdomen in an erect posture shows crescentic gas shadow under the right dome of diaphragm.^{3,4} Intravenous fluid infusion with correction of electrolyte imbalance is the immediate priority in management. Other accessory measures of colloid or crystalloid infusion to treat hypovolemia and shock and packed red blood cell transfusion is important to make the patient fit for anesthesia.⁵⁻⁷

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MATERIALS AND METHODS

A total of 100 cases of perforation of duodenum and stomach have been included in this study. Ethics the protocol was approved by the Local Committee and written informed consent was obtained from each patient. Out of them, 70 cases were managed by definitive surgical method by laparotomy and closure of the perforation with Graham's Omental onlay patch repair. Thirty cases were unfit to undergo an anesthetic and surgical line of management. Hence, bilateral large bore drains were kept in the flanks by blind method under local infiltrative lignocaine analgesia. The outcome was closely followed up to record the prognosis and recovery. For all patients anti *Helicobacter pylori* treatment are given as a protocol post-operatively at the time of discharge.

RESULTS

A study of 100 cases of hollow viscous perforation in stomach and duodenum was carried, out of which 80 are males and 20 females. Operative management was done in 70 cases, and non-operative management was done in 30 patients.

The patients age group was divided into different categories ranging from below <35 years to >75 years (Table 1).

Out of 100 samples for study males patients were 80 in number, while female patients were 20 in number. The pie chart represents the study sample (Figure 1).

The site of perforation, which was involved in study sample was found to be in five patients in the gastric region and 65 in duodenal regions (Figure 2).

Various reasons for morbidities have been mentioned in percentage in Table 2 and represented in graphical format (Figure 3).

Time at which oral fluids were allowed to patients. For operated patients on 4th post-operative day and for non-operated patients: on 7th post-operative day (Figure 4).

Maximum death rates after non-operative management occurred in patients above 45 years i.e., 8/10 are represented in Table 3, Figure 5a and b.

DISCUSSION

The etiology of upper gastrointestinal hollow viscous perforation is multi-factorial and not fully understood even today. It has been observed that treatment of acid

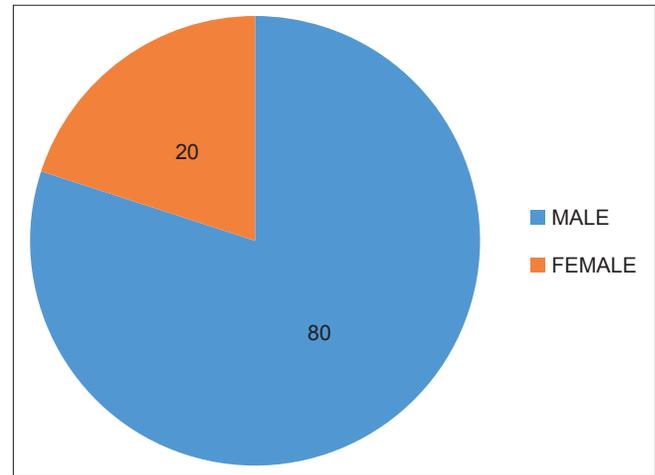


Figure 1: Sex incidence

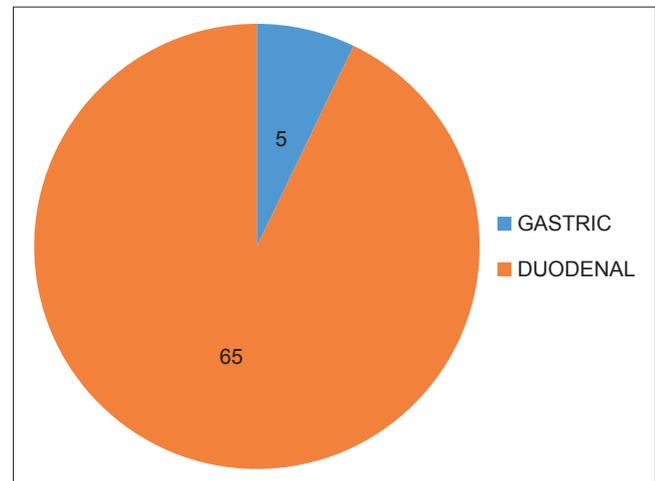


Figure 2: Site of perforation

Table 1: Age incidence of patients with HVP (gastric and duodenal)

Age (years)	Male (80)	Female (20)	Operative management (70)	Number of deaths after surgery (10)	Non-operative management (30)	Number of deaths after non-operative management (10)
<35	10	Nil	8	1	2	Nil
35-45	50	6	40	5	16	2
46-55	10	12	17	2	5	3
56-65	5	2	4	2	3	2
66-75	2	Nil	1	Nil	1	1
>75	3	Nil	Nil	Nil	3	2

HVP: Hollow viscous perforation

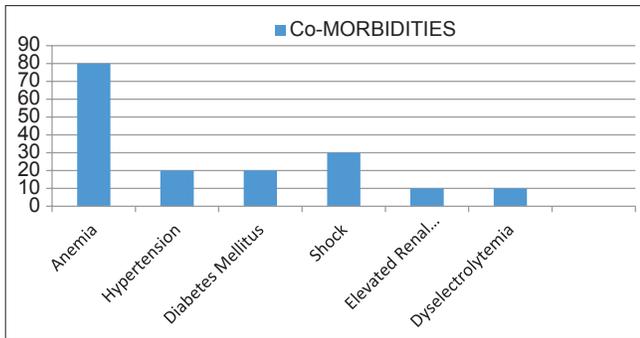


Figure 3: Co-morbidities

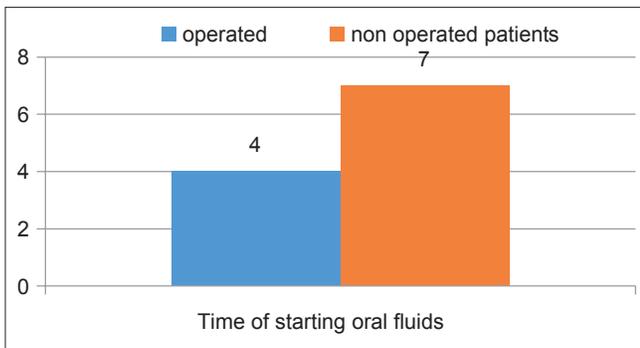


Figure 4: Time at which oral fluids was allowed to patients

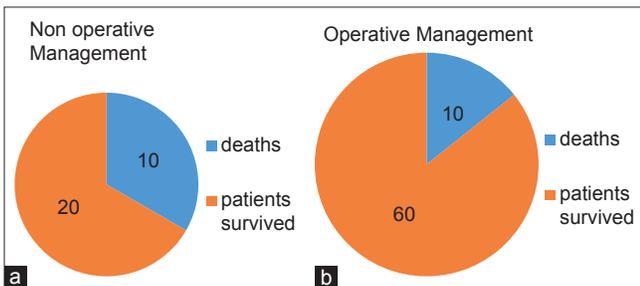


Figure 5: (a) Non-operative management (b) Operative management deaths

Table 2: Co-morbidities

Co-morbidities	Percentage
Anemia	80
Hypertension	20
Diabetes mellitus	20
Presentation with shock (SBP<80 mm of Hg)	30
Elevated renal parameters	10
Dysselectrolytemia	10

SBP: Systolic blood pressure

Table 3: Maximum death rates after non-operative management

Type of management	Number of patients survived	Number of patients died	Total
Non-operative	20	10	30
Operative	60	10	70

peptic disease, non-ulcer dyspepsia with proton pump inhibitors and anti-*H. Pylori* treatment with triple therapy in selected cases also has not brought big changes in the incidence of perforation as a complication. Hence, the incidence of duodenal perforation is still high.^{8,9} Acute or long standing usage of analgesics especially non-steroidal anti-inflammatory drug such as diclofenac sodium, alcohol abuse, smoking tobacco and male sex are other proposed causes responsible for acute duodenal perforation. Most commonly perforation is found typically in the first part of the duodenum just lateral to the vein of mayo. On laparotomy, reactive peritoneal fluid admixed with bile is a common finding. Sometimes, flakes of mucus mixed with organized fibrous tissue and omental adhesions are observed thus making it difficult to expose the perforation.¹⁰ The size of the perforation is usually 0.5 cm to sometimes as large as 2 cm, which allows undigested food material to contaminate the peritoneal cavity.^{11,12}

The perforation is closed after trimming the edges with a non-absorbable silk or delayed absorbable vicryl by simple suturing. An on-lay patch of the greater omentum from nearby greater curvature of the stomach is done to just transpose over the wound to ensure good vascularity and healing. Peritoneal lavage with saline is done, and a subhepatic drain is kept in situ and anchored securely to the abdominal wall. Post-operative follow-up with Ryle's tube aspiration for 48 h, fluid and electrolyte management, antibiotics are all meticulously followed.¹³

Non-Operative Management

In patients with high risk for anesthesia and surgery, with the reasons like severe non-responding hypotension, raised renal parameters, patients on anti-coagulant treatment, a non-operative management line is a better choice for such patients. Bilateral large bore polyvinyl chloride drains of 32G are kept into the peritoneal cavity simultaneously. Under local xylocaine, infiltrative analgesia with a skin incision drain ends are thrust into the peritoneal cavity, and drained fluid is collected into bags.¹⁴ After 48 h the drain output is measured and monitored. If the drain output decreases, patient circulatory status improves and bowel sounds return over the next few days explorative laparotomy is not undertaken. Conservative management by supportive care is provided. As the patient condition improves, the perforation is assumed to be closed spontaneously.¹⁵

CONCLUSION

Non-operative management by keeping bilateral flank drains of upper gastrointestinal hollow viscous perforation is a formidable line of management as an alternative to

surgical management in patients with compromised general condition, unfit for any type of anesthesia.

REFERENCES

1. Uccheddu A, Floris G, Altana ML, Pisanu A, Cois A, Farci SL. Surgery for perforated peptic ulcer in the elderly. Evaluation of factors influencing prognosis. *Hepatogastroenterology* 2003;50:1956-8.
2. Nogueira C, Silva AS, Santos JN, Silva AG, Ferreira J, Matos E, *et al.* Perforated peptic ulcer: Main factors of morbidity and mortality. *World J Surg* 2003;27:782-7.
3. Hermansson M, Staël von Holstein C, Zilling T. Surgical approach and prognostic factors after peptic ulcer perforation. *Eur J Surg* 1999;165:566-72.
4. Testini M, Portincasa P, Piccinni G, Lissidini G, Pellegrini F, Greco L. Significant factors associated with fatal outcome in emergency open surgery for perforated peptic ulcer. *World J Gastroenterol* 2003;9:2338-40.
5. Svanes C. Trends in perforated peptic ulcer: Incidence, etiology, treatment, and prognosis. *World J Surg* 2000;24:277-83.
6. Shan YS, Hsu HP, Hsieh YH, Sy ED, Lee JC, Lin PW. Significance of intraoperative peritoneal culture of fungus in perforated peptic ulcer. *Br J Surg* 2003;90:1215-9.
7. Crofts TJ, Park KG, Steele RJ, Chung SS, Li AK. A randomized trial of nonoperative treatment for perforated peptic ulcer. *N Engl J Med* 1989;320:970-3.
8. Berne TV, Donovan AJ. Nonoperative treatment of perforated duodenal ulcer. *Arch Surg* 1989;124:830-2.
9. Keane TE, Dillon B, Afdhal NH, McCormack CJ. Conservative management of perforated duodenal ulcer. *Br J Surg* 1988;75:583-4.
10. Donovan AJ, Berne TV, Donovan JA. Perforated duodenal ulcer: An alternative therapeutic plan. *Arch Surg* 1998;133:1166-71.
11. Marshall C, Ramaswamy P, Bergin FG, Rosenberg IL, Leaper DJ. Evaluation of a protocol for the non-operative management of perforated peptic ulcer. *Br J Surg* 1999;86:131-4.
12. Crofts TJ, Park KG, Steele RJ, Chung SS, Li AK. A randomized trial of nonoperative treatment for perforated peptic ulcer. *N Engl J Med* 1989;320:970-3.
13. Katkhouda N, Mavor E, Mason RJ, Campos GM, Soroushyari A, Berne TV. Laparoscopic repair of perforated duodenal ulcers: Outcome and efficacy in 30 consecutive patients. *Arch Surg* 1999;134:845-8.
14. Lee FY, Leung KL, Lai PB, Lau JW. Selection of patients for laparoscopic repair of perforated peptic ulcer. *Br J Surg* 2001;88:133-6.
15. Bergamaschi R, Mårvik R, Johnsen G, Thoresen JE, Ystgaard B, Myrvold HE. Open vs laparoscopic repair of perforated peptic ulcer. *Surg Endosc* 1999;13:679-82.

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Assessment of Ophthalmological Causes of Headaches in a Tertiary Care Center in South India

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Abstract

Background: Headache is the most common ailment of mankind. There is a popular notion that is prevailing in the society, that all persons should undergo ophthalmic examination for headache.

Objective: The aim was to assess the various ocular causes of headache among patients attending the outpatient and inpatient wards.

Methods: A sample of 100 consecutive patients with ocular causes of headache were selected from the inpatient and outpatient wards of Government Medical College were evaluated in detail by taking the detailed history and doing proper systemic and local examination.

Results: Most ocular headache is insidious in origin, intermittent in nature, predominantly evening occurring, and usually periorbital or global in nature. Eyestrain is the most leading cause of headache, which constitutes about 75%. The major cause of eyestrain is refractive errors, which contributes to about 58.9%. The predominant refractive error leading to ocular headache is astigmatism against the rule type, which contributes to 41%.

Conclusion: The major cause of ocular headache is eye strain, which is mainly contributed by the refractive errors, especially astigmatism.

Key words: Headache, Ophthalmology, Pain

INTRODUCTION

Headache is probably the most common ailment of mankind. The term headache (or) cephalgia includes pains located in the head and unpleasant sensations in the cranial vault and facial pains.¹ Headaches may be caused due to various mechanisms. They include intra cranial or an extra cranial traction, pressure, displacement (or) dilatation of vessels, inflammation, sustained muscular contraction and metabolic disturbances ranging from hypothyroidism to hangover. Although it is popularly believed that ocular dysfunction (or) disease are common

causes of headache, in majority of the cases a patient who presents with headache as his chief symptom is rarely found to have any ocular condition to which headache is attributed.²⁻⁴ There is a popular notion that is prevailing in the society, that all persons should undergo ophthalmic examination for headache. This is the reason why, many patients will approach ophthalmologists for headaches. Hence, ophthalmologists must be familiar with not only the ocular causes of headache, but also other diseases associated with headache.

Ray and Wolff concluded that headache may results from:⁵

- Traction on the venous sinuses or their tributaries
- Traction on meningeal arteries
- Traction on the large arteries at the base of the brain
- Direct pressure on cranial or cervical pain-sensitive nerves
- Dilation of intracranial arteries and
- Inflammation of any pain sensitive structure.

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Regardless of the vasomotor and biochemical mechanisms that produce headache, there appears to be three potential pathways for the transmission of painful impulses of headache.⁵

1. The trigeminal nerve would be the primary transmitter; however the glossopharyngeal, vagal and facial nerves as well as posterior cervical nerves may also transmit painful facial impulses
2. There may be sympathetic sensory conduction
3. Referred pain to the head from extracranial disease.

Pain of ocular origin usually follows the distribution of first division of trigeminal nerve, which supplies the eye, the orbit and forehead, but may spread, if severe, and cause painful reflex contraction of the ipsilateral frontal and occipital muscles.⁶⁻¹¹

Headache of the ocular origin may arise as a result of:

- Eye strain
 - Refractive errors
 - Accommodative difficulties either insufficiency or excess
 - Heterophorias
 - Convergence difficulties
 - Aniseikonia
 - Heterotropias
 - Environmental factors leading to eye strain.
- Intraocular inflammations
- Ocular hypertension (or) glaucoma
- Diseases of the external eye and its adnexa
- Trauma.

Despite extensive literature on ocular causes of headaches and its importance, there is scant literature from India on the common ocular causes of headache. This study was designed to assess the various ocular causes of headache among patients attending the outpatient and inpatient wards of a Government Medical College Teaching Hospital in Andhra Pradesh, South India.

METHODS

The study was conducted among out-patient and inpatients attending the Government Medical College Teaching Hospital, Kakinada, Andhra Pradesh. A sample of 100 consecutive patients with ocular causes of headache was selected for this study between the period of July 2002 and October 2004. Inclusion criteria were presence of headache with suspected ocular cause by the primary physician, or presence of headache with associated ocular symptoms. All these patients were evaluated in detail by taking the detailed history and doing proper systemic and local examination.

Examination of the eye consists of detailed study of the globe and its adnexa. Proper attention has been paid to the refractive errors, convergence and accommodation anomalies, heterophorias, heterotropias, and galucomas. As far as the examination of the globe is concerned, slit land examination was done in suspected cases of intraocular inflammations. In ametropic cases, after recording visual acuity, through retinoscopic examination was done. In suspected cases of convergence anomalies. The near point of convergence is recorded with the help of ruler and pen. Under accommodation anomalies, the near visual acuity was measured by British Faculty of Ophthalmologists test, and that of near point of accommodation was measured by RAF ruler. In suspected cases of strabismus, the cover tests were performed to note the type of squint. In the case of heterophorias, Maddox rod with tangent scale and Maddox wing tests were performed for distant and near examination respectively. For all cases routinely the intraocular tension was recorded with the help of schiottz's indentation tonometry. In some suspected cases of Glaucomas, the gonioscopy was performed to know the anterior chamber angle status. In appropriate cases, like in the case of iridocyclitis, scleritis, and further laboratory investigations are done for the proper management. In certain conditions, other super specialists help also taken in evaluating the cases.

The case proforma for each of the patients was filled up by the ophthalmologist. This was then entered into the computer spreadsheet. The data was analyzed using Statistical Package for Social Sciences version 17. Simple frequencies were analyzed to identify patterns of ocular pathology in patients presenting with ocular causes of headache.

The study was approved by the Institutional Review Board and Ethics Committee. Appropriate written informed consent was obtained from each participant before the study.

RESULTS

The characteristics of the study sample are shown in Table 1. The maximum age incidence of the ocular cause of headache is seen in second, third and fourth decades. The students contribute to the major group of ocular headache i.e., 36% among the occupational incidence. Next comes house wives belong to lower social group of 28%. The unskilled workers suffer 24%. Skilled workers contribute to 3%. They include tailors, mechanics, painters and lathe workers. Professionals include Doctors, Engineers, Teachers who contribute 9%. Persons who come under ungrouped are those who are dependent on others because of their senility, disability or chronic illness.

Table 2 describes the characteristics of the eye pain. Most ocular headache is insidious in origin, intermittent in nature,

predominantly evening occurring, and usually periorbital or global in nature.

Table 3 describes the various causes of headache among the sample. These are the common ocular causes of headache. From the data, it is seen that eyestrain is the most leading cause of headache, which constitutes about 75%. Next to this is raised intraocular pressure, which constitutes about 12%. The main reason for this high incidence of eyestrain is

Table 1: Characteristics of study sample

Characteristic	Categories	Numbers (n=100)	Percentage
Age	0-10	3	3
	11-20	24	24
	21-30	31	31
	31-40	19	19
	41-50	14	14
	51-60	6	6
	61-70	3	3
Sex	Male	46	46
	Female	54	54
Occupation	Students	36	36
	Housewives	28	28
	Unskilled workers	24	24
	Skilled workers	3	3
	Professionals	9	9

Table 2: Characteristics of the headache of ocular origin

Characteristic of headache	Categories	Numbers (n=100)	Percentage
Mode of onset	Insidious	79	79
	Sub-acute	7	7
	Acute	14	14
Periodicity	Intermittent	73	73
	Constant	27	27
Time of onset of headache	Morning	26	26
	Day time	12	12
	Evening	52	52
	Night	10	10
Site of pain	Periorbital one side	24	24
	Periorbital both sides	44	44
	Occipital	2	2
	Generalized	30	30
Nature of pain	Boring	22	22
	Burning	13	13
	Pressure	28	28
	Throbbing	24	24
	Vague	13	13
	Provocative factors (reading near work, painting, tailoring)	Present	67
Relieving factors	Absent	33	33
	Rest of the eyes	35	35
	Analgesics	20	20
	No specific relieving factors	45	45
Associated symptoms	Pain with or without symptoms	49	49
	Watering	18	18
	Blurring of vision	26	26
	Systemic factors	7	7

due to the high incidence of refractive errors, convergence insufficiency among the population.

Table 4 shows the various causes for eye strain among the sample of 75 patients who presented with this condition. The major cause of eyestrain is refractive errors, which contributes to about 58.9%. Convergence insufficiency contributes to 12.8% and accommodative insufficiency comes next with 17.9%. The heterophorias, heterotropias contributes to the lower proportion of eye strains.

Table 5 shows the various types of refractive errors among patient presenting with ocular causes of headache. The predominant refractive error leading to ocular headache is astigmatism against the rule type, which contributes to 41%. Next to this is the hypermetropia, which constitutes about 28.22%.

DISCUSSION

This study is an attempt to profile the nature of ocular causes of headache in a typical tertiary care medical college teaching hospital set up. It was seen that eye strain was the most common ocular cause of headache. Further analysis

Table 3: Common ocular causes of headache in the sample

Ocular cause	Number of cases	Percentage
Eye strain	75	75
Intraocular inflammation	10	10
Raised I.O.P	12	12
Diseases of external eye and adnexa	2	2
Iatrogenic	1	1

IOP: Intraocular pressure

Table 4: Causes of eye strain leading to headache

Causes of eye strain	Number of cases	Percentage
Refractive errors	46	58.9
Convergence insufficiency	10	12.8
Accommodative insufficiency	14	17.95
Heterophorias	7	9
Heterotropias	1	1.3

Multiple conditions could be present in same patient

Table 5: Various types of refractive errors leading to headache

Type of refractive errors	Number of cases	Percentage	
Astigmatism	Against the rule	32	41
	With the rule	10	12.8
	Oblique	4	5.12
Hypermetropia	22	28.22	
Myopia with anisometropia	10	12.8	

of eye strain revealed that refractive errors, accommodative insufficiency and convergence insufficiency were the major contributors to eye strain. Astigmatism was the commonest refractive error leading to ocular origin headache.

Various authors have described the ophthalmological causes of headaches elaborately. Not only is ocular pathology a common cause of headaches, patients with neurological headaches can also present to the ophthalmologist with ocular manifestations. Several primary headache disorders can present with manifestations in the eye, which are often picked up by the ophthalmologist. Since several primary causes of headache may be confused with ophthalmological origin headache, a thorough ophthalmological examination is very important.

This study clearly identified eye strain as the dominant ocular cause of headache. Among eye strain, refractive errors were the leading cause. There is significant debate on the association between refractive errors and headaches.¹² The International Headache Society classifies a particular form of Headache Associated with Refractive Errors (HARE), however, adds a clause that it is an over diagnosed condition.¹³ An interesting study from Portugal looked at patients with fully correction refractive errors/absent refractive error versus patients with uncorrected refractive error. They found that there was no difference in their history of headaches or headache patterns. They concluded that HARE are very rare.¹² A study from Turkey assessed 300 patients with headache and 800 without headaches for presence of refractory errors. They found that the prevalence of refractory errors was higher in the headache group compared to the controls. While myopia and hyperopia were similar in both the groups rates of astigmatism were higher in the headache group. Compound and mixed type of astigmatism, anisometropia and miscorrected refractive errors were more common in the headache group.¹⁴ A systematic review of studies showed that there is no evidence to support that full correction of refractive errors can alleviate headaches.¹⁵ Thus, this study places a rather drastic question on the association between refractive errors and headaches.

In this context, the finding of this study that refractory errors are the leading cause of eye strain and eye strain the leading cause of ocular headache needs to be evaluated closely. Firstly this is an observational study. It is based on patients attending the outpatient and inpatient settings in a tertiary care medical college teaching hospital. This could be a biased population as most of the patients attending

this setting is likely to be with more severe disorders and referred patients. A community based assessment of ocular causes of headache would lead to a better picture of the association between refractory errors and headache.

CONCLUSION

From this study on ocular causes of headache, the major cause of ocular headache is eye strain which is mainly contributed by the refractive errors, especially astigmatism. So for all the patients attending the out-patient department with the complaints of headache, they can be subject to the retinoscopy in order to rule out refractive errors. Other causes for producing the headache such as glaucoma, iridocyclitis, heterophorias, heterotropias should also be considered in evaluating the patient with ocular headache. However, it is important to note that this is a small study from a tertiary care setting. There is a need for further studies from community to look at common ocular causes of headache and develop guidelines for headache management in the Indian context.

REFERENCES

1. Friedman DI. Headache and the eye. *Curr Pain Headache Rep* 2008;12:296-304.
2. Friedman DI. The eye and headache. *Ophthalmol Clin North Am* 2004;17:357-69, vi.
3. Friedman DI, Gordon LK, Quiros PA. Headache attributable to disorders of the eye. *Curr Pain Headache Rep* 2010;14:62-72.
4. Shareef AH, Dafer RM, Jay WM. Neuro-ophthalmologic manifestations of primary headache disorders. *Semin Ophthalmol* 2008;23:169-77.
5. Ray BS, Wolff HG. Experimental studies on headache: Pain-sensitive structures of the head and their significance in headache. *Arch Surg* 1940;41:813-56.
6. Dafer RM, Jay WM. Headache and the eye. *Curr Opin Ophthalmol* 2009;20:520-4.
7. Tomsak RL. Ophthalmologic aspects of headache. *Med Clin North Am* 1991;75:693-706.
8. Omoti AE, Waziri-Erameh MJ. Pattern of neuro-ophthalmic disorders in a tertiary eye centre in Nigeria. *Niger J Clin Pract* 2007;10:147-51.
9. Mandic Z, Novak-Laue K, Lacmanovic Loncar V, Petric Vickovic I, Reiner ET, Ivekovic R, *et al.* Ophthalmological causes of headache. *Acta Med Croatica* 2008;62:211-8.
10. Scheuerle AF, Kolling G. Headaches from an ophthalmological perspective. *HNO* 2011;59:651-5.
11. Kairys DJ, Tibbetts C, Saliba K. A standard optometric headache history. *J Am Optom Assoc* 1983;54:165-76.
12. Gil-Gouveia, R, Martins IP. Headaches associated with refractive errors: Myth or reality? *Headache* 2002;42:256-62.
13. Gordon GE, Chronicle EP, Rolan P. Why do we still not know whether refractive error causes headaches? Towards a framework for evidence based practice. *Ophthalmic Physiol Optics* 2001;21:45-50.
14. Akinci A, Güven A, Degerliyurt A, Kibar E, Mutlu M, Citirik M. The correlation between headache and refractive errors. *JAAPOS* 2008;12:290-3.

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Incidence of Osteoporosis in Chronic Obstructive Pulmonary Disease Patients in a Tertiary Care Hospital: A Prospective Clinical Study

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Abstract

Background: The purpose of the present study is to know the incidence of osteoporosis in chronic obstructive pulmonary disease (COPD) patients in relation to its severity and early diagnosis of osteoporosis in COPD patients and its treatment can change quality of life of the patients.

Methods: A prospective clinical study consisted of 100 COPD patients above 40 years were undertaken to study the incidence of osteoporosis. Of which, 74 males and 26 females were included in this study. Known COPD patients were assessed by GOLD criteria of severity.

Results: The study group consisted of 100 patients, of which 74 are males and 26 are females. Incidence of osteopenia and osteoporosis among males are 16.21% and 60.81% respectively. Incidence of osteopenia and osteoporosis among females are 19.23% and 50.00% respectively ($P > 0.05$). Among men incidence of osteoporosis increases with an increase of grading. It increased from 9.09% for Grade 2 to 81.81% to Grade 4 ($P < 0.01$). Among women incidence of osteoporosis increases with increase of grading. It increased from 20.00% for Grade 2 to 70.00% to Grade 4 ($P > 0.05$). Incidence of osteoporosis is high among patients on oral steroids 82.97%. Incidence among oral inhaled corticosteroid patients is 51.51% and on no steroids is 10% ($P > 0.05$).

Conclusions: In the present study, incidence of severity of osteoporosis increases with increased grading of COPD with high use of oral steroids. Early diagnosis of osteoporosis in COPD patients with early treatment can change the quality of life.

Key words: Chronic obstructive pulmonary disease, Quality of life, Steroid therapy

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a complex disease; the initial symptoms are cough with mucus production and dyspnea.¹ As the disease progression other symptoms may also develop. Osteoporosis might also develop possibly due to a certain number of factors related to the disease. Etiology of osteoporosis in COPD is probably complex, and various factors may contribute

to its pathogenesis. The pathophysiological mechanisms in COPD are mainly due to oxidative stress, which acts as an important amplifying mechanism in copd. Biomarkers of oxidative stress (e.g. hydrogen peroxide, 8-isprostane) are increased in the exhaled breath condensate, sputum and systemic circulation of COPD patients.^{2,3} Osteoporosis is a systemic skeletal disease characterized by a decreased bone mineral density (BMD) and/or deterioration of the microarchitecture, resulting in increased bone fragility and hence an increased susceptibility to fractures. The preclinical state of osteoporosis is called osteopenia. World Health Organization (WHO) definition for osteoporosis is based on the measurement of BMD.⁴ Dual energy X-ray absorptiometry (DEXA) is currently the “gold standard” and the most frequently used method of BMD measurement. BMD is expressed in standard deviation (SD) of means, the T and Z-scores. The T-score is a SD compared with a

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young adult sex matched control population. The Z-score is a SD compared with an age- and sex-matched control population. T-scores of < -2.5 are defined as osteoporosis.⁵

The prevalence of osteoporosis has been found to be high in inflammatory bowel disease, sarcoidosis and COPD. The common link in these diseases might be systemic inflammation. Indeed, chronic inflammatory diseases lead to the production of cytokines that stimulate bone turnover. This increased bone turnover may increase bone fragility and hence may be associated with an increased fracture risk. Indeed, Bon *et al.* found a significant correlation between C-telopeptides of Type I collagen (a marker of bone resorption) and interleukine-4 (IL-4) and tumor necrosis factor α (TNF- α) in COPD patients.⁶ In addition, they found a significant correlation between N-terminal procollagen propeptide (a marker of bone formation) and both IL-4 and TNF- α . Another link could be physical inactivity due to the underlying disease, which in turn gives rise to a lower BMD. Another explanation could be that osteoporosis has the same risk factors as some chronic diseases e.g. smoking. The pathogenesis of osteoporosis in chronic diseases is complicated and not fully understood.⁷

About 35% of the COPD patients had markedly low 25-hydroxyvitamin D levels (i.e., 10 ng/mL). Vitamin D deficiency may also contribute to the decreased BMD associated with COPD due to less sun exposure and poor nutrition as a result of decreased functional status. Corticosteroid use decreases luteinizing hormone and follicle stimulating hormone secretion from the pituitary gland. There is a direct effect of glucocorticoids, which decreases estrogen and testosterone production.⁸

METHODS

A prospective clinical study consisted of 100 COPD patients, who were admitted in Government General Hospital, Kakinada during November 2012-September 2014 were undertaken to conduct this study to look incidence of osteoporosis in COPD patients. 74 males and 26 females were studied. Ethics the protocol was approved by the local committee and written informed consent was obtained from each patient.

Inclusion Criteria

1. Age >40 years
2. Known COPD patients as assessed by GOLD criteria of severity.

Exclusion Criteria

1. Patients not willing for follow-up
2. Patients in respiratory or cardiac distress.

Consent was taken. All patients were clinically examined, and investigated by complete blood picture, chest X-ray, and Spirometry. All patients were sent for DEXA scan and serum vitamin D3 estimation.

Data are presented as mean \pm SD. Differences in categorical variables were analyzed using the Chi-square test. $P < 0.05$ was considered as statistically significant.

RESULTS

The study group consisted of 100 patients, of which 74 are males and 26 are females. Among males 14.86% of them are in 40-50 age group, 21.62% of them are in 50-60 age group, 31.08% of them are in 60-70 age group and 32.43% of them are above 70 years age group.

Among females 23.07% of them are in 40-50 age group, 19.23% of them are in 50-60 age group 34.61% of them are in 60-70 age group and 23.07% of them are above 70 years age group (Table 1).

Among males, 9.45% were in Grade 1, 14.86% were in Grade 2, 31.08% were in Grade 3, 44.59% were in Grade 4. Among females 7.69% were in Grade 1, 19.23% were in Grade 2, 30.76% were in Grade 3, 34.61% were in Grade 4 (Table 2).

Table 1: Age distribution

Age in years	Males	%	Females	%
40-50	11	14.86	6	23.07
50-60	16	21.62	5	19.23
60-70	23	31.08	9	34.61
Above 70	24	32.43	6	23.07

Table 2: Distribution with grading

COPD grading	Males	%	Females	%
Grade 1	7	9.45	2	7.69
Grade 2	11	14.86	5	19.23
Grade 3	23	31.08	8	30.76
Grade 4	33	44.59	9	34.61

COPD: Chronic obstructive pulmonary disease

Table 3: Incidence of osteoporosis with sex

Sex	Normal BMD	%	Osteopenia	%	Osteoporosis	%
Males	17	22.97	12	16.21	45	60.81
Females	8	30.76	5	19.23	13	50.00

BMD: Bone mineral density

Incidence of osteopenia and osteoporosis among males are 16.21% and 60.81% respectively. Incidence of osteopenia and osteoporosis among females are 19.23% and 50.00% respectively ($P > 0.05$) (Table 3).

Among men incidence of osteoporosis increases with increase of grading. It increased from 9.09% for Grade 2 to 81.81% to Grade 4 ($P < 0.01$) (Table 4).

Among women incidence of osteoporosis increases with increase of grading. It increased from 20.00% for Grade 2 to 70.00% to Grade 4 ($P > 0.05$) (Table 5).

Osteoporosis incidence increases among men as age advances ($P < 0.01$). Osteoporosis incidence increases among women as the age advances ($P < 0.05$).

Incidence of osteoporosis among premenopausal women is 16.67% and among postmenopausal women is 55% ($P > 0.05$).

Incidence of osteoporosis is high among people with low body mass index (BMI). Its incidence is 75.80% among low BMI people and 36.36% among people with high BMI ($P < 0.01$).

Incidence of osteoporosis is high among patients on oral steroids 82.97%. Incidence among oral inhaled corticosteroid patients is 51.51% and on no steroids is 10% ($P > 0.05$) (Table 6).

DISCUSSION

In the present study incidence of osteoporosis in low BMI patients is (75.80%) and overweight patients is (36.36%). This association was statistically significant ($P < 0.05$). In the present study, majority of patients who had osteoporosis had Grade 4 COPD (81.81%) and Grade 3 COPD (73.91%). Incidence of osteoporosis increased with grading of copd from 14% (Grade 1) to 80% (Grade 4) among males. Among females also COPD incidence increased from Grade 1 to Grade 4. Present study is on par with Jørgensen and Schwarz study.⁹ In the present study, incidence of osteopenia and osteoporosis among males are 12% and 60.81%, respectively. This is on par with the above mentioned studies.

An Indian study which recently was conducted on 37 patients showed, prevalence of osteoporosis of 21.6% and osteopenia 27%. However, this study had used calcaneal ultrasonography for the diagnosis of osteoporosis, which is not considered as standard test.

We have used DEXA scan for the diagnosis of osteoporosis, which is considered a gold standard test and the patients were classified according to the WHO criteria.⁹⁻¹¹

The incidence of osteoporosis and osteopenia in patients with Grade 4 and Grade 3 severity of COPD is 81.81% and 73.91% respectively as per our study. Hence, we propose that a prophylactic treatment with calcium (1000 mg/day) and vitamin D (800 IU/day) as a standard supplementation,

Table 4: Incidence of osteoporosis among men based on COPD severity

Grade	Males	%	Normal BMD	%	Osteopenia	%	Osteoporosis	%
1	7	9.45	6	85.71	1	14.28	0	0
2	11	14.86	8	72.72	2	18.18	1	9.09
3	23	31.08	3	13.04	3	13.04	17	73.91
4	33	44.59	0	0	6	18.18	27	81.81

BMD: Bone mineral density, COPD: Chronic obstructive pulmonary disease

Table 5: Incidence of osteoporosis among women based on COPD severity

Grade	Females	%	Normal BMD	%	Osteopenia	%	Osteoporosis	%
1	3	7.69	3	100	0	0	0	0
2	5	19.23	3	60	1	20	1	20
3	8	30.76	1	12.50	2	25	5	62.5
4	10	34.61	1	10	2	20	7	70

BMD: Bone mineral density, COPD: Chronic obstructive pulmonary disease

Table 6: Incidence of osteoporosis in relation with steroid usage

Steroid usage	Number of persons	%	Normal BMD	%	Osteopenia	%	Osteoporosis	%
No	20	20	16	80	2	10	2	10
ICS	33	33	9	27.27	7	21.21	17	51.51
Oral	47	47	0	0	8	17.02	39	82.97

BMD: Bone mineral density, ICS: Inhaled corticosteroid

considering that calcium and vitamin D have been shown to reduce fracture risk in men and women (target serum level of 25-OHD ≥ 30 ng/mL). An oral bisphosphonate, as alendronate and risedronate, currently considered that first-line treatment for osteoporosis in men should be recommended, with patient education regarding potential side effects. Intravenous bisphosphonates, as zoledronic acid (5 mg once yearly), offer an alternative option for men who cannot tolerate oral bisphosphonates or who find the dosing regimen more convenient.¹²⁻¹⁴ Anabolic drugs like the human parathyroid hormone (PTH) analogue teriparatide (PTH 1-34) stimulate bone formation through effects on osteoblasts and osteocytes and may therefore more directly target the main pathophysiological mechanism in osteoclastic giant cells (OGCS)-induced osteoporosis. Teriparatide has been found to be superior to alendronate in OGCS induced osteoporosis, both regarding change in BMD and morphometric vertebral fractures, but there is no evidence for hip fracture reduction. This agent is suitable for men with severe osteoporosis (established osteoporosis; T-scores ≤ -2.5 SD in combination with at least one fragility fracture) who continue to fracture after 1 year of bisphosphonate therapy, or multiple risk factors for fracture, or failed previous treatment (those who cannot tolerate or do not have an adequate response to bisphosphonates). Treatment should be reserved for these high-risk patients because of the need for daily injection and high cost.¹⁵⁻¹⁸

CONCLUSION

In this study, the incidence of osteoporosis is high in COPD patients with increasing severity and age with corticosteroids usage prophylactic use of calcium and vitamin D3 changes the lifestyle of patients.

