Original Article

Respiratory Complications in Human Immunodeficiency Virus Seropositive Patients in Correlation to CD4 Count: An Observational Cross-Sectional Study

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Abstract

Introduction: Despite the advent and easy access of antiretroviral therapy (ART), human immunodeficiency virus (HIV) associated respiratory complications remains a significant cause of mortality and morbidity among HIV-seropositive individuals. CD4 count is an excellent indicator for developing opportunistic respiratory infections and complications.

Materials and Methods: We prospectively and cross sectionaly studied the clinical, laboratorical, microscopical, and radiological parameters of 227 HIV-seropositive patients with respiratory complications at Government Medical College Hospital and ART Center over a period of 2 years with a view to identify the correlation of CD4 count and respiratory complication.

Results: Our study documented pulmonary tuberculosis (PTB) as the most common respiratory complication seen in 147 patients (64.76%) followed by bacterial pneumonia (BCP) in 51 patients (22.47%) followed by other fungal infections seen in 20 patients (8.81%). Pneumocystis pneumonia was seen in 7 patients (3.08%). Malignancy was seen in 2 patients (0.88%). PTB and BCP occurred at all CD4 count levels, but incidence increases in patients with lower CD4 counts.

Conclusion: There is a strong correlation between CD4 count and pattern of respiratory complications in HIV seropositive patients. Patients with CD4 count <200 cells/μL are more prone for respiratory complications. Hence, high level of clinical suspicion required for diagnosis of respiratory complications in HIV-infected individuals particularly with patients having CD4 count <200 cells/μL.

Keywords: CD4 count, Human immunodeficiency virus, Respiratory complications

INTRODUCTION

In India first case of human immunodeficiency virus (HIV), infection was reported in Chennai in 1986.[1] Since then the incidence of HIV infection is increasing in Asia, particularly in the Indian subcontinent. India is in the epicenter of HIV pandemic.[2] The total number of people living with HIV/acquired immunodeficiency syndrome (AIDS) in India are estimated at 23.9 lakh in 2009.[3] Pulmonary complications have been one of the most common causes of morbidity and mortality since advent of AIDS. The opportunistic infections are caused by mycobacterial, bacterial, viral, fungal, parasitic pathogens. Each of these opportunistic infections has characteristic clinical and radiographic presentation. CD4 cell count is an excellent indicator of an HIV-infected patient's risk of developing opportunistic pulmonary infections presumably because it reflects stage of HIV disease and degree of immunocompromise. Each of HIV-related respiratory illness typically develops at or below a characteristic CD4 cell count range.[4] Hence, knowledge of the CD4 count is extremely important in defining possible diagnosis and therapeutic plan. Pulmonary complications are also likely to vary according to geographical location, HIV risk factors, gender, and social habits of patients. Hence, present study is aimed at evaluating clinical profile of respiratory complications among HIV-seropositive patients in correlation to CD4 count levels. Knowledge of the pattern

of the pulmonary complications in HIV will help clinicians to develop faster diagnostic and therapeutic approach.

MATERIALS AND METHODS

This is prospective observational cross-sectional study of 227 patients attending antiretroviral therapy center and outpatient department as well as inpatient department (both wards and intensive care unit) for a period of 2 years from January 2012 to December 2013 undertaken in tertiary care hospital in Department of Medicine, Government Medical College, Latur.

HIV seropositive patients irrespective of their antiretroviral treatment status above the age of 12 years and <60 years are included.

Patients known case of respiratory disorder such as asthma, chronic obstructive airway disease, and lung cancer. Patients known cases of any illness other than respiratory disease (cardiovascular disorder such as ischemic heart disease, myocardial infarction, hypertensive heart disease and neurological diseases such as meningitis, encephalitis, and HIV encephalopathy) Patients suffering from extra-pulmonary tuberculosis (PTB) such as abdominal tuberculosis, tuberculosis meningitis, tuberculosis pericardial effusion, tuberculosis lymphadenopathy, and HIV-seropositive female with pregnancy were excluded (Table 1).

CD4 count was done as part of the initial evaluation. Patients divided into three groups according to their CD4 count:

1 Patients having CD4 count >500 cells/μL
2 Patients having CD4 count 200-499 cells/μL
3 Patients having CD4 count <200 cells/μL.

Results complied and statistically analyzed with Chi-square test and unpaired *t*-test.