REFERENCES

- Graat-Verboom L, Smeenk FW, van den Borne BE, Spruit MA, Donkers-van Rossum AB, Aarts RP, *et al.* Risk factors for osteoporosis in Caucasian patients with moderate chronic obstructive pulmonary disease: A case control study. *Bone* 2012;50(6):1234-9.
- Global Strategy for the Diagnosis, Management, and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD). Available at: <http://www.atsjournals.org/doi/abs/10.1164/rccm.200703-456so>. [Last accessed on 2014 Nov 23].
- Hattiholi J, Gaude GS. Prevalence and correlates of osteoporosis in chronic obstructive pulmonary disease patients in India. *Lung India* 2014;31:221-7.
- Gupta RK, Ahmed SE, Al-Elq AH, Sadat-Ali M. Chronic obstructive pulmonary disease and low bone mass: A case-control study. *Lung India* 2014;31:217-20.
- Incalzi RA, Caradonna P, Ranieri P, Basso S, Fuso L, Pagano F, *et al.* Correlates of osteoporosis in chronic obstructive pulmonary disease. *Respir Med* 2000;94:1079-84.
- McEvoy CE, Ensrud KE, Genant HK, Yu W, Griffith JM, *et al.* Association between corticosteroid use and vertebral fractures in older men with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 1998;157:704-9.
- Bolton CE, Ionescu AA, Shiels KM, Pettit RJ, Edwards PH, Stone MD, *et al.* Associated loss of fat-free mass and bone mineral density in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2004;170(12):1286-93.
- Biskobing DM. *Chest J* 2002. Available from: <http://www.journal.publications.chestnet.org>. [Last accessed on 2014 Nov 25].
- Jørgensen NR, Schwarz P. Osteoporosis in chronic obstructive pulmonary disease patients. *Curr Opin Pulm Med* 2008;14:122-7.
- Grippi M, Elias J, Fishman J. *Fishman's Text Book of Pulmonary Diseases and Disorders*. 5th ed., Vol. 1. New York: Little, Brown; 1969-1973.
- Mason RJ, Broaddus VC, Thomas M. Murray & Nadal Textbook of Respiratory Medicine. 5th ed. Ch. 32. Philadelphia: Saunders Elsevier; 2007. p. 1288/278.
- Watanabe R, Tanaka T, Aita K, Hagiya M, Homma T, Yokosuka K, *et al.* Osteoporosis is highly prevalent in Japanese males with chronic obstructive pulmonary disease and is associated with deteriorated pulmonary function. *J Bone Miner Metab* 2014.
- Graat-Verboom L, Spruit MA, van den Borne BE, Smeenk FW, Martens EJ, Lunde R, *et al.* Correlates of osteoporosis in chronic obstructive pulmonary disease: An underestimated systemic component. *Respir Med* 2009;103:1143-51.
- Lehouck A, Boonen S, Decramer M, Janssens W. COPD, bone metabolism, and osteoporosis. *Chest* 2011;139:648-57.
- Ferguson GT, Calverley PM, Anderson JA, Jenkins CR, Jones PW, Willits LR, *et al.* Prevalence and progression of osteoporosis in patients with COPD: Results from the Towards a Revolution in COPD Health study. *Chest* 2009;136:1456-65.
- Sin DD, Man JP, Man SF. The risk of osteoporosis in Caucasian men and women with obstructive airways disease. *Am J Med* 2003;114:10-4.
- Kanis JA. On Behalf of the World Health Organization Scientific Group. Assessment of Osteoporosis at the Primary Health-care Level: Technical Report. UK: World Health Organization Collaborating Centre for Metabolic Bone Diseases, University of Sheffield; 2008.
- Bhattacharyya P, Paul R, Ghosh M, Dey R, Barooah N, *et al.* Prevalence of osteoporosis and osteopenia in advanced chronic obstructive pulmonary disease patients. *Lung India* 2011;28:184-6.

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Carcinoma Gallbladder: A Review of Literature

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Abstract

Carcinoma of gallbladder is a very aggressive disease with poor outcomes. In spite of newer and advanced imaging techniques and better understanding of the disease even at the molecular level there is increased the incidence of mortality seen with this disease. This magnitude of the cancer problem in the Indian sub-continent (sheer numbers) is increasing due to, the poor to moderate living standards and inadequate medical facilities. The prevalence of gallbladder cancer in India is estimated to be around 2.5 million, with about 800,000 new cases and 550,000 deaths/annum. Women are more commonly affected than men. The disease commonly occurs in the age group ranging from 29 to 90 years with a peak incidence in their 60's with great geographic and ethnic variation. Carcinoma gallbladder a disease, which was a disease of old age, is now also found commonly in the younger age group also where it presents with greater ferocity.

Keywords: Age, Carcinoma, Gallbladder, Surgery, Women

INTRODUCTION

Every year in India there is about 800,000 new cases and 550,000 deaths per annum.¹ It has been reported that during 2008, there were 145,662 gallbladder cancer cases globally with an age-standardized rate of 2.0 per 105 person years.² Gallbladder cancer is the most common abdominal malignancy in the northern India.³ The Indian Council of Medical Research Cancer Registry has reported incidence rate of 4.5% in males and 10.1% in females per 100,000 population in northern India.⁴ Globally this incidence varies geographically with higher rates in certain areas of Latin America (Colombia, Peru, and Ecuador), North America (Hispanic and American Indian populations), Eastern Europe (Poland, the Czech Republic, Slovakia, Hungary, and the former East Germany) and Japan.⁵

Gallbladder carcinomas are associated with gallstones (80%), porcelain (calcified) gallbladder (10-20%) and abnormal choledochopancreatic duct junction. Anomalous pancreaticobiliary duct junction is a rare congenital

malformation of the biliary tract, in which the pancreatic duct drains into the biliary tract outside the duodenal wall.⁶ More prevalent in Asians (particularly Japanese patients), this anomaly carries a heightened risk of developing biliary tract cancer; 3-18% develop gallbladder cancer.^{6,7} Size of the gallstones is an important risk factor. The patients with gallstones larger than 3 cm have a significantly greater risk of developing carcinoma.⁸ About 0.3-3.0% of patients with gallstones develop gallbladder cancer. Chronic inflammatory state of the gallbladder usually as a result of gallstones is a significant risk factor for gallbladder cancer.⁹ Gallbladder polyps are also associated with a risk of malignancy.¹⁰ Choledochal cyst has been implicated as a risk for malignancy.¹¹

The occurrence of carcinoma gallbladder has a direct correlation with the length of time that the gall stones reside in the gallbladder. A long duration provides the necessary time for such chronic trauma to the mucosa to initiate a sequence of pathologic changes that culminate in cancer. This also explains the inverse correlation that exists between cholecystectomy rates and gallbladder cancer; socioeconomic issues can delay access to cholecystectomy for cholelithiasis, increasing gallbladder cancer rates.¹² In patients with carcinoma gallbladder, the incidence of cholelithiasis ranges from 54% to 97%. Carcinoma gallbladder is more common in patients with Mirizzi's syndrome, and typhoid carriers are a high-risk group.^{13,14} *Salmonella typhi* (~6% of carriers develop gallbladder

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cancer: A 12-fold risk increase) and *Helicobacter bilis* have been implicated in gallbladder cancer.^{15,16} Bacterial colonization often accompanies chronic cholecystitis it has been proposed that bacteria may play a significant role in carcinogenesis.¹⁷ Gallbladder polyps are considered a risk factor. Polypoidal masses of the gallbladder affect 5% of adults (range, 0.3-7%), depending upon the population studied. Most gallbladder polyps (over two-thirds) are composed of cholesterol esters, the common composition of those under 5 mm, yet they are not particularly associated with cholesterol gallstones. Other polypoidal lesions are adenomas, leiomyomas, or inflammatory polyps. The majority of these immobile hyperechoic shadows are incidental findings discovered on abdominal ultrasound performed for other purposes. Most polyps do not grow or change in size. Features predicting malignancy of polypoidal gallbladder masses include large polyps (>10 mm; one-quarter are malignant); a solitary lesion; a sessile polyp; polyp growth; age over 50-60 years; or associated gallstones. Features are suggesting a malignant polyp, or when accompanied by gallbladder symptoms (biliary-type pain), warrant cholecystectomy.¹⁸ Polyps over 18 mm must be removed, as they are likely malignant.¹⁹

Gallbladder cancer appears to develop from dysplastic mucosa that progress to carcinoma *in situ* and then to invasive carcinoma.²⁰

Other factors, that increase the risk for gallbladder cancer, include obesity, a high-carbohydrate diet, smoking, and alcohol use.²¹ Adequate intake of fruits and vegetables has been shown to be a protective factor. Findings from various studies on the adequate consumption of vegetables indicate an inverse association with gallbladder cancer risk.^{22,23} Several large population-based and observational epidemiological studies have highlighted the importance of vegetables and fruits in reducing the risk of cancer in a variety of organs and tissues.²³

There are many other factors which are associated with gallbladder cancer though their exact role in the pathogenesis of gallbladder cancer is not proven such as high concentrations of free radical oxidation products.²⁴ Some chemicals have been implicated in the gallbladder cancer including methyl dopa, oral contraceptives, isoniazid and occupational exposure in the rubber industry.²⁵

Approximately 60% of tumors originate in the fundus of the gallbladder, 30% originate in the body, and 10% originate in the neck. Gallbladder cancers can be categorized into infiltrative, nodular, combined nodular infiltrative, papillary, and combined papillary-infiltrative forms. Infiltrated tumors cause thickening and induration of the gallbladder wall. They spread

easily in a subserosal plane, which is the same plane used for routine cholecystectomy. Nodular types show early invasion through the gallbladder wall into the liver or neighboring structures and may be easier to surgically control than the infiltrative form. Papillary carcinomas have the best prognosis and exhibit a polypoid cauliflower-like appearance. These may completely fill the lumen of the gallbladder, with only minimal invasion of the gallbladder wall. Histologically, the most common type of gallbladder cancer is adenocarcinoma. Other types, such as adenosquamous carcinoma, oat cell carcinoma and sarcomas are also seen. In 92% of invasive carcinomas, 86% of carcinomas *in situ*, and 28% of dysplastic epithelia p53 protein is identifiable.²⁶

In 39% of gallbladder cancers, K-ras mutations are identified.²⁷ Allele-specific deletions of the p53, deleted in colon cancer, and 9p genes play an important role in the pathogenesis of gallbladder cancer.²⁸ In some studies, p53 and p21 have been found to be abnormally expressed in the mucosa of gallbladders harboring chronic cholecystitis.²⁸ Other genetic abnormalities, that have been documented, include overexpression of c-erbB-2 gene²⁹ and decreased expression of the nm23 gene product.³⁰ In cholesterol stones, the factors best identified are the genes responsible for specific biliary lipid transporters in the canalicular membrane - The adenosine triphosphate-binding cassette (ABC) transporters. These transporters include ABCG5/ABCG8 for cholesterol secretion, ABCB11 as the bile salt export pump, and ABCB4 for phospholipids and lecithin.¹⁵ Mutations in the gene ABCG5/G8, as the variant D19H, result in increased cholesterol secretion into bile, making it an important susceptibility factor.³¹ Defective ABCB4 leads to decreased lecithin secretion and stone formation. In gallbladder cancer, variants of the apolipoprotein B (APOB) gene is responsible for APOB function which influences cholesterol handling by the liver, has been associated with an increased risk for gallbladder cancer.³² One comprehensive explanation for the association of gallbladder cancer with cholesterol gallstones suggests an interdependent disposal pathway for cholesterol and environmental toxins exported into bile, linked by the activity of hepatic nuclear receptors and ABC transporter pumps.³³ Female sex hormones increase the secretion of cholesterol and xenobiotics into bile. Furthermore, prolonged gallbladder residence time (stasis due to impaired contractility) results from progesterone and the excessive cholesterol secreted in bile. Such protracted exposure allows environmental carcinogens such as aflatoxin B, possibly the culprit in some endemic areas.¹⁵ Total parenteral nutrition is a well-known risk factor for developing microlithiasis (biliary sludge) and gallstone disease, in addition to acute acalculous cholecystitis in critically ill-patients.³⁴

Gallbladder cancer can spread by direct invasion through the gallbladder wall into the liver or peritoneal cavity. The gallbladder has a narrow wall consisting of a thin lamina propria and a single muscle layer. Once a gallbladder cancer penetrates this muscle layer, it has access to major lymphatic and vascular channels as well as the liver or peritoneal cavity by penetration through the wall. Gallbladder cancer can also spread via lymphatic, hematogenously and along biopsy tracks or surgical wound tracks. Hematogenous spread originates from the small veins extending directly from the gallbladder into the portal venous system of the gallbladder fossa leading to segments IV and V of the liver or via large veins to the portal venous branches of segments V and VIII.³⁵ Boerma reviewed the literature and determined that at the time of presentation only 10% of gallbladder cancers were confined to the gallbladder wall, 59% invaded the liver, 45% invaded regional lymph nodes, 34% had distant hepatic metastases, and 20% had extrahepatic hematogenous metastases.^{35,36}

The most common site of extra-abdominal metastases is the lung which occurs in cases of advanced intra-abdominal disease. The stage of disease is the most reliable predictor of outcome and ultimately outweighs histology, grading, or other biological parameters. The main staging systems over the past 5 years include the modified Nevin system,³⁶ Japanese Biliary Surgical Society System,³⁷ American Joint Commission on Cancer/Union Internationale Centre le Cancer tumor-node-metastasis staging system (Table 1).³⁸

Gallbladder cancer is either detected early as an incidental finding when cholecystectomy is performed for symptomatic cholelithiasis or late, when the tumor has invaded the bile ducts or has metastasized intra-abdominally.³¹ The clinical presentation of gallbladder cancer is difficult to separate from that of biliary colic. Advanced symptoms such as persistent pain, weight loss,

and jaundice are often signs of unresectability. Elderly patients with a history of biliary colic that changes to a persistent, unrelenting, dull pain should be suspected of having gallbladder cancer, especially in the presence of weight loss or a right-upper quadrant mass. Any new right-upper-quadrant symptoms should prompt a work-up. The presence of jaundice is a particularly ominous finding. The median survival of patients with jaundice was 6 months as compared to patients without jaundice where the survival was 16 months.^{39,40} Laboratory examination generally is not very helpful expect for the typical signs of advanced disease such as anemia, hypoalbuminemia, leukocytosis and elevated alkaline phosphate or bilirubin. Tumor markers may be of help and should be considered if gallbladder cancer is suspected. Serum carcinoembryonic antigen >4 ng/mL is 93% specific and 50% sensitive for detecting gallbladder cancer in the presence of appropriate symptoms⁴¹ and a CA 19-9 serum level >20 U/mL is 79.4% sensitive and 79.2% specific.⁴² Increased epidermal growth factor receptor (EGFR) expression has been noted in various cancers such as colon, squamous cell of the head and neck, non-small cell lung and breast cancers several small studies from Asia, Europe and Australia have examined the expression of EGFR in gallbladder cancer. The improved understanding of EGFR's role in oncogenesis has made it an attractive target for therapeutic intervention in several cancers. In a study by Kaufman *et al.* they found that EGFR was overexpressed in their patients of carcinoma gallbladder, they found that 3+ EGFR correlated with poorly differentiated carcinoma and patients with 1+ EGFR correlated with well-differentiated carcinoma.⁴³

Early carcinoma gallbladder may be detected on abdominal ultrasonography (USG) as a fixed polypoidal mass projecting into the lumen of the gallbladder with absence of acoustic shadowing or as an asymmetric thickening of the gallbladder wall.⁴⁴ Signs of malignant disease on ultrasound examination include discontinuous mucosa, echogenic mucosa, and submucosal echolucency.⁴⁰ Diffuse thickening of the gallbladder is also common in gallbladder cancer but is also found in a benign condition.⁴¹ The diagnostic accuracy of USG is over 80% in detecting carcinoma gallbladder (Chijiwa *et al.* 1991).⁴⁴ A helical computed tomography scan with fine cuts through the liver may provide improved imaging over USG and should be examined carefully for evidence of liver metastases and enlarged celiac, perihepatic, and interaortocaval lymph nodes. A magnetic resonance (MR) scan with MR cholangiography is an ideal study.

Carcinoma gallbladder is incidentally discovered during cholecystectomy for benign diseases in 12-36% of patients (Bergdahl 1980).⁴⁵ If carcinoma gallbladder is discovered

Table 1: AJCC staging system for gallbladder cancer (Seventh Edition)

T-stage	N-stage	M-stage
Tis=Carcinoma <i>in situ</i>	N0=No regional nodal metastases	M0=No distant metastases
T1=Tumor invades lamina propria (T1a) or muscle layer (T1b)	N1=Metastases to nodes along cystic duct, hepatic artery, common bile duct, and/or portal vein	M1=Distant metastases
T2=Tumor invades perimuscular connective tissue	N2=Metastases to pericaval, periaortic, superior mesenteric artery, and/or celiac artery nodes	
T3=Tumor perforates serosa and/or invades the liver and/or one adjacent organ		
T4=Tumor invades main portal vein or hepatic or multiple extrahepatic organs		

AJCC: American Joint Committee on Cancer

intraoperatively the surgeon has to decide whether curative surgery is possible after determining the extent of disease. If the disease is so extensive as to preclude curative resection then a biopsy along with the appropriate palliative procedure may be carried out. Sometimes the probability of carcinoma gallbladder becomes evident only after the gallbladder is opened up after removal hence it is important to examine the opened gallbladder carefully before closing the abdomen. A difficult gallbladder at surgery usually raises the suspicion of cancer. Unusual findings at surgery such as a gallbladder mass, dense adhesion of the organs which are adjacent to the gallbladder and a difficult dissection of the gallbladder from the liver-bed are all pointers to the presence of a possible malignancy. Surgery is the only curative form of treatment with results depending upon the stage of the disease. Patients with disease confined to the gallbladder are treated by an extended or radical cholecystectomy (Gall *et al.* 1991).⁴⁶ Definitive resection for gallbladder cancer depends on the stage and location of the tumor as well as whether it is a repeat resection after the previous simple cholecystectomy. T1 (Stage IA) tumors can be treated with simple cholecystectomy. Stage IB, II, and selected Stage III (T4NO) tumors should be treated with en bloc resection of the gallbladder, segments IVb and V of the liver and regional lymph node dissection.⁴⁷ Donohue *et al.* (1990) reported a 5 year survival of 29% after extended cholecystectomy in patients with transmural (T3, T4) tumor invasion and lymph node involvement.⁴⁸ Nakamura *et al.* (1989), Ogura *et al.* (1991) and Ouchi *et al.* (1994) advocate more extensive surgery such as excision of bile ducts, more extensive liver resections and even pancreaticoduodenectomy to further increase survival rates.^{49,50} The criteria for resectability can vary, but presence of multiple peritoneal or liver metastases, distant metastases, extensive involvement of hepatoduodenal ligament, encasement or occlusion of major vessels and poor performance status are contraindications for surgical resection. Recommendations for liver resection for gallbladder cancer have ranged from a limited wedge excision of 2 cm of liver around the gallbladder bed to routine extended right hepatic lobectomy. The goal is to achieve a negative margin on the tumor, encompassing cells that have directly infiltrated the liver.⁴⁷

In patients not fit for tumor resection, some form of palliative procedure such as a surgical bilioenteric bypass or endoscopic/percutaneous stenting in patients with obstructive jaundice may be done (Baxter and Garden, 1999).⁵¹ Advances during the past decade in both endoscopic and radiologically guided percutaneous stenting of the biliary tract have made operative bypass, in cases of unresectable cancers, largely unnecessary. Non-operative stenting is the preferred approach. Duodenal or intestinal bypass may be done as a palliative procedure if gastric

outlet or intestinal obstruction is present. In addition, patients may require palliation of pain, which is a major problem in advanced carcinoma of the gallbladder.⁵² The incidence of gallbladder cancer is low compared with the incidence of gallstones in the population, so prophylactic cholecystectomy for asymptomatic cholelithiasis to prevent the development of carcinoma is not indicated. Studies have suggested that the prognosis is different for pT1a and pT1b tumors after simple cholecystectomy.⁵³ T1a staging, no extended cholecystectomy is indicated, and simple cholecystectomy should result in a 100% 5-year survival. These tumors are recognized incidentally at the time of pathologic review, and as long as the cystic duct margin is negative, no further surgery is indicated. T1b staged tumors, an extended cholecystectomy is indicated as these tumors have been reported to recur after simple cholecystectomy. Patients with Stage II disease (T2NO) are best treated with an extended cholecystectomy. When an extended cholecystectomy is performed for T2 disease, the 5-year survival has been reported to be as high as 100% but probably falls in the range of 70-90%. Simple cholecystectomy alone is associated with a 5-year survival rate of 20-40.5%.⁵⁴ For patients with Stage T1b disease (T3 N1), an extended cholecystectomy is the recommended treatment approach. This should include en bloc resection of the common bile duct for the grossly positive periportal lymph nodes in order to improve periportal lymph node clearance. The 5-year survival ranges from 45% to 63% for patients having metastatic disease to N1 nodes. The 3-year survival has ranged from 38% to 80% in various trials. Stage III gallbladder cancer represents an advanced malignancy that is generally beyond surgical treatment. However, patients with T4NO disease, representing a mass-forming gallbladder cancer, may achieve long-term survival after an extended resection.⁵⁵ Patients with nodal metastases beyond the hepatoduodenal ligament have a poor prognosis, and in general for these cases the authors advocate palliative care.

Chemotherapy has not been widely successful in the treatment of gallbladder carcinoma fluorouracil is the most extensively used drug and fluorouracil-based combinations such as fluorouracil, adriamycin, and mitomycin C have been used without much success. The best responses were obtained by use of combined gemcitabine and cisplatin - survival was significantly improved. Ben-David *et al.* reported 14 patients with gallbladder cancer treated at the University of Michigan with resection followed by radiotherapy or chemoradiotherapy. The median radiation dose was 54 Gy and approximately half the patients received concurrent chemotherapy.⁵⁶ The median survival was 23 months, interestingly there was no difference in survival between R0 and R1 resection patients. Wang *et al.* analyzed the SEER data and identified 4180 patients who underwent

resection between 1988 and 2003. The authors constructed a multivariate Cox proportional hazards model for overall survival. Age, gender, papillary histology, stage, and adjuvant radiotherapy were significant predictors of survival. The model predicts that adjuvant radiotherapy provides a survival benefit in node-positive or T2 or higher disease. The unadjusted median overall survival in patients who received radiotherapy was 15 months compared to 8 months in those who did not receive radiotherapy ($P < 0.0001$).⁵⁷ In another study, Balachandran *et al.* reported 117 patients with gallbladder cancer, of whom 80 underwent simple cholecystectomy, and 37 underwent extended resections. 73 patients received adjuvant chemoradiotherapy and 44 did not. No details were provided regarding this therapy or the selection criteria for adjuvant therapy. The median survival of all 117 patients was 16 months. On multivariate analysis, T-stage and the use of adjuvant therapy were the only statistically significant independent predictors of survival. Median survival was 24 months, 11 months in patients with or without adjuvant chemoradiotherapy ($P = 0.001$), and this difference was most pronounced for patients with T3, node-positive disease or after a simple cholecystectomy.⁵⁷ The high risk of systemic spread and loco-regional failure associated with gallbladder cancer that extends beyond the mucosa has led most cancer centers to recommend consideration of adjuvant chemotherapy and radiotherapy.

CONCLUSION

Carcinoma gallbladder is a devastating disease with dismal results. There is an increase in the number of cases of carcinoma gallbladder, may be due to better imaging techniques and more awareness among the patients due to better facilities. The progression of the disease is rapid with low 5-year survival. Key to survival is early detection of the disease and aggressive treatment strategy. Surgery is the only curative form of treatment which can achieve its intended goal if done at an early stage (T1) otherwise with the loco-regional spread, and jaundice survival is barely 6 months. Resection of hematogenous metastasis is not justified nor is resection of distant nodal disease. Radiotherapy and chemotherapy are the adjuvants to treatment but still the gold standard treatment is surgical resection (Ro) at an early stage.

REFERENCES

1. Kumar NA. Consolidated Report of the Population Based Cancer Registries. National Cancer Registry Programme. New Delhi, India: Indian Council of Medical Research; 1990-96.
2. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. GLOBOCAN 2008, Cancer Incidence and Mortality Worldwide. IARC Cancer Base No 10. Lyon, France: International Agency for Research on Cancer; 2010.
3. Singh MK, Chetri K, Pandey UB, Kapoor VK, Mittal B, Choudhuri G. Mutational spectrum of K-ras oncogene among Indian patients with gallbladder cancer. *J Gastroenterol Hepatol* 2004;19:916-21.
4. Indian Council of Medical Research. Annual Report of Population Based Cancer Registries of the National Programme (1993). New Delhi: ICMR; 1996.
5. Curado MP, Edwards B, Shin HR, Storm H, Ferlay J, Heaneu M, *et al.*, editors. Cancer Incidence in Five Continents. IARC Scientific Publication No. 160. Vol. IX. Lyon, France: International Agency for Research on Cancer; 2007.
6. Chijiwa K, Kimura H, Tanaka M. Malignant potential of the gallbladder in patients with anomalous pancreaticobiliary ductal junction. The difference in risk between patients with and without choledochal cyst. *Int Surg* 1995;80:61-4.
7. Kang CM, Kim KS, Choi JS, Lee WJ, Kim BR. Gallbladder carcinoma associated with anomalous pancreaticobiliary duct junction. *Can J Gastroenterol* 2007;21:383-7.
8. Giang TH, Ngoc TT, Hassell LA. Carcinoma involving the gallbladder: a retrospective review of 23 cases - pitfalls in diagnosis of gallbladder carcinoma. *Diagn Pathol* 2012;7:10.
9. Bartlett DL, Fong Y. In: Blumgart LH, Fong Y, Jarnagin WR, editors. Hepatobiliary Cancer. Ch. 10. Atlanta, GA: American Cancer Society; 2001. p. 211-24.
10. Kwon W, Jang JY, Lee SE, Hwang DW, Kim SW. Clinicopathologic features of polypoid lesions of the gallbladder and risk factors of gallbladder cancer. *J Korean Med Sci* 2009;24:481-7.
11. Lee SE, Jang JY, Lee YJ, Choi DW, Lee WJ, Cho BH, *et al.* Choledochal cyst and associated malignant tumors in adults: a multicenter survey in South Korea. *Arch Surg* 2011;146:1178-84.
12. Eldon A. Review gallbladder cancer: The basics. *Gastroenterol Hepatol* 2008;4:737-41.
13. Redaelli CA, Büchler MW, Schilling MK, Krähenbühl L, Ruchti C, Blumgart LH, *et al.* High coincidence of Mirizzi syndrome and gallbladder carcinoma. *Surgery* 1997;121:58-63.
14. Aldridge MC, Bismuth H. Gallbladder cancer: the polyp-cancer sequence. *Br J Surg* 1990;77:363-4.
15. Kumar S, Kumar S, Kumar S. Infection as a risk factor for gallbladder cancer. *J Surg Oncol* 2006;93:633-9.
16. Dutta U, Garg PK, Kumar R, Tandon RK. Typhoid carriers among patients with gallstones are at increased risk for carcinoma of the gallbladder. *Am J Gastroenterol* 2000;95:784-7.
17. D'Angelica M, Jarnagin WR. Tumors of the gall bladder. In: Blumgart LH, editor. *Surgery of the Liver, Biliary Tract, and Pancreas*. 4th ed. Vol. 1. New York: W.B. Saunders; 2006. p. 764-81.
18. Myers RP, Shaffer EA, Beck PL. Gallbladder polyps: epidemiology, natural history and management. *Can J Gastroenterol* 2002;16:187-94.
19. Kubota K, Bandai Y, Noie T, Ishizaki Y, Teruya M, Makuuchi M. How should polypoid lesions of the gallbladder be treated in the era of laparoscopic cholecystectomy? *Surgery* 1995;117:481-7.
20. Albores-Saavedra J, Henson DE. Atlas of Tumor Pathology: Tumors of the Gallbladder and Extrahepatic Bile Ducts. Second Series. Fascicle 22. 2nd ed. Bethesda, MD: Armed Forces Institute of Pathology; 1986. p. 28-123.
21. Moerman CJ, Bueno-de-Mesquita HB. The epidemiology of gallbladder cancer: lifestyle related risk factors and limited surgical possibilities for prevention. *Hepatogastroenterology* 1999;46:1533-9.
22. Tyagi BB, Manoharan N, Raina V. Risk factors for gallbladder cancer: A population based case-control study in Delhi. *Indian J Med Pediatr Oncol* 2008;29:16-26.
23. Pandey M, Shukla VK. Diet and gallbladder cancer: a case-control study. *Eur J Cancer Prev* 2002;11:365-8.
24. Shukla VK, Shukla PK, Pandey M, Rao BR, Roy SK. Lipid peroxidation product in bile from patients with carcinoma of the gallbladder: a preliminary study. *J Surg Oncol* 1994;56:258-62.
25. Mancuso TF, Brennan MJ. Epidemiological considerations of cancer of the gallbladder, bile ducts and salivary glands in the rubber industry. *J Occup Med* 1970;12:333-41.
26. Wee A, Teh M, Raju GC. Clinical importance of p53 protein in gall bladder carcinoma and its precursor lesions. *J Clin Pathol* 1994;47:453-6.
27. Imai M, Hoshi T, Ogawa K. K-ras codon 12 mutations in biliary tract tumors detected by polymerase chain reaction denaturing gradient gel electrophoresis. *Cancer* 1994;73:2727-33.
28. Yanagisawa N, Mikami T, Koike M, Okayasu I. Enhanced cell kinetics,

- p53 accumulation and high p21WAF1 expression in chronic cholecystitis: comparison with background mucosa of gallbladder carcinomas. *Histopathology* 2000;36:54-61.
29. Chow NH, Huang SM, Chan SH, Mo LR, Hwang MH, Su WC. Significance of c-erbB-2 expression in normal and neoplastic epithelium of biliary tract. *Anticancer Res* 1995;15:1055-9.
 30. Fujii K, Yasui W, Shimamoto F, Yokozaki H, Nakayama H, Kajiyama G, *et al.* Immunohistochemical analysis of nm23 gene product in human gallbladder carcinomas. *Virchows Arch* 1995;426:355-9.
 31. de Aretxabala X, Roa I, Burgos L, Losada H, Roa JC, Mora J, *et al.* Gallbladder cancer: an analysis of a series of 139 patients with invasion restricted to the subserosal layer. *J Gastrointest Surg* 2006;10:186-92.
 32. Pandey SN, Srivastava A, Dixit M, Choudhuri G, Mittal B. Haplotype analysis of signal peptide (insertion/deletion) and XbaI polymorphisms of the APOB gene in gallbladder cancer. *Liver Int* 2007;27:1008-15.
 33. Venniyoor A. Cholesterol gallstones and cancer of gallbladder (CAGB): molecular links. *Med Hypotheses* 2008;70:646-53.
 34. Roslyn JJ, Pitt HA, Mann LL, Ament ME, Den Besten L. Gallbladder disease in patients on long-term parenteral nutrition. *Gastroenterology* 1983;84:148-54.
 35. Boerma EJ. Towards an oncological resection of gall bladder cancer. *Eur J Surg Oncol* 1994;20:537-44.
 36. Nevin JE, Moran TJ, Kay S, King R. Carcinoma of the gallbladder: staging, treatment, and prognosis. *Cancer* 1976;37:141-8.
 37. Onoyama H, Yamamoto M, Tseng A, Ajiki T, Saitoh Y. Extended cholecystectomy for carcinoma of the gallbladder. *World J Surg* 1995;19:758-63.
 38. Bartlett DL, Fong Y. Tumors of the gallbladder. In: Blumgart LH, Fong Y, editors. *Surgery of the Liver and Biliary Tract*. 3rd ed. New York: Churchill Livingstone; 2000. p. 993-1015.
 39. Wibbenmeyer LA, Sharafuddin MJ, Wolverson MK, Heiberg EV, Wade TP, Shields JB. Sonographic diagnosis of unsuspected gallbladder cancer: Imaging findings in comparison with benign gallbladder conditions. *AJR Am J Roentgenol* 1995;165:1169-74.
 40. Misra S, Chaturvedi A, Misra NC, Sharma ID. Carcinoma of the gallbladder. *Lancet Oncol* 2003;4:167-76.
 41. Strom BL, Maislin G, West SL, Atkinson B, Herlyn M, Saul S, *et al.* Serum CEA and CA 19-9: potential future diagnostic or screening tests for gallbladder cancer? *Int J Cancer* 1990;45:821-4.
 42. Ritts RE Jr, Nagorney DM, Jacobsen DJ, Talbot RW, Zurawski VR Jr. Comparison of preoperative serum CA19-9 levels with results of diagnostic imaging modalities in patients undergoing laparotomy for suspected pancreatic or gallbladder disease. *Pancreas* 1994;9:707-16.
 43. Kaufman M, Mehrotra B, Limaye S, White S, Fuchs A, Lebowicz Y, *et al.* EGFR expression in gallbladder carcinoma in North America. *Int J Med Sci* 2008;5:285-91.
 44. Chijiwa K, Sumiyoshi K, Nakayama F. Impact of recent advances in hepatobiliary imaging techniques on the preoperative diagnosis of carcinoma of the gallbladder. *World J Surg* 1991;15:322-7.
 45. Bergdahl I. Gallbladder carcinoma first diagnosed at microscopic examination of gallbladders removed for presumed benign disease. *Ann Surg* 1980;191:19-30.
 46. Gall FP, Köckerling F, Scheele J, Schneider C, Hohenberger W. Radical operations for carcinoma of the gallbladder: present status in Germany. *World J Surg* 1991;15:328-36.
 47. Bartlett DL, Ramanathan RK, EdgerBen, Josef. *Cancer of the biliary tree. Cancer Principals and Practice of Oncology*. 9th ed., Ch. 85. Philadelphia: Lippincott, Williams and Wilkins; 2011. p. 1019-47.
 48. Donohue JH, Nagorney DM, Grant CS, Tsushima K, Ilstrup DM, Adson MA. Carcinoma of the gallbladder. Does radical resection improve outcome? *Arch Surg* 1990;125:237-41.
 49. Nakamura S, Sakaguchi S, Suzuki S, Muro H. Aggressive surgery for carcinoma of the gallbladder. *Surgery* 1989;106:467-73.
 50. Ogura Y, Mizumoto R, Isaji S, Kusuda T, Matsuda S, Tabata M. Radical operations for carcinoma of the gallbladder: present status in Japan. *World J Surg* 1991;15:337-43.
 51. Baxter I, Garden OJ. Surgical palliation of carcinoma of the gallbladder. *Hepatogastroenterology* 1999;46:1572-7.
 52. Ouchi K, Owada Y, Matsuno S, Sato T. Prognostic factors in the surgical treatment of gallbladder carcinoma. *Surgery* 1987;101:731-7.
 53. Otero JC, Proske A, Vallilengua C, Luján M, Poletto L, Pezzotto SM, *et al.* Gallbladder cancer: surgical results after cholecystectomy in 25 patients with lamina propria invasion and 26 patients with muscular layer invasion. *J Hepatobiliary Pancreat Surg* 2006;13:562-6.
 54. Pawlik TM, Gleisner AL, Vigano L, Kooby DA, Bauer TW, Frilling A, *et al.* Incidence of finding residual disease for incidental gallbladder carcinoma: implications for re-resection. *J Gastrointest Surg* 2007;11:1478-86.
 55. D'Angelica M, Dalal KM, DeMatteo RP, Fong Y, Blumgart LH, Jarnagin WR. Analysis of the extent of resection for adenocarcinoma of the gallbladder. *Ann Surg Oncol* 2009;16:806-16.
 56. Ben-David MA, Griffith KA, Abu-Isa E, Lawrence TS, Knol J, Zalupski M, *et al.* External-beam radiotherapy for localized extrahepatic cholangiocarcinoma. *Int J Radiat Oncol Biol Phys* 2006;66:772-9.
 57. Balachandran P, Agarwal S, Krishnani N, Pandey CM, Kumar A, Sikora SS, *et al.* Predictors of long-term survival in patients with gallbladder cancer. *J Gastrointest Surg* 2006;10:848-54.

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Role of Obesity in Chronic Periodontal Diseases: A Systematic Review

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Abstract

Obesity has increased at an alarming rate in recent years and is the fastest growing health-related problem in the world. Obesity is a long-term disease that develops from an interaction between genotype and the environment, obese adults have also been considered to be at high risk for multiple inflammatory diseases and conditions such as cardiovascular disease, diabetes and arthritis. It has been proved that obesity contributes to an overall systemic inflammatory state, effecting metabolic and immune parameters, thereby increasing susceptibility to periodontal disease. Many studies on obesity and periodontal disease suggested that they both are interlinked with each other and obesity itself has been recognized as a major risk factor for periodontal disease. It has been found that adverse effects of obesity on the periodontium may be mediated through pro-inflammatory cytokines and various other bioactive substances. The present literature focuses on the possible role of obesity and obesity-related diseases like diabetes and coronary heart diseases, as a potential contributor to periodontal disease.

Key words: Body mass index, obesity, periodontitis

INTRODUCTION

Obesity has increased at an alarming rate in recent years.¹ Overweight increases the likelihood of a patient having associated health and social problems, which may affect dental services and dental management. The prevalence of obesity in the United States is increasing in children and adults.² Increasing evidence suggests that obesity is not a simple problem of will power or self-control but a complex disorder involving appetite regulation and energy metabolism that is associated with a variety of conditions.³⁻⁶

Lifestyle patterns are influenced by an overabundance of energy-dense food choices and decreased opportunities and motivation for physical activity.⁷

According to the U.S. surgeon general, approximately one-fourth of American adults are completely sedentary,

and more than three-fifth are not regularly active at the recommended level of ½ h/day. About 14% of young people between 12 and 21 years of age report no recent physical activity and 50% of these young person's are not vigorously active. An estimated 300,000 preventable deaths occur each year in the United States because of unhealthy diet and physical inactivity,⁸ which are known contributors to obesity. The present literature highlights the important aspects in relation between obesity and periodontal disease.

OBESITY - DEFINITION AND ASSESSMENT

The description of obesity is based on body mass index (BMI, also called Quetelet Index), which is the ratio of body weight (in kg) to body height (in m) squared.⁹ BMI is highly correlated with fat mass and morbidity and mortality and therefore sufficiently reflects obesity-related disease risk in a wide range of populations. Body fat distribution is assessed by the measurement of waist circumference, with 102 cm in men and 88 cm in women, respectively, being the cutoff point for abdominal obesity associated with an increased risk of morbidity.⁹ Waist circumference shows a close correlation with the amount of visceral adipose tissue, and visceral adipose tissue has been shown to be metabolically more active and to secrete far greater amounts

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of cytokines and hormones compared with subcutaneous adipose tissue.¹⁰

Causes, Incidence, and Risk Factors

Taking of more calories than you burn can lead to obesity because the body stores unused calories as fat. Obesity can be caused by:

- Eating more food than your body can use especially carbohydrates
- Drinking too much alcohol
- Not getting enough exercise, physical work.

Today, we know that biology is a big reason why some people cannot keep the weight off. Some people, who live in the same place and eat the same foods, become obese, while others do not. Our bodies have a complex system to help keep our weight at a healthy level.

A person may be obese, follow an unhealthy diet, and have an eating disorder all at the same time.

Sometimes, medical problems or treatments cause weight gain, including:

- Underactive thyroid gland (hypothyroidism)
- Medicines such as birth control pills, antidepressants, and antipsychotics.

Other things that can cause weight gain are:

- Quitting smoking. Most people who quit smoking gain 4-10 pounds in the first 6 months after quitting. Some people gain as much as 25-30 pounds
- Stress, anxiety, feeling sad, or not sleeping well.
- For women:
 - Menopause - women may gain 12-15 pounds during menopause
 - Not losing the weight they gained during pregnancy.

Signs and Tests

The health care provider will perform a physical examination and ask questions about your medical history, eating habits, and exercise routine.

The two most common ways to measure health risks from your weight are:

- BMI
- Waist circumference (your waist measurement in inches).

BMI is measured using height and weight. You and your health care provider can use your BMI to estimate how much body fat you have.

Extra weight around your middle or stomach area increases your risk for Type 2 diabetes, heart disease, and stroke.

People with “apple-shaped” bodies also have an increased risk for these diseases. Skin fold measurements may be taken to check your body fat percentage.

DISCUSSION

Interrelationship of Obesity, Periodontitis, and Chronic Inflammation

It has been now well established that inflammation is an essential component in the development of atherosclerosis, and observational studies showed that periodontitis is associated with a moderately, but significantly, higher risk of coronary heart disease (CHD).¹¹⁻¹³

Interventional studies that examined the effects of antibiotic treatment on cardiovascular risk have generally failed to show any beneficial effect; however, these studies have mostly been of short duration (<1 year of treatment) and have investigated the effects on secondary prevention only. It has been suggested that the secretion of tumor necrosis factor alpha (TNF- α) by adipose tissue triggered by lipopolysaccharides from periodontal Gram-negative bacteria promotes hepatic dyslipidemia and decreases insulin.

Type 2 diabetes and decreased insulin sensitivity are associated with the production of advanced glycation end products, which trigger inflammatory cytokine production, thus predisposing to inflammatory diseases such as periodontitis. Thus in addition to being a risk factor for Type 2 diabetes and CHD, obesity-related inflammation may also promote periodontitis. Conversely, periodontitis, once it exists, may promote systemic inflammation and thereby increase the risk of CHD.

Evidence for Association between Obesity and Periodontal Disease

The first report on the relationship between obesity and periodontal disease appeared in 1977 when Perlstein *et al.*, found alveolar bone resorption to be greater in obese animals compared to non-obese Zucker rats.¹⁴ Since then a large number of studies were carried out to get an overview of the association between obesity and periodontal disease. In 2005, Dalla Vecchia *et al.*, evaluated the relationship between overweight, obesity and periodontitis and found that obesity was significantly associated with periodontitis in adult and non-smoker women. However, overweight was not significantly associated with periodontitis.¹⁵ Genco *et al.*, concluded that obesity is associated with high plasma levels of TNF- α and its soluble receptors, which in turn may lead to a hyper-inflammatory state increasing the risk for periodontal disease.¹⁶ A study on metabolic disorders related to obesity and periodontal disease concluded that

the association among periodontal disease, diabetes, and obesity confounds each other. An epidemiologic study on obesity and periodontitis in 60-70-year-old men found a positive correlation between obesity and periodontal disease.¹⁷ Sarlati *et al.*, conducted a study on the relationship between obesity and periodontal status in a sample of young Iranian adults and found that the overall and abdominal obesity were associated with the extent of periodontal disease and hence prevention and management of obesity may be an additional factor for improving periodontal health.¹⁸ A study on a young Japanese adult population concluded that BMI could be a potential risk factor for periodontitis among healthy young individuals i.e. those with BMI of <30 kg/m².¹⁹ Khader *et al.*, did a study on the association between periodontal disease and obesity among adults in Jordan and came to the conclusion that BMI, high waist circumference and high fat percentage were significantly associated with increased odds of having periodontitis. In Copenhagen city, an inverse relation between obesity and clinical attachment level and a slight association between BMI and bleeding on probing was found.²⁰ Boesing *et al.*, (2009) conducted a study on the interface between obesity and periodontitis with emphasis on oxidative stress and inflammatory response and found obesity to participate in the multifactorial phenomenon of occurrence of periodontitis through the increased production of reactive oxygen species.²¹

Effect of Periodontal Treatment on Obesity and Other Related Disease and Vice Versa

Tendon *et al.*, found that patients of chronic generalized periodontitis who were offered periodontal therapy showed improvement in the various lipid parameters except high-density lipoproteins cholesterol, which was not significantly altered. Chronic periodontitis in otherwise healthy individuals may, therefore, be contributing to the systemic inflammatory burden in these patients and adversely altering the lipid profile.²² A randomized controlled clinical trial by Singh *et al.*, involving 45 Type 2 diabetic patients showed that periodontal therapy had a role to play in improved glycemic control, more so in those patients who were subjected to periodontal treatment and adjunctive doxycycline (100 mg daily for 14 days).²³

Periodontal treatment resulted in a significant decrease in bleeding on probing, pocket depth and lowered serum inflammatory markers in patients with CHD and no CHD. This may result in decreased risk of CHD in treated patients.²⁴

Some studies have indicated that maintaining a normal weight by regular physical activity is associated with lower periodontitis prevalence.²⁵⁻²⁷

Individuals who pursued regular exercise have lower plasma levels of inflammatory markers, such as interleukin-6 and C-reactive protein, and show an increased insulin sensitivity that may beneficially affect periodontal health.^{25,26} A study that analyzed the National Health and Nutrition Examination Survey-III study population demonstrated that individuals who maintained a normal weight, pursued regular exercise, and consumed a diet in conformity with the dietary guidelines for Americans and the food guide pyramid recommendations were 40% less likely to have periodontitis.²⁶

Role of Dentist in Managing Obesity and Periodontal Disease

Dentists may wonder what their role should be in the management of obesity and obesity-related diseases such as diabetes and atherosclerosis. The diagnosis of such patients is in the realm of physicians. However, a dentist can evaluate patients for signs and symptoms of obesity-related diseases. Mathus-Vliegen *et al.*, documented that obesity is related to several aspects of oral health, such as dental caries, periodontitis and xerostomia.²⁸ Dentists should have ample knowledge of the signs, symptoms and diagnostic tests for metabolic syndrome and related diseases. The most common oral manifestations of diabetes are burning mouth syndrome, candidiasis, dental caries, and glossodynia, and periodontal manifestations includes multiple gingival and periodontal abscesses, inflammatory gingival enlargements, deep periodontal pockets, gingival polyps and mobile teeth.²⁹

Dentists usually do not communicate with patients with diabetes mellitus (DM) and their physicians consistently. The results of a study of general dentists and periodontists showed that only 35% of periodontists and 14% of general practice dentists consistently communicated with physicians concerning their patients with DM.³⁰

Dentist should refer their overweight and obese periodontal patient for weight reduction interventions like diet therapy, behavioral therapy, pharmacotherapy and surgical procedures so that they can have better control over periodontal inflammation. In the future, if obesity is to be acknowledged as a multiple-risk-factor syndrome for overall and oral health, general and oral risk assessment in the dental office should include the evaluation of BMI on a regular basis.

CONCLUSION

Obesity is a complex and multifactorial disease. Its relationship with periodontal disease and other chronic diseases is well-documented, but the underlying mechanism is under investigation. It is quite difficult to say whether

obesity predisposes an individual to periodontal disease, or periodontal disease affects lipid metabolism or both. Further prospective studies are needed to address the question of causality and to determine if obesity is a true risk factor for periodontal disease, especially among the younger population. If this proves to be the case, periodontal disease prevention could be included in planned intervention campaigns designed to prevent obesity-related diseases. Conversely, the prevention and management of obesity may be an adjunctive approach to improving periodontal health.

REFERENCES

- Haenle MM, Brockmann SO, Kron M, Bertling U, Mason RA, Steinbach G, *et al.* Overweight, physical activity, tobacco and alcohol consumption in a cross-sectional random sample of German adults. *BMC Public Health* 2006;6:233.
- Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: executive summary. Expert Panel on the Identification, Evaluation, and Treatment of Overweight in Adults. *Am J Clin Nutr* 1998;68:899-917.
- Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults – The evidence report. National Institutes of Health. *Obes Res* 1998;6 Suppl 2:51S-209. Published erratum appears in *Obes Res* 1998;6:464.
- Barlow SE, Dietz WH. Obesity evaluation and treatment: Expert Committee recommendations. The Maternal and Child Health Bureau, Health Resources and Services Administration and the Department of Health and Human Services. *Pediatrics* 1998;102:E29.
- American Association of Clinical Endocrinologists, American College of Endocrinology. AACE/ACE position statement on the prevention, diagnosis and treatment of obesity (1998 revision). *Endocr Pract* 1998;4:299-350.
- Thomas PR. Weighing the options: Criteria for evaluating weight-management programs. Committee to Develop Criteria for Evaluating the Outcomes of Approaches to Prevent and Treat Obesity, Institute of Medicine. Washington, D.C.: National Academy Press: 1995.
- Haffajee AD, Socransky SS. Relation of body mass index, periodontitis and *Tannerella forsythia*. *J Clin Periodontol* 2009;36:89-99.
- Ylöstalo P, Suominen-Taipale L, Reunanen A, Knuutila M. Association between body weight and periodontal infection. *J Clin Periodontol* 2008;35:297-304.
- Executive summary of the clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. *Arch Intern Med* 1998;158:1855-67.
- Pouliot MC, Després JP, Lemieux S, Moorjani S, Bouchard C, Tremblay A, *et al.* Waist circumference and abdominal sagittal diameter: best simple anthropometric indexes of abdominal visceral adipose tissue accumulation and related cardiovascular risk in men and women. *Am J Cardiol* 1994;73:460-8.
- Beck JD, Offenbacher S. Systemic effects of periodontitis: epidemiology of periodontal disease and cardiovascular disease. *J Periodontol* 2005;76 11 Suppl:2089-100.
- Dietrich T, Garcia RI. Associations between periodontal disease and systemic disease: evaluating the strength of the evidence. *J Periodontol* 2005;76 11 Suppl:2175-84.
- Mattila KJ, Pussinen PJ, Paju S. Dental infections and cardiovascular diseases: a review. *J Periodontol* 2005;76 11 Suppl:2085-8.
- Perlstein MI, Bissada NF. Influence of obesity and hypertension on the severity of periodontitis in rats. *Oral Surg Oral Med Oral Pathol* 1977;43:707-19.
- Dalla Vecchia CF, Susin C, Rösing CK, Oppermann RV, Albandar JM. Overweight and obesity as risk indicators for periodontitis in adults. *J Periodontol* 2005;76:1721-8.
- Genco RJ, Grossi SG, Ho A, Nishimura F, Murayama Y. A proposed model linking inflammation to obesity, diabetes, and periodontal infections. *J Periodontol* 2005;76 11 Suppl:2075-84.
- Linden G, Patterson C, Evans A, Kee F. Obesity and periodontitis in 60-70-year-old men. *J Clin Periodontol* 2007;34:461-6.
- Sarlati F, Akhondi N, Etehad T, Neyestani T, Kamali Z. Relationship between obesity and periodontal status in a sample of young Iranian adults. *Int Dent J* 2008;58:36-40.
- Ekuni D, Yamamoto T, Koyama R, Tsuneishi M, Naito K, Tobe K. Relationship between body mass index and periodontitis in young Japanese adults. *J Periodontol* 2008;43:417-21.
- Kongstad J, Hvidtfeldt UA, Gronbaek M, Stoltze K, Holmstrup P. The relationship between body mass index and periodontitis in the Copenhagen City Heart Study. *J Periodontol* 2009;80:1246-53.
- Boeing F, Patiño JS, da Silva VR, Moreira EA. The interface between obesity and periodontitis with emphasis on oxidative stress and inflammatory response. *Obes Rev* 2009;10:290-7.
- Tendon S, Dhingra MS, Lamba AK, Verma M, Munjal A, Faraz F. Effect of periodontal therapy on serum lipid levels. *Indian J Med Specialities* 2010;1:19-25.
- Singh S, Kumar V, Kumar S, Subbappa A. The effect of periodontal therapy on the improvement of glycemic control in patients with type 2 diabetes mellitus: A randomized controlled clinical trial. *Int J Diabetes Dev Ctries* 2008;28:38-44.
- Hussain Bokhari SA, Khan AA, Tatakis DN, Azhar M, Hanif M, Izhar M. Non-surgical periodontal therapy lowers serum inflammatory markers: a pilot study. *J Periodontol* 2009;80:1574-80.
- Merchant AT, Pitiphat W, Rimm EB, Josphipura K. Increased physical activity decreases periodontitis risk in men. *Eur J Epidemiol* 2003;18:891-8.
- Al-Zahrani MS, Borawski EA, Bissada NF. Periodontitis and three health-enhancing behaviors: maintaining normal weight, engaging in recommended level of exercise, and consuming a high-quality diet. *J Periodontol* 2005;76:1362-6.
- Al-Zahrani MS, Borawski EA, Bissada NF. Increased physical activity reduces prevalence of periodontitis. *J Dent* 2005;33:703-10.
- Mathus-Vliegen EM, Nikkel D, Brand HS. Oral aspects of obesity. *Int Dent J* 2007;57:249-56.
- Ship JA. Diabetes and oral health: an overview. *J Am Dent Assoc* 2003;134 Spec No:4S-10.
- Kunzel C, Lalla E, Lamster IB. Management of the patient who smokes and the diabetic patient in the dental office. *J Periodontol* 2006;77:331-40.

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Minimally Invasive Thyroidectomy: A Review Article

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Abstract

Introduction: Various techniques of minimally invasive thyroidectomy (MIT) have been practiced by the surgeons in the recent past to extrapolate the proven benefits of minimal access Surgery even with regard to various diseases of the thyroid gland. This article aims to review the benefits of various techniques of MIT over conventional open thyroidectomy in terms of morbidity, complication rate, and cosmetic outcome.

Materials and Methods: This is a retrospective study reviewing various articles and publications in reputed magazines by downloading them using different search engines. Only the material relevant to the objectives of this article was reviewed.

Results: Cosmetic outcomes were excellent, post-operative pain was less, the duration of hospital stay was very much less with MIT when compared with conventional thyroidectomy. Other complication rates are comparable. Operative times were significantly longer for MI video-assisted thyroidectomy (MIVAT) or Endoscopic thyroidectomy and Robotic endoscopic thyroidectomy (BABA technique).

Conclusion: MIVAT and MI endoscopic thyroidectomy especially the anterior chest wall approach are safe and effective with excellent cosmetic outcome in the hands of well-trained Surgeons when compared to conventional thyroidectomy. It is possible now to remove large nodules and even perform a total thyroidectomy with endoscopic thyroidectomy procedures.

Key words: Endoscopic, Minimally invasive, Robotic, Thyroidectomy

INTRODUCTION

Rapid developments in video laparoscopic surgery have been observed in past several decades. Thyroidectomies performed by open method are well-effective, tolerable, and safe, but it involves transverse incision on the neck measuring 7-10 cm in length. These thyroid disorders are pretty common among women's and the scars due to incision make them uncomfortable and cosmetically unacceptable.¹

Minimally invasive (MI) methods are now widely used in various medical fields. Now MI can even be used for performing endocrine surgeries. These MI thyroid procedures can be subdivided into three subgroups:

(1) Endoscopic access from a small lateral incision in the neck, (2) video-assisted methods using a central incision-MIVAT and (3) range of endoscopic methods. MI procedures are precisely indicated and defined. Video-assisted methods using a central incision consequently represent a safe method that involve less trauma to tissue, a short period of hospitalization and appreciable cosmetic benefits for the patient. Hence, these MI surgeries are playing an ever increasing role in neck surgery.²

Objective of Review

This review aimed to know the outcome of MI video-assisted thyroidectomy (MIVAT) and to compare complications between the MIVAT and few other conventional thyroidectomy MI endoscopy approaches.

MATERIALS AND METHODS

This review is prepared by downloading the articles from several search engine like PubMed, Medline, Scopus, EbscoHost, etc.

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Only articles pertaining to and relevant to MIVAT, MI endoscopic thyroidectomy via different approaches and also early experiences with Endoscopic Thyroidectomy with Da Vinci Robot system using Bilateral Axillary Breast Approach (BABA) in comparison with that of conventional thyroidectomy are included in this study.

Factors such as operative time, cosmetic outcome, complications, length of hospital stay, and post-operative pain were evaluated.

RESULTS

Hegazy, *et al.* studies total 68 patients and compared the MIVAT versus that of MI open surgery (Sofferman technique). The two groups were comparable to the extent of the surgery age, gender of the patient. The study concluded that the MIVAT group had a longer operative time (115.4 ± 33.5 min) as compared to the open technique group (65.6 ± 23.7 min). The post-operative pain was comparatively less in the MIVAT group ($P < 0.05$) than the open technique group. However, no significant difference was obtained in relation to cosmetic outcome in both group ($P < 0.05$).²

Chung *et al.* conducted study involving 301 patients. They evaluated the completeness of thyroidectomy and comparing the complications of endoscopic thyroidectomy with conventional open thyroidectomy. They came to conclusion that there was no statistical significance in the sets of parameters like: No difference in post-op thyroglobulin levels, no difference in the occurrence of vocal cord paralysis and no difference in the incidence of hypocalcaemia between the two groups. Furthermore, they stated that cosmetic outcome was excellent in the video-assisted group. Moreover, mean hospital days were lower in the endoscopic thyroidectomy group (mean 3.04 days) as compared to the open technique group (mean 3.18 days).³

Bellantone *et al.* evaluated 62 patients comparing the video-assisted versus conventional thyroid lobectomy. Parameters like cosmetic outcome, post-operative pain, complications (bleeding, infection, recurrent nerve palsy) were taken into consideration. They noted that the patients who underwent video-assisted surgery were more satisfied with the cosmetic outcome (mean \pm standard deviation [SD], 9.2 ± 0.5) as compared to the open conventional surgery (mean \pm SD, 5.8 ± 0.2) ($P < 0.001$). Furthermore, the post-operative pain was significantly lower than the open surgery group in the video-assisted group ($P < 0.001$). The duration of hospital stay was lower in the video-assisted group (mean \pm SD, 1.1 ± 0.1 days) as compared to open surgery group (mean \pm SD, 2.2 ± 0.2 days), but was found not statistically significant.⁴

Ujiki *et al.* conducted study on 48 patients to compare the video-assisted thyroidectomy versus conventional thyroidectomy. They concluded that operative time is longer in the MIVAT group (mean \pm standard error of mean, 102 ± 4 min) as compared to conventional group (86 ± 3 min) and it was not statistically significant ($P < 0.05$). Analgesic requirements found no significant difference between the both the groups ($P < 0.05$).⁵

In a study conducted by Shailesh *et al.*, 15 patients were taken. Of these, thyroid lobectomy was performed on 8 cases, total thyroidectomy on 3 cases, and subtotal thyroidectomy in 4 cases. The average blood loss was 20 ml (range 15 ml-35 ml). Mean operative time was 85 min (range 60-120 min). There were no complications and no cases were converted to open. There were no subcutaneous emphysema, ecchymosis or hypercarbia and no cases of recurrent laryngeal nerve palsy or post-operative tetany observed in any patient. Patients were discharged on the 2nd post-operative day. The suprasternal incision was widened to a mean size of 5.6 cm (range 2-7.5 cm) for removal of the specimen. However, this scar was well hidden beneath the clothes of the patients, and all patients were satisfied with the cosmetic result of the surgery.⁶

In a study of Hiroshi and Yoshifumi, 22 patients were treated by the anterior chest approach to endoscopic thyroidectomy and 28 patients by the axillary approach. The only complication was one case of post-operative emphysema. The patients were satisfied with the cosmetic results of the procedures and the minimal degree of post-operative hypesthesia, paresthesia, and discomfort.⁷

In another article of Radford *et al.* five trials were identified. The total number of patients was 318. Primary outcomes that were measured were pain, hypocalcemia (post-operatively) and post-operative recurrent laryngeal nerve palsy. Along with this, there was no difference in rates of post-operative hypocalcemia or post-operative recurrent laryngeal nerve palsy between the techniques. Reported pain scores at 24 h were significantly lower in MIVAT compared to conventional surgery. Pooled effect size was -4.496 (95% confidence interval [CI] = -7.146 – -2.045 , $P = 0.0004$). Secondary outcome measures were operative time, blood loss, and cosmesis. There was a significant improvement in patient reported scores for cosmesis with MIVAT. The pooled effect size was 3.669 (95% CI 0.636 – 6.702 , $P = 0.0178$). MIVAT was associated with a significant increase in operative time. Pooled effect size was 1.681 (95% CI 0.600 – 2.762 , $P = 0.0023$). No statistical difference in blood loss between the groups was observed.⁸

Lee *et al.* conducted study of endoscopic thyroidectomy using the BABA with the Da Vinci Robot system between

March and May 2008. 15 patients diagnosed with papillary thyroid cancer underwent robotic-assisted endoscopic thyroidectomy using the BABA technique. The mean operating time was 218 min. Steady decrease in operative time from the initial case to the 15th case was observed. The blood loss was minimal. The recurrent laryngeal nerve and parathyroid glands were identified in great detail with ease and preserved in all cases. There were no post-operative complications in any case.⁹

DISCUSSION

The studies which we compared and observed in this article show that endoscopic techniques have gained a major acceptance from surgeons who slowly and surely equipped themselves with these techniques. For some other reasons and also for cosmetic oriented, patients today are more knowledgeable, and they want best options, comfortable surgical care, and best outcomes with absence of any morbidity.

It has been observed that the majority of the patients those who underwent video-assisted thyroidectomy have less post-operative pain than in the open surgery group. In addition, the length of hospital stay is comparatively shorter in the MIVAT group.¹⁰

However, it was found that there is no significant difference in post-operative complications between the both groups, and the operative time was significantly longer for the MIVAT group than the open surgery group. Patient's satisfaction of cosmetic outcome was significantly higher in the MIVAT group than that of the open surgery group.

The cervical approach utilizes small incisions in the neck thus making it cosmetically unacceptable and cannot be used for lesions >4 cm. Only patients who have small nodules with a low index of suspected malignancy are offered this endoscopic approach.¹¹ The operative field is small, and because the camera is near the anatomic structures, it often has to be removed for cleaning, which significantly increases the operating time.¹²

The axillary approach makes it difficult to visualize the opposite lobe. Although sectioning the sternohyoid muscle creates a good visual space even for the contralateral region and enables the contralateral gland of the thyroid to be resected, the operating time is extremely prolonged and the additional scar tissue causes discomfort while swallowing and neck pain as a result of adhesions. Therefore, this endoscopic procedure is not indicated for thyroid nodules that extend to the contralateral thyroid lobe.¹³

The anterior chest wall approach utilizes port access at various positions on the anterior chest wall depending on the surgeon, thus avoiding a cervical incision. In this technique, the trocars are over the sternum and infraclavicularly. These are hidden by the clothes of the patient and are not visible routinely.^{14,15}

This technique also allows bilateral neck exploration. Hence, it has been possible to perform total thyroidectomies with a central compartment clearance for papillary carcinoma and near-total thyroidectomies for large multinodular goiters. The largest dimension of thyroid lobe removed in was 11 cm. The chief contraindications to this endoscopic method are previous neck surgery and neck irradiation.¹⁵

Three-dimensional (3-D) MIVAT was carried out with a 4-mm, 3-D 0° stereoscopic endoscope. Operative time for total thyroidectomy ranged from 72 to 90 min. Neither intra-nor post-operative complications were reported during the study. The surgical team noticed a good perception of depth and easy recognizing of anatomic structures, especially concerning the upper and lower vascular pedicle, the parathyroids, the superior and inferior laryngeal nerves.¹⁰

The ideal indications for robotic surgery are still to be established. The neck area, especially the thyroid gland poses a difficult challenge for many endoscopic surgeons. Robotic surgery is useful in this area due to its excellent magnification and endowrist function. The mean operating time was 218 min. There was a steady decrease in operative time from the initial case to the 15th case. The blood loss was minimal. The recurrent laryngeal nerve and parathyroid glands were identified in great detail with ease and preserved in all cases. There were no post-operative complications in any case.⁹

CONCLUSION

MIVAT can be performed safely and effectively as open thyroidectomy and can be the treatment of choice in a selected group of patients.

Endoscopic thyroidectomy via the anterior chest wall approach combines the advantages of minimal access techniques. In spite of the reduced size of skin incision, precise anatomic details are observed through a greatly magnified view using an endoscopic camera. Large nodules have been removed, and total thyroidectomy has been done without using cutaneous elevation. Decreased pain and better cosmetic results are the greatest benefits of this procedure. It also results in decreased functional loss due to transection of the neck musculature after open surgery.

Central compartment clearance can be done effectively. Using this technique performing modified neck dissections endoscopically is possible. The technique is safe and effective in the hands of an appropriately trained surgeon.

With 3-D MIVAT preliminary impression suggests that 3-D MIVAT is safe and effective. Future studies with larger case series are required to determine the role of this procedure.

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REFERENCES

1. Lukás J, Paska J. Minimally invasive thyroidectomy. *Cas Lek Cesk* 2009;148:194-6.
2. Hegazy MA, Khater AA, Setit AE, Amin MA, Kotb SZ, El Shafei MA, *et al.* Minimally invasive video-assisted thyroidectomy for small follicular thyroid nodules. *World J Surg* 2007;31:1743-50.
3. Chung YS, Choe JH, Kang KH, Kim SW, Chung KW, Park KS, *et al.* Endoscopic thyroidectomy for thyroid malignancies: Comparison with conventional open thyroidectomy. *World J Surg* 2007;31:2302-6.
4. Bellantone R, Lombardi CP, Bossola M, Boscherini M, De Crea C, Alesina PF, *et al.* Video-assisted vs conventional thyroid lobectomy: A randomized trial. *Arch Surg* 2002;137:301-4.
5. Ujiki MB, Sturgeon C, Denham D, Yip L, Angelos P. Minimally invasive video-assisted thyroidectomy for follicular neoplasm: Is there an advantage over conventional thyroidectomy? *Ann Surg Oncol* 2006;13:182-6.
6. Puntambekar SP, Palep RJ, Patil AM, Rayate NV, Joshi SN, Agarwal GA, *et al.* Endoscopic thyroidectomy: Our technique. *J Minim Access Surg* 2007;3:91-7.
7. Takami H, Ikeda Y. Minimally invasive thyroidectomy. *ANZ J Surg* 2002;72:841-2.
8. Radford PD, Ferguson MS, Magill JC, Karthikesalingham AP, Alusi G. Meta-analysis of minimally invasive video-assisted thyroidectomy. *Laryngoscope* 2011;121:1675-81.
9. Lee KE, Rao J, Youn YK. Endoscopic thyroidectomy with the da vinci robot system using the bilateral axillary breast approach (BABA) technique: Our initial experience. *Surg Laparosc Endosc Percutan Tech* 2009;19:e71-5.
10. Mercante G, Battaglia P, Manciooco V, Cristalli G, Pellini R, Spriano G. Three-dimensional minimally invasive video-assisted thyroidectomy: Preliminary report. *J Exp Clin Cancer Res* 2013;32:78.
11. Inabnet WB 3rd, Jacob BP, Gagner M. Minimally invasive endoscopic thyroidectomy by a cervical approach. *Surg Endosc* 2003;17:1808-11.
12. Gagner M, Rubino F. Endoscopic parathyroidectomy. In: Gagner M, Inabnet WB, editors. *Minimally Invasive Endocrine Surgery*. Philadelphia: Lippincott, Williams and Wilkins; 2002.
13. Ikeda Y, Takami H, Sasaki Y, Takayama J, Niimi M, Kan S. Clinical benefits in endoscopic thyroidectomy by the axillary approach. *J Am Coll Surg* 2003;196:189-95.
14. Yeung GH. Endoscopic thyroid surgery today: A diversity of surgical strategies. *Thyroid* 2002;12:703-6.
15. Ikeda Y, Takami H, Sasaki Y, Takayama J, Niimi M, Kan S. Comparative study of thyroidectomies. Endoscopic surgery versus conventional open surgery. *Surg Endosc* 2002;16:1741-5.

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Deep (Aggressive) Angiomyxoma of Vulva: A Case Report

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Abstract

Aggressive angiomyxoma (AAM) is rare, locally aggressive mesenchymal tumor that has a high propensity for local recurrence that exceeds 35%. It involves mainly the pelvis, vulva, perineum, vagina and urinary bladder in women of the reproductive age group. It presents clinically mostly as a vulval polyp and simulates a vulvar abscess, Bartholin gland cyst, vaginal cyst or an inguinal hernia. As a result, complete excision is preferable if this can be accomplished without undue morbidity. In instances where complete removal would be associated with high morbidity or when preservation of fertility is desired, incomplete removal may be acceptable if the risks of recurrence and additional surgical interventions are understood. All patients require long-term follow-up. Gross examination usually reveals a large mass, commonly >10 cm and not infrequently >20 cm. AAMs generally have fairly uniform, low to moderate cellularity, and they contain relatively small, stellate-shaped and spindle cells, set in a loosely collagenous, myxomatous stroma with scattered vessels of varying caliber and a variety of entrapped regional structures. We report a case of AAM in a 40-year-old female presenting with a vulval mass on right labia majora.

Key words: Aggressive angiomyxoma, Mesenchymal tumor, Vulval polyp

INTRODUCTION

Cases of aggressive angiomyxoma (AAM) were first described as a distinct clinic pathologic entity by Steeper and Rosai in 1983.¹ The term AAM has been widely accepted and in 2003, was classified by the World Health Organization as deep angiomyxoma.²

It is a rare soft tissue tumor with a high risk of local infiltration and recurrence. There have been fewer than 250 cases reported in the world literature to date.³

AAM has a predilection for adult females, with a peak incidence in the fourth and fifth decades. About 90% of patients are women in reproductive age group.⁴ It almost exclusively involves the vulvovaginal, perineal and pelvic regions of women of reproductive age group. A few cases have been described in males, usually in the scrotum.

The female to male ratio is 6.6/1.⁵ It presents clinically mostly as a vulval polyp and is diagnosed on microscopic examination. Wide excision is the first line of treatment. Adjuvant treatments such as gonadotropin-releasing hormone agonists, have been used for primary treatment and for treatment against tumor recurrence.

CASE REPORT

A 40-year-old female patient visited to the gynaecological outpatient department with a slow growing mass in the right labia majora. The patient was normal 6 months back, when she noticed a small swelling on the right labia majora, which was progressively slowly increasing in size. She also complained of dyspareunia. On local examination, vulva was asymmetric. Right labia majora was enlarged and bulged downward. There was a firm circumscribed mass measuring 3 cm × 2 cm that was non-tender, soft and spongy in consistency on manual examination. A provisional diagnosis of Bartholin's mass was made before operation. There was no change in the color of skin and inguinal lymphadenopathy.

Her routine investigations revealed dimorphic anemia. Her complete blood count revealed hemoglobin - 10 g%, total White blood cell count 7500/cumm, platelet - 14,700/cumm.

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Her bleeding time and clotting time were normal. HIV and hepatitis B surface antigen were non-reactive by enzyme-linked immunosorbant assay. Chest X-ray was normal.

She underwent local excision of the mass under local anesthesia and the sample was sent to our department for histopathological examination.

Gross examination showed a well-circumscribed mass covered with skin measuring 3 cm × 2 cm × 1 cm. The cut surface was grey-white, homogenous with gelatinous areas. Multiple section was taken and processed.

Microscopic Examination

Hematoxylin and eosin stained sections showed tumor covered with thin layer of epidermis with fairly uniform, moderate cellularity, and they contain small, stellate-shaped and spindle cells, in loosely collagenous, myxomatous stroma (Figure 1) with scattered vessels of varying calibre (Figure 2). The neoplastic cells had ill-defined cell borders, scanty to moderate eosinophilic cytoplasm and relatively bland nuclei with vesicular chromatin and central nucleolus and minimal nuclear pleomorphism and atypical mitotic figures (Figures 3-5). Variable-sized thin-walled capillaries and thick walled medium and large sized vessels seen (Figure 6). Some of these vessels showed perivascular hyalinization of their vascular walls. These findings were suggestive of AAM.

DISCUSSION

Angiomyxomas are classified as superficial (cutaneous myxoma) or AAM. Superficial angiomyxomas usually present in the middle-aged adults as a single nodule or a polypoidal lesion in the head and neck region that may be clinically confused with skin tag or neurofibroma. The stroma is made up of mostly edema with little myxoid material. AAMs occurs almost exclusively in the pelvic and the perineal regions of women of reproductive age, and is occasionally reported in men.⁶ The term “aggressive” denotes its propensity for local aggression and recurrences after excision. Usually, this tumor is non-metastasizing in nature, but there are reports of multiple metastases in women mostly to lung treated initially by excision and who later succumbed to metastatic disease.^{7,8}

The diameter of neoplasms has been reported as varying from 5 to 23 cm, but is usually >10 cm.⁹

The usual presentation of AAM is a painless cyst or an ill-defined swelling of the vulva or pelvic region. Clinical diagnosis is difficult because of its rarity. Misdiagnosis is common, occurring in >80% cases.¹⁰ The main differential diagnosis includes vulvar abscess, lipoma, gartner cyst,

vaginal cyst, bartholin cyst, vaginal prolapse, levator hernia and hernia of the canal of nuck.¹¹

On computerized tomography (CT) scan, these tumors have a well-defined margin with attenuation less than that of muscle. On magnetic resonance imaging (MRI), these show high signal intensity on T2-weighted images. The attenuation on CT and MRI are likely to be related to the loose myxoid matrix and high water content of angiomyxoma.¹²

Macroscopically, AAM has a diffuse, gelatinous, homogeneous cut surface with areas of congestion and haemorrhage.¹³

Histological examination generally shows stellate and spindle-shaped neoplastic cells scattered in a background of loose myxoid stroma with numerous blood vessels of varying caliber and a variety of entrapped regional structures. The tumor cells have scanty eosinophilic cytoplasm with poorly defined borders and relatively bland nuclei with an open chromatin pattern and a small central nucleolus. Mitoses and nuclear atypia are infrequent. In many cases, there is the presence of loosely organized collections of well-developed myoid cells around the vessels and nerve segments. The stromal cells can show immunoreactivity to different combinations of vimentin, desmin, smooth muscle actin, muscle specific actin, CD 34, estrogen receptor and progesterone receptor.¹⁰

Various studies on the pathogenesis of AAM have demonstrated aberrations involving chromosome 12, and in several studies, its high mobility group AT-hook 2 (HMGIC) gene has been implicated.

Differential Diagnosis²

Histopathologically differential diagnosis includes myxoma, myxoid neuro fibroma, liposarcoma, fibrosarcoma, vaginal botryoid psuedosarcoma and myxoid-type malignant fibrous histiocytoma (Table 1).²

Hydropic (edematous) and myxoid smooth muscle tumors usually feature larger tumor cells with spindle morphology, abundant eosinophilic cytoplasm (in which longitudinal cytoplasmic striations may be highlighted with a Masson trichrome stain), and sometimes, juxtannuclear vacuoles. True myxoid smooth muscle tumors contain abundant hyaluronic acid, a feature not seen in AAM.

Myxofibrosarcoma (myxoid malignant fibrous histiocytoma) predominantly affects adults in the later decades of life. This entity has more pronounced mitotic activity and cytologic atypia, even in lower grade examples, than is present in AAM. Also, myxoid sarcomas usually contain a complex microvascular network with branching and curvilinear capillaries that are notably absent in most benign soft tissue tumors. Sometimes physiologic conditions, such as

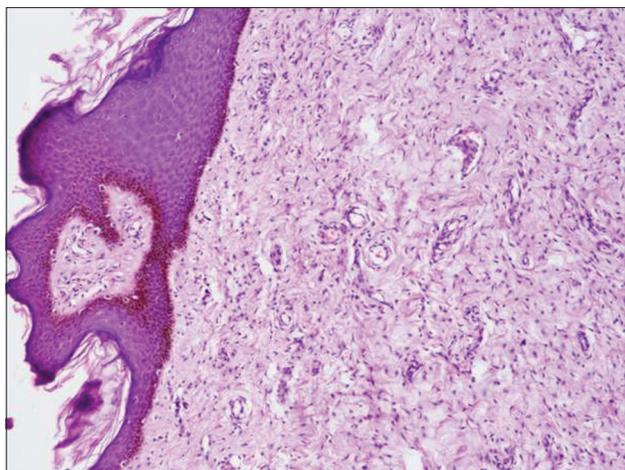


Figure 1: Thin epidermis with uniform, moderate cellularity, and they contain small, stellate-shaped and spindle cells, scattered vessels of varying calibre (H and E, 10x)

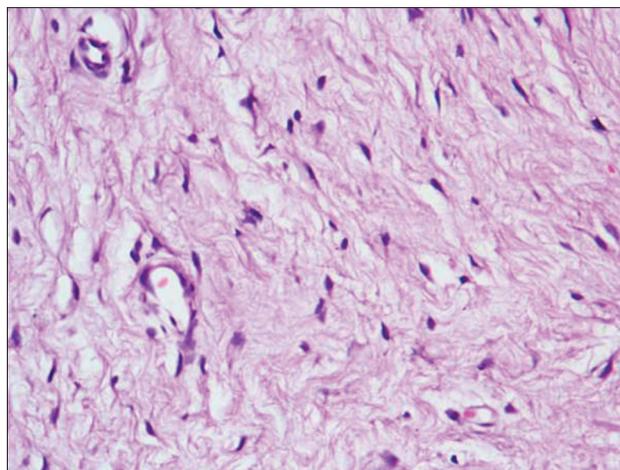


Figure 4: Myxomatous stroma with stellate cells (H and E, 40x)

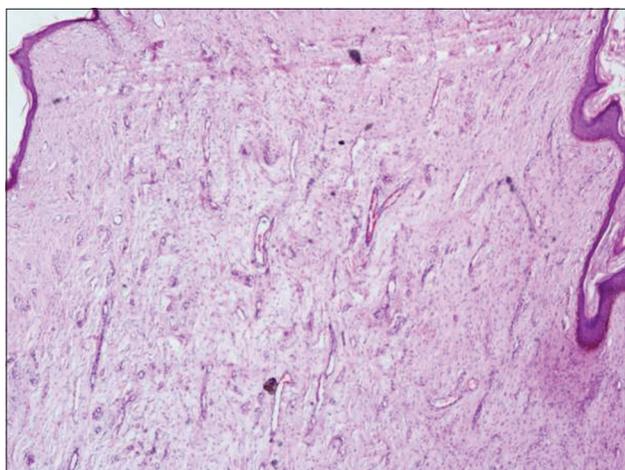


Figure 2: Uniform spindle cells in myxomatous stroma with scattered varying size shape blood vessels. At places branched vessels present (H and E, 4x)

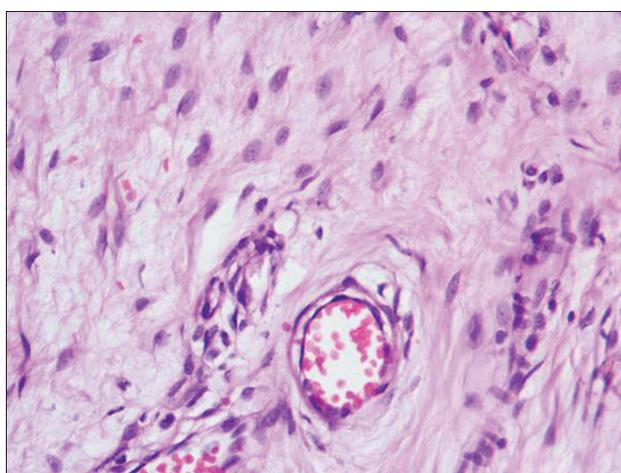


Figure 5: Cellular areas uniform spindle shaped cells with vesicular chromatin and noticeable nucleoli with moderate eosinophilic cytoplasm (H and E, 40x)

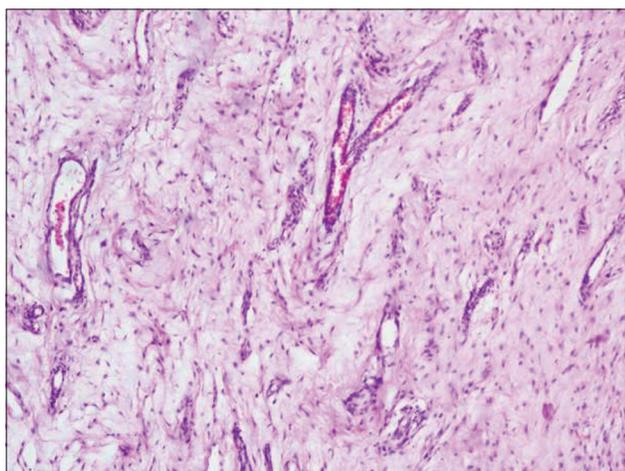


Figure 3: Thick wall blood vessels and spindle cells in myxomatous stroma (H and E, 10x)

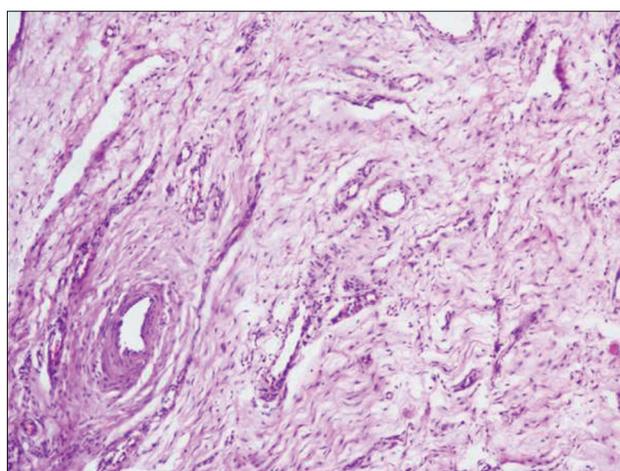


Figure 6: Thick wall blood vessel with spindle shaped tumor cells (H and E, 10x)

childhood asymmetric labium majus enlargement (a.k.a., prepubertal vulvar fibroma or fibrous hyperplasia) and

vulval hypertrophy with lymphedema, can also be confused with AAM, especially when one is confronted with a biopsy sample unaccompanied by relevant clinical information.