RESULTS

Of 227 patients, majority of patients belong to age group 31-40 accounting for 109 patients (48.02%) followed by 51 patients of age group 21-30 (22.47%). 40 patients were from age group 41-50 (17.62%). 10 (4.40%) and 17 patients (7.49%) were from age group 12-20 and 51-60, respectively. Of 227 patients 147 (64.76%) were males, and 80 patients (35.24%) were females.

Of 227 patients, 153 (67.40%) patients were from rural locality and 74 (32.60%) were from urban locality.

Of 227 patients, 157 patients were having CD4 count <200 cells/μL (69.16%) and 59 patients were having CD4 count between 200 and 499 cells/μL (25.99%). 11 patients were having CD4 count >500 cells/μL (4.85%) (Table 2).

Of 227 patients, fever (84.58%) and weight loss (79.30%) were the most common constitutional symptoms. Among cardinal respiratory symptoms, productive cough (79.7%) was the most common respiratory symptom followed by chest pain (74.01%) and dyspnea (62.56%). Hemoptysis was seen in (17.18%) patients.

Among 227 patients, 95 patients having consolidation on chest X-ray (41.85%), Hilar lymphadenopathy in 89 patients (39.21%) followed by fibrosis in 42 patients (18.50%) followed by pleural effusion in 38 patients (16.74%). Miliary mottling was present in 19 patients (8.37%). Cavitary lesion was seen in 21 patients (9.25%). Bilateral diffuse nodular opacities were seen in 10 patients (4.41%). Bilateral symmetric perihilar interstitial opacification was seen in 3 patients (1.32%).

Of 227 patients, PTB was the most common respiratory complication seen in 147 patients (64.76%) followed by bacterial pneumonia (BCP) in 51 patients (22.47%) followed by other fungal infections seen in 20 patients (8.81%). Pneumocystis pneumonia (PCP) was seen in 7 patients (3.08%). Malignancy seen in 2 patients (0.88%) (Table 3).

PTB is the most common respiratory complication in HIV-seropositive patients. Its incidence increases as CD4 count declined. Of 157 patients diagnosed to have PTB, 112 patients were having CD4 count <200 cells/μL, 33 patients were having CD4 count between 200 and 499 cells/μL, and 2 patients were having CD4 count >500 cells/μL. BCP seen in 16 patients having CD4 count <200 cells/μL and in 26 patients having CD4 count

Table 1: Distribution of patients according to CD4 count (cells/μL) and diagnosis

CD4 count	Diagnosis					
	PTB	BCP	Fungal	PCP	Malignancy	Total
>500	02	09	00	00	00	11
200-499	33	26	00	00	00	59
<200	112	16	20	07	2	157
Total	147	51	20	07	02	227

Test used is Chi-square test, χ^2=58.4, df=8, P<0.05, Significant, BCP: Bacterial pneumonia, PTB: Pulmonary tuberculosis, PCP: Pneumocystis pneumonia

Table 2: Distribution of patients according to their CD4 count (cells/μL)

CD4 count	Number	Percentage
>500	11	4.85
200-499	59	25.99
<200	157	69.16
Total	227	100

Table 3: Distribution of patients according to their diagnosis

Diagnosis	Number (*n*=227)	Percentage
PTB	147	64.76
BCP	51	22.47
Fungal infections	20	8.81
PCP	07	3.08
Malignancy	02	0.88
Total	227	100

BCP: Bacterial pneumonia, PTB: Pulmonary tuberculosis, PCP: Pneumocystis pneumonia

between 200 and 499 cells/μL. 9 patients of BCP were having CD4 count >500 cells/μL. All patients of PCP, fungal infections, and malignancy were having CD4 count <200 cell/μL.

In patients with CD4 count >500 cells/μL, 9 chest X-ray showed consolidation and 2 showed Hilar lymphadenopathy, 1 showed pleural effusion, and 1 showed other radiological sign. In patients with CD4 count 200-499 cells/μL, 32 chest X-ray showed consolidation, 8 X-ray showed fibrosis, 22 showed Hilar lymphadenopathy, 11 X-ray showed pleural effusion, and 9 showed other radiological signs. Among patients with CD4 count <200 cells/μL, consolidation was seen in 54 X-ray, fibrosis in 34, Hilar lymphadenopathy in 65, miliary mottling in 19, pleural effusion in 26, and other signs in 24 X-ray. Mean CD4 count among total patients was 179.95 cells/μL and among males it was 180.99 cells/μL. Among female patients, mean CD4 count was 179.99 cells/μL.