Table 1: Differential diagnosis of deep angimyxoma²

	Sarcoma botryoides	Deep angimyxoma	Angiomyofibroblastoma	Superficial angimyxoma	Fibroepithelial polyp
Age at presentation	Pre-pubertal	Reproductive years	Reproductive years	Reproductive years	Reproductive years
Size, site and macroscopic configuration	Polypoid, exophytic or mass	Often larger than 5 cm, exophytic	Subcutaneous, <5 cm	Small dermal lobulated, superficial	Small, subepithelial, exophytic
Margins	Infiltrative	Infiltrative	Compressive		Poorly circumscribed
Cellularity and cells	Largely paucicellular with a variably pronounced cambium layer, spindle shaped cells, including rhabdomyoblasts in myxoid zones	Paucicellular cytologically bland, stellate	More cellular than DA perivascular concentration of cells is usual. Cytologically bland plasmacytoid or epitheloid cells may be prominent	Elongated thin walled vessels	Bland spindle cells in addition to enlarged layer, pleomorphic stromal cells with smudged chromatin
Vessels	Inconspicuous	Medium caliber, thick walled vessels, pinwheel collagen	Smaller vessels than DA perivascular concentration of stromal cells	Elongated thin walled vessels	
Matrix		Paucicellular, myxoid			
Mitotic index	Usually easily found	Rare	Rare	Rare	Rare
Immunohistochemistry	Actin and desmin positive. Myogenin and myoD positive	Actin, desmin and vimentin positive	Strongly desmin positive. Minority of cells in occasional cases shows positivity for either smooth muscle actin or panmuscle actin (HHF35). Negative for S-100 protein, keratin, fast myosin and myoglobin	Desmin negative	Often desmin positive
Associated finding				Stromal neutrophil when multiple, consider carney syndrome	Overlying epithelium may demonstrate intraepithelial neoplasia
Clinical course	Fully malignant neoplasm alveolar histology adverse prognostic factor	Local recurrence common, never metastasizes	Dose not recur occasional lesion has hybrid features of DA and AMFB and should be treated as DA		Benign, no recurrences

AFMB: Angiomyofibroblastoma, DA: Deep angimyxoma

Recognition that these poorly-demarcated processes are largely centered in the superficial soft tissues and the absence of many characteristic features of AAM, such as a perivascular/perineural myxoid proliferation are important.

Other less common lesions that may enter the differential diagnosis are:

1. Myxoid neuro fibroma, which has more buckled or wavy nuclei and whose
2. Cells are S-100 protein positive
3. Low grade myxofibrosarcoma, which has thin-walled curvilinear vessels, shows more nuclear atypia and is essentially always desmin negative
4. Myxoidliposarcoma, which contains delicate arborizing vessels and small lipoblasts
5. Cellular angiofibroma, which is well circumscribed.

Prognosis and Predictive Factors

The treatment for this locally aggressive but non-metastasizing proliferation is primarily surgical with close attention to margins. Approximately 35% of patients develop one or more local recurrences.

CONCLUSION

AAM is rare and is difficult to diagnose clinically. Radiological examination is helpful in the detection, but histology is the gold standard for diagnosis. Wide excision is curative, and prognosis of such tumors is good. Long-term follow-up is necessary, and MRI is the preferred method for detecting recurrences.

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REFERENCES

1. Steeper TA, Rosai J. Aggressive angiomyxoma of the female pelvis and perineum. Report of nine cases of a distinctive type of gynecologic soft-tissue neoplasm. *Am J Surg Pathol* 1983;7:463-75.
2. Tavassoli FA, Devilee P. Pathology and Genetics: Tumours of the Breast and Female Genital Organs. World Health Organization Classification of Tumours. Lyon: IARC Press; 2003. p. 315-29.

3. Haldar K, Martinek IE, Kehoe S. Aggressive angiomyxoma: A case series and literature review. *Eur J Surg Oncol* 2009;10:10-6.
4. Magtibay PM, Salmon Z, Keeney GL, Podratz KC. Aggressive angiomyxoma of the female pelvis and perineum: A case series. *Int J Gynecol Cancer* 2006;16:396-401.
5. Chan YM, Hon E, Ngai SW, Ng TY, Wong LC. Aggressive angiomyxoma in females: is radical resection the only option? *Acta Obstet Gynecol Scand* 2000;79:216-20.
6. Han-Geurts IJ, van Geel AN, van Doorn L, M den Bakker, Eggermont AM, Verhoef C. Aggressive angiomyxoma: Multimodality treatments can avoid mutilating surgery. *Eur J Surg Oncol* 2006;32:1217-21.
7. Siassi RM, Papadopoulos T, Matzel KE. Metastasizing aggressive angiomyxoma. *N Engl J Med* 1999;341:1772.
8. Blandamura S, Cruz J, Faure-Vergara L, Machado-Puerto I, Ninfo V. Aggressive angiomyxoma: A second case of metastasis with patient's death. *Hum Pathol* 2003;34:1072-4.
9. Cinel L, Taner D, Nabaie SM, Dogan M. Aggressive angiomyxoma of the vagina. Report of a distinctive type gynecologic soft tissue neoplasm. *Acta Obstet Gynecol Scand* 2000;79:232-3.
10. Smith HO, Worrell RV, Smith AY, Dorin MH, Rosenberg RD, Bartow SA. Aggressive angiomyxoma of the female pelvis and perineum: Review of the literature. *Gynecol Oncol* 1991;42:79-85.
11. Mathieson A, Chandrakanth S, Yousef G, Wadden P. Aggressive angiomyxoma of the pelvis: A case report. *Can J Surg* 2007;50:228-9.
12. Outwater EK, Marchetto BE, Wagner BJ, Siegelman ES. Aggressive angiomyxoma: Findings on CT and MR imaging. *AJR Am J Roentgenol* 1999;172:435-8.
13. Güngör T, Zengeroglu S, Kaleli A, Kuzey GM. Aggressive angiomyxoma of the vulva and vagina. A common problem: Misdiagnosis. *Eur J Obstet Gynecol Reprod Biol* 2004;112:114-6.

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Gastric Bezoar Following Gastrojejunal Anastomosis: An Unwanted Case Presentation

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Abstract

Bezoars are a form of concretions resulting from the indigestible material in the gastro-intestinal tract. Depending on the nature of the content bezoar can be phytobezoars, trichobezoar, pharmacobezoar and lactobezoar. In general, gastric phytobezoars are common in patients with dentition problems, impaired digestion, psychiatric ailment, decreased gastric motility and manipulation of gastro-intestinal (GI) tract. They usually have a wide range of clinical presentations from abdominal discomfort and weight loss to small bowel obstruction. We report a case of gastric bezoar who previously underwent gastrojejunostomy for duodenal ulcer, presenting with mass per abdomen. Bezoar presenting as a mass per abdomen is uncommon. We recommend routine use of upper GI (UGI) endoscopy for all the cases of mass per abdomen even if there are no UGI symptoms, especially following gastric surgery.

Key words: Gastric bezoar, Gastrojejunal anastomosis, Mass per abdomen, Upper gastrointestinal endoscopy

INTRODUCTION

Bezoars are one of the rare entities encountered in the surgical practice. Usually are seen in patients with psychiatric ailment or sometimes in altered gastrointestinal (GI) tract anatomy. They usually have a wide range of clinical presentations from abdominal discomfort and weight loss to small bowel obstruction.¹

We report a case of patient with gastric bezoar who previously underwent gastro-jejunostomy (GJ) for duodenal ulcer, presenting with mass per abdomen with no upper GI (UGI) symptoms with difficulties we have faced in diagnosis.

CASE REPORT

A 60-year-old male presented with 3 months history of a lump and dull aching pain in the left upper abdomen.

There was a history of one episode of vomiting, weight loss, also complaint of on and off distension of abdomen which used to relieve after passing loose stools but he did report early satiety and loss of appetite. In the past, he had a history of peptic ulcer disease for which he had undergone GJ 24 years back.

On examination, patient was afebrile; there was no pallor, no lymphadenopathy. Old upper midline incision scar was present. There was mass felt in the left hypochondrium, slightly mobile, with ill-defined margins and moving with respiration which was dull on percussion and separate from the liver dullness. There was no hepato-splenomegaly, and digital rectal examination revealed empty rectum. During the hospital stay, mild distension of abdomen was present, patient was advised for Ryle's tube insertion but he refused. Next day the distension reduced following passing of loose stool. A clinical diagnosis of colonic mass cancer (splenic flexure) was made.

Routine blood tests (liver function test, complete hemogram), plain abdominal X-ray were un-remarkable. UGI endoscopy was not done as there were no UGI symptoms. Contrast-enhanced computed tomography (CECT) - Abdomen was inconclusive, revealing diffuse circumferential wall thickening (? inflammatory changes) of jejunal loops, small

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hypodense lesion in right lobe of liver (? hemangioma) with bilateral pleural effusion and fluid in recto-vesical pouch (Figure 1) and colonoscopy was refused by the patient.

On exploration old gastrojejunal anastomosis, (GJA) was found which might have been done for previous peptic ulcer disease. A diffuse mass of about $7\text{ cm}^2 \times 6\text{ cm}^2$ was found inside the body of the stomach and appeared to be arising from the wall initially and was hard in consistency. Later on found to be separate stomach wall. We also found narrowing of GJA, which was admitting only one finger. Gastrostomy was done, and the mass was found to be gastric bezoar (Figures 2 and 3). Subtotal gastrectomy was done along with dismantling of GJA. The continuity of the bowel was maintained by doing Roux-En-Y anastomosis. Post-operative period was un-eventful and was discharged on 7th post-operative day.

DISCUSSION

A bezoar is also known as an enterolith, a concretion of foreign or indigestible material found in the alimentary canal. Depending on the nature of the content, it can be classified into many types. Most common ones are phytobezoars, trichobezoar, pharmacobezoar and lactobezoar. They are relatively rare and are found in <1% of patients undergoing gastroscopy.²

Gastric bezoars are a rare clinical entity, most commonly observed in patients with mental or emotional illness, but it is more common in patients having altered GI anatomy and/or motility.³ Patients with the previous history of gastric surgeries have compromised the pyloric function and acid reducing operations like truncalvagotomy leads to impairment in GI motility which further increases the risk for bezoar formation. A 5-12% incidence of bezoar formation has been reported in the post-gastrectomy status.⁴ Our patient had peptic ulcer disease which had led to the gastric outlet obstruction and had undergone GJ and truncalvagotomy 24 years back.

Most common presenting symptoms of bezoar are abdominal discomfort, weight loss and small bowel obstruction. But in our case, patient presented with a history of mass per abdomen with dull aching pain. This is an unusual presentation of bezoar, wherein the patient presents with a mass per abdomen with no UGI symptoms. Al-Alawi *et al.* studied five patients of bezoar, all of whom had truncalvagotomy and drainage procedures for peptic ulcer disease. The time between surgery and presentation with bezoar complication ranged between 4 and 21 years with an average of 13.4 years.⁵ In our case



Figure 1: Contrast enhanced computed tomography abdomen



Figure 2: Gastrectomy specimen with bezoar



Figure 3: Surgical specimen of divided bezoar

patient presented after 24 years of surgery. CECT scan was not able to diagnose correctly because of adhesions induced by previous surgery and *in situ* GI anastomosis.

Bezoar presenting as a mass per abdomen is not recorded in literature, and misinterpretation of radiological findings led us to face diagnostic difficulties. Hence, bezoar should be kept in mind as a differential diagnosis in any patient

with the previous history of gastric surgery and UGI endoscopy should be done in all cases even if there are no GI symptoms. Our limitation was that we could not do UGI endoscopy and colonoscopy.

CONCLUSION

Bezoar presenting as mass per abdomen is uncommon and remains a diagnostic challenge. It should be suspected in patients with a previous history of gastric surgery. Low threshold should be kept for diagnosing bezoar when the patient comes with mass per abdomen with previous gastric surgery. We recommend routine use of UGI endoscopy for all the cases of mass per abdomen even if there are no

UGI symptoms, especially following gastric surgery. Bezoar is a curable disease, because of diagnostic difficulties it can cause significant morbidity as happened in our case.

REFERENCES

1. DeBaakey M, Ochsner A. Bezoars and concretions: A comprehensive review of the literature with an analysis of 303 collected cases and a presentation of 8 additional cases. *Surgery* 1939;5:132-60.
2. Kadian RS, Rose JF, Mann NS. Gastric bezoars – Spontaneous resolution. *Am J Gastroenterol* 1978;70:79-82.
3. Dorn HF, Gillick JL, Stringel G. Laparoscopic intragastric removal of giant trichobezoar. *JLS* 2010;14:259-62.
4. Bowden TA Jr, Hooks VH 3rd, Mansberger AR Jr. The stomach after surgery. An endoscopic perspective. *Ann Surg* 1983;197:637-44.
5. AH, Abdul-Saboor M, Haider F, Al-Assas MM. Gastrointestinal bezoar - Case reports and literature review. *Bahrain Med Bull* 2001;23:38-41.

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Typhoid and Malaria Co-infection from North Karnataka: A Case Report

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Abstract

Typhoid fever and malaria are life threatening illnesses, which are endemic in North Karnataka and causes significant morbidity, mortality and economic loss and are common in most parts of the India and the world. Typhoid fever is caused by bacteria *Salmonella typhi* and malaria by *Plasmodium* parasites, which spread to people through bites of infected anopheles mosquitos. These both have become a major public health problem in several parts of the country. About 95% of the population in the country resides in malaria endemic areas. There are chances that the person may get mixed infections, which are usually missed in routine diagnosis by physician in the investigation of pyrexia in the endemic area. Hence, require careful and accurate laboratory diagnosis, which plays an important role to rule out mixed infection and for effective treatment of patients. Here, we present one such case of malaria and typhoid co-infection from a tertiary care hospital of North Karnataka.

Key words: Co-infection, Endemic, Malaria, Typhoid

INTRODUCTION

Typhoid fever and malaria are endemic in Karnataka and India and other most developing and tropical countries in the world. And these are important public health problem in developing countries and in most part of the world.

Enteric fever is associated with poor public health and low socio-economic indices and Indian subcontinent has the highest incidence of the disease worldwide.¹

It is more common in areas of the world where hand washing is less frequent and water is likely to be contaminated with sewage.

Malaria is a potentially life-threatening parasitic disease and has been a major public health problem in several parts of the country, and 95% of the population in the

country resides in malaria endemic areas.² The World Health Organization estimates that 3.4 billion people live in areas at risk of malaria transmission in 106 countries and territories. And in 2012, malaria caused 207 million clinical episodes and 627,000 deaths worldwide.³

Although these two diseases are caused by different organisms, both malaria and typhoid share similar symptomatology and epidemiology. Here, we present a case of *Salmonella typhi* and *Plasmodium vivax* co-infection from North Karnataka.

CASE REPORT

A 22-year-old male student by profession presented with fever, chills and rigors, which subsided with sweating after taking antipyretics and associated with loss of appetite, nausea and admitted to the teaching hospital of Bidar Institute of Medical Sciences (BRIMS), Bidar.

On examination, he was febrile with the temperature swinging between 100°F and 115°F, blood pressure 100/60 mmHg and coated tongue. There was no hepatosplenomegaly and no rashes over the body. The patient did not show any other systemic abnormalities.

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His total blood count showed normal hemoglobin (15.3 g%) and platelet count (1.45 lakhs/cmm). The white cell count was within normal range (6000 cells/cumm) with neutrophil and eosinophil dominance. Serum creatinine was 0.82 mg/dl, blood urea 25 mg/dl and total bilirubin 0.69 mg/dl.

Salmonella enterica, subspecies enterica, serovar typhi isolated from blood culture which was sensitive to ciprofloxacin and chloramphenicol. The Widal test report was, TO (antibody against somatic antigen) 1:160, TH (antibody against flagellar antigen) 1:320.

He was started on chloramphenicol 500 mg for 7 days. Despite this, his temperature failed to settle. His blood smear examination for malarial parasite was done (Giemsa staining) and the blood film showed trophozoites of *P. vivax*.

He was started treating with a course of chloroquine and recovered after completion of the chloroquine course.

DISCUSSION

Typhomalaria was first described in the medical literature in the middle of the 19th century, by the United States army who were suffering from febrile illness that seemed to be typhoid.⁴

Malaria and typhoid fever are widely spread in the tropics and subtropics. Malaria is a parasitic infection transmitted from person to person by infected anopheles mosquito while typhoid fever is a bacterial infection caused by *Salmonella* spp. They are life threatening illnesses with similar clinical manifestation.

Co-infection is not uncommon in the tropics. However the actual underlying mechanism of association between malaria and *Salmonella* spp associated infection is still uncertain. But, it seems clear that malaria predisposes to bacteraemia due to *Salmonella*.⁵ It has been shown that antibody response to antigen of *S. typhi* was markedly reduced in acute episode of malaria compared with that in controls where humoral immunity is transiently impaired.⁶

In tropical countries like India which are endemic for both typhoid and malaria, both these diseases co-exist and it is

difficult to differentiate them only on clinical suspicion alone due to overlapping clinical sign and symptoms and antigenic cross-reactivity. The prevalence of malaria and typhoid fever co-infection in endemic areas will be reduced if diagnosis is based on the both clinical symptoms and laboratory findings.⁷

CONCLUSION

Many areas of the Karnataka and India are still considered endemic for both malaria and typhoid infection. Person living in such an the environment is at risk of contracting both these diseases. Therefore, a high index of suspicion is necessary to diagnose a co-infection as most clinicians link every symptom and sign to a single etiology and pathology as the signs and symptoms of malaria and typhoid fever often overlay. Clinical diagnosis, the most widely used approach, is unreliable because the symptoms of malaria are non-specific. Laboratory diagnosis plays an important role in such cases to rule out mixed infection and for effective treatment of the patients.

Thus, our case should alert physicians to consider about typhoid and malaria co-infection in their differential diagnosis of similar cases in the endemic area.

REFERENCES

1. Available from: <http://www.nvbdc.gov.in/malaria-new.html>. National Vector borne Disease Control Programme (Internet) Place (Unknown). Available from: <http://www.nvbdc.gov.in/malaria-new.html>. [Last updated 2014 Dec 15; Last cited on 2014 Dec 16 at 02:00 pm].
2. Kothari A, Pruthi A, Chugh TD. The burden of enteric fever. *J Infect Dev Ctries* 2008;2:253-9.
3. Available from: <http://www.cdc.gov/malaria/about/facts.html>. Centers for Disease Control and Prevention (Internet) Place (Unknown). Available from: <http://www.cdc.gov/malaria/about/facts.html>. [Last updated on 2014 Mar 26; Last cited on 2014 Dec 16 at 02:00 pm].
4. Uneke CJ. Concurrent malaria and typhoid fever in the tropics: The diagnostic challenges and public health implications. *J Vector Borne Dis* 2008;45:133-42.
5. Keong BC, Sulaiman W. Typhoid and malaria co-infection - an interesting finding in the investigation of a tropical Fever. *Malays J Med Sci* 2006;13:74-5.
6. Chowdhury F, Chisti MJ, Khan AH, Chowdhury MA, Pietroni MA. *Salmonella typhi* and *Plasmodium falciparum* co-infection in a 12-year old girl with haemoglobin E trait from a non-malarious area in Bangladesh. *J Health Popul Nutr* 2010;28:529-31.
7. Shukla S, Pant H, Sengupta C, Chaturvedi P, Chaudhary BL. Malaria and typhoid, do they co-exist as alternative diagnosis in tropics? A tertiary care hospital experience. *Int J Curr Microbiol Appl Sci* 2014;3:207-14.

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Electrosurgical Management of an Unusual Pregnancy Epulis: A Case Report

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Abstract

Pyogenic granuloma is an exuberant granulation tissue produced in response to various stimuli. It is an inflammatory hyperplasia which is benign, localized and commonly seen on the gingiva and rarely on other parts of the oral cavity. Predominantly, it is seen in second to the third decade of life in young females in anterior teeth. Clinically it appears to be a small red erythematous exophytic lesion, diagnosis of which is confirmed by biopsy. This presents case is an exuberant pyogenic granuloma present on the lingual side of the mandibular posterior teeth and was excised using electrocautery to achieve better gingival contour with minimum bleeding.

Key words: Inflammatory hyperplasia, Lasers, Pregnancy epulis, Pyogenic granuloma

INTRODUCTION

Pyogenic granuloma is a rapidly growing reactive proliferation of endothelial cells seen commonly on the gingiva in response to chronic irritation. This is a relatively common benign mucocutaneous lesion.¹ It is believed to be reactive and not neoplastic in nature.²⁻⁴ The term pyogenic granuloma is a misnomer in that it is neither pus-producing nor it does represent granulomatous inflammation. In fact, no relationship exists between bacteria and emergence of this reactive proliferation.^{4,5}

The final diagnosis of the lesion is mainly by biopsy and histopathological examination. Conventional treatment of pyogenic granuloma consists of surgical excision along with the elimination of irritating local factors. The latest treatment options include the use of lasers of different type. But, lasers are not being used because of the lack of review for the outcome of a laser surgery for such lesion.

Thus, we present this case of pregnancy epulis that was treated using electrocautery with good marginal contouring.

CASE REPORT

A 27-year-old female patient reported to the Department of Periodontics, with a complaint of swelling in the lower right back teeth region since 6 months, which was gradual on onset and progressive in size and causing discomfort during eating. Patient medical history revealed that she had delivered a baby 2 months back. Intra-oral examination revealed a solitary sessile erythematous growth along the marginal gingiva on the lingual side in relation to 44, 45, 46 measuring 1.5 cm × 1 cm in size and covering the lingual surface of the involved teeth (Figure 1). On palpation, the growth is firm, non-tender which bleed easily on probing. Radiographic examination revealed vertical bone defect.

A surgical excision was planned using electrocautery. The treatment was divided into 2 phases. During the first phase a conventional non-surgical therapy was performed with a full mouth scaling and root planning. During this phase, there was profuse bleeding, which ceased within few minutes on the application of pressure with a gauge. For the second phase of the surgery the patient was recalled and on the day of visit the growth was excised with help

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of electrocautery at high frequency electrical current of 1.5~1.7 MHz up to the base of the lesion with the help of single wire electrode (Figure 2) by ensuring that the lesion was completely excised. The soft tissue remnants adjacent to the tooth were trimmed to prevent recurrence of the lesion. Then the loop electrode was used to plane the surface of the lesion excised. After planning of the surface ball electrode, was used to stop bleeding point from the excised site (Figure 3). On completion of the whole procedure, periodontal pack (Figure 4) was then applied to prevent the wound from trauma and to enhance

healing for 1 week. The follow-up visit after 2 months showed excellent contouring (Figure 5). The excised sample (Figure 6) was subjected to histopathological examination, which confirmed the diagnosis as pyogenic granuloma.

DISCUSSION

The incidence of pyogenic granuloma has been described as between 26.8% and 32% of all reactive lesions,^{6,7} with



Figure 1: Pre-operative view of the growth



Figure 2: Electrocautery used to excise the lesion



Figure 3: Postoperative view of site of lesion



Figure 4: Pack applied at the site of excision



Figure 5: Postoperative view of the lesion site after 2 months

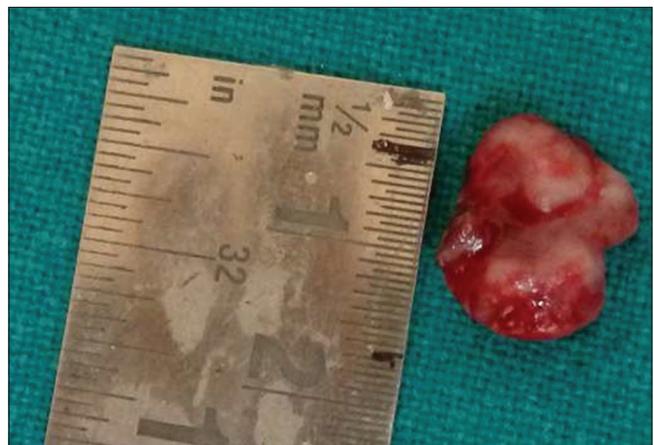


Figure 6: Size of the lesion 1.5 cm x 1 cm measured with the help of scale

female to male ratio 2:1 and can occur at any age, but predominant in second and third decade. This is due to vascular effects of female hormones like estrogen and progesterone. According to Jafarzadeh *et al.* the incidence rate increases in pregnancy due to increased level of estrogen and progesterone,^{8,9} and is also called Pregnancy tumor.

In the oral cavity, interdental papillae are most commonly affected accounting for 70% of the cases. They are more common on maxillary anterior area than any other area in the mouth but in this case, it was associated with the mandibular posterior region. Gingival irritation and inflammation due to abundant dental plaque and calculus were present as precipitating factors as found by Patil *et al.* in her study.⁹

Pyogenic granuloma usually appears as a localized solitary lump with sessile or pedunculated base and a smooth or lobulated surface and is deep red or purplish in color. Development of the lesion is slow, asymptomatic, and painless but sometimes grows rapidly. Sometimes the surface may be ulcerated and friable, may be covered with a yellow fibrinous membrane. Due to more fibrous appearance older pyogenic granulomas resemble fibromas.⁸

Pyogenic granuloma can be differentially diagnosed with lesions like the hemangioma, Kaposi sarcoma, squamous cell carcinoma, basal metastatic carcinoma, etc.

Features of pyogenic granuloma normally seen histopathologically are a matrix of edematous connective tissue in which numerous thinned walled vascular channels can be seen. These vessels sometimes are organized in lobular aggregates, and some pathologists require this lobular arrangement for the diagnosis (lobular capillary hemangioma). There is also moderately dense mixed cellular infiltrate. The overlying stratified squamous

epithelium may be atrophic or hyperplastic, and is usually degenerated or ulcerated in large areas, and the ulcer edge may have a primitive dysplastic appearance. Mitotic activity may be noted in the stromal cells.¹⁰

As pyogenic granuloma is a benign lesion, surgical excision is the treatment of choice, other conventional surgical modalities for treatment are cryosurgery, Nd:YAG, CO₂ and flash lamp pulsed dye lasers. In this case, electrocautery was used to eliminate the complete lesion, and a better gingival contour with minimum bleeding was achieved.

Thus, it is concluded that electrocautery can be used as a successful tool for the excision of such kind of lesions without much discomfort to the patient and without compromising the esthetics.

REFERENCES

1. Shenoy SS, Dinkar AD. Pyogenic granuloma associated with bone loss in an eight year old child: A case report. *J Indian Soc Pedod Prev Dent* 2006;24:201-3.
2. Amirchaghmaghi M, Falaki F, Mohtasham N, Mozafari PM. Extragingival pyogenic granuloma: A case report. *Cases J* 2008;1:371.
3. Ramirez K, Bruce G, Carpenter W. Pyogenic granuloma: Case report in a 9-year-old girl. *Gen Dent* 2002;50:280-1.
4. Neville BW, Pamm DD, Allen CM, Bouquot JE. *Oral and Maxillofacial Pathology*. 2nd ed. St Louis, Missouri: WB Saunders Co.; 2004. p. 444-9.
5. Weies SW, Goldblum JR. *Enzinger's & Weiss's Soft Tissue Tumors*. 5th ed. St. Louis, Mo: Mosby; 2008. p. 864-5.
6. Kfir Y, Buchner A, Hansen LS. Reactive lesions of the gingiva. A clinicopathological study of 741 cases. *J Periodontol* 1980;51:655-61.
7. Buchner A, Calderon S, Ramon Y. Localized hyperplastic lesions of the gingiva: A clinicopathological study of 302 lesions. *J Periodontol* 1977;48:101-4.
8. Jafarzadeh H, Sanatkhani M, Mohtasham N. Oral pyogenic granuloma: A review. *J Oral Sci* 2006;48:167-75.
9. Patil K, Mahima VG, Lahari K. Extragingival pyogenic granuloma. *Indian J Dent Res* 2006;17:199-202.
10. Kerr DA. Granuloma pyogenicum. *Oral Surg Oral Med Oral Pathol* 1951;4:158-76.

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Successful Use of Non-invasive Positive Pressure Ventilation in a Patient with Peripartum Cardiomyopathy: A Case Report

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Abstract

Peripartum cardiomyopathy (PPCM) occurs in approximately 1/3000-1/10,000 deliveries and may result in severe ventricular dysfunction during last month of pregnancy or early puerperium. The clinical presentation and the management of the disease are similar to that of dilated cardiomyopathy due to any other cause. Non-invasive positive pressure ventilation (NPPV) delivers mechanically assisted ventilation to the lungs, without the use of an invasive endotracheal airway. We report a case of a 22-year-old woman, with full-term gestation, in the active stage of labor with PPCM, in decompensated heart failure and pulmonary edema. She was successfully managed with NPPV without any adverse outcome for mother and child.

Key words: Echocardiography, Heart failure, Non-invasive positive pressure ventilation, Peripartum cardiomyopathy

INTRODUCTION

Peripartum cardiomyopathy (PPCM) is an idiopathic cardiomyopathy, characterized by heart failure (HF) and left ventricular systolic dysfunction towards the end of the pregnancy or within 5 months of delivery, when no other cause of HF is identified.¹ The clinical presentation and the management of the disease are similar to that of dilated cardiomyopathy due to any other cause. Along with intensive care management, these patients may also require anesthetic management during vaginal or operative delivery. Non-invasive positive pressure ventilation (NPPV) delivers mechanically assisted ventilation to the lungs, without the use of an invasive endotracheal airway. It reduces the need for invasive mechanical ventilation and the complications associated with it. The length of stay in the intensive care unit and the mortality in selected patients is also reduced.²

CASE REPORT

A 22-year-old primigravida with full-term gestation in the active stage of labor presented with sudden onset of dyspnea, tachypnea, tachycardia and low oxygen saturation. Her heart rate was 120 beats/min; BP was 140/90 mmHg; respiratory rate was 40/min, and SpO₂ was 80% with O₂ @ 6 L/min with face mask. On auscultation, bilateral crepitations were heard all over the lung fields, and normal heart sounds were heard with S3 gallop.

Hematological, renal, liver and clotting parameters are normal. ABG showed pH of 7.38, PCO₂ 27 cmH₂O, PO₂ 58 cm H₂O, HCO₃⁻ 14 meq/L, SO₂ 82%. Brain natriuretic peptide levels were 890 pg/ml. 2D echocardiography revealed global hypokinesia with left ventricular function (LVEF) 28%, fractional shortening of 20%, LV end-diastolic dimension of 3.2 cm/m², normal RA and RV with normal valves and no evidence of pulmonary hypertension.

Patient was started on NPPV in 45° propped up position with P_{insp} 16 cmH₂O, PEEP 6 cm H₂O, FiO₂ 100%. Injection furosemide 40 mg intravenous (IV) was given. Injection dobutamine infusion was started with 3 mcg/kg/min. Patient improved gradually after increasing P_{insp} to 20 cm H₂O, PEEP to 8 cm H₂O, and

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injection Furosemide 20 mg was repeated. Injection dobutamine infusion was increased to 5 mcg/kg/min. FiO₂ slowly reduced to 60%. Emergency cesarean section was planned meanwhile she delivered by normal vaginal delivery. Baby cried immediately after birth with APGAR score of 7 and 9 at 1 and 5 min respectively.

Patient was shifted to cardiac ICU with NPPV support. Patient improved clinically. So, NPPV support was reduced gradually and removed after 12 h and switched over to non-re-breathing oxygen mask for next 48 h. Injection dobutamine was tapered slowly and stopped. She was started on digoxin, carvedilol, diuretics and LMWH. With this treatment, there was a significant improvement in the LVEF (LVEF – 28% → 38%). Pulmonary edema was regressed. After 1 week, the patient was discharged from hospital for out-patient treatment. Patient was asked to come for follow-up every month for up to 6 months.

DISCUSSION

In this case, PPCM was diagnosed upon exclusion of other causes for the HF, according to the diagnostic criteria of PPCM. The diagnosis is confirmed on the basis of diagnostic criteria:³ (a) development of the HF during the last month of pregnancy or within 5 months of delivery; (b) absence of an identifiable cause for the HF; (c) absence of recognizable heart disease prior to the last month of pregnancy; (d) left ventricular dysfunction determined during echocardiography with ejection fraction <45%, fractional shortening of <30% on an M-mode echocardiographic scan, or both, and a left ventricular end-diastolic dimension of >2.7 cm/m² of body-surface area.^{4,5}

There is an increased incidence with multiple gestation, preeclampsia, obesity, advanced maternal age, African descent and prolonged use of tocolytics.⁶ These risk factors are not present in our patient. Although historically PPCM risk factors occur in elder women and African women, contemporary trends show that there is an increasing incidence (24-37%) in young primigravid and white patients.⁷

The etiology of PPCM is uncertain; viral,⁸ autoimmune, genetic and idiopathic causes have been considered.

The treatment of PPCM is not different from acute and chronic HF. The combination of digoxin, diuretics and sodium restriction, anticoagulation, b-blockers and afterload reduction forms the cornerstone of therapy.⁹ Same treatment modalities were given to our patient, to which she responded well. Dobutamine infusion was tapered slowly and was started on Digoxin, in addition to Carvedilol, Diuretics and Warfarin.

Newer drugs like Milrinone, Levosimendan and Bromocriptine, are also being used for PPCM. Levosimendan is a calcium sensitizer that has positive inotropic action and vasodilatation property. Levosimendan is effective in improving the cardiac output and decreasing the mortality.¹⁰

Mechanical cardiovascular support with an intra-aortic balloon pump or ventricular assist devices may be required if medical therapy is unsuccessful in women with PPCM. Left ventricular assist devices can act as a bridge to recovery or transplantation.¹¹ Use of short-term extracorporeal membrane oxygenation has also been of benefit in women with PPCM whose HF was refractory to medical therapy and who had persistent pulmonary edema with hypoxemia. Extracorporeal membrane oxygenation can also serve as a bridge to left ventricular assist devices in patients with refractory cardiogenic shock despite use of an intra-aortic balloon pump and full inotropic support.¹¹ Cardiac transplantation is indicated if supportive treatment fails.

NPPV rapidly improves oxygenation by re-expanding flooded alveoli, increasing functional residual capacity, and thereby more favorably positioning the lung on its compliance curve. This will reduce the work of breathing.¹² Afterload will be decreased by increasing the pericardial pressure and decreasing the trans-mural pressure. This will improve the cardiac performance.¹³ There will be an augmentation of stroke volume¹⁴ and reduction in the cardiac sympathetic activity¹⁵ in patients with HF and elevated left ventricular end-diastolic pressure. Increase in the intra-thoracic pressure reduces right and left ventricular end-diastolic volume, thereby decreasing the preload.¹⁶ This favorable effect occurs when filling pressures are high and ventricular performance is poor.

Improved inotropic function of the left ventricle or reduced left ventricular afterload with NPPV is evidenced by increase in stroke volume without a change in pulmonary capillary wedge pressure.

Discontinuation of the therapy is recommended only in case of recovery of the left ventricular function, by monitoring the cardiac function with repeated 2D cardiac ultrasound imaging.¹⁷ Recovery of the left ventricular function usually occurs within 2-6 months after diagnosis.⁷ The mortality rate of PPCM is 30-60% and may be caused by severe pulmonary congestion, arrhythmias and thromboembolic events.¹⁸ In future pregnancies there are 50-80% chances of developing cardiac failure, with 60% mortality rate.¹⁹

CONCLUSION

PPCM is a rare disease of unknown cause. Diagnosis is difficult and requires vigilance. The main objective of

treatment is to reduce the symptoms of congestive HF. High degree of clinical suspicion supported by the early echocardiography is important to diagnose this entity that can have a poor outcome despite optimal medical management. NPPV may offer an adjunct to medical therapy in improving left ventricular function and augmenting cardiac performance in a subset of patients with PPCM.

REFERENCES

1. Sliwa K, Hilfiker-Kleiner D, Petrie MC, Mebazaa A, Pieske B, Buchmann E, *et al.* Current state of knowledge on aetiology, diagnosis, management, and therapy of peripartum cardiomyopathy: A position statement from the Heart Failure Association of the European Society of Cardiology Working Group on peripartum cardiomyopathy. *Eur J Heart Fail* 2010;12:767-78.
2. Brochard L, Mancebo J, Elliott MW. Noninvasive ventilation for acute respiratory failure. *Eur Respir J* 2002;19:712-21.
3. Demakis JG, Rahimtoola SH, Sutton GC, Meadows WR, Szanto PB, Tobin JR, *et al.* Natural course of peripartum cardiomyopathy. *Circulation* 1971;44:1053-61.
4. Pearson GD, Veille JC, Rahimtoola S, Hsia J, Oakley CM, Hosenpud JD, *et al.* Peripartum cardiomyopathy: National heart, lung, and blood institute and office of rare diseases (National Institutes of Health) workshop recommendations and review. *JAMA* 2000;283:1183-8.
5. Hibbard JU, Lindheimer M, Lang RM. A modified definition for peripartum cardiomyopathy and prognosis based on echocardiography. *Obstet Gynecol* 1999;94:311-6.
6. Lampert MB, Lang RM. Peripartum cardiomyopathy. *Am Heart J* 1995;130:860-70.
7. Amos AM, Jaber WA, Russell SD. Improved outcomes in peripartum cardiomyopathy with contemporary. *Am Heart J* 2006;152:509-13.
8. Felker GM, Jaeger CJ, Klodas E, Thieman DR, Hare JM, Hruban RH, *et al.* Myocarditis and long-term survival in peripartum cardiomyopathy. *Am Heart J* 2000;140:785-91.
9. Bales AC, Lang RM. Peripartum cardiomyopathy. Uptodate (electronic clinical reference) 2002.
10. Follath F, Cleland JG, Just H, Papp JG, Scholz H, Peuhkurinen K, *et al.* Efficacy and safety of intravenous levosimendan compared with dobutamine in severe low-output heart failure (the LIDO study): A randomised double-blind trial. *Lancet* 2002;360:196-202.
11. Gavaert S, van Belleghem Y, Bouchez S. Acute and critically ill peripartum cardiomyopathy and "bridge to" therapeutic options: A single center experience with intraaortic balloon pump, extra-corporeal membrane oxygenation and continuous-flow left ventricular assist devices. *Crit Care* 2011;15:R93.
12. Katz JA, Marks JD. Inspiratory work with and without continuous positive airway pressure in patients with acute respiratory failure. *Anesthesiology* 1985; 63:598-607.
13. Fessler HE, Brower RG, Wise RA, Permutt S. Effects of systolic and diastolic positive pleural pressure pulses with altered cardiac contractility. *J Appl Physiol* (1985) 1992;73:498-505.
14. Bradley TD, Holloway RM, McLaughlin PR, Ross BL, Walters J, Liu PP. Cardiac output response to continuous positive airway pressure in congestive heart failure. *Am Rev Respir Dis* 1992;145:377-82.
15. Kaye DM, Mansfield D, Aggarwal A, Naughton MT, Esler MD. Acute effects of continuous positive airway pressure on cardiac sympathetic tone in congestive heart failure. *Circulation* 2001;103:2336-8.
16. Mehta S, Liu PP, Fitzgerald FS, Allidina YK, Douglas Bradley T. Effects of continuous positive airway pressure on cardiac volumes in patients with ischemic and dilated cardiomyopathy. *Am J Respir Crit Care Med* 2000;161:128-34.
17. Elkayam U. Clinical characteristics of peripartum cardiomyopathy in the United States: Diagnosis, prognosis, and management. *J Am Coll Cardiol* 2011;58:659-70.
18. Chan F, Ngan Kee WD. Idiopathic dilated cardiomyopathy presenting in pregnancy. *Can J Anaesth* 1999;46:1146-9.
19. Veille JC. Peripartum cardiomyopathies: a review. *Am J Obstet Gynecol* 1984;148:805-18.

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Use of Immediate Veneer Retained Indirect Fiber Reinforced Composite Bridges in the Replacement of Failing Anterior Teeth: A Case Study Presentation

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Abstract

The loss of a front tooth can be a very stressful time for a patient and very few are willing to accept a gap at the front of their smile for even a short time. This case report article looks at the use of laboratory constructed fiber reinforced composite (FRC) bridges to provide immediate replacement of anterior teeth. The techniques demonstrated allow the use of minimally invasive techniques to protect the abutment teeth from iatrogenic damage whilst providing esthetically pleasing and cost-effective solutions for patients

Keywords: Adhesive, Bridges, Fibre reinforced, Minimally invasive

INTRODUCTION

The use of fiber reinforced composites (FRC) in dentistry has enjoyed much success for several decades¹ but its use has often been limited to the provision of periodontal splints and acrylic denture repairs. In the past two decades however research but the likes of Prof Pekka Vallittu of the Institute of Dentistry, Turku, Finland has shown how effective these techniques can be in the field of direct short span bridges and anatomical posts.^{2,3} The use of FRCs in laboratory based procedures has, perhaps, been less rapid to gain in popularity and advances in this technology have been overlooked in favor of the advances in super strength ceramics. It is not the intention of this article to contrast the various properties of ceramics versus FRCs but it will try and show some of the properties of FRCs that make them an ideal product for minimally invasive aesthetic bridges that can be provided at a relatively low cost to patients who might otherwise be faced with an immediate denture as their only alternative treatment option.

Studies and articles looking at laboratory made FRC bridges have highlighted the strength of these materials⁴ and have shown their good clinical performance⁵ along with their relative ease of use.⁶ Some studies have also highlighted the problems of fracture of the underlying fiber framework⁷ and how the risk of this can be reduced.⁸ It is with this latter research in mind that the cases shown here use the StickTech range of fibers that allow a greater level of cohesive strength between the veneering composite and fiber frame work than was previously achievable.

As with all adhesive bridge design it is important to consider the forces acting upon it and to ensure that the load is distributed in the most favorable way possible. The longitudinal fibers in the framework are anisotropic in design and as such are immensely strong when load is placed perpendicular to the fiber orientation but much less so when the load is placed down the long axis of the fibres.⁹ The bonding of the bridges is achieved via well-established enamel and dentine bonding protocols in combination with dual-cure resin cements so can be expected to provide a very strong, durable bond.¹⁰ That said any bond can generally be expected to perform better under a compressive load than a flexural one. By placing retentive wings on the buccal surfaces of upper anterior teeth we are at risk of subjecting more demanding flexural forces on our bridges and our design must allow for this by ensuring

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sufficient surface area of good quality enamel bonding and keeping any ex-centric contacts off the pontic(s) whenever possible. This design process requires careful pretreatment planning and any compromises in design must be clearly discussed with the patient beforehand.

As a general rule there is a “two fiber minimum” to bridge design to allow sufficient support to the over laying composite. Any tendency to over-engineer the design needs to be resisted however as there is greater need to allow sufficient room for the overlaying composite to ensure adequate aesthetics. Finite element analysis studies by Ootaki¹¹ have shown that it is possible to allow sufficient thickness of fiber whilst leaving enough room for overlaying composite. They state that at least 0.5 mm of overlaying composite is required to cover fibers aesthetically and it is generally accepted that any composite more than 3 mm away from the underlying fiber framework or natural tooth support needs to be viewed as being unsupported and at risk of cohesive failure (Figure 1).

The fitting surface of the retentive wings need to remain free of overlaying composite, so they remain available for “reactivation” with Stick Resin (see bonding protocols below).

The inherent flexibility of the FRC products allows them to work as fixed-fixed designs rather than the cantilever design favored for metal based adhesive wing retained bridges and this means that we can combine an element of periodontal splint into our design of bridge, where appropriate. As has been stated previously by Kerr¹² there is a wide range of treatment options available to clinicians and patients and FRC bridges should be seen as an additional tool in the tool box and not to be seen as a panacea for all dental ills. The authors of this article subscribe to an approach of “dynamic lifetime therapy” which highlights the need for lessening the biological impact of treatments and delaying the use of heavy intervention for as long as possible. The use



Figure 1: Laboratory made fibre reinforced composite bridge

of FRC bridges fits well with this approach as it allows us to place “no prep” veneer supported bridges in the aesthetic zone for patients who often present with highly compromised mouths. By so doing we can provide a rapid solution to an acute problem whilst also enhancing the patient’s self-confidence and allowing them to “love their teeth again.” Such positive feelings are an essential part of a patient’s treatment process as it will often have been impossible for them to commit to investing time, effort and money into teeth that gave them such negative feelings.

The following case studies highlight the varied ways in which we can design FRC indirect, immediate bridges to meet individual patient needs. They also show some inherent shortcomings in the technique, with particular reference to the difficulty of managing soft tissues post-operatively.

In all cases the fiber framework as a combination of StickTech(™) “Crown and Bridge Fibers” and “Periodontal Fibers,” the overlaying composite was Gradia Lab Composite and the bonding system was Vitique Cement(DMG) with OptiBond Fl (Kerr).

Bonding protocol for abutment teeth when cementing Immediate Indirect FRC bridges following extraction of teeth

- 1) Isolation of abutment teeth under rubber dam
- 2) Air abrasion of abutment surfaces desirable
- 3) Etch of abutment surfaces with 37% phosphoric acid
- 4) Follow manufacturer instructions for OptiBond Fl (Kerr) to coat all appropriate abutment surfaces
- 5) Follow manufacturer instructions for use of Vitique Cement (DMG) or equivalent dual cure luting composite cement

Bonding protocol for FRC Wings prior to cementing

- 1) Coat wings with Stick Resin a minimum of 5 min before cementing and store in light proof container
- 2) Blow off excess Stick Resin prior to coating with Vitique Cement (DMG) and placing against abutment teeth.

The use of Stick Resin is recommended by the manufacturer when using pre-cured everStick and Stick products from StickTech™ to activate the Inter Penetrating Network (IPN), which maximizes adhesion between the fibers and the luting cement. The IPN relies upon the action of the Stick Resin to partially dissolve the fiber’s outer protecting polymer matrix. The everStick fiber products consist of individual, silanated glass fibers. The fibers are locked to each other with linear polymers (Poly Methyl Methacrylate, [PMMA]) and cross linking monomers (bis-GMA) to form

an IPN structure within the polymer matrix. The PMMA in the matrix of the fiber bundle is partly removed (dissolved) during the reactivation which creates spaces for micro tags to form with the luting cement. Furthermore, chemical bonding (retention) happens between the polymerized fiber surface and the new composite because PMMA is a linear polymer. Ends of linear polymer chains react with new resin. Only linear polymers can be dissolved with resin.

The cases below highlight the way we can use this approach to provide excellent aesthetics with a minimal or “no prep” approach to the abutment teeth. The first case shows a basic “periodontal splint” bridge that was the early approach to this technique. The later cases show how we, the authors, have adapted our approach to use buccally placed “veneers” as our retaining wings, which allows us to modify aesthetics much more whilst staying true to our minimally invasive approach.

CASE REPORTS

Case 1

Conventional fiber reinforced periodontal splint with pontics attached (Figure 2a-c).

Case 2

Replacement of retained lower deciduous central incisors (please note as part of this course of treatment the existing metal wing retained cantilever bridges replacing both upper lateral incisors were also replaced with indirect FRC bridges) (Figure 3a-d).

Case 3



Figure 2: (a) Retracted mirror shot showing lingual periodontal and pontics replacing lower central incisors, (b) Retracted shot showing hygienic gingival adaptation around lower pontics at 3 months, (c) Smile shot showing protective lip line hiding gingival margins of pontics

Immediate placement of laboratory prepared 4 unit bridge intended as long-term provisional prior to definitive planning (Figure 4a-e).

Case 4

Case 4 An immediate replacement of upper right lateral incisor with buccally placed adhesive veneers (Figure 5a-d).

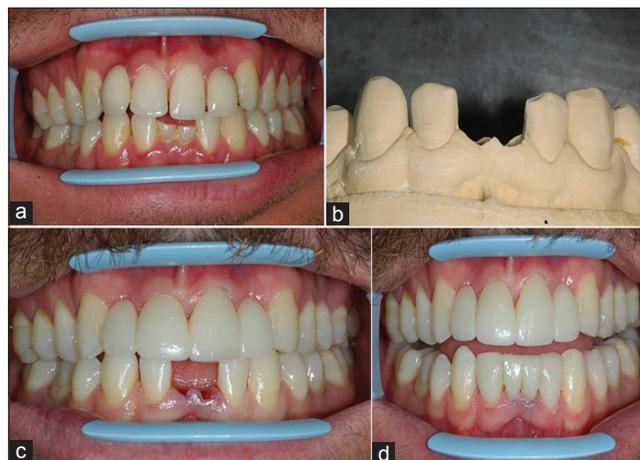


Figure 3: (a) Retracted shot of retained lower central deciduous incisors, (b) Trimmed model showing preparation for ovate pontics, (c) extraction site ready for immediate placement. Note abutment lateral incisors remain intact with no preparation of tooth tissue, (d) Retracted view of bridge cemented in place showing excellent gingival healing around pontics



Figure 4: (a) Retracted view of lower incisors prior to removal, (b) Extraction site showing no preparation to abutment canine teeth, (c) Retracted view showing isolation of intended abutment teeth and etching of fit surface, (d) Retracted view showing seating and bonding of immediate wing retained bridge under isolation of rubber dam, (e) Retracted view showing immediate post view with bridge cemented in place

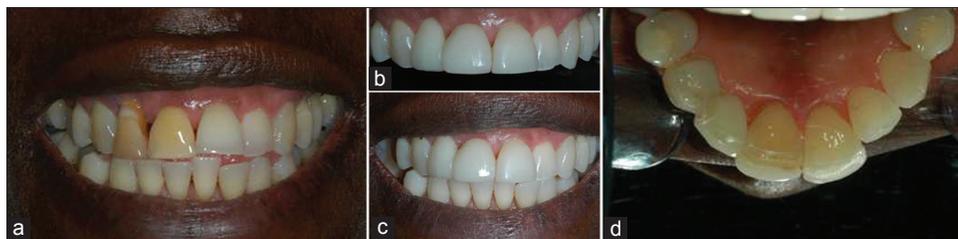


Figure 5: (a) Pre-operative smile shot showing discoloured upper right central and lateral incisor, (b) Retracted view showing excellent gingival adaptation around upper right lateral incisor pontic at 3 month review, (c) Smile shot at 3 month review showing greatly enhanced aesthetics with no need for tooth preparation of either abutment tooth, (d) Retracted mirror shot at 3 month review showing palatal wing on upper right canine and buccal wing on upper right central incisor, which has helped bring this tooth out into line with adjacent upper left central incisor

DISCUSSION

It is probably an accepted truth in dentistry that there is no “ideal” restorative solution to replace a missing tooth. We have to balance patient’s time, finances and attitudes to dental care with the general health of the mouth and the adjacent teeth in particular along with the desire to both “tread lightly” but also offer predictability and longevity.

The traditional immediate one tooth anterior denture possibly still has a place in modern dentistry but its clear disadvantages in terms of comfort, function and patient satisfaction mean that a fixed alternative that can be added to at later appointments and does not involve any heavy alteration to abutment teeth should be sort where ever possible.

Whilst implants are often cited as the first choice for replacing teeth it needs to be recognised that the financial implications, length and complexity of treatment, general health of the patient, bone quality and quantity and occlusal considerations can all be factors that may make implants a far from ideal treatment choice. Immediate placement and loading of implants in the aesthetic zone is a complex and sometimes risky process that needs very careful planning and execution if we are to avoid suboptimal soft tissue aesthetics in the long run.

Conventional bridge work has been the mainstay of restorative dentistry for decades and well-designed executed bridges in carefully chosen cases can produce outstanding longevity. Unfortunately, the strength and durability of conventional porcelain used to metal bridges comes at a biological price that can be unaffordable to many teeth. The old adage that “when a bridge fails; it takes a tooth with it” sadly comes true all too often. Immediate placement of these conventional bridges is seldom if ever viable which leaves a prolonged period

of temporization that brings a separate set of problems in itself.

Fiber reinforced bridges are by no means an “ideal” restoration but they can offer excellent aesthetics, minimal intervention, good longevity and excellent cost effectiveness. The ability to add to the pontic over the healing period to maximize affects is also a great benefit with this technique.

CONCLUSION

Fiber reinforced bridges are an additional tool in the dental armamentarium and can be used as an excellent immediate replacement option with clear benefits over an immediate denture in terms of patient comfort and satisfaction. Their role as a long-term definitive restoration has yet to be proved but early indications are promising and their minimal intervention approach means they can be replaced at a later date with little or no lasting damage to abutment teeth.

All laboratory work in this article was made by Robin Snell of Pyramid Laboratory

REFERENCES

1. Smith DC. Recent developments and prospects in dental polymers. *J Prosthet Dent* 1962;12:1066-78.
2. van Heumen CC, van Dijken JW, Tanner J, Pikaar R, Lassila LV, Creugers NH, *et al*. Five-year survival of 3-unit fiber-reinforced composite fixed partial dentures in the anterior area. *Dent Mater* 2009;25:820-7.
3. Ferrari M, Vichi A, Fadda GM, Cagidiaco MC, Tay FR, Breschi L, *et al*. A randomized controlled trial of endodontically treated and restored premolars. *J Dent Res* 2012;91:72S-8.
4. Dyer SR, Lassila LV, Jokinen M, Vallittu PK. Effect of fiber position and orientation on fracture load of fiber-reinforced composite. *Dent Mater* 2004;20:947-55.
5. Piovesan EM, Demarco FF, Piva E. Fiber-reinforced fixed partial dentures: A preliminary retrospective clinical study. *J Appl Oral Sci* 2006;14:100-4.
6. Chafaie A, Portier R. Anterior fiber-reinforced composite resin bridge: A

- case report. *Pediatr Dent* 2004;26:530-4.
7. Li W, Swain MV, Li Q, Ironside J, Steven GP. Fibre reinforced composite dental bridge. Part II: Numerical investigation. *Biomaterials* 2004;25:4995-5001.
 8. Yokoyama D, Shinya A, Lassila LV, Gomi H, Nakasone Y, Vallittu PK, *et al.* Framework design of an anterior fiber-reinforced hybrid composite fixed partial denture: A 3D finite element study. *Int J Prosthodont* 2009;22:405-12.
 9. Xie Q, Lassila LV, Vallittu PK. Comparison of load-bearing capacity of direct resin-bonded fiber-reinforced composite FPDs with four framework designs. *J Dent* 2007;35:578-82.
 10. Aboush YE, Jenkins CB. The bonding of an adhesive resin cement to single and combined adherends encountered in resin-bonded bridge work: An *in vitro* study. *Br Dent J* 1991;171:166-9.
 11. Ootaki M, Shin-Ya A, Gomi H, Shin-Ya A, Nakasone Y. Optimum design for fixed partial dentures made of hybrid resin with glass fiber reinforcement by finite element analysis: Effect of vertical reinforced thickness on fiber frame. *Dent Mater J* 2007;26:280-9.
 12. Kerr I. The use of fibre reinforced composite (FRC) in the provision of direct and indirect immediate replacement bridges. *Smile Dent J* 2013;8:39.

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Scerosing Stromal Tumor of Ovary - A Rare Ovarian Disease Presenting With Hyperandrogenism: A Case Report

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Abstract

Scerosing stromal tumor is a rare benign tumor of ovary with the peak incidence during second and third decades of life. Pathologically, it is distinguished from other ovarian stromal tumors by the presence of plenty of collagen and a pseudo lobular pattern. The cellular areas are separated by edematous and collagenous strands. Majority of patients presents with menstrual irregularities, pelvic pain and abdominal lump. Though the tumors mostly do not produce hormones, both elevated estrogenic and androgenic hormone production has been documented in few cases. This high hormone levels and menstrual problem usually resolves after correcting surgery. No recurrence is often reported. In our case, the lady presented with amenorrhea, hirsutism and a huge lower abdominal mass. Serum testosterone level was elevated, other hormonal levels were within normal limits.

Key words: Hormone, Neoplasm, Ovary

INTRODUCTION

The ovarian stroma gives rise to fibromas, thecomas, luteinized fibromas or thecomas, granulosa cell tumors and some lipoid cell tumors. Scerosing stromal tumor (SST) of the ovary is a rare ovarian tumor with prevalence of 1.5-6% of ovarian stromal tumors.¹ It was first described as a distinct entity in the ovarian stromal tumors by Chalvardjian and Scully in 1973.² Ovarian SST occurs more commonly during the second to third decades of life with an average age of occurrence of 27.5 years. More than 80% of SSTs occur in patients below the age of 30 years.³ The most common presenting symptoms are menstrual irregularities, pelvic pain, palpable lower abdominal lump and hirsutism in some cases. Though most of the tumors are hormonally inactive, both estrogenic and androgenic features has also been reported.⁴ Amenorrhea, Infertility and endometrial

hyperplasia concomitant with SST indicate a status of excessive hormone production.⁵ Tumor size varies from 1.5 cm to 20 cm in diameter. Usually there are no adhesions surrounding the tumors. On magnetic resonance imaging, a diagnosis of SST can be strongly suggested, when typical signal patterns such as hypointense nodules, hyperintense stroma, lobulation, strong enhancement with gadolinium and a peripheral hypointense rim are present.⁶ Mostly, they are benign and no recurrences documented in majority of the cases. Here, we present a case of SST who presented with features of hyperandrogenism and defeminization and huge abdominal lump.

CASE REPORT

A 33-year-old woman presented to our outpatient department (OPD) with c/o amenorrhea of 1 year, swelling of abdomen, low back pain and nauseating tendency since last 3 months. She was a P₃₊₁ with 3 living children aged 15 year, 11 year and 6 years. Previously her menstrual cycle was regular with average flow. Thereafter her cycles become irregular for a period of 3-4 months and since the last 1 year she is amenorrhic. She was having no significant medical illness in her past and did not have any surgery. General examination showed mild pallor

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with excessive hair growth over the face, beard area, thighs which the woman admitted to be of recent onset (Figure 1). Breasts were normal. There was clitoromegaly (Figure 2). There was a 24 week size mass on abdomen with firm feel and smooth surface. On per vaginal examination the uterus could not be palpated separated from the mass. Side of origin of the mass couldn't be ascertained. Ultrasonography showed a huge complex SOL measuring 18 cm × 10 cm × 15 cm within the pelvis and uterus to be displaced anteriorly. A decision of laparotomy was taken. Preoperative investigations were within normal limit including the hormonal levels of follicle stimulating hormone, luteinizing hormone, thyroid stimulating hormone, prolactin and estradiol. Serum testosterone level was elevated-146 ng dl (normal 20-80 ng dl). Serum CA-125 level was 97 U ml. On exploration, there was no ascitic fluid within the peritoneal cavity. A huge degenerated mass with ruptured capsule originating from right ovary and distorting the pelvic anatomy was found. Opposite tube and ovary was embedded over the mass. A decision of total abdominal hysterectomy with bilateral salpingo-oophorectomy was taken considering the possible malignant nature of the mass and completed family of the woman. Surgical staging was done. Liver, peritoneal surface was free of any palpable deposit. Omental biopsy was taken and sent for histopathological examination (HPE). Postoperative period was uneventful and the woman discharged on 8th postoperative day after stitch removal. She came to our OPD after one and half months with HPE report showing an ovarian stromal tumor characterized by cellular heterogeneity, prominent vasculature, and a pseudolobular appearance composed of both cellular and hypocellular areas suggestive of SST of ovary. Menses not yet resumed, but no new hair growth over any part of the body. The case was lost to follow-up thereafter and we could not trace whether there was reversion of the hyperandrogenic features and resumption of regular menses.

DISCUSSION

Histologically, SST is characterized by pseudo lobulation of cellular areas, a prominent tendency to sclerosis, a frequently marked vascularity and a pronounced variation in cellular size and shape.⁷ It has occasionally been confused with massive ovarian edema and Krukenberg's tumor. The distinction between SST and Krukenberg's tumor depends on immunohistochemistry stain. Some cases of SST analyzed immunohistochemically demonstrated expression of vascular permeability factor/vascular endothelial growth factor in the luteinized theca-like cells, the capillaries and in medium sized blood vessels. In addition, trisomy 12, monosomy 16, positive vimentin reaction, weakly positive desmin and smooth muscle specific actin stains and a negative cytokeratin in SST has been reported.^{8,9} The SST is different from the fibroma, thecoma, and lipoid-cell

tumor both clinically and pathologically: (1) They occur in a much younger age group - The age of the patients averaged 28 years, whereas the other stromal tumors are common in the 5th and 6th decades of life. (2) The sclerosing tumors show a prominent vascularity, which is marked in the cellular areas of the tumors. (3) Hyalinized plaques, a common feature of fibromas and thecomas, is absent. Collagen is present mostly in short coarse strands or individual fine fibers. (4) Whereas edema tends to be diffuse in fibromas, it is typically focal in the sclerosing tumors. (5) Ascites frequently complicates fibromas that attain a diameter of 5-6 cm and are edematous but rare in SSTs'.¹⁰

CONCLUSION

Though SST is a rare tumor, it should be considered in young woman with menstrual irregularity and pelvic mass. Enucleation is enough for this tumor and menstrual regularity resumes after surgery in most cases. Recurrence is not reported till now.



Figure 1: Recent onset hirsutism



Figure 2: Clitoromegaly

REFERENCES

1. Peng HH, Chang TC, Hsueh S. Sclerosing stromal tumor of ovary. *Chang Gung Med J* 2003;26:444-8.
2. Chalvardjian A, Scully RE. Sclerosing stromal tumors of the ovary. *Cancer* 1973;31:664-70.
3. Saitoh A, Tsutsumi Y, Osamura RY, Watanabe K. Sclerosing stromal tumor of the ovary. Immunohistochemical and electron-microscopic demonstration of smooth-muscle differentiation. *Arch Pathol Lab Med* 1989;113:372-6.
4. Damjanov I, Drobnjak P, Grizelj V, Longhino N. Sclerosing stromal tumor of the ovary: A hormonal and ultrastructural analysis. *Obstet Gynecol* 1975;45:675-9.
5. Stylianidou A, Varras M, Akrivis C, Fylaktidou A, Stefanaki S, Antoniou N. Sclerosing stromal tumor of the ovary: A case report and review of the literature. *Eur J Gynaecol Oncol* 2001;22:300-4.
6. Ihara N, Togashi K, Todo G, Nakai A, Kojima N, Ishigaki T, *et al.* Sclerosing stromal tumor of the ovary: MRI. *J Comput Assist Tomogr* 1999;23:555-7.
7. Kawauchi S, Tsuji T, Kaku T, Kamura T, Nakano H, Tsuneyoshi M. Sclerosing stromal tumor of the ovary: A clinicopathologic, immunohistochemical, ultrastructural, and cytogenetic analysis with special reference to its vasculature. *Am J Surg Pathol* 1998;22:83-92.
8. Lopes JM, Seruca R, Hall AP, Branco P, Castedo SM. Cytogenetic study of a sclerosing stromal tumor of the ovary. *Cancer Genet Cytogenet* 1990;49:103-6.
9. Cashell AW, Cohen ML. Masculinizing sclerosing stromal tumor of the ovary during pregnancy. *Gynecol Oncol* 1991;43:281-5.
10. Richardson GS, Ulfelder H. Problems presented by benign solid ovarian tumors. *Clin Obstet Gynecol* 1961;4:834-45.

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Orthodontic Alignment of an Impacted Maxillary Incisor: A Case Report

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Abstract

Maxillary central incisors are the most important units of the dentition providing facial esthetics to an individual. It's not just the facial esthetics, which is affected by its absence, but important functions such as phonetics, mastication, and lip support are affected too. Unerupted maxillary anterior teeth can cause severe functional and esthetics concerns for the child. Impacted permanent central incisor can be successfully aligned into occlusion by surgical exposure and employing orthodontic measures. This case report presents the surgical exposure and orthodontic traction of impacted right central incisor. With proper orthodontic procedure, the maxillary tooth was successfully aligned into the dental arch.

Key words: Impacted maxillary incisor, Orthodontic alignment, Surgical exposure

INTRODUCTION

Impaction of permanent central incisors though not very common, but can be encountered in clinical practice. The maxillary central incisors are the second most common labially impacted unerupted tooth after maxillary canine.¹

The incidence of unerupted maxillary central incisor has been around 0.13%.² They are more common in Cucasians and Mongoloied races (Davies 1987).

The occurrence of impacted maxillary incisors can be associated with hereditary and environmental factors like presence of supernumerary teeth,^{3,4} compound odontomes⁵ retained deciduous teeth, presence of thick mucosa, dense overlying bone, arch space loss.⁴

Absence of anterior teeth such as maxillary central incisor can cause both functional and psychological problems as it is an important segment of dentition providing important functions such as esthetics, mastication, phonetics, and lip support.

Various management options of such type of cases is to remove any retained deciduous/supernumerary tooth obstructing the path of its eruption, create and maintain sufficient mesial and distal space, removal of impacted central incisor and space maintained with fixed or removable prosthesis,⁶ followed by an implant placement,^{7,8} but the most appropriate treatment option is surgical exposure followed by orthodontic traction and alignment.⁹

In this case report, an impacted maxillary central incisor was orthodontically aligned into occlusal after exposing it surgically.

CASE REPORT

A 15-year-old boy came to the Department of Pedodontics with the chief complaint of missing upper right permanent central incisor. After taking detailed history, it was revealed that the child had a trauma to the maxillary arch, while playing football around 6 years of age.

Intra-oral examination revealed a bony bulge in labial vestibule at mucogingival junction with a thick mucosa covering over it (Figure 1). Adequate space between left central incisor and right lateral incisor was present to accommodate missing right central incisor, patient had Class I molar relationship.

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Intra-oral periapical radiograph was taken to confirm the presence, position and morphology of unerupted incisor (Figure 2).

Based on clinical and radiographic investigations it was decided to do surgical exposure of impacted tooth and then bond a bracket on the labial surface of the tooth and bring down to its normal position.

Surgical exposure was done, and the child was called after 1 week so that acute symptoms of surgery should subside (Figure 3).

Edge-wise brackets were bonded on permanent maxillary left central incisor, lateral incisor, and left canine and right lateral incisor and right canine, right and left permanent first and second premolars with NiTi wire was used for anchorage from left and right first permanent molars where molar band with molar tube was bonded (Figure 4).

The patient was given strict oral hygiene instructions, and an orthodontic toothbrush was prescribed for the same.

Patient was called for regular follow-ups after every 15 days (Figure 5). After a span of 2 months, the right central incisor erupted well to its normal occlusal and anatomy with acceptable gingival contour (Figure 6). The vitality test was done, which showed a positive response.

Patient was then referred for further periodontal consultations.

DISCUSSION

The occurrence of unerupted maxillary incisors can be associated with hereditary and environmental factors. The definition of impaction varies with different clinicians, according to Kuflinec and Shapira¹⁰ impaction can be described as a condition in which an embedded tooth in the alveolus is prevented from eruption or a tooth is locked in position by bone or by the adjacent.

Suri *et al.* states that if the eruption is delayed in terms of both chronological and dental age, it is unlikely that the permanent tooth will erupt without orthodontic



Figure 1: Impacted right central incisor



Figure 3: Surgical exposure of central incisor

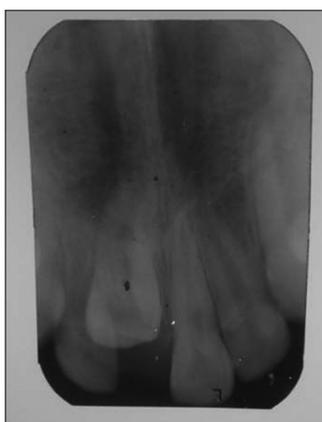


Figure 2: Radiograph showing impacted maxillary right central incisor



Figure 4: Orthodontic braces placed



Figure 5: Orthodontic extrusion



Figure 6: Right central incisor brought into occlusion

intervention.¹¹ A comprehensive dental and medical history combined with clinical and radiographic investigation are required prior to formulating and treatment plan.

There are several treatment options for the impacted central incisor. If the impacted tooth is extracted there is a risk of resorption of alveolar bone and this can lead to alveolas becoming thinner and deficient, to avoid these disadvantages it is always beneficial to facilitate the eruption of the impacted tooth. Surgical exposure orthodontic traction and alignment are preferred for such kind of scenarios.

Previous studies have shown that an impacted tooth can be brought into proper alignment in the dental arch by surgical exposure and orthodontic traction. A comprehensive evaluation of the case is of prime consideration prior to initiate a treatment, factors such as position, level

of root completion, root angulation, space available to accommodate the impacted tooth are to be evaluated.^{12,13}

It is always beneficial for the esthetics of the patient, if labial epithelial attachment on the impacted incisor is preserved during surgical exposure then the aligned tooth can have good gingival contour and attached gingiva.¹⁴

CONCLUSION

Impacted permanent central incisor can be successfully aligned into occlusion by surgical exposure and employing orthodontic measures and this can be a treatment of choice, preferred over extractions and surgical repositioning as this treatment plan give good results and there is as such no major side effects associated.

However, such kind of cases requires continuous monitoring of periodontal health and vitality of the tooth during and after the treatment.

REFERENCES

1. Macphee CG. The incidence of erupted supernumerary teeth in consecutive series of 4000 school children. *Br Dent J* 1935;58:59-60.
2. Leyland L, Batra P, Wong F, Llewelyn R. A retrospective evaluation of the eruption of impacted permanent incisors after extraction of supernumerary teeth. *J Clin Pediatr Dent* 2006;30:225-31.
3. Betts A, Camilleri GE. A review of 47 cases of unerupted maxillary incisors. *Int J Paediatr Dent* 1999;9:285-92.
4. Becker A, editor. *The Orthodontic Treatment of Impacted Teeth*. 1st ed. St. Louis: Mosby Company; 1998. p. 53-85.
5. Katz RW. An analysis of compound and complex odontomas. *ASDC J Dent Child* 1989;56:445-9.
6. Asher C, Lewis DH. The integration of orthodontic and restorative procedures in cases with missing maxillary incisors. *Br Dent J* 1986;160:241-5.
7. Henry PJ, Laney WR, Jemt T, Harris D, Krogh PH, Polizzi G, *et al*. Osseointegrated implants for single-tooth replacement: A prospective 5-year multicenter study. *Int J Oral Maxillofac Implants* 1996;11:450-5.
8. Lewis DH, Eldridge DJ. Orthodontic/restorative interface. *Dent Update* 1992;19:195-6, 198.
9. Lin YT. Treatment of an impacted dilacerated maxillary central incisor. *Am J Orthod Dentofacial Orthop* 1999;115:406-9.
10. Kufinec MM, Shapira Y. The impacted maxillary canine: I. Review of concepts. *ASDC J Dent Child* 1995;62:317-24.
11. Suri L, Gagari E, Vastardis H. Delayed tooth eruption: Pathogenesis, diagnosis, and treatment. A literature review. *Am J Orthod Dentofacial Orthop* 2004;126:432-45.
12. Tanaka E, Watanabe M, Nagaoka K, Yamaguchi K, Tanne K. Orthodontic traction of an impacted maxillary central incisor. *J Clin Orthod* 2001;35:375-8.
13. Uematsu S, Uematsu T, Furusawa K, Deguchi T, Kurihara S. Orthodontic treatment of an impacted dilacerated maxillary central incisor combined with surgical exposure and apicoectomy. *Angle Orthod* 2004;74:132-6.
14. Thosar NR, Vibhute P. Surgical and orthodontic treatment of an impacted permanent central incisor: A case report. *J Indian Soc Pedod Prev Dent* 2006;24:100-3.

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Isolated Adult Hypoganglionosis Presenting as Sigmoid Phytobezoar: A Case Report

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Abstract

Bezoars are the mass found trapped in the gastrointestinal system. They can also be termed as Gastrolith. The word "bezoar" is derived from the Persian pād-zahr, which means "antidote." Trichobezoars and phytobezoars are the most frequent and usual form in the stomach and can pass into the small bowel where they occasionally cause obstruction. Most bezoars are found in patients with a history of previous gastric surgery. Here, we report an interesting rare case of isolated adult hypoganglionosis presented as sigmoid phytobezoar causing chronic progressive abdominal pain with distension. Computed tomography showed the air mottled intraluminal mass with dilated sigmoid colon and rectosigmoid focal smooth narrowing.

Key words: Bezoar radiology, Focal hypoganglionosis, Large bowel obstruction, Sigmoid colon phytobezoar

INTRODUCTION

Isolated hypoganglionosis is a rare cause of intestinal innervation defects, can present as enterocolitis or poor bowel function, in infancy or childhood. We report a case of hypoganglionosis with an unusual presentation of sigmoid phytobezoar in a 57-year-old male patient. Bezoars usually form in the stomach and can pass into the small bowel where they can cause gastric or small bowel obstruction (SBO). Only few cases of colonic bezoar have been reported in the literature and were noted in post-operative stricture and psychiatric patients according to Agha *et al.*¹ We report a case of hypoganglionosis of rectosigmoid presenting as phytobezoar. Large bowel obstruction due to colonic bezoar is a diagnostic challenge and may cause life threatening complications. For colonic bezoar computerized tomography (CT) seems to be the main diagnostic modality, also for detecting the etiology as in our case report and the associated complications.

CASE REPORT

A 57-year-old male patient had progressively increasing abdominal pain and constipation for 2 weeks. He had a history of chronic constipation since childhood, for which he was taking high fiber diet and was treated with laxatives. Physical examination revealed distended abdomen with a hard mass in the lower abdomen. A CT scan demonstrated gross dilatation of the sigmoid colon of 15 cm diameter with the air mottled intraluminal mass. There was no enhancing solid component on intravenous (IV) contrast study and no flow of oral contrast distal to the lesion. Per-rectal contrast revealed suspicious focal rectosigmoid smooth narrowing for 5 cm, beyond which colonoscopy could not be passed. Patient was initially managed conservatively, as symptoms progressed was subjected for laparotomy, sigmoidectomy with a side-to-side colorectal anastomosis was performed. Histopathology of the resected specimen showed occasional ganglion cells and hypertrophied nerve bundles in the muscle layers, suggesting hypoganglionosis corresponding to the site of narrowing demonstrated on CT.