Mean CD4 count among patients of tuberculosis was 152.12 cells/μL and among patients of BCP it was 325.88 cells/μL. Mean CD4 count was 99 cells/μL, 54.78 cells/μL and 55 cells/μL in patients of PCP, fungal infections and malignancy, respectively.

Mean CD4 count among sputum positive patient was 217.08 cells/μL.

Mean CD4 count among sputum negative patients was 165.37 cells/μL.

DISCUSSION

In the present study, of 227 patients, 157 patients were having CD4 count <200 cells/μL (69.16%) followed by CD4 count between 200 and 499 cells/μL was present in 59 patients (25.99%). CD4 count >500 cells/μL was present in 11 patients (4.85%).[5] Fever (84.58%) and weight loss (79.30%) were the most common constitutional symptom and among cardinal respiratory symptoms productive cough (79.74%) was the most common presenting chief complaint of the patients followed by chest pain (74.01%) and dyspnea (62.56%). Hemoptysis was seen in 39 patients (17.18%).[5,6] In the present study, of 227 patients, 95 patients (41.85%) showed consolidation on chest X-ray followed by Hilar lymphadenopathy seen in 89 patients (39.21%). Fibrosis was seen in 42 patients (18.50%) and pleural effusion in 38 patients (16.74%). Miliary mottling was present in 19 patients (8.37%). Other radiological signs including cavitary lesion present in 21 patients (9.25%), B/L diffuse nodular opacities in 10 patients (4.41%), B/L symmetric perihilar interstitial opacification in 3 patients (1.32%).[7]

Of 227 patients, 147 patients were diagnosed to have PTB (64.76 %) and BCP in 51 patients (22.47%). Clinicoradiological features of 7 patients were suggestive of PCP (3.08%). Fungal infections like pulmonary aspergillosis, cryptococcosis, etc., were found in 20 patients (8.81%). Malignancy found in 2 patients (0.88%).[7-10]

In PTB fever, chronic productive cough and weight loss were major chief complaints of patients. Hemoptysis was seen in lesser number of patients due to less number of fibrocavitary lesions. Of 147 patients of tuberculosis, 112 patients having CD4 count <200 cells/μL and 200-499 cells/μL in 33 patients and >500 cells/μL in 2 patients. In PTB patients with CD4 count >200 cells/μL were having typical presentation with all the patients positive for sputum acid-fast bacilli (AFB) and more number of classical fibrocavitary lesion on chest X-ray. But in PTB patients with CD4 count <200 cells/μL sputum positivity for AFB was found to be low this is due to less number of cavitary lesions. Atypical X-ray findings were more and less number of classical fibrocavitary lesion because chest X-ray findings of tuberculosis in HIV will depend on the level of immunosuppression, and most of patients in the present study had CD4 count <200 cells/μL and hence more number of atypical findings.

In BCP most patients presented with fever, purulent sputum, chest pain, and dyspnea with characteristically showing unilateral, focal, segmental, or lobar consolidation on chest radiograph. Of 51 patients of BCP, CD4 count <200 cells/μL seen in 16 patients and CD4 count between 200 and 499 cells/μL in 26 patients. CD4 count >500 cells/μL was seen in 9 patients. The most common organism isolated on sputum for gram stain and cultures was *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* and *Haemophilus influenzae*. Patients with BCP having CD4 count <200 cells/μL are often associated with bacteremia and sepsis. Methicillin-resistant *S. aureus* is more common HIV-infected individual particularly at lower CD4 cell counts.

Clinocoradiological correlation, sputum examination, and bronchoscopic examination of 7 patients were suggestive of PCP. All patients of PCP were having CD4 count <200 cells/μL. Although PCP is AIDS-defining illness incidence of PCP was found to be low in the present study as well as in other Indian studies. This may be due to the fact that lack of proper diagnostic utilities for PCP and extensive use of CO-TRIMOXAZOLE prophylaxis and predominance of other pulmonary disease like PTB.

In fungal infections, *Candida albicans* and *Candida tropicalis* were the most common organisms found. *C. albicans* and *C. tropicalis* were proved to be pathogens by assessing gram staining of sputum showing yeast like budding cells with pseudohyphae in presence of numerous polymorphonuclear leucocytes's, obtaining them on repeated culture in pure growth and improvements of symptoms with antifungal. Pulmonary aspergillosis was seen in 3 patients. Cryptococcus neoformans found in 1 patient. In all patients of fungal infections, CD4 count was <200 cells/μL.