DISCUSSION

Isolated hypoganglionosis is a rare cause of intestinal innervation defects. It accounts for 5% of all intestinal

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neuronal malformations, characterized by sparse and small mesenteric ganglia, with hypertrophy of muscularis mucosa. Isolated hypoganglionosis can present as enterocolitis or poor bowel function, in infancy or childhood and can be isolated or associated with Hirschsprung's disease. Only 92 cases of isolated hypoganglionosis were reported from 1978 to 2009 according to Qadir *et al.*² Isolated hypoganglionosis predisposing to phytobezoar is even more rare, and this case report describes the atypical presentation of the disease. Patients usually present with severe acute and chronic constipation, pseudo-obstruction or enterocolitis. Until date, there is a similar case of isolated hypoganglionosis of sigmoid colon has been reported in the literature,² but presented as sigmoid volulus.

Bezoars consist of ingested foreign materials that accumulate within the gastrointestinal tract and are classified according to the materials of which they are composed. Approximately, 2-4% of SBOs are caused by bezoars and decreases as goes distally. In addition, presentation with features of acute surgical abdomen is extremely rare, accounting for only 1% of the patients. A bezoar is a concretion of indigestible material found in the gastrointestinal tract, which usually forms in the stomach and passes into the small bowel, where it can cause SBO. It can be classified into one of the four major types: trichobezoar, pharmacobezoar, lactobezoar, and phytobezoar. Phytobezoars are the most common, and are composed of vegetable matter such as celery, pumpkin, grape skin, prune and persimmons and it contains large amount of non-digestible fibers such as cellulose, hemicellulose, lignin and fruit tannins.³⁻⁵

Radiological investigations being the initial modality of choice of investigation for patients with suspected bowel obstruction. Findings on radiographs can suggest the presence of bezoars, barium, and CT studies can confirm it.³ The most extensive series published in this literature by Ripollés *et al.*⁶ has emphasized on CT and no other study has yet contrasted the usefulness of the different imaging techniques in application to bezoars.

Abdominal radiography demonstrated a distended sigmoid colon and rectum with dissipated feces (Figure 1). CT is much more sensitive and specific, and published series have shown the focal well-circumscribed air-mottled intraluminal mass, as noted in our case also. CT may be considered the imaging technique of choice for confirming the diagnosis of gastrointestinal bezoars. CT aids to establish the site of obstruction and to determine the cause and detect the existence of additional intestinal or gastric bezoars. A CT scan demonstrated gross dilatation of the sigmoid colon of 15 cm diameter with the air mottled intraluminal

mass (Figures 2a and b). There was no enhancing solid component or bowel wall enhancement on IV contrast study. And there was no distal flow of oral contrast to the rectum. Per-rectal contrast, revealed suspicious focal rectosigmoid smooth narrowing for 5 cm, demonstrated on reconstructed CT images (Figure 3), and also beyond which colonoscopy also could not be passed.

The method of management of bezoar removal depends on the site of impaction, the size, nature, and



Figure 1: X-ray abdomen shows distended sigmoid with dissipated faeces

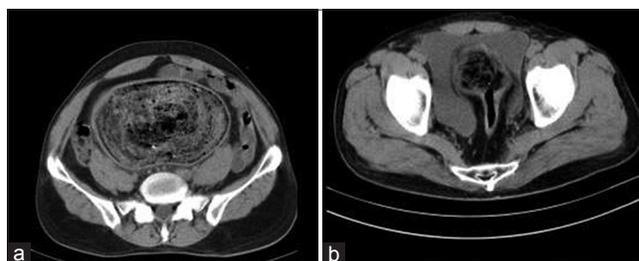


Figure 2: (a and b) Computerized tomography scan demonstrated gross dilatation of the sigmoid colon of 15 cm diameter with air mottled intraluminal mass



Figure 3: Computerized tomography reconstructed images shows smooth narrowing of rectosigmoid, without abnormal wall thickening and proximally dilated sigmoid colon with mottled appearance

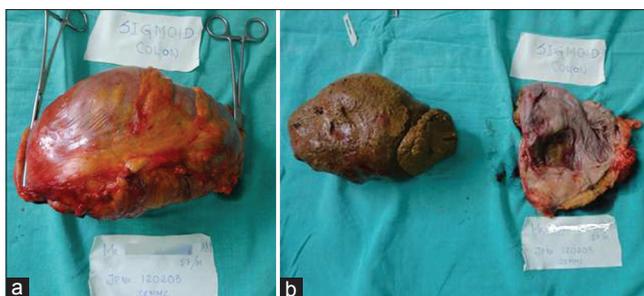


Figure 4: (a and b) Surgical specimen shows bezoar with fecaloma causing dilated sigmoid colon

complications. Moreover surgical management is reserved for those presenting with life-threatening complications such as sigmoid volvulus, hemochezia or peritonitis⁷ and in cases when conservative management by digital evacuation, enemas and colonoscopy fails.

Our patient was initially managed conservatively, as symptoms progressed, and CT findings favored colonic bezoar, he was subjected for laparotomy, sigmoidectomy with a side-to-side colorectal anastomosis was performed. Operative confirmation of distal sigmoid focal narrowing (Figure 4a and b) indicated hypoganglionosis by histopathology and immunochemistry. Underlying narrowed segment predisposing to phytobezoar can be explained due to long-term laxatives and high fiber diet.

CONCLUSIONS

Isolated hypoganglionosis is a rare disease with clinical and epidemiological features similar to Hirschsprung's disease, but the age at diagnosis is higher. High degree of suspicion in cases of chronic constipation needs evaluation and CT may reveal the established features of phytobezoar and the predisposing factors. A definitive diagnosis requires histopathological analysis of full-thickness intestinal biopsies. And the treatment should be tailored according to the extent of hypoganglionosis.

REFERENCES

1. Agha FP, Nostrant TT, Fiddian-Green RG. "Giant colonic bezoar." A medication bezoar due to psyllium seed husks. *Am J Gastroenterol* 1984;79:319-21.
2. Qadir I, Salick MM, Barakzai A, Zafar H. Isolated adult hypoganglionosis presenting as sigmoid volvulus: A case report. *J Med Case Rep* 2011 8;5:445.
3. Ali WA, Gondal ZI, Yammahi AA, Hushki SF, Badri F, ElTayeb YH. A case of small bowel obstruction due to phytobezoars. *J Surg Case Rep* 2013;2013. pii: rjt046.
4. Arvind B, Sachin K, Mathews VV, Telisinghe PU. Colonic obstruction secondary to phytobezoar. *Brunei Int Med J* 2010;6:100-4.
5. Bala M, Appelbaum L, Almogy G. Unexpected cause of large bowel obstruction: colonic bezoar. *Isr Med Assoc J* 2008;10:829-30.
6. Ripollés T, García-Aguayo J, Martínez MJ, Gil P. Gastrointestinal bezoars: Sonographic and CT characteristics. *AJR Am J Roentgenol* 2001;177:65-9.
7. Wang LT, Hsiao CW. Clinical spectrum and treatment of bezoars in adults: Experience of 20 cases in a single institute. *J Soc Colon Rectal Surg Taiwan* 2008;19:9-15.

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Congenital Diaphragmatic Hernia in Adult Presenting with Obstruction: A Rare Case

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Abstract

Congenital diaphragmatic hernia occurs in 1 out of every 2000-3000 live births. A majority of the patients will be diagnosed either antenatally or will present with respiratory distress in the first few hours of life. Presentation in adults is extremely rare and accounts for about 5-25% of diaphragmatic hernias. Patients, who present with late diaphragmatic hernias, complain of a wide variety of symptoms and diagnosis can be difficult. We report a case of a 43-year-old male who presented with intestinal obstruction and acute onset of shortness of breath. Radiological imaging was done, and the diagnosis of left diaphragmatic hernia was made. The patient underwent an emergency operation through a thoraco-abdominal approach and the contents, which is the small intestine, omentum, portion of the stomach and transverse colon was reduced. The diaphragmatic defects were multiple, largest defect measures 5 cm × 8 cm, and primary repair was done. In addition, a prolene mesh was reinforced over the defect. Post-operative period was uneventful and patient remains well at follow-up.

Key words: Congenital diaphragmatic hernia, Diaphragm, Hernia

INTRODUCTION

Congenital diaphragmatic hernia (CDH) is a term applied to a variety of congenital birth defects that involve abnormal development of the diaphragm, with herniation of the abdominal content through diaphragm into the chest. Its incidence is 1 in 4000-5000 live births. The most common type of CDHs occurs in the posterolateral portion of the diaphragm through the foramen of Bochdalek's.¹ Late presentation of CDH is reported to be 5-25%.^{1,2} This phenomenon is well reported, with 80-90% occurring on the left side of the diaphragm and patients usually presents immediately after birth, requiring early surgical repair.³ Obstructed diaphragmatic hernia as a cause of intestinal obstruction in adults is very rare.⁴ We reported this case for its rarity.

CASE REPORT

A 43-year-old male presented to us with complaints of abdominal pain, vomiting and acute onset respiratory distress. There was no history of trauma to chest or abdomen. The past medical and family history was insignificant. General physical examination shows normal blood pressure, tachycardia and increase respiratory rate. Chest examination revealed a decreased breath sound on the left side and abdomen was distended, with increase bowel sounds. Other systemic examinations were within normal limits.

Chest X-ray (Figure 1) was done and bowel gas shadow was seen in the left hemithorax with mild contralateral mediastinal shift. Since the patient was stable, computed tomography (CT) scan thorax (Figures 2 and 3) was done and a left diaphragmatic hernia was seen, containing omental fat, short segment of the transverse colon and small bowel with a portion of the stomach. The mass compressed the left lung and caused shifting of the heart towards the opposite side. Other hematological and routine investigations were within normal limits.

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The patient was taken for emergency operation, and a reduction of the hernia was done through a left thoraco-abdominal approach (7th ICS). The left diaphragm was thin out with multiple defects. The largest defect measures 5 cm × 8 cm. There was no hernia sac. The contents, which consist of the omentum, portion of transverse colon, short segment of the small bowel and

portion of the stomach, was seen herniating through the left posterolateral diaphragmatic defect (Figures 4 and 5). The contents were viable and reduced into the abdominal cavity. The defects were closed primarily (Figure 6) with prolene 2-0 and a prolene mesh (Figure 7) was reinforced



Figure 1: Chest X-ray – posterior anterior view



Figure 2: Coronal section computed tomography thorax

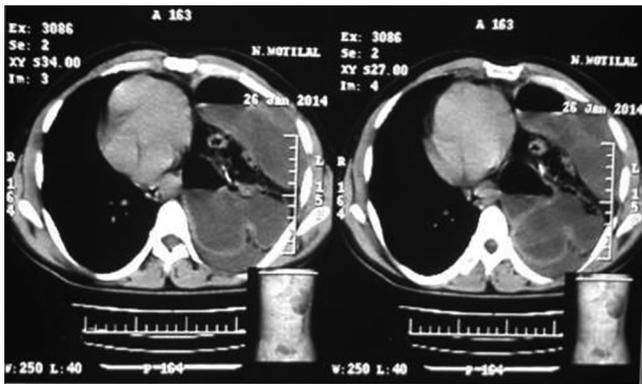


Figure 3: Axial section computed tomography thorax

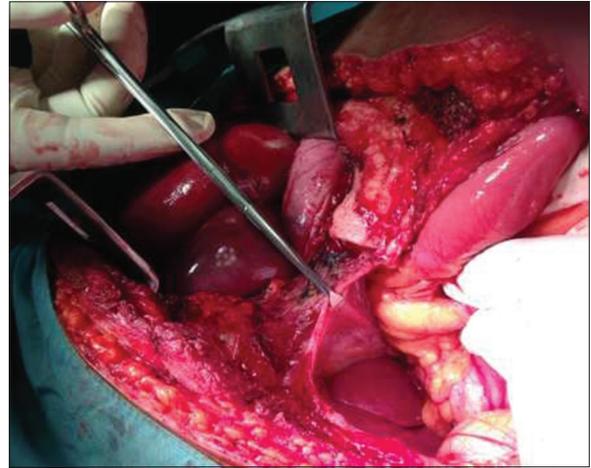


Figure 4: Abdominal contents in thorax



Figure 5: Constricted portion of the small bowel

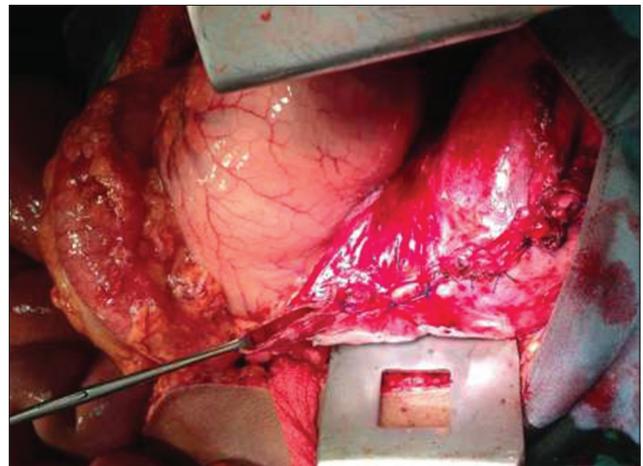


Figure 6: Primary repair of the largest defect

over the defects, on the thoracic cavity side. Intercostal drain was kept in the left hemithorax. Post-operative period was uneventful. Patient was allowed orally on post-operative day 2, drain was removed on post-operative day 6 and patient were discharged on post-operative day 7. In subsequent follow-up, patient was doing well and repeat chest X-ray (Figure 8) was grossly normal.

DISCUSSION

CDHs are usually found in neonates, and 5-25% of all reported cases occur in adults.^{1,2} Causes of late presentation of CDH are thought to be either due to late rupture of small hernia sac that contained the viscera in the abdomen or plugging of the hernial defect by solid viscera prior to the development of the hernia, due to raised intra-abdominal pressure.² Bochdalek hernia is the most frequently seen CDH, which occurs as a result of inadequate closure of the posterolateral pleuroperitoneal membrane.¹ The incidence of Bochdalek's hernia in routine CT scans has been reported to vary from as low as 0.17% to as high as

6%.³ Thus, they are more common than assumed but the majority stay asymptomatic.

The human diaphragm is derived from four sources: (1) Septum transversum - ventral and pericardial portion, (2) the pleuroperitoneal membrane furnishes the lateral portions, (3) Dorsal mesentery provides the medial dorsal component, (4) striated muscles of diaphragm have its origin opposite the fifth cervical segment. The canals normally close by 8th weeks of gestation, failure of which leads to the formation of defects in the diaphragm.⁴ Defect varies in size, ranging from 1 to 2 cm in diameter to complete agenesis of the hemidiaphragm. A hernial sac is present in 10-20% of cases, but has no physiological significance. Defects occur more frequently on the left side (70-90%) than on the right side (15-25%) of the diaphragm, and abdominal contents, including stomach, bowel loops, liver, spleen or fat tissues, can be displaced into the thoracic cavity.⁴ In 73% of adults, the hernia involves only omentum or fat.³ As observed in our patient, the hernial contents, not only, included omentum and fat but also the transverse colon, stomach and small intestine.

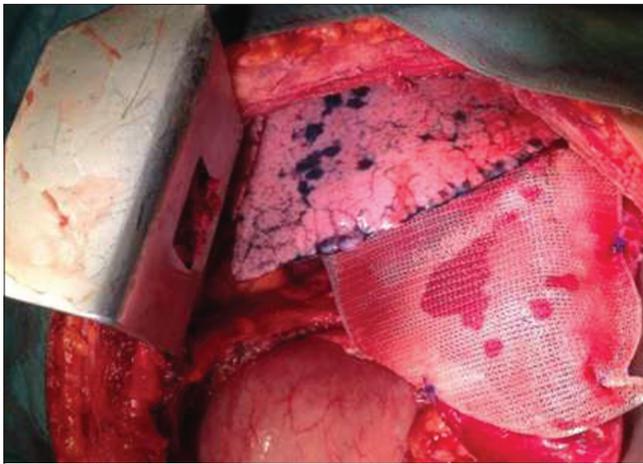


Figure 7: Prolene mesh reinforced over the primary repair



Figure 8: Chest X-ray - posterior-anterior view (post-operative)

CDH tends to be present shortly after birth, with over 80% presenting on the left side.³ The classic triad of respiratory distress, apparent dextrocardia and a scaphoid abdomen is usually seen in neonates. Bowel loops in the hemithorax will be evident on imaging studies.⁵ In adulthood, a CDH can present with gastrointestinal tract symptoms, which can include intermittent abdominal pain, vomiting, and dysphagia. Respiratory symptoms usually include dyspnea and chest pain.⁵ Depending on the extent of herniation of abdominal viscera into the thorax the symptoms may be intermittent or acute. Acute presentation is usually due to incarceration, obstruction, or strangulation of the hernia.⁶

Diagnosis is ascertained by a combination of chest X-rays, CT, magnetic resonance imaging, as well as upper gastrointestinal and bowel double-contrast study. Bochdalek hernia can be misdiagnosed as pleural effusion, pneumonia, tension pneumothorax, lung cysts, and atelectasis.⁷

Management of a Bochdalek hernia includes reducing the abdominal contents and repairing the defect through a laparotomy or thoracotomy with non-absorbable sutures. Successful laparoscopic and thoracoscopic repairs of Bochdalek hernias have both been described.⁸ Right-sided defects are usually dealt with by a thoracic or the thoraco-abdominal approach because of the presence of the liver. Outcome of adult patients having Bochdalek hernia depends on the types of presentation, early radiological confirmation and prompt intervention.

The mortality rate for elective surgery has been reported at <4%.⁹ However, when the patient presents in an acute state, mortality can be as high as 32%, because of delayed diagnoses or development of severe complications.¹⁰

CONCLUSION

CDH can present uncommonly in adult. In a patient with atraumatic virgin abdomen presenting with features of subacute intestinal obstruction with significant respiratory symptoms, clinician should keep in mind the possibility of obstructed diaphragmatic hernia as a cause of intestinal obstruction. Thorough clinical examination with appropriate investigation like chest X-ray, CT of chest and abdomen will usually clinched the diagnosis. Prompt treatment once diagnosed can result in good outcome.

REFERENCES

1. Christiansen LA, Blichert-Toft M, Bertelsen S. Strangulated diaphragmatic hernia. A clinical study. *Am J Surg* 1975;129:574-8.
2. Rawat JD, Kureel SN, Tendon RK, Tendon S, Wakhar AK. Obstructed diaphragmatic hernia. *J Indian Assoc Pediatr Surg* 1999;4:34-8.
3. Lee EJ, Lee SY. "Fluid" shift on chest radiography: Bochdalek hernia. *2010;182:E311-2.*
4. Mullins ME, Stein J, Saini SS, Mueller PR. Prevalence of incidental Bochdalek's hernia in a large adult population. *AJR Am J Roentgenol* 2001;177:363-6.
5. Burki T, Amanullah A, Rehman AU, Ali MN. Late presentation of Bochdalek hernia with intestinal symptoms. *J Ayub Med Coll Abbottabad* 2002;14:27-8.
6. Sridhar AV, Nichani S. Late presenting congenital diaphragmatic hernia. *Emerg Med J* 2004;21:261-2.
7. Chiu CC, Yeh HF, Chiu TF. Bochdalek diaphragmatic hernia masquerading as pneumonia – A rare cause of non-traumatic hemothorax. *Am J Emerg Med* 2009;27:252.e1-2.
8. Alimoglu O, Eryilmaz R, Sahin M, Ozsoy MS. Delayed traumatic diaphragmatic hernias presenting with strangulation. *Hernia* 2004;8:393-6.
9. Chai Y, Zhang G, Shen G. Adult Bochdalek hernia complicated with a perforated colon. *J Thorac Cardiovasc Surg* 2005;130:1729-30.
10. Perch P, Houck WV, DeAnda A Jr. Symptomatic bochdalek hernia in an octogenarian. *Ann Thorac Surg* 2002;73:1288-9.

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Amelogenesis Imperfecta: A Case Report and Review of Literature

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Abstract

Amelogenesis imperfecta (AI) is a hereditary disorder that causes developmental alterations in the structure of enamel. It represents a group of heterogenous conditions. AI has several names such as hereditary enamel dysplasia, hereditary brown enamel, hereditary brown opalescent teeth. In this disorder, the enamel is hypoplastic, hypomineralized or both. It may show autosomal dominant, autosomal recessive, sex-linked or sporadic pattern. It is necessary to diagnose this disorder and provide durable, functional and esthetic management of these patients to improve the quality of their lives. We present a case of AI affecting the dentition of an 18-year-old girl.

Key words: Amelogenesis imperfecta, Enamel, Hereditary, Management, Treatment

INTRODUCTION

Amelogenesis imperfecta (AI) is a group of inherited defects of enamel that show clinical and genetic heterogeneity. It affects all or only some of the teeth in the primary or permanent dentition.¹

In its mildest form, AI causes discoloration while in its most severe presentation; the enamel is hypo mineralized causing it to be abraded from the teeth shortly after their emergence into the oral cavity. Enamel findings are highly variable ranging from deficient enamel formation to defects in mineral and protein content.² Apart of enamel defects, AI has been also associated with abnormalities in dental eruption, congenitally missing teeth, anterior open bite, pulpal calcifications, root and crown

resorption, hypercementosis, root malformations, and taurodontism.³ AI patients may experience compromised chewing function due to tooth sensitivity and the short clinical crowns caused by attrition and/or incomplete eruption.⁴ No racial predilection of the AI has been reported. In the affected teeth, the dentin and root form are normal.⁵

Treatment aims to relieve pain or tooth sensitivity, to preserve as much tooth structure as possible while preventing further tooth loss, to maintain mastication and to improve the appearance because this has great psychological impact on patient's confidence.⁶ This report presents the diagnosis and treatment planning of an 18-year-old girl whose chief concern was unaesthetic appearance of her teeth.

CASE REPORT

An 18-year-old female patient reported to the Department of Oral Pathology, Shree Bankey Bihari Dental College and Research Centre, Ghaziabad with the chief complaint of yellow stains on all the teeth and chipping off of the teeth while biting hard food. Patient had these discolored

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teeth since childhood, and her milk teeth were similarly discolored too. Patient reported that she felt extreme dissatisfaction with the unesthetic appearance of her teeth. There was no family history, and medical history was non-contributory. Extra-oral examination did not reveal any relevant findings. On intra-oral examination, there was generalized yellowish discoloration of all the teeth along with diffuse pitting, more prominent on labial and buccal aspect and generalized attrition. The surfaces of the teeth were rough and irregular in shape and much smaller than normal with considerable tooth sensitivity (Figures 1-5). The emergence pattern and timing of teeth were normal. Examination of periodontium revealed a chronic generalized gingivitis with calculus deposition. On palpation, by probing resistance was felt and tooth material is soft in consistency with mild flaking of residual enamel. Based on history and clinical examination a provisional diagnosis of AI - hypo plastic type was made.

Patient was advised orthopantomogram that showed generalized thinning of enamel on all tooth surfaces and enamel was even absent in certain areas (Figure 6). Based on history, clinical findings, radiological report and histopathological findings the case was diagnosed as hypoplastic AI. Patient was advised oral prophylaxis and composite restoration or full-coverage crowns.



Figure 1: Rough pitted surface on labial surface of all the teeth



Figure 2: Left buccal segment



Figure 3: Right buccal segment



Figure 4: Maxillary occlusal view



Figure 5: Mandibular occlusal view



Figure 6: Orthopantomogram showing thin layer of enamel over tooth surfaces

DISCUSSION

AI is a developmental, often inherited disorder that affects enamel. It occurs in the absence of systemic features and comprises of diverse phenotypic entities.⁷

AI can be subdivided at the clinical level into various forms depending on the type of defect and stage at which enamel formation is disturbed, into hypoplastic, hypo mineralized or hypo maturation type.⁸

In cases, with an X-linked form, the disorder results from a mutation in the amelogenin gene, AMELX. In cases of dominant forms of AI, the enamelin gene, ENAM, is implicated in the pathogenesis.⁹

In the hypo maturation type, the affected teeth exhibit mottled, opaque white-brown yellow, discolored enamel, which is softer than normal. In radiographs, thickness of enamel is normal, but density is the same as that of the dentin.⁴

The hypo calcified type shows pigmented and easily detachable enamel. Radiographically, enamel thickness is normal, but its density is even less than that of the dentin.⁴

In the hypoplastic type, the enamel is well-mineralized but its amount is less. Clinically grooves and pits are present on the surface of the fine enamel. The rough pattern of the hypoplastic type, exhibits thin, hard, and rough surfaced enamel. The tooth is tapered towards the incisal/occlusal face and has open contact points. Radiographs exhibit a thin peripheral outline of radiodense enamel and low or absent cusps. Clinical and radiographic appearances of the teeth of our case were similar to rough pattern hypoplastic type AI.⁵

AI can have a profoundly negative functional and emotional impact on individuals that may include pain and difficulty in eating as well as social avoidance, distress and low self-esteem. Dental care can be challenging and protracted.¹⁰ The primary goal for the treatment is to address each concern as it presents with an overall comprehensive plan that outlines anticipated future treatment needs. Clinician treating children and adolescents with AI must understand and solve the clinical and emotional demands of these disorders with sensitivity. It is important to establish good rapport with the child and the family. Timely intervention is critical to spare the patient from psychosocial consequences of these disfiguring conditions. A comprehensive and prompt approach is reassuring to the patient and family and may help decrease their anxiety.¹

The treatment options vary depending on several factors such as age of the patient, severity of the disorder, socioeconomic status and most importantly patient's age and cooperation. Numerous treatment modalities based on prognosis have been described for the rehabilitation of AI such as a combination of extractions, adhesive restorations, stainless steel crowns, overdentures, porcelain crowns and veneers after crown lengthening.¹¹

Oral hygiene can be difficult for these patients due to the sensitivity while brushing. The use of warm water for tooth brushing will go some way towards relieving symptoms while rinsing.

Regular use of fluoride mouthwashes can help to reduce sensitivity and prevent caries.⁹

Root canal treatment as well as esthetic crown replacement for decayed teeth should be done to achieve the Jackson's triad of esthetic harmony, structural balance and functional efficiency.¹²

CONCLUSION

AI affects the psychology of the patient negatively due to the aesthetic concerns. It should be promptly identified and treated, and existing dentition should be protected so that teeth can be conserved as much as possible. Oral rehabilitation can certainly provide a good prognosis provided there are less clinical complications. Patient should be counseled and motivated and must be taught how to maintain good oral hygiene, which goes a long way in maintaining the dentition.

REFERENCES

1. Sarawathi N, Ghousia S, Shashibhushan KK, Poornima S. Amelogenesis imperfect - A case report. *J Oral Health Res* 2011;2:106-10.
2. Channougananda SC, Ashokan KA, Ashokan SC, Bojan AB, Ganesh RM. Literature review of amelogenesis imperfecta with case report. *J Indian Acad Oral Med Radiol* 2012;24:83-7.
3. de Souza JF, Fragelli CM, Paschoal MA, Campos EA, Cunha LF, Losso EM, *et al.* Noninvasive and multidisciplinary approach to the functional and esthetic rehabilitation of amelogenesis imperfecta: A pediatric case report. *Case Rep Dent* 2014;2014:127175.
4. Canger EM, Celenk P, Yenisey M, Odyakmaz SZ. Amelogenesis imperfecta, hypoplastic type associated with some dental abnormalities: A case report. *Braz Dent J* 2010;21:170-4.
5. Bhateja S, Sahni P, Arora G, Solanki J. Amelogenesis imperfecta – A case report and literature review. *Dent Impact* 2014;6:15-9.
6. Chaudhary M, Dixit S, Singh A, Kunte S. Amelogenesis imperfecta: Report of a case and review of literature. *J Oral Maxillofac Pathol* 2009;13:70-7.
7. Chen CF, Jan HC, Eduardo B, Peters CM, Estrella MR. Treatment considerations for patient with amelogenesis imperfecta: A review. *Braz Dent Sci* 2013;16:7-18.
8. Tambuwala A, Kulkarni A, Tembey A, Bohra T, Chand MA. Amelogenesis imperfecta. *Univ Res J Dent* 2012;2:127-31.
9. Rathi VN, Singh GM, Mukesh K, Dahake TP, Rachna T, Ranjan KM. Oral

- rehabilitation of amelogenesis imperfecta: A case report. *Indian J Dent Sci* 2013;5:64-6.
10. Suchancova B, Holly D, Janska M, Stebel J, Lysy J, Thurzo A, *et al.* Amelogenesis imperfecta and the treatment plan - interdisciplinary team approach. *Bratisl Lek Listy* 2014;115:44-8.
 11. Poulter JA, Murillo G, Brookes SJ, Smith CE, Parry DA, Silva S, *et al.* Deletion of ameloblastin exon 6 is associated with amelogenesis imperfecta. *Hum Mol Genet* 2014;23:5317-24.
 12. Nigam P, Singh VP, Prasad K, Tak J, Sinha A, Grewal P. Amelogenesis imperfecta - A review. *J Adv Med Dent Sci Res* 2014;2:83-90.

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Malignant Mixed Mesodermal Tumor of Ovary in Young Female: A Rare Case Report

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Abstract

Carcinosarcoma, also known as malignant mixed mesodermal tumor (MMMT), occurs predominantly in postmenopausal women of low parity these are very rare neoplasms associated with an aggressive clinical course and overall poor prognosis, stage is best predictor, and most patients present at advanced stage. Uterus and ovary are common sites for MMMT, though it can occur anywhere along the female genital tract and in the peritoneum. Microscopically, carcinosarcoma is a biphasic neoplasm with intermixed epithelial and mesenchymal elements. The sarcomatous component can be homologous or heterologous depending on whether it is composed of native mesenchymal elements of the organ it arises from or other non-native elements such as rhabdomyoblastic, osteogenic, chondroblastic or lipoblastic element. The epithelial component can be endometrioid, undifferentiated, clear cell, or serous. We report a case of MMMT in 22-year-old parous women who present to a gynecologic department with the complaints of the abdominal mass, pain, vaginal bleeding. Histopathological examination confirms the diagnosis of MMMT.

Key words: Carcinosarcoma, Mixed mesodermal tumor, Ovary

INTRODUCTION

Ovarian carcinosarcomas, also called as malignant mixed mesodermal tumor (MMMT), is a rare variant of ovarian cancer, accounting for <1% of all ovarian tumors.¹

MMMTs of the ovary are included in the endometrioid category because they resemble the tumors with those designations that are encountered most commonly in the endometrium.^{2,3} Although this tumor contains epithelial and mesenchymal elements (both of which are malignant), immunohistochemistry, and genetic studies have supported a clonal origin of both components.

The most common symptoms are pelvic or abdominal pain, abdominal distention, bowel symptoms, and weight loss. The serum concentration of CA-125 is usually elevated.

Most patients have a palpable adnexal mass and many have ascites. More than 70% of carcinosarcomas have spread beyond the ovaries at the time of diagnosis.^{1,4}

The pattern of spread, as in ovarian carcinoma, is primarily to the peritoneum, omentum, and regional lymph nodes. Treatment is by hysterectomy, bilateral salpingo-oophorectomy, and excision of as much extraovarian tumor as possible, followed by chemotherapy.³

Carcinosarcomas tend to be large, with an average diameter of 15 cm. They are either cystic and solid or entirely solid tumors. The solid portions are gray or tan, and areas of hemorrhage and necrosis are usually prominent. Microscopically, carcinosarcoma is a biphasic neoplasm with intermixed epithelial and mesenchymal elements.

CASE REPORT

A 22-year-old Hindu married female visited gynecologic outpatient department with the chief complaints of irregular, excessive vaginal bleeding since 1 year and heaviness in the lower abdomen since 6 months. She also complains headache, weakness, fatigue, abdominal pain and weight loss.

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On physical examination, a mass was palpated in right pelvic area. The mass was about 15 cm × 12 cm in size, firm, and immobile on palpation.

Per vaginal examination, reveal blood clots and a firm growth. Percussion of abdomen reveals fluid in the peritoneal cavity. On auscultation, bowel sound are normal. A provisional diagnosis of ovarian tumor was made.

Her laboratory investigation reveal - Microcytic hypochromic anemia (hemoglobin 9 g/dl), leukocytosis (13,500/ μ l). Other hematological parameter was normal. Her bleeding time, clotting time were normal. Liver and kidney functions were normal. Enzyme-linked immunosorbent assay for HIV and hepatitis B antigen was non-reactive. Urine analysis revealed no pathology. The serum CA-125 level was elevated (276 U/ml).

Pelvic ultrasound and computed tomography revealed a huge and heterogeneous pelvic mass containing solid parts with ascites. At laparotomy, the surgeon found 17 cm × 11.5 cm × 3 cm unilateral ovarian tumor. The patient underwent unilateral salpingo-oophorectomy. Gross specimen was sent for histopathological examination.

Gross

Ovarian mass measuring 17 cm × 11.5 cm × 3.5 cm in size. Outer surface is glistening white and slightly nodular. Cut surface shows homogenous greyish white solid areas along with hemorrhagic areas seen at periphery (Figure 1).

Microscopy

Section shows malignant epithelial and mesenchymal component (Figure 2). Epithelial component shows endometrioid carcinoma. Epithelial cells are arranged in diffuse as well as glandular pattern (Figure 3). Glands are well formed. In some gland secretion present. Cells

in diffuse or sheet are round to oval pleomorphic with moderate to abundant cytoplasm. Nucleus is vesicular. In some cells, nucleoli are visible. A few mitotic figure also present. Hyaline globules are present at places. Mesenchymal component shows features of undifferentiated sarcoma (Figure 4). Spindle cells are arranged in fascicles and show minimal pleomorphism (Figures 5 and 6). At places, blood vessels hemorrhage and cysts present (Figure 7).

Histologically, the major part of the tumor consists of the carcinomatous which is adenocarcinoma with undifferentiated sarcomatous element. Hence, on the basis of clinical finding, gross and microscopic finding a diagnosis of MMMT was offered.

DISCUSSION

Microscopically, carcinosarcoma is a biphasic neoplasm with intermixed epithelial and mesenchymal elements. The epithelial component can be any type of surface epithelial carcinoma, but serous, endometrioid, and undifferentiated carcinoma are most common.⁵ The mesenchymal component is a pure sarcoma or a mixture of various types of sarcoma. Homologous sarcomatous elements include fibrosarcoma, leiomyosarcoma, and undifferentiated sarcoma. Heterologous elements, such as rhabdomyosarcoma, chondrosarcoma, or osteosarcoma, are present in a majority of ovarian carcinosarcomas.⁶ Eosinophilic hyaline globules are often present in carcinosarcomas, scattered among either the epithelial or mesenchymal cells. These globules are positive on periodic acid-Schiff staining, and a minority is immunoreactive for α 1-antitrypsin.

Singular cases of mixed mesodermal tumor have been reported to show trophoblastic or neuroectodermal differentiation or to express alpha-fetoprotein (AFP).⁷

Gross Features

These tumors are composed of soft to firm, yellow to brown, solid tissue, often exhibiting hemorrhage, necrosis, and cystic degeneration. They may be predominantly cystic. Occasionally, bone or cartilage is evident on palpation.

Microscopic Features

The epithelial component is usually of high grade and most often resembles serous or endometrioid carcinoma, but malignant mucinous, squamous, or clear-cell elements or undifferentiated carcinoma, including small-cell carcinoma of the pulmonary type, may be encountered as well.

Nonmesodermal types of tissue in rare tumors have included glial and neuronal differentiation (including



Figure 1: Cut surface shows homogenous greyish white solid areas along with cystic and hemorrhagic areas

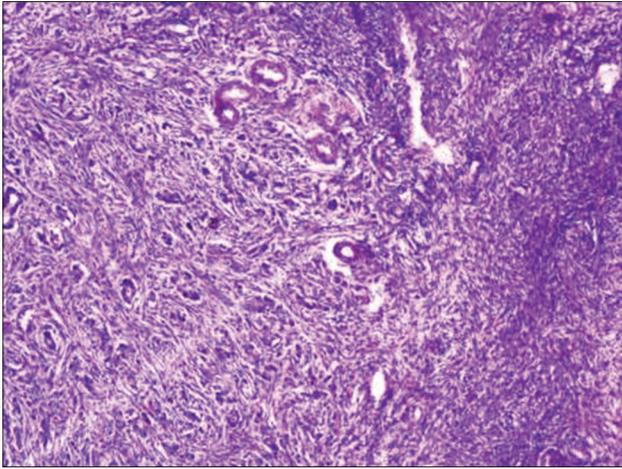


Figure 2: Epithelial (glands) and mesenchymal component (spindle cells), (H and E, 10x)

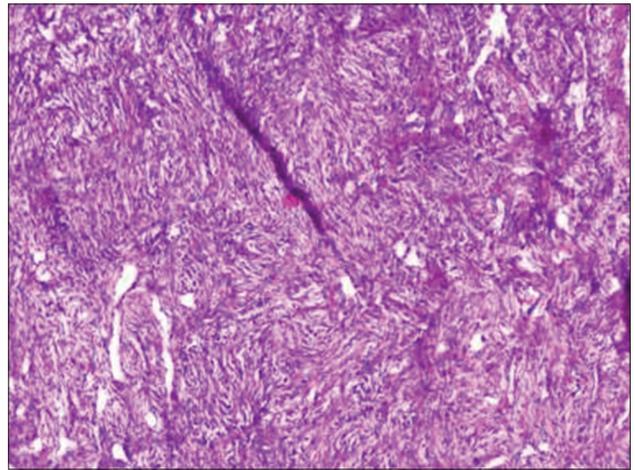


Figure 5: Undifferentiated sarcomatous component (H and E, 10x)

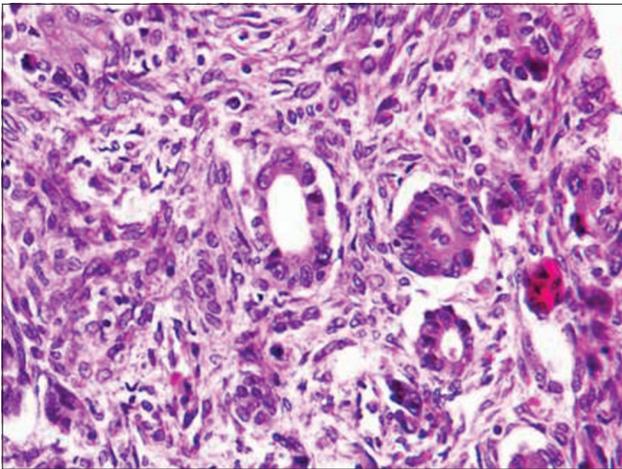


Figure 3: Well-formed gland with round to oval cells representing carcinomatous component (H and E, 40x)

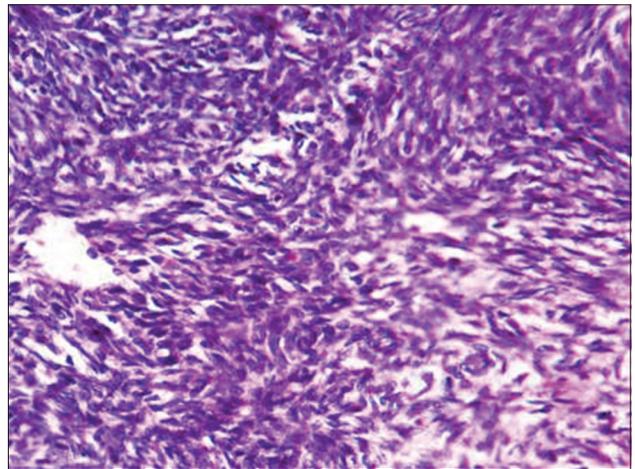


Figure 6: Spindle cells arranged in fascicles with minimum pleomorphism representing undifferentiated sarcomatous component (H and E, 40x)

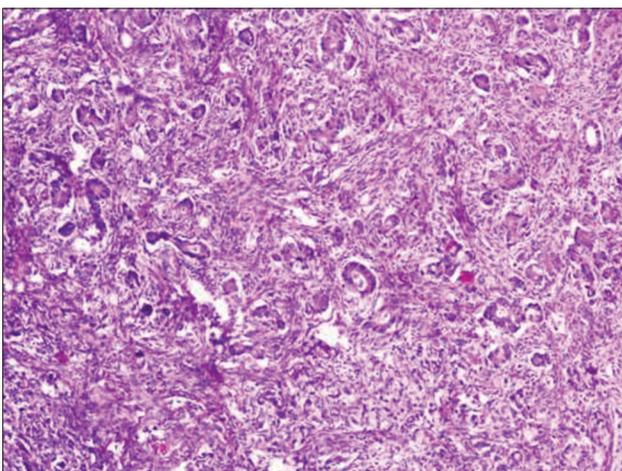


Figure 4: Intermixed epithelial and mesenchymal component. Hyaline globules are present at places (H and E, 10x)

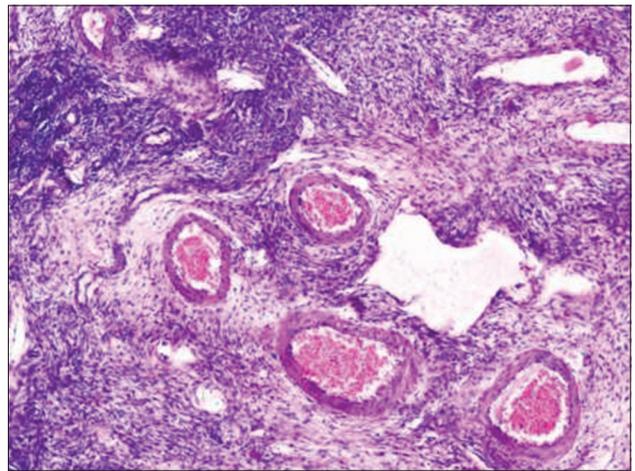


Figure 7: Blood vessels, cyst formation with tumor component (H and E, 40x)

foci resembling peripheral neuroectodermal tumor), well-differentiated hepatic-type cells, and trophoblastic

differentiation. Rare tumors have been associated with an increased serum level of AFP.

Differential Diagnosis

The neoplasm that is most often confused with the heterologous MMMT is the immature teratoma. In contrast to the former tumor, the latter is almost never found in women older than 50 years. It contains elements derived from all three germ layers, lacks a malignant müllerian-type component, and almost always contains a prominent primitive neuroectodermal component. However, as noted above, rare MMMTs contain tissue of neuroectodermal derivation (both glial and neuroepithelial), and occasional tumors contain neuroendocrine cells. Finally, the cartilage in immature teratomas has a fetal appearance, whereas in MMMTs it usually resembles the cartilage of a poorly differentiated chondrosarcoma, with marked nuclear pleomorphism.⁸

Heterologous Sertoli-Leydig cell tumors (SLCTs) with islands of cartilage or rhabdomyoblasts may cause diagnostic difficulty, but the finding of Leydig cells, sex cord formations, tubules, or gastrointestinal-type mucinous glands or cysts should facilitate the diagnosis. Finally, SLCTs often lead to virilization. In difficult cases, staining for epithelial membrane antigen (EMA) and α -inhibin and/or calretinin is useful because MMMTs are usually EMA+, whereas only occasional SLCTs are EMA+ and then in only a few Sertoli cells; α -inhibin and/or calretinin staining identifies the tumor as belonging in the Sertoli-Leydig cell category.⁸

CONCLUSION

MMMT are rare and aggressive tumor of ovary in reproductive age group. MMMT should always keep in

mind as a differential diagnosis in ovarian mass and should be differentiated from mixed germ cell tumor.

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REFERENCES

1. Harris MA, Delap LM, Sengupta PS, Wilkinson PM, Welch RS, Swindell R, *et al.* Carcinosarcoma of the ovary. *Br J Cancer* 2003;88:654-7.
2. Barnholtz-Sloan JS, Morris R, Malone JM Jr, Munkarah AR. Survival of women diagnosed with malignant, mixed müllerian tumors of the ovary (OMMT). *Gynecol Oncol* 2004;93:506-12.
3. Rutledge TL, Gold MA, McMeekin DS, Huh WK, Powell MA, Lewin SN, *et al.* Carcinosarcoma of the ovary—a case series. *Gynecol Oncol* 2006;100:128-32.
4. Brown E, Stewart M, Rye T, Al-Nafussi A, Williams AR, Bradburn M, *et al.* Carcinosarcoma of the ovary: 19 years of prospective data from a single center. *Cancer* 2004;100:2148-53.
5. Boucher D, Têtu B. Morphologic prognostic factors of malignant mixed müllerian tumors of the ovary: A clinicopathologic study of 15 cases. *Int J Gynecol Pathol* 1994;13:22-8.
6. Barakat RR, Rubin SC, Wong G, Saigo PE, Markman M, Hoskins WJ. Mixed mesodermal tumor of the ovary: Analysis of prognostic factors in 31 cases. *Obstet Gynecol* 1992;80:660-4.
7. Nasser H, Morris RT, Fathallah L. Ovarian malignant mixed müllerian tumor with primitive neuroectodermal differentiation: Case report with review of the literature. *Pathol Res Pract* 2011;207:202-6.
8. Clement PB, Young RH. Ovarian surface epithelial-stromal tumors. *Sternberg's Diagnostic Surgical Pathology*. 5th ed., Ch. 54. Philadelphia: Lippincott Williams & Wilkins; 2010. p. 2279-308.

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Rectus Sternalis: A Case Report

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Abstract

The sternalis is an anatomical variant of anterior chest wall muscle. It occurs either unilateral or bilateral. It lies in the anterior chest wall, superficial to the sternal origins of the pectoralis major muscle. The sternalis usually courses longitudinally adjacent to the sternum and does not cross the midline. In the Department of Anatomy, during routine dissection of thoracoabdominal region of a 49-year-old male, a distinct, separate fusiform muscular mass about 12 cm long was found in the left hemithorax, covered by superficial fascia and located anterior to the pectoralis major muscle. The details are given in this case report. There is a lot of debate on the origin of the muscle. This muscle can be misdiagnosed on routine mammography as a breast mass. It can play an important role in reconstruction flap surgeries. Such anatomical variation should be kept in mind during surgical procedures and diagnosis.

Key words: Dissection, Mammography, Sternum

INTRODUCTION

The sternalis is an anatomical variant of anterior chest wall muscle. It occurs either unilateral or bilateral. It lies in the anterior chest wall, superficial to the sternal origins of the pectoralis major muscle. The sternalis usually courses longitudinally adjacent to the sternum and does not cross the midline. Several variations regarding the superior and inferior attachments have been noted. The superior attachment can include the tendon of the sternocleidomastoid muscle,¹ sternum, clavicle, pectoralis major, platysma and the upper ribs and costal cartilages. The inferior insertions can include the third to eighth costal cartilages, 4th to 8th ribs, the anterior rectus sheath, the pectoralis major fascia, and the subcutaneous adipose tissue overlying the muscle.²

The sternalis muscle is a well-known documented normal anatomic variant seen in humans.^{3,4}

Many more terms have been used in the literature to describe sternalis muscle such as “parasternalis” and “rectus sterni” muscle.^{5,6}

The reported incidence of the sternalis muscle varies across genders, with a higher incidence in females (8.7% compared with 6.4%).⁷ An incidence of 4-8% is reported in Indian subject.⁸

CASE REPORT

During routine dissection in the Department of Anatomy, of the thoracoabdominal region of a 49-year-old male a variation was seen. A distinct, separate fusiform muscular mass about 12 cm long, covered by superficial fascia and located anterior to the pectoralis major muscle on the left side was found. Its origin was inferior to the sternal angle and was at a distance from the clavicle as per Figure 1.

The lateral tendinous portion originated together with fibers of sternochondrocostal portion of the left pectoralis major muscle, whereas the medial portion was firmly attached to the body of sternum. The fibers ran superficial and perpendicular to the fibers of pectoralis major muscle. The tendons and the muscle fibers together form a fusiform muscle 12 cm long, 6 cm wide that inserted into the deep fascia covering the superficial surface of the abdominal portion of the pectoralis major muscle. Small twigs of nerves were seen piercing the muscle, but could not be traced. Since they were one above the other and present parasternally, they are likely to be the continuation of left anterior intercostals nerves.

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DISCUSSION

According to Turner 1867, Bartolemeu Cabrolio 1529-1603, Professor of anatomy in Montpellier, named it for the first time in his book *Anatomes Elenchus Accuratissimus* published in 1604. It was Du Puy, however, in 1726 who was the first author to describe it accurately. The history is compiled in Table 1.⁵

Two radiological reports (Bradley *et al.* 1996,⁹ Murphy and Nokes, 1996) highlighted the diagnostic dilemma posed by a sternalis muscle in the detection of breast cancer. Although sternalis has been well-described in the literature, some confusion persists. For example, it is presented in Gray's Anatomy,¹⁰ as a variation of pectoralis major and is called rectus sternalis, whereas in the embryology text by Larsen (1997)¹¹ it is presented as a derivative of the rectus column and called sternalis.

There is a debate since the 17th century particularly about the homology and innervation of sternalis, and there is an extensive literature. The homology debate from the literature reviewed Table 2 shows that the sternalis has been classified by various authors under four main headings, as being derived:

1. From pectoralis major
2. From rectus abdominis
3. From sternomastoid and
4. From the panniculus carnosus.

An examination of the innervation patterns has narrowed the debate. Sternalis is either pectoralis major derived with an innervation from the thoracic pectoral nerves or

rectus derived with an innervation from the intercostal nerves.

Recently, two articles reported on the sternalis muscle^{12,13} attributed the nerve supply to be anterior cutaneous branch of the intercostals nerve. Morrita (1944)¹⁴ studied 46 sternalis muscle and never observed the innervation coming from intercostals nerve.

Kida *et al.*¹⁵ has observed the nerve supply of sternalis in more than 40 cases over 15 years. In those cases, nerve supply came from pectoral nerves only.

There are many reports on the participation of the intercostals nerves. Shephard 1885; Bardeleben, 1888; Fick, 1891; Christian, 1898; Yap, 1921; Taniguchi and Fochihara, 1932; Slobodin, 1934, 1935; Barlow, 1935; Misra, 1954; Rao and Rao, 1954; Kacker, 1960; Bles, 1968; Kitamura *et al.* 1985; Shen *et al.*, 1992; Jeng and Su, 1998; O'Neill and Folancurran, 1998. However, it's quite challenging to preserve the accurate nerve supply as the nerves get easily damaged during dissection of pectoralis fascia, so a preferred technique would be microdissection.¹⁵

This anomaly is not associated with any symptoms. The presence of sternalis muscles has been associated with other congenital abnormalities of pectoralis major muscle and in 48% of anencephalic neonates.⁷ According to a recent review by Bradley *et al.* 1996⁹ the sternalis muscle is identified in only 4 of 32,000 patients during mammography screening. In these cases, it is usually identified on the cranio-caudal projection as a triangular or flame shaped structure, sometimes with ill-defined margins frequently with fat surrounding it in the medial and deep layers of the breast. Using other imaging techniques, such as computed tomography (CT) or magnetic resonance imaging (MRI), the sternalis muscle is clearly revealed

Table 1: Background history of the sternalis muscle⁵

Year	Author
1604	Cabrolio: Names it for the first time
1726	Du Puy: Describes the muscle's associations
1800	Sommering: Describes the direction of the muscle fibres in relation to the fibres of the pectoralis major muscle
1825	Meckel: Refers to the existence of aponeurotic intersections
1854	Strambio: Confirms the existence of aponeurotic intersections
1888	Bardeleben: The first reference to the muscle's innervation (a study of 8 cases)
1888	Roubinowitch: First observation in living subject
1890	Le Double: Reports 33 cases
1911	Pichler: Publishes the results of his research in 10,500 living subjects
1912	Sclavounos: Describes the muscle's innervation in detail
1912	Eisler: Reviews all published works about the muscle, including his personal contribution
1950	Costa: Studies 74 muscles in 1000 cadavers
2001	Jelev, Georgiev, and Surchev: Provide a compilation of frequencies in population and subpopulation and also introduce a classification scheme based on muscle attachment

According to Turner (1867), Costa (1950), and Jelev *et al.* (2001)



Figure 1: Unilateral sternalis muscle

Table 2: Homology of the sternalis muscle from a review of the literature⁵

Derivation from pectoralis major	Derivation from rectus abdominis	Derivation from sternomastoid	Derivation from panniculus carnosus
Bardeleben, 1876	Early anatomists*	Bourienne, 1773*	Turner, 1867
Abraham, 1883	Bardeleben, 1876	Theile, 1843*	Barlow, 1935
Cunningham, 1884, 1888	Fick, 1917	Henle, 1858*	Shen <i>et al.</i> 1992
Shepherd, 1885	Fukuyama, 1940	Bardeleben, 1876	
Bryce, 1899	Rao & Rao, 1954	Rao & Rao, 1954	
Eisler, 1901	Blees, 1968	Blees, 1968	
Ruge, 1905	Larsen, 1997		
Huntington, 1905			
Fick, 1917			
Yap, 1921			
Fukuyama, 1940			
Dziallis, 1968			
Kida & Kudoh, 1991			

*Turner (1867)

as a longitudinal structure with a parasternal course. When supine the muscle is flattened or band like. When person is prone the muscle is mobile and has a bulging appearance. The classic description on CT or MRI is deep, vertically oriented parasternal tubular structure surrounded by fatty tissue.⁵ The sternalis can present alterations on electrocardiogram⁵ or wrongly interpreted as mass requiring surgical resection.⁹ Pichler (1911) stated “in order to reach reliable evidence I used the following method:

“If you let the subject perform stroking, scratching movements in a horizontal direction at the area of the opposite anterior superior iliac spine with the elbow fixed and flexed in a blunt angle, a sternalis muscle if present, would become prominent.”²⁵

CONCLUSION

Awareness of the muscle and its early identification is imperative in order to proceed in an appropriate plane during surgical dissection. A subcutaneous vertical craniocaudally oriented muscle strip is very confusing if the surgeon is not aware of its identity. A recent case report indicates that, many surgeons are not familiar with this variant.¹⁶ In cases where the muscle is identified and spared, a special note be made so that it is not mistake for a recurrence at a later date. The target depth of radiation of internal mammary nodes varies if the muscle is spared, and the same information should be conveyed to the radiotherapist. Radiologists should be familiar with the image findings of the sternalis muscle to avoid any confusing pathologic lesions and facilitate its clinical use such as flap.¹⁶ The sternalis if present could be used for reconstructive surgical operations on the breast.¹⁷

Despite numerous description of the sternalis muscle in the literature, the muscle though known to anatomists, is relatively unknown by clinicians. Discussion of the muscle is non-existent during medical training or seldom included in standard medical texts.¹⁸

During medical training a mention of this muscle should be done to prevent any misdiagnosis.

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REFERENCES

- Shankar VV, Rajan R. Rectus sternalis muscle - A rare anatomical variant. *Natl J Clin Anat* 2013;2:41-3.
- Blees G. A peculiar type of sternalis muscle. *Acta Morphol Neerl Scand* 1968;7:69-72.
- Bailey PM, Tzarnas CD. The sternalis muscle: a normal finding encountered during breast surgery. *Plast Reconstr Surg* 1999;103:1189-90.
- Vandeweyer E. The sternalis muscle in head and neck reconstruction. *Plast Reconstr Surg* 1999;104:1578-9.
- Arráez-Aybar LA, Sobrado-Perez J, Merida-Velasco JR. Left musculus sternalis. *Clin Anat* 2003;16:350-4.
- Loukas M, Bowers M, Hullett J. Sternalis muscle: a mystery still. *Folia Morphol (Warsz)* 2004;63:147-9.
- Scott-Conner CE, Al-Jurf AS. The sternalis muscle. *Clin Anat* 2002;15:67-9.
- Harish K, Gopinath KS. Sternalis muscle: importance in surgery of the breast. *Surg Radiol Anat* 2003;25:311-4.
- Bradley FM, Hoover HC Jr, Hulka CA, Whitman GJ, McCarthy KA, Hall DA, *et al.* The sternalis muscle: an unusual normal finding seen on mammography. *AJR Am J Roentgenol* 1996;166:33-6.
- Standring S. *Gray's Anatomy*. 39th ed. London: Churchill; 1973.
- Larsen WJ, editor. *Human Embryology*. 2nd ed. Edinburgh: Churchill- Livingstone; 1997.

12. Jeng H, Su SJ. The sternalis muscle: an uncommon anatomical variant among Taiwanese. *J Anat* 1998;193:287-8.
13. O'Neill MN, Folan-Curran J. Case report: bilateral sternalis muscles with a bilateral pectoralis major anomaly. *J Anat* 1998;193:289-92.
14. Morrita M. Observation of muscles sternalis and muscoli pectoralis in mammals and a morphological interpretation of essence of musculus sternalis. *Acta Anat Japan* 1944;22:357-66.
15. Kida MY, Izumi A, Tanaka S. Sternalis muscle: topic for debate. *Clin Anat* 2000;13:138-40.
16. Young Lee B, Young Byun J, Hee Kim H, Sook Kim H, Mee Cho S, Hoon Lee K, *et al*. The sternalis muscles: incidence and imaging findings on MDCT. *J Thorac Imaging* 2006;21:179-83.
17. Gupta M, Harjeet. Bilateral sternalis in relation to body of sternum. *Nepal Med Coll J* 2004;6:62-3.
18. Jelev L, Georgiev G, Surchev L. The sternalis muscle in the Bulgarian population: classification of sternalis. *J Anat* 2001;199:359-63.

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Modified Quad Helix: A Case Report

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Abstract

Anterior open bite is a challenging malocclusion to treat. Etiology composites imperative function in the diagnosis. Abnormal tongue habits results in anterior open bite or they can develop as secondary to thumb sucking. Many orthodontists have had an unfavorable proficiency of ending orthodontic treatment, with what materialized to be suitable results, but relapsed because the patient had a tongue thrust swallowing pattern. Treatment approaches must incorporate interception of habit and correction of the malocclusion. The case report explicates a modified quad helix appliance used effectively into intercept tongue thrusting habit and the concurrent correction of posterior cross bite. The modified design has the benefit of easy assembly, being flexible and more patients accommodating.

Keywords: Modified quad helix, Mouth breathing, Posterior cross bite, Tongue thrusting

INTRODUCTION

An anterior open bite is one of the most difficult malocclusions to treat, and the difficulty increases considerably when it is associated with a posterior cross-bite. An anterior open bite can be caused by skeletal vertical disharmony, muscular imbalance, habits, or local alveolar growth deficiency.¹⁻⁵ Posterior cross bites can also have several etiologies, including transverse skeletal imbalance between the maxilla and the mandible and altered tooth positioning in a buccal-palatal or lingual direction.^{4,5} The treatments for open bite and cross bite are determined by their etiology and diagnosis.^{1,2} Large skeletal imbalances must be corrected surgically, but the tooth and alveolar disharmonies can be corrected by dentoalveolar movement.⁶

Complex malocclusions must be treated by combining treatment concepts and techniques to achieve an effective result.⁷ This article describes the diagnosis and treatment

of a young patient with a severe anterior open bite and a posterior crossbite with tongue thrusting habit.

CASE REPORT

A 21-year-old male patient presented with no significant medical history. His chief concern was the difficulty in lip closure and chewing food. The patient was aware of his mouth breathing and tongue thrust. The dental open bite was probably related to abnormal tongue function.

Examination of the patient revealed facial symmetry to be acceptable. On smiling, no gingival display was present (Figure 1). Intraorally, he had a 5 mm anterior open bite that extended distally to the mandibular canine. He had a Class I molar malocclusion with mild crowding and an overjet of 4 mm. The canines and the first premolars on the right and left side were in crossbite (Figure 2). Skeletally, the patient had significant incisor protrusion and a high mandibular plane angle (39) that contributed to the Class II skeletal relationship (ANB:5) and increased lower facial height (Table 1). The panoramic radiograph showed a partially impacted mandibular left third molar (Figure 3).

Treatment Objectives

The primary objectives in the treatment of this patient were to: (1) Correct the tongue habit, (2) correct the posterior

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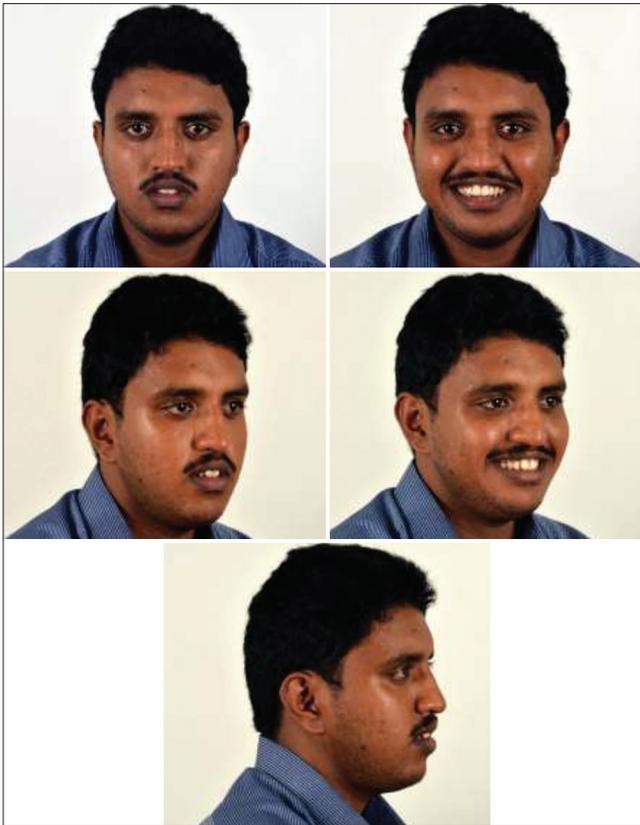


Figure 1: Pretreatment extra-oral photographs

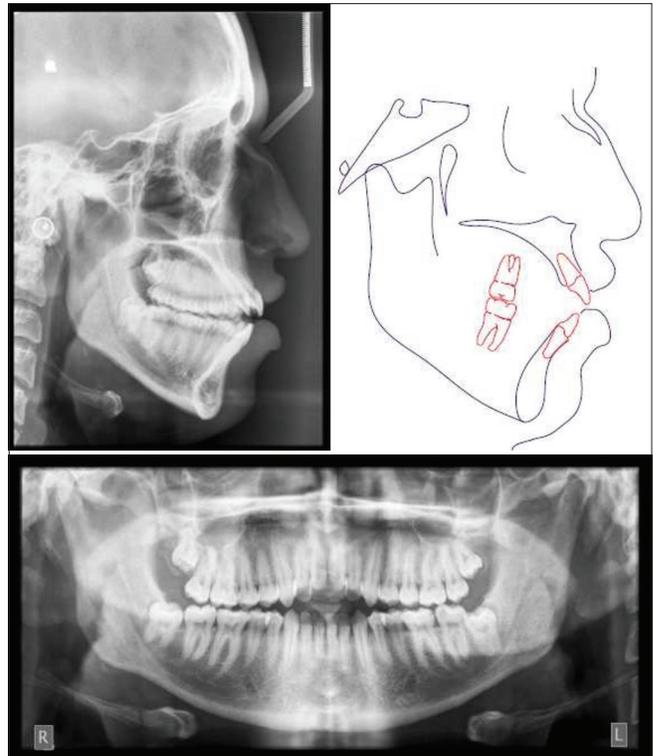


Figure 3: Pre-treatment lateral ceph with tracing and panoramic radiograph



Figure 2: Pretreatment intra-oral photographs

crossbite at the right side to achieve proper intercuspation, (3) vertically control the maxillary posterior teeth to prevent mandibular plane opening, (4) erupt the maxillary incisors to close the bite and increase tooth exposure.

Table 1: Cephalometric analysis

Measurement	Normal values	Pre-treatment	Mid-treatment	Post-treatment
SNA	82	85	85	82
SNB	80	78	83	80
ANB	2	6	2	2
FMA	22	32	30	30
Sn GOGN	32	39	36	37
Y-axis	59.4	67	63	63
IMPA	90	92	90	88
U1 to LI	130	108	113	112
U1-NA (°)	22	36	32	29
U1-NA (mm)	4	7	11	9
L1-NB (°)	25	34	32	28
L1-NB (mm)	4	9	9	9

IMPA: Incisor mandibular plane angle

Treatment

A non-surgical alternative was chosen for this patient where in bracket placement more toward the gingival (anterior teeth) and occlusal surfaces (posterior teeth) would aid in preventing extrusion of posterior teeth and encourage closure in the anterior segment. Tongue therapy, that consisted of daily exercises of the tongue being positioned properly during speech, swallowing, and resting positions, was initiated with the goal of reducing the tongue thrust habit. Settling elastics were to be used for final settling of the posterior segment. Full-time retention was planned along with continued evaluation of tongue posture.

Appliance Design

To correct the tongue thrusting habit and resolve the transverse, vertical, and functional deficiencies, we used an anterior modified quad helix, made of 0.036 inches stainless steel wire soldered to bands on the first permanent molars. The lingual arms of the appliance were extended to the canines, and to the posterior bridge of the quad helix, a modified tongue crib made of 0.032 inches stainless steel wire is soldered to prevent tongue thrusting habit (Figure 4).

Treatment Progress

The maxillary and mandibular arches were banded and bonded with 0.022 × 0.028-inches MBT (3M Unitek, Monrovia, California) appliances, and continuous 0.014 inches nickel-titanium archwires were placed. A quad helix was fabricated and soldered to the banded molars for the correction of the cross bite. At every appointment, quad helix was activated for the correction of the posterior cross bite. The activation of the quad helix was carried out for 4 months along with 0.016 and 0.018 inches nickel-titanium archwires (Figure 5).

After initial alignment was obtained, continuous 0.017 × 0.025-inches nickel-titanium wires were placed for 4 months to continue alignment and begin leveling. Patient was instructed to place the tongue in the palatal region while swallowing saliva. He was extremely compliant with this exercise because he was motivated to speed the treatment process along. Six months into treatment, a modification to the quad helix was made by soldering a tongue crib to the posterior bridge to control the tongue from pushing the anterior teeth (Figure 6).

A 0.017 × 0.025-inches stainless steel archwires were placed, and the leveling of the arches continued. By about 8 months into treatment, a reverse sweep was given on the upper and



Figure 4: Modified quad helix with tongue crib



Figure 6: Intraoral photographs with modified quad helix



Figure 5: Mid-treatment photographs



Figure 6a: Mid treatment lateral ceph

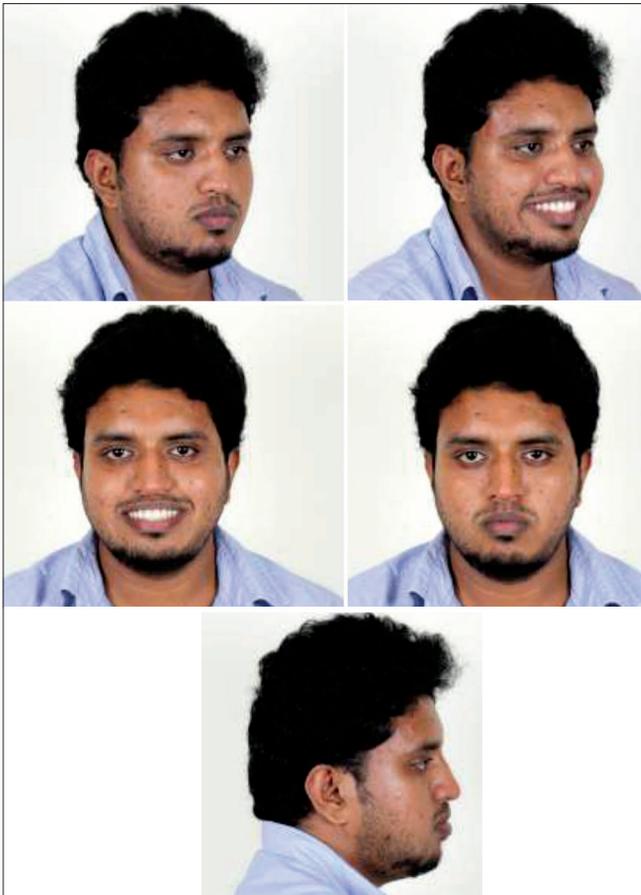


Figure 7: Post treatment extraoral photographs



Figure 8: Post treatment intraoral photographs

lower arch wires for the correction of the anterior open bite. After a month, a lower 0.016 inches reverse nickel-

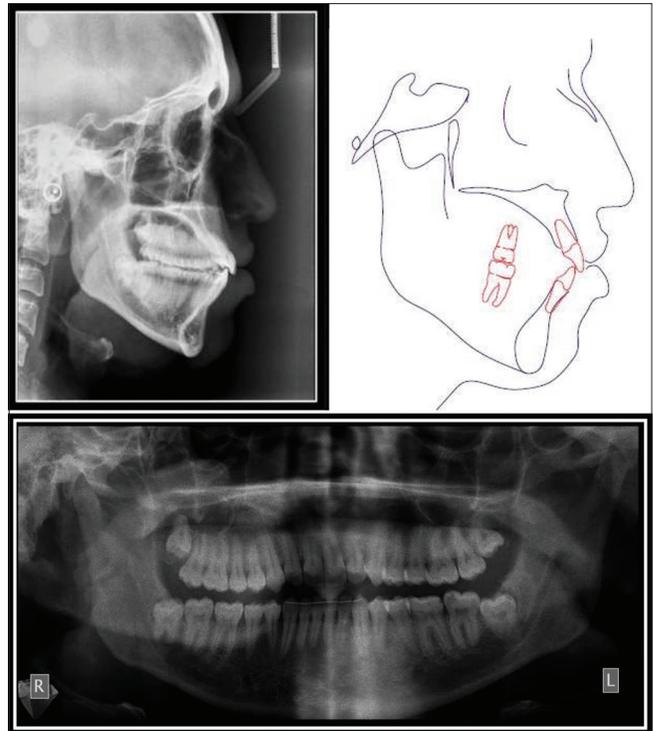


Figure 9: Post-treatment lateral ceph with tracing and panoramic radiograph

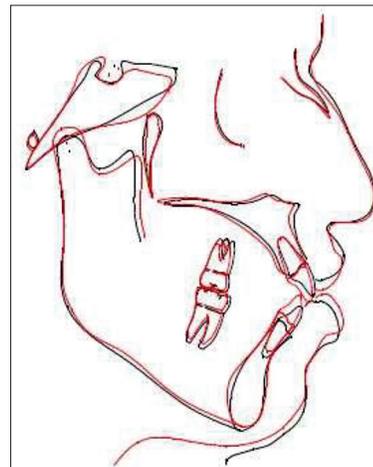


Figure 10: Post treatment cephalometric superimposition (black lines - pretreatment, red lines - post treatment)

titanium archwire along with box elastics was given. In the next appointment, there was a significant reduction in the open bite.

After 11 months of treatment, anterior open bite and posterior cross bite was completely resolved. A 0.019 × 0.025-inches stainless steel lower and a 0.014 inches nickel-titanium archwires were placed. At the same time, bilateral trapezoid elastics from the maxillary canine to the mandibular second permanent molars. After 1 month of elastic wear,

settling of the occlusion was attained, with the open bite reduced to 0 mm. Appliances were removed, and retainers were delivered. Cooperation was excellent, and the patient reported no temporomandibular joint problems during treatment (Figures 7-10).

Fulltime elastic wear continued for 2 months, tapered to night only for 1 month, and then stopped. The upper archwire was sectioned, and finishing elastics (3/4 inches, 2 oz) were used for approximately 5 weeks.

DISCUSSION

The difficulty of managing anterior open bite malocclusions is not only in obtaining the correct diagnosis, but also in treating the case to a successful facial and dental result. The orthodontist's challenge is to minimize molar extrusion during treatment to prevent downward and backward mandibular rotation.¹⁰ Faced with the limitations that routine orthodontic treatment modalities present, most orthodontists would agree that a skeletal hyperdivergent open bite malocclusion in an adult is ideally corrected with combined orthodontic treatment and orthognathic surgery. The most common surgical procedure is a LeFort I osteotomy, which allows impaction of the posterior maxilla and autorotation of the mandible.^{8,10} This patient was hesitant to consent to the orthognathic surgical plan because of the additional expense and risks of surgery. The advantages of the orthognathic surgical option are that the overbite can be overcorrected and relapse is less than with a non-surgical approach.^{9,10}

CONCLUSION

The Quad Helix is one of the most versatile appliances that can be used, because it is easy to use and well tolerated by patients. The modified appliance shown here is simple to fabricate and place. It can simultaneously correct posterior crossbite, through lateral expansion, and anterior open bite, by means of a habit-preventing metal segment soldered to the posterior bridge.

REFERENCES

1. Huang GJ. Long-term stability of anterior open-bite therapy: A re-view. *Semin Orthod* 2002;8:162-72.
2. Sarver DM, Weissman SM. Nonsurgical treatment of open bite in nongrowing patients. *Am J Orthod Dentofacial Orthop* 1995;108:651-9.
3. Worms FW, Meskin LH, Isaacson RJ. Open-bite. *Am J Orthod* 1971;59:589-95.
4. Graber TM, Swain BF. *Orthodontics. Current Principles and Techniques*. St Louis: Mosby; 1985.
5. Moyers RE. *Ortodontia*. 4th ed. Rio de Janeiro, Brazil: Guanabara Koogan; 1991.
6. Stuani MB, Stuani AS, Stuani AS. Modified Thurow appliance: a clinical alternative for correcting skeletal open bite. *Am J Orthod Dentofacial Orthop* 2005;128:118-25.
7. Pearson LE. Case report KP. Treatment of a severe openbite excessive vertical pattern with an eclectic non-surgical approach. *Angle Orthod* 1991;61:71-6.
8. Bell WH. Le Forte I osteotomy for correction of maxillary deformities. *J Oral Surg* 1975;33:412-26.
9. Denison TF, Kokich VG, Shapiro PA. Stability of maxillary surgery in openbite versus nonopenbite malocclusions. *Angle Orthod* 1989;59:5-10.
10. Lindsey CA, English JD. Orthodontic treatment and masticatory muscle exercises to correct a Class I open bite in an adult patient. *Am J Orthod Dentofacial Orthop* 2003;124:91-8.

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Bone Marrow Necrosis: A Case Report

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Abstract

The bone marrow is one of the largest organs in the human body (Lund, 2000). It is the major hematopoietic organ and is important as both a primary and secondary lymphoid organ. Since it is a potential target organ of various disorders, evaluation of blood and bone marrow is an important component of any overall assessment studies. Bone marrow evaluation studies provide information about bone marrow tissue architecture like cellularity, cell lineages, vascular or stromal alterations, inflammation or necrosis. When it is used in conjunction with a complete blood count, the histological examination of bone marrow provides information regarding the hematopoietic system that might otherwise be missed by examination of peripheral blood smear alone. Bone marrow is rarely affected by various disorders like metastatic tumors storage disorders, leukemia, lymphomas, etc. Few such lesions result in necrosis of bone marrow. This signals bad prognosis. The various disorders which affect the bone marrow are leukemias, lymphomas, storage disorders, tuberculosis, metastatic deposits, and fungal infections. We report a case of 65-year-old female who underwent bone marrow biopsy. Histological features were consistent with necrosis of bone marrow.

Keywords: Bone marrow, Hematopoietic, Necrosis, Thrombocytopenia

INTRODUCTION

Bone marrow necrosis is defined as necrosis of myeloid tissue and medullary stroma in large areas of hematopoietic bone marrow.¹ It is an unusual histological finding most commonly encountered after autopsy in patients with leukemia or sickle cell disease. Though there are various other disorders which can lead to bone marrow necrosis, still the above-mentioned two causes remain the most common ones.²

Bone marrow necrosis was first described by Wade and Stevenson in 1942. That patient had sickle cell disease and died of cerebral infarction.³ Most of the available data about bone marrow necrosis are from the post mortem studies because there was the lack of awareness and lack of documentation of the very few cases which were diagnosed during the lifetime of the patient.

CASE REPORT

A 56-year-old female patient was admitted in the medical ward with history of (h/o) weakness, tiredness, fatigue, and fever of 15 days duration on and off. General physical examination did not reveal features of anemia. No organomegaly or lymphadenopathy was noted. Clinical opinion of pyrexia of unknown origin was given. Routine hematological investigations were done. The reports are as follows: Hemoglobin - 06 g%, total count - 5400 cells/cumm, platelet count - 40,000. Impression on peripheral smear report was anemia with thrombocytopenia.

Bone marrow aspiration and biopsy were performed under local anesthesia. Patient was cooperative during the procedure aspirated material was mixed with trisodium citrate in a petridish and biopsy material was transferred to formalin solution. Before transferring to formalin, multiple imprint smears were taken on glass slides. Histopathology section received specimen of bone marrow biopsy in formalin, measuring 1.7 cm in length. Specimen was kept in formalin for 24 h for better fixation. Then material was transferred to decalcification fluid (5% nitric acid) for 24 h. To confirm decalcification, chemical test was employed. Finally, the material was sent for routine processing. Staining was done using routine hematoxylin-eosin stain.

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Grossly specimen consisted of two grey white firm pieces of tissue larger one measuring 1.5 cm and smaller one 0.3 cm in length. Entire tissue was processed. Microscopy showed evidence of extensive bone marrow necrosis. Focal areas showed mild myelofibrosis. Hematopoietic cells were very much reduced. Some bony spicules show evidence of osteosclerosis. Impression: Secondary myelofibrosis with evidence of marrow necrosis suggested bone scan and radiological to rule out malignancy. Initially, patient did not agree for any other investigations and her condition deteriorated. Patient died after 5 days of histopathological diagnosis (Figures 1-3).

DISCUSSION

Bone marrow necrosis is relatively infrequent diagnosis in routine bone marrow biopsy specimens. In leukemia, hemoglobinopathies and malignancies marrow necrosis are mainly due to impairment in blood supply.³ The incidence of bone marrow necrosis is variable, i.e, 0.5-3%. Vesterby and Jensen reported bone marrow necrosis to be 6.5% in autopsies of leukemic patients. Dunn *et al.* reported an incidence of 0.37% in consecutive bone marrow aspirates performed alone or with biopsies.⁴ Layla *et al.* reported the incidence as 1.6% of consecutive biopsies. Bone marrow necrosis is classified into three types based on the area involved with necrosis. Hence, if necrosis is restricted to a focal area it is called mild, if intermediate involvement is seen it is termed as moderate and if extensive involvement of the bone marrow is noted then it is termed as severe type. Accordingly, it is graded as follows Grade I - <20%, Grade II - 20-50% and Grade III is >50%. As per literature 90% of the cases of bone marrow necrosis show malignancy as an underlying cause and in 60% cases it is hematopoietic malignancy (acute leukemia being the commonest). The other causes are tuberculosis, drugs, sickle cell disease and disseminated intravascular coagulation.⁵ Colon carcinoma as an underlying cause for thrombotic thrombocytopenic purpura and bone marrow necrosis has been reported by Lee *et al.*⁶ Anemia and thrombocytopenia is observed in 90% and 80% cases respectively. White blood cell count may be normal, low or elevated in 30%, 45% and 25% cases respectively. Leuco-erythroblastic reaction is noted in 55% cases. Lactate dehydrogenase, alkaline phosphatase and/or alkaline transaminase and uric acid values may show elevation. The presenting symptoms are bone pain, fever, back pain, malaise, and weight loss.

Our patient presented with fever and back pain as the chief complaints. Laboratory investigations showed significant anemia and thrombocytopenia. The other parameters were in normal limits.

The patient died within a week of bone marrow biopsy diagnosis. Further follow-up including bone scan could not be done since the patient died within 5 days of bone marrow biopsy diagnosis.

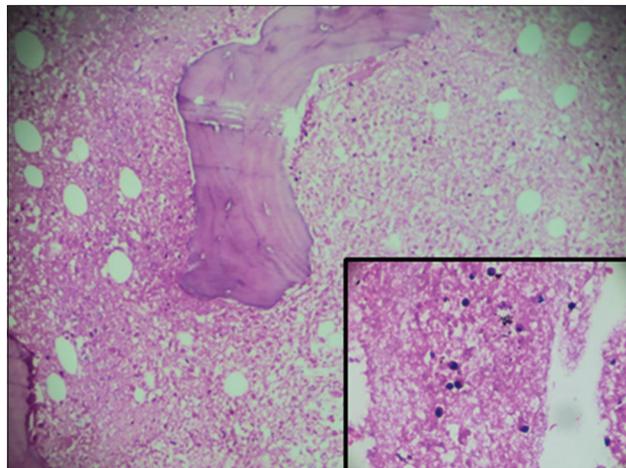


Figure 1: Bony trabeculae with areas of necrosis and sparse bone marrow cellularity

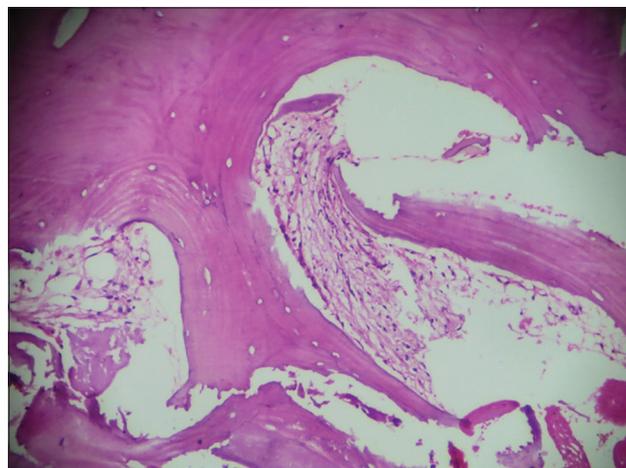


Figure 2: Sclerosis and focal marrow fibrosis

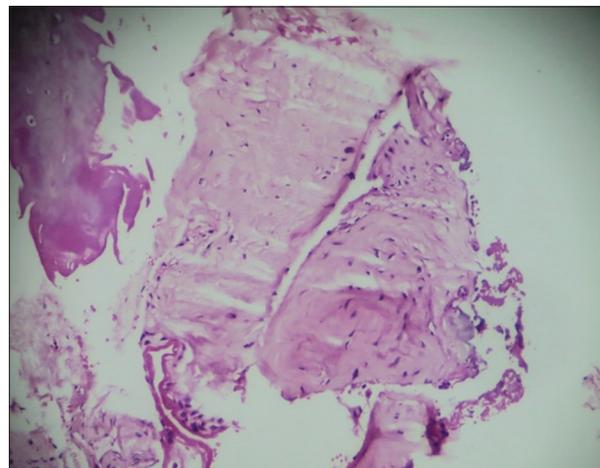


Figure 3: Areas of fibrosis with scant cellularity in background

Patients usually die within months and even days after the diagnosis. Occasional cases of survival up to 2 years has been noted where the diagnosis on bone marrow biopsy was tuberculosis.

Let us understand the histopathology of bone marrow necrosis. It is characterized by gelatinous transformation and necrosis of the myeloid tissue, focal hypoplasia, and background of amorphous, pink material. Grading of necrosis is essential because it helps one to assess the degree of damage to the bone marrow. Prognostic factors of bone marrow necrosis are greatly dependent on age of patient and nature of associated disease. Children with hematopoietic malignancies like acute myeloid leukemia with bone marrow necrosis appear to have the same prognosis as those without necrosis. Adult with bone marrow necrosis associated with non-cancerous condition may have better chances of complete recovery and long term survival than adults with hematologic malignancy. Prognosis in certain cases is difficult to predict if necrosis is due to a drug or disseminated intravascular coagulation versus an underlying malignancy.⁷

According to the available literature, the overall prognosis of cases with bone marrow necrosis is poor.

Early diagnosis can improve the survival rate. It can be achieved by treating the underlying cause/disease and providing supportive measures for anemia, thrombocytopenia or any other complication.⁸

CONCLUSION

This case is being presented because of the observations that patients with hematopoietic malignancies or solid

malignancies do present with certain alarming signs/symptoms or abnormal laboratory reports. One needs to be alert and correlate these abnormal parameters with the general condition of the patient. Various studies on the same subject have shown that the patient survival is limited to few months or even days after the histopathological diagnosis. What information does it convey? Early diagnosis is required especially in old age group patients presenting with fever, lethargy and abnormal laboratory reports. The underlying cause can be leukemia, lymphomas, solid malignancy poisoning or even infections.

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REFERENCES

1. Janssens AM, Offner FC, Van Hove WZ. Bone marrow necrosis. *Cancer* 2000;88:1769-80.
2. Cowan JD, Rubin RN, Kies MS, Cerezo L. Bone marrow necrosis. *Cancer* 1980;46:2168-71.
3. Shafiq M, Ali N. Bone marrow necrosis - initial presentation in sickle cell anemia. *Am J Case Rep* 2013;14:416-8.
4. Al-Gwaiz LA. Bone marrow necrosis. *Ann Saudi Med* 1997;17:374-6.
5. Paydas S, Ergin M, Baslamisli F, Yavuz S, Zorludemir S, Sahin B, *et al.* Bone marrow necrosis: Clinicopathologic analysis of 20 cases and review of the literature. *Am J Hematol* 2002;70:300-5.
6. Lee JL, Lee JH, Kim MK, Cho HS, Bae YK, Cho KH, *et al.* A case of bone marrow necrosis with thrombotic thrombocytopenic purpura as a manifestation of occult colon cancer. *Jpn J Clin Oncol* 2004;34:476-80.
7. Devi K, Patnaik L, Chakravorty S, Mishra K, Mohanty GN. Bone marrow necrosis in paediatric patients. *Indian J Pathol Microbiol* 2000;43:47-50.
8. Santana AN, Ramos RG, Zanandrea EF, Brandão-Neto RA. Bone marrow necrosis successfully treated with corticosteroid. *Eur J Haematol* 2005;74:75-6.

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Intestinal Obstruction by Carcinoid Tumor in Ileum: A Case Report

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Abstract

Intestinal obstruction is a challenge both clinically and management wise, often perturbing the surgeon. Post-operative adhesions and as a component of long standing Hernias with superadded complication of irreducibility and obstruction form the major etiological factors for intestinal obstruction. In tropical countries, intestinal tuberculosis of the ileocecal region is another important cause. Crohn's disease and small intestinal tumors are clinically very rare presentation in tropical countries like India. We report a rare case of small intestinal obstruction with a constricting stricture in ileum without any regional lymphadenopathy. After due investigations, explorative laparotomy was done, and resection with end to end anastomosis was performed. The specimen was sent for histopathological examination. Biopsy proved it to be carcinoid tumor, with local fibrosis.

Keywords: Contrast-enhanced computed tomography- Abdomen, Laparotomy, Resection

INTRODUCTION

Carcinoid tumors are peculiar tumors that arise from the neuroendocrine cells in the gastrointestinal or respiratory tract. Carcinoid tumors when grow to a size of more than 1.5 cm acquire a high potential for metastasis to visceral organs like liver.¹ Carcinoid tumors are most commonly arise in distal small intestine namely ileum and jejunum. Though they do not grow to a big size to cause intraluminal obstruction, they usually cause obstruction by local desmoplastic reaction thus compromising the motility.² They may also be a source of intussusceptions due to their tiny size. However, carcinoid syndrome with a plethora of vasoactive substances causing flushing of skin and hypotension may occur with hepatic metastasis.³

CASE REPORT

A 55-year-old, male patient presented with intermittent, generalized, dull and colicky abdominal pain accompanied with nausea, fever and chills for 6 months. He complained of weight loss and constipation during this period.

On physical examination patient was afebrile, blood pressure: 140/60 mm of Hg, pulse rate: 74/min and respiratory rate: 18/min. His abdomen showed deep tenderness in periumbilical, right lower quadrant regions. There were no signs of acute intestinal obstruction like distension, guarding, rigidity or rebound tenderness. There was no palpable lump.

Laboratory findings indicated anemia (hemoglobin: 9.5 g%), white blood cell count, platelet count, liver function tests, serum electrolytes, blood urea, serum creatinine are normal, serum amylase, and lipase levels are also normal.

Ultrasound abdomen showed a short segment thickened bowel loop in right iliac region probably ileum, decreased peristalsis, with dilated proximal segments. Mild amount of free fluid noted in abdomen and pelvis. No lymphadenopathy, no liver metastasis. Contrast-

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enhanced computed tomography scan with oral and intravenous contrast showed thickened terminal ileum of thickness 8 mm with dilated proximal bowel loops, mild to moderate ascites, no lymphadenopathy, and no liver metastasis.

Laparotomy was done, and a mass of 2 cm was identified at 10-15 cm from ileocecal junction causing obstruction with dilated loops of ileum and jejunum (Figures 1 and 2). Bowel wall was thickened with narrowed lumen. There were no mesenteric lymph nodes and no liver metastasis. Local resection was performed for a length of 4 cm on either side, and end to end anastomoses was done. Macroscopic examination showed typical yellowish nodular growth in the full thickness of the bowel wall with typical narrowing at the site of the growth.

Specimen was sent for histopathology. The diagnosis of carcinoid tumor was confirmed by pathologic report.

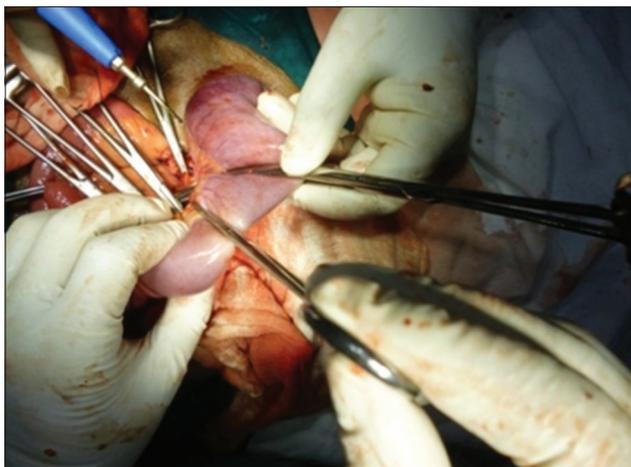


Figure 1: Intra operative picture



Figure 2: Dissected tumor

DISCUSSION

Small intestinal obstruction usually presents with vague abdominal pain and distension of abdomen. Vomiting and constipation are features in either acute scenario or advanced stage of presentation.⁴ In tropical countries small intestinal obstruction is usually associated with bowel adhesions in a previously operated patient or strangulated hernia. Tuberculosis of ileocecal region, ileoileal or ileocolic intussusceptions, and Meckel's diverticulitis are also other causes though rare. Small bowel tumors are extremely rare as a cause of intestinal obstruction.^{5,6}

Carcinoid tumors are the most common primary tumors of the small intestines and mesentery. They can be traced to their embryonic origin from the endochromaffin cells of Kulchitsky which are the neural crest cells situated at the base of crypts of lieberkuhn.⁷

Carcinoid tumors of the gastrointestinal tract form the majority 66.9% as against those from the tracheobronchial tree which form about 24.5%. Of these, appendix is the most common site for carcinoid tumors in intestines. However, a small percentage of carcinoid tumors may arise from a small intestine also of these ileum forms the most common site (91%).⁸ Male preponderance and average age incidence of above 55 years are observed. Small intestinal carcinoid tumors are in majority asymptomatic 70-80% and may be found incidentally at the time of operation for symptoms of bowel obstruction or during exploration. No specific imaging or endoscopic study or series can trace out the carcinoid tumors.⁹ Typical histopathology specimen shows clusters of uniform cells with scant cytoplasm and nucleus exhibits salt and pepper chromatin pattern under electron microscopy.¹⁰

Frequently presenting as nodular growths or as stricture of the intestine with obstruction they have to be traced by careful intra operative examination of bowel inch by inch.¹¹ The lumen compromise may be traced to peritumoral fibrosis or invasion, causing direct luminal strictures, or secondary to desmoplastic reaction leading to ischemic changes. A small subset of functionally active tumors accounts for in this group. Such tumors secrete vasoactive substances such as serotonin, vasoactive intestinal peptide, etc., with a concomitant presence of multiple hepatic metastases.¹²

The primary management is by surgical resection. Local resection is done for tumors <1 cm size. For lesions more than 1.5 cm, there is a high risk of recurrence and so

segmental resection with extensive clearance of mesenteric lymph nodes is mandatory.¹³

In our case, we did a resection of 4 cm on proximal and distal sides in order to give a safe margin. A high index of suspicion has saved our patient as the diagnosis of carcinoid tumor by histopathology came as a surprise. The patient recovered well and is advised the follow-up every 3 months for the appearance of any recurrences or hepatic metastasis.

This case has been reported for its histopathological rarity, insidious clinical presentation, and fair recovery.¹⁴

CONCLUSIONS

A case of Intestinal obstruction in a small bowel cannot be definitively given a preoperative biopsy specimen as it is inaccessible by endoscopy. Hence, while dealing with small intestinal tumors or isolated strictures causing mechanical obstruction careful palpation of the entire length of the small intestine and a generous resection should be planned and can affect the prognosis of the patient.

REFERENCES

1. Singhal H. Carcinoid tumor, intestinal. Available from: <http://www.emedicine.com>. [Last accessed on 2010 Jul 22].
2. Burke AP, Thomas RM, Elsayed AM, Sobin LH. Carcinoids of the jejunum and ileum: An immunohistochemical and clinicopathologic study of 167 cases. *Cancer* 1997;79:1086-93.
3. Marshall JB, Bodnarchuk G. Carcinoid tumors of the gut. Our experience over three decades and review of the literature. *J Clin Gastroenterol* 1993;16:123-9.
4. Oberdorfer S. Karzinoide tumoren des dünnarms. *Frankf Z Pathol* 1987;1:426-9.
5. Broaddus RR, Herzog CE, Hicks MJ. Neuroendocrine tumors (carcinoid and neuroendocrine carcinoma) presenting at extra-appendiceal sites in childhood and adolescence. *Arch Pathol Lab Med* 2003;127:1200-3.
6. Khan AN. Carcinoid. *Gastrointestinal. Emedicine*, July, 2005. Available from: <http://www.emedicine.com>. [Last accessed on 2010 Jul 25].
7. Gould M, Johnson RJ. Computed tomography of abdominal carcinoid tumour. *Br J Radiol* 1986;59:881-5.
8. Yamaguchi T, Manabe N, Tanaka S, Fukumoto A, Shimamoto M, Nakao M, *et al.* Multiple carcinoid tumors of the ileum preoperatively diagnosed by enteroscopy with the double-balloon technique. *Gastrointest Endosc* 2005;62:315-8.
9. Strodel WE, Vinik AI, Thompson NW, Eckhauser FE, Talpas GB. Small bowel carcinoid tumors and the carcinoid syndrome. In: Thompson NW, Vinik AI, editors. *Endocrine Surgery Update*. New York, NY: Grune and Stratton; 1983. p. 277-91.
10. Levy AD, Sobin LH. From the archives of the AFIP: Gastrointestinal carcinoids: Imaging features with clinicopathologic comparison. *Radiographics* 2007;27:237-57.
11. Basson MD, Ahlman H, Wangberg B, Modlin IM. Biology and management of the midgut carcinoid. *Am J Surg* 1993;165:288-97.
12. Eriksson B, Klöppel G, Krenning E, Ahlman H, Plöckinger U, Wiedenmann B. Consensus guidelines for the management of patients with digestive neuroendocrine tumors – Well-differentiated jejunal-ileal tumor/carcinoma. *Neuroendocrinology* 2008;87:8-19.
13. Picus D, Glazer HS, Levitt RG, Husband JE. Computed tomography of abdominal carcinoid tumors. *AJR Am J Roentgenol* 1984;143:581-4.
14. Barclay TH, Schapira DV. Malignant tumors of the small intestine. *Cancer* 1983;51:878-81.

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Interstitial Lung Disease in a Glass Industry Worker: A Rare Case Report

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Abstract

Occupational lung diseases are caused by long-term exposure to irritating or toxic agents in the workplace for the workers. Epidemiologic studies in humans suggest that there is no direct evidence of chronic lung disease associated with glass exposure. However, rare cases of granulomatous lung disease have been reported. We report a case of a 27-year-old male patient working in a glass manufacturing industry with recent onset of breathlessness and cough. Chest X-ray, high-resolution computed tomography revealed nodular opacities. Bronco-alveolar lavage sample and lung biopsy revealed histopathological examination report. Patient is being managed by corticosteroid inhalers and respiratory physiotherapy. Change in profession has been advised for prevention of future exposure.

Key words: Glass industry worker, Investigation profile, Occupational lung diseases, Respiratory illness, Steroid inhalers

INTRODUCTION

Occupational lung diseases are caused by long-term exposure to irritating or toxic agents in the workplace for the workers.¹ Clinical presentation is usually asymptomatic or with mild cough and breathlessness, which the patient neglects. Radiological, endoscopic and invasive guided biopsy are the tools to establish the diagnosis. The management is mostly symptomatic, but identification of one case is very helpful in planning prevention strategies in the same industry or similar places.²

CASE REPORT

A 27-year-old, male presented to the pulmonology outpatient department with exertion dyspnea since 3 years and breathlessness at rest since 3 weeks. There is no

history of fever, cough with expectoration and hemoptysis. There is a history of asthenia, loss of appetite and loss of weight (8 kg - 12.9% of prior weight of 62 kg) over 3 months. Patient gives a history of working in a glass manufacturing industry at industrial zone since 15 years. He is a glass shiner with silica dust and glasscutter without any specific protective measures and works 6 h/day. On examination, Grade 3 breathlessness, accessory respiratory muscles are acting, no evidence of cyanosis and clubbing, no generalized or cervical lymphadenopathy, diffuse coarse crepitations heard over all zones of lungs, vocal fremitus, vocal resonance - normal, breath sounds were diminished. No clinical evidence of effusion. Finger pulse oximeter showed - PaO₂: 95% pulse rate 85/min. Investigation are complete blood profile -hemoglobin: 10.2 mg%, white blood cell: 10,400/cmm, differential count: P - 68%, L - 27%, M - 3%, E - 2% platelets count was 2.5 lakhs/cmm. Sputum staining showed negative for acid-fast bacilli in Zeil-Nelson stain and florescent microscopy. Mixed connective tissue disease blood profile; complement 3 and 4 negative, enzyme-linked immunosorbent assay for antinuclear antibodies and double standard DNA antibodies negative. Chest X-ray: Bilateral multiple military mottling (Figure 1). Pulmonary function tests: Mixed functional disorder with both restrictive and obstruction pattern has been noted. Peak expiratory flow rate: 70%, forced expiratory volume in 1 s: 10%, forced vital

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capacity: 40%. A high resolution computed tomography thorax: Bilateral multiple interstitial mottling with fibrosis (Figure 2). Broncho alveolar lavage showed: Cytology shows macrophages with dust particles and lymphocytes and fibroblasts. Lung biopsy has been performed with soft tissue biopsy needle gun (an open lung biopsy was performed because of an uncommon radiologic pattern rarely observed in patients with an occupational history of glass fiber exposure). Light microscopy showed peri-bronchiolar infiltration of lymphoid cells (Figure 3) and many foreign-body-type granulomas throughout the examined tissue. Alveolar macrophages observed by light microscopy had numerous round and elongated particles inside their cytoplasm and plate like material when examined.

Later the patient was admitted in intensive care unit and treatment consisting of tablet prednisolone 20 mg once a day along with inhalation bronchodilator and corticosteroid (budesol respules – levalbuteral 1.25 mg with budesonide 0.5 mg). Oxygen supplementation by mask with monitoring with pulse oxymeter was also carried out along with immuno nutrition of antioxidants multivitamins and protein. Some improvement is there, but patient is bed ridden and respiratory cripple. Prognosis was good, and patient was advised relocation in the same plant or change of profession.

DISCUSSION

Epidemiologic studies in humans suggest that there is no direct evidence of chronic lung disease associated with glass exposure. A cohort study of 6586 workers engaged in glass fiber production indicated no excess malignant or non-malignant respiratory disease.² Guber *et al.* (2006) reported a case of interstitial lung disease with a relatively benign course during the follow-up period of ≥ 4 years.³ The biopersistence mechanism of the fibers deposited in the respiratory tract results from a combination of physiologic clearance (mechanical translocation/removal) and physicochemical events (chemical dissolution and leaching, mechanical breaking).⁴ In our case, a thorough work up of the patient with signs and symptoms of respiratory disease revealed a peculiar occupational parenchymal lung disease. Biopsy proves it to be associated with fibrosis thus leading to vulnerability of the patient to land in respiratory failure. An expectant management with corticosteroid and broncho-dilator therapy was started.⁵ Inhalation route is the most preferred one to avoid systemic side effects. Immediate re-location or change in profession has been advised for the suffering patient. Industrial authorities have been informed, and a study of the other employees was undertaken. Out of eight members employed another



Figure 1: Chest X-ray: Bilateral multiple military mottling

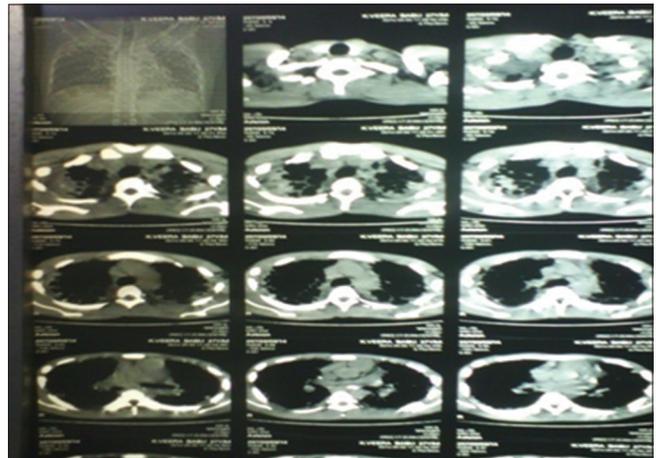


Figure 2: Computed tomography thorax: Bilateral multiple interstitial mottling with fibrosis

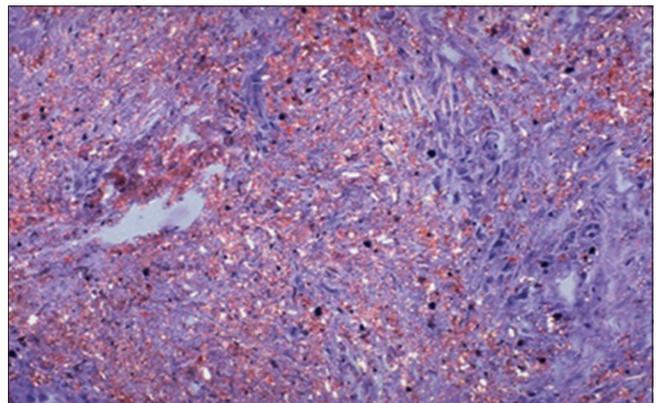


Figure 3: Peri-bronchiolar infiltration of lymphoid cells

male has been identified with early changes in pulmonary function tests. Hence, surveillance has been advised. Other precautions, like using filter-masks, maintenance of ideal

humidity, have been discussed with the authorities of the industry.^{6,7}

CONCLUSION

Interstitial lung disease due to exposure to glass particles is very rare case that has come across. In our case, a thorough work up of the patient with signs and symptoms of respiratory disease revealed a peculiar occupational parenchymal lung disease. Biopsy proves it to be associated with fibrosis thus leading to vulnerability of the patient to land in respiratory failure. An expectant management with corticosteroid and broncho-dilator therapy was started. Inhalation route is the most preferred one to avoid systemic side-effects. Immediate re-location or change in profession has been advised for the suffering patient.

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REFERENCES

1. Lippmann M. Effects of fiber characteristics on lung deposition, retention, and disease. *Environ Health Perspect* 1990;88:311-7.
2. Ferreira AS, Moreira VB, Castro MC, Soares PJ, Algranti E, Andrade LR. Case report: analytical electron microscopy of lung granulomas associated with exposure to coating materials carried by glass wool fibers. *Environ Health Perspect* 2010;118:249-52.
3. Guber A, Lerman S, Lerman Y, Ganor E, Trajber I, Edelstein E, *et al.* Pulmonary fibrosis in a patient with exposure to glass wool fibers. *Am J Ind Med* 2006;49:1066-9.
4. Marsh GM, Youk AO, Stone RA, Buchanich JM, Gula MJ, Smith TJ, *et al.* Historical cohort study of US man-made vitreous fiber production workers: I. 1992 fiberglass cohort follow-up: initial findings. *J Occup Environ Med* 2001;43:741-56.
5. Morgan RW, Bratsberg JA. Mortality study of fibrous glass production workers. *Arch Environ Health* 1981;36:179-83.
6. Baan RA, Grosse Y. Man-made mineral (vitreous) fibres: Evaluations of cancer hazards by the IARC Monographs Programme. *Mutat Res* 2004;553:43-58.
7. Zisman DA, Keane MP, Belperio JA, Strieter RM, Lynch JP rd. Pulmonary fibrosis. *Methods Mol Med* 2005;117:3-44.

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Multiple Endocrine Neoplasia Type 2b: A Rare Case Report

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Abstract

Multiple endocrine neoplasia Type 2b is a rare syndrome caused by mutations in RET proto oncogene. It is a rare case, which is found 1 in 30,000. We report a case of 23-year-old male patient with goiter, right lower chest pain, paroxysmal spells and hypertension. On examination, mucosal neuromas and Grade 2 hard goiter were observed. Patient's thyroid profile was normal. Fine-needle aspiration cytology thyroid showed medullary carcinoma of the thyroid. Calcitonin levels were found to be elevated. Contrast enhanced computed tomography neck showed 28 mm × 20 mm heterogeneous mass in the right lobe of the thyroid. Histopathology and immune histochemistry confirmed the pheochromocytoma.

Key words: Medullary carcinoma thyroid, Multiple endocrine neoplasia TYPE 2B, Pheochromocytoma

INTRODUCTION

Multiple endocrine neoplasia Type 2B is a rare syndrome caused by mutations in RET proto oncogene. The genetic defect in MEN 2 is on chromosome 10 (10q 11.2). MEN Type 2B is transmitted as autosomal dominant trait associated with various endocrine tumors. Multiple endocrine neoplasia affects 1 in 30,000 people.¹ Incidence of MEN Type 2A is 80%, familial medullary thyroid carcinoma 15%, MEN Type 2B 5%. Among sub types - Type 2A is most common followed by familial medullary thyroid carcinoma. MEN Type 2B is relatively uncommon, accounting for 5% of all cases of MEN. MEN Type 2B is associated with medullary carcinoma thyroid, pheochromocytoma, mucosal neuromas, gangliomatosis of intestinal tract and marfanoid habitus, whereas hyperparathyroidism is absent.²

We report a rare case of MEN Type 2B presented with pheochromocytoma, medullary thyroid carcinoma and

mucosal neuromas of lips and tongue with no marfanoid habitus.

CASE REPORT

A 23-year-old male patient presented with goiter of 1 year duration with no compressive symptoms with no history suggestive of hypothyroidism or hyper thyroidism. He had pain in right lower chest region of 6 months duration with no history of respiratory tract infections. He also had a history of three episodes of paroxysmal spells during past 6 months. Each spell was characterized by headache, sweating and palpitations. Examination revealed mucosal neuromas of lips and tongue (Figure 1), high arched palate, Grade 2 hard goiter with no marfanoid habitus. He had hypertension. Systemic examination was normal.

Table 1 shows baseline biochemical profile.

Thyroid profile was normal. Fine needle aspiration cytology (FNAC) of thyroid showed medullary carcinoma. Ultrasonography of thyroid showed solitary nodule of the right lobe of the thyroid in view of low sensitivity of U/S we did contrast enhanced computer tomography (CECT) (Figure 2). CECT neck showed mass of size 28 mm × 20 mm in the right lobe of the thyroid with lymph node metastasis (Figure 3) and calcitonin levels were elevated. In view of the presence of paroxysmal spells, we evaluated

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Figure 1: Mucosal neuromas of tongue and lips

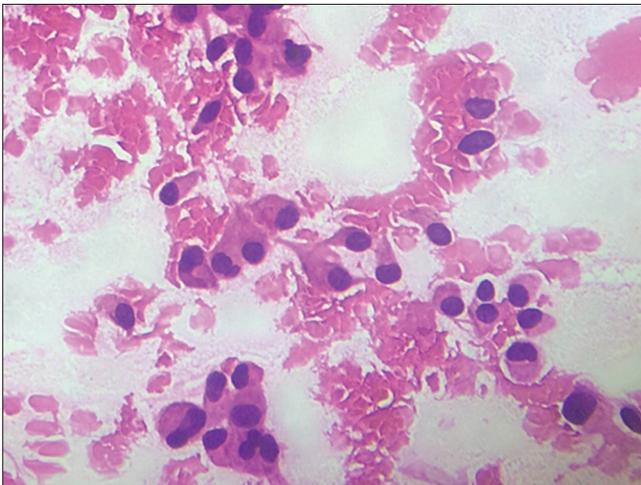


Figure 2: Fine needle aspiration cytology of thyroid showing medullary carcinoma of thyroid

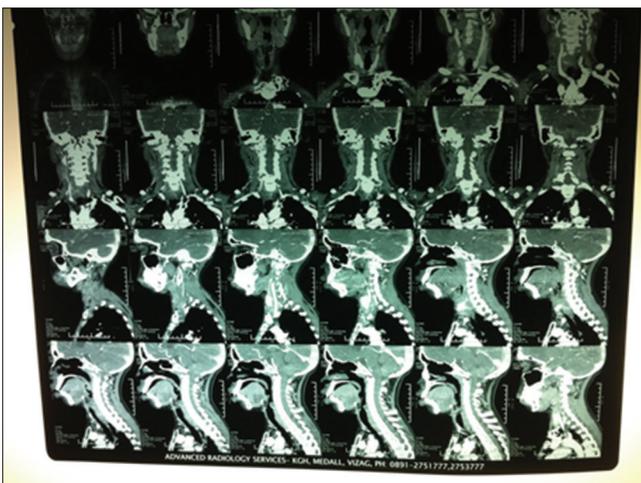


Figure 3: Contrast enhanced computed tomography neck showing heterogeneously enhancing hypodense lobulated mass lesion of 28 mm x 20 mm seen in right Level II/III station, right trachea esophageal groove, inseparable from hypopharynx, cricoids and proximal esophagus

for pheochromocytoma. Elevated plasma metanephrines, nor-metanephrines and were noticed (Table 2). Magnetic resonance imaging abdomen revealed right supra renal mass. Pre-operatively patient was managed with an alpha blocker (prazosin) for hyper tension. He underwent laparotomy and right adrenalectomy. Specimen was taken out and sent for biopsy (Figure 4). Immunohistochemistry and histopathology (Figure 5) confirmed pheochromocytoma. Post-operatively he was managed with 2.5 mg of



Figure 4: Biopsy specimen of pheochromocytoma

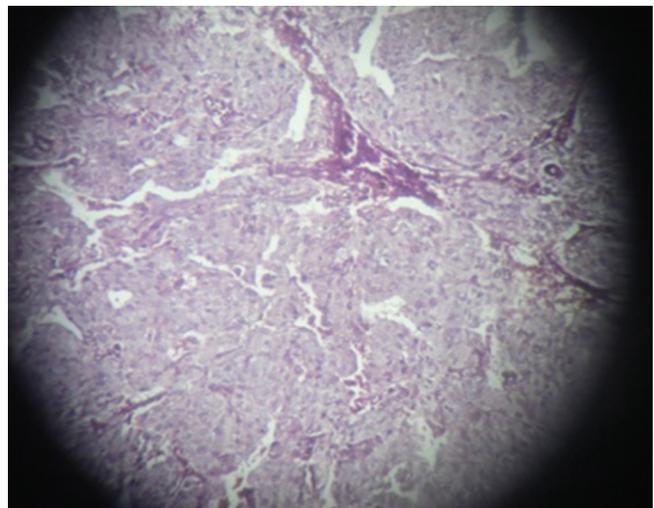


Figure 5: Histopathological examination shows uniform polygonal cells arranged as well-defined nests (zell ballen pattern) separated by thin fibrovascular septae. Individual cells show basophilic granular cytoplasm with round to oval nuclei. At places tumor cells show clear cytoplasm. The surrounding fibrofatty tissue shows congested vascular space

Table 1: Biochemical profile

Hemoglobin %	11.8 g/dl
Total leucocyte count	17,700/mm ³
Differential count	N - 81%, L - 12%, M - 1%, E - 1%
Random blood sugar	133 mg/dl
Blood urea	21 mg/dl
Serum creatine	0.6 mg/dl
SGOT	29 U/L
SGPT	28 U/L
Serum bilirubin (total)	0.4 mg/dl
Serum proteins (total)	7.8 mg/dl
Albumin	4.4 mg/dl

SGOT: Serum glutamine oxalo acetyl transaminases, SGPT: Serum glutamine pyruvate transaminases

Table 2: Hormone profile

Serum calcitonin	1515 pg/ml
Tri iodo thyronine (T3)	1.25 ng/ml
Tetra iodo thyronine (T4)	10.75 µg/dl
Thyroid stimulating hormone	1.30 µIU/dl
Metanephrine	743 pg/ml
Nor-metanephrine	405.6 pg/ml

prazosin once daily. Patient deferred surgery for medullary carcinoma of the thyroid.

DISCUSSION

We report a case of multiple endocrine neoplasia (MEN Type 2B) who presented with mucosal neuromas, medullary carcinoma thyroid, pheochromocytoma. Williams and Pollock³ reported first case of MEN Type 2B. Chong first named this disease as MEN Type 2B. Patient with MEN Type 2B usually present in the first decade of life. Recent studies revealed age at diagnosis may range from 1 to 31 years,⁴ but our case was presented at the age of 23 years.

Among 100% of patients with MEN Type 2B develop mucosal neuromas in the lips, tongue and oral cavity, conjunctiva eye lids and within cornea. Our case had mucosal neuromas over tongue and lips several years after birth.^{5,6} Ganglio neuromas in the gastrointestinal tract are usually seen in 30% of MEN Type 2B. Ganglion neuromas are most commonly seen in a large bowel, small bowel, liver, gallbladder and pancreas. Marfanoid habitus is present in 75% of MEN Type 2B as are skeletal abnormalities such as

kyphosis, pectus excavatum and talipes supinatus. Our case did not have marfanoid habitus. Medullary thyroid cancers are usually seen in 90-95% of MEN 2B and are commonly multiple this malignant tumor appears in late teens or twenties. Hyperplasia of C-cells of thyroid and hyperplasia of the adrenal medulla are thought to be pre malignant lesions of medullary thyroid cancer and pheochromocytoma. Our patient had medullary carcinoma thyroid with lymph node metastasis. Patient deferred surgery for medullary carcinoma of the thyroid. Medullary carcinoma of the thyroid in MEN Type 2B carries a poor prognosis compared with sporadic cases.⁷

Pheochromocytoma is usually manifested in 45-50% of patients with MEN Type 2B occurring during second and third decade of life. It is frequently multicentric and bilateral. Our patient had right adrenal pheochromocytoma. 50% of MEN Type 2B are autosomal dominant, others are sporadic. Our case did not have any family history, and so it could be sporadic.

CONCLUSIONS

Finally, we report a rare case of MEN Type 2B who presented with pheochromocytoma, mucosal neuromas medullary carcinoma of the thyroid.

REFERENCES

1. Diaz RE, Wohlk N. Multiple endocrine neoplasia: the Chilean experience. Clinics (Sao Paulo) 2012;67 Suppl 1:7-11.
2. Brandi ML, Gagel RF, Angeli A, Bilezikian JP, Beck-Peccoz P, Bordi C, et al. Guidelines for diagnosis and therapy of MEN type 1 and type 2. J Clin Endocrinol Metab 2001;86:5658-71.
3. Williams ED, Pollock DJ. Multiple mucosal neuromata with endocrine tumours: A syndrome allied to von Recklinghausen's disease. J Pathol Bacteriol 1966;91:71-80.
4. Brauckhoff M, Gimm O, Weiss CL, Ukkat J, Sekulla C, Brauckhoff K, et al. Multiple endocrine neoplasia 2B syndrome due to codon 918 mutation: Clinical manifestation and course in early and late onset disease. World J Surg 2004;28:1305-11.
5. Gorlin RJ, Cohen MM, Levin LS. Hamartoneoplastic syndromes. In: Syndromes of the Head and Neck. New York: Oxford University Press; 1990. p. 385-92.
6. Schenberg ME, Zajac JD, Lim-Tio S, Collier NA, Brooks AM, Reade PC. Multiple endocrine neoplasia syndrome--type 2b. Case report and review. Int J Oral Maxillofac Surg 1992;21:110-4.
7. Block MA. Surgical treatment of medullary carcinoma of the thyroid. Otolaryngol Clin North Am 1990;23:453-73.

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