Malignancy found in 2 patients was Lymphoma with CD4 count <200 cells/μL.

In the present study, of 227 patients, 64 patients (39.19%) found positive for sputum AFB and 163 patients (71.81%) were sputum AFB negative.[5] In patients with CD4 count <200 cells/μL, 29 patients (45.31%) found positive for sputum AFB. In patients with CD4 count between 200 and 499 cells/μL, 33 patients found positive for sputum AFB. 2 patients with CD4 count >500 cells/μL were found positive for sputum for AFB.

Mean CD4 count among total patients was 179.95 cells/μL. Mean CD4 count among males was 180.99 cells/μL and females was 179.39 cells/μL.[5] Mean CD4 count among PTB patients was 152.12 cells/μL and among patients of BCP was 325.88 cells/μL. Mean CD4 count among fungal infections was 54.78 cells/μL and among PCP patients was 99 cells/μL. Mean CD4 count among patients of malignancy was 55 cells/μL. Hence, it shows that all respiratory complications in HIV patients are more common at lower CD4 counts.

Mean CD4 count among sputum positive patients was 217.08 cells/μL. Mean CD4 count among sputum negative patients was 165.37 cells/μL ($P < 0.0001$). Hence, the sputum negativity is more common with lower CD4 counts.

In present study, 157 patients were having CD4 count <200 cells/μL (69.16%), 59 patients (25.99%) were having CD4 count between 200 and 499 cells/μL and 11 patients were having CD4 count >500cells/μL (4.85%). Majority of PTB occurred in patients with CD4 count <200 cells/μL. BCP commonly found in patients with CD4 count <500 cells/μL. PCP and fungal infections and Malignancy seen in patients having CD4 count <200 cells/μL. Mean CD4 count among all patients was 179.95 cells/μL.[5,7,11] HIV-seropositive individual and patient having CD4 count <200 cells/μL is 6 times more likely to develop an opportunistic infection compared to those with CD4 count >350 cells/μL.[12] There is significant statistical correlation between CD4 count and respiratory complications ($P < 0.05$). Hence, it shows that patients having CD4 count <200 cells/μL are more prone to all respiratory complications and associated with more number of atypical X-ray findings and sputum negative for AFB. Hence, CD4 count has a major role in diagnosis and treatment of respiratory complications in HIV-seropositive individual.

PTB is the most common respiratory complication seen in HIV-seropositive patients (64.76%) followed by BCP (22.47%) and fungal infections (8.81%).

CD4 count and profile of respiratory complications correlated very well. Decrease in CD4 count is associated with an increase in a number of pulmonary complications. Majority of pulmonary complications were seen in patients having CD4 count <200 cells/μL.

CONCLUSION

There is a strong correlation between CD4 count and pattern of respiratory complications in HIV-seropositive patients. Patients with CD4 count <200 cells/μL are more prone for respiratory complications. Hence, high level of clinical suspicion required for diagnosis of respiratory complications in HIV-infected individuals particularly with patients having CD4 count <200 cells/μL.

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Original Article

Sclerosing Pleurodesis in Recurrent Pneumothorax: A Retrospective Study

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Abstract

Introduction: Due to non-availability and restricted use of the tetracycline group of antibiotics, pneumologists felt the importance of other agents, which can prevent recurrent pneumothorax. The aim of this study is to see the efficacy of talc in prevention of recurrent pneumothorax.

Methods: This study was carried over on 18 patients, who have previous episodes of pneumothorax. In this study, talc was instilled in the pleural space at the time of thoracoscopy and thoracotomy.

Results: Insufflated talc was very effective in preventing recurrence of the pneumothorax. Only (5.6%) had a recurrence during the follow-up period. After a second treatment with talc, there has been no new recurrence during a follow-up of 10 months.

Conclusion: The present study demonstrates that the intrapleural insufflation of talc at the time of thoracoscopy and thoracotomy is an effective means of treating recurrent pneumothorax.

Keywords: Insufflation, Recurrent pneumothorax, Thoracoscopy, Thoracotomy

INTRODUCTION

It is observed that recurrence rate after first spontaneous pneumothorax ranges between 25% and 50%.[1-3] Several materials have been instilled into the pleural space through the chest tubes in attempts to decrease the recurrence rates. Tetracycline has been widely used and has been demonstrated to be more effective than placebo in a large controlled study.[4] Chemical pleurodesis has been attempted in spontaneous pneumothorax to minimize the recurrence rate. One of the sclerosing agent that has been used for this is talc, which has least chances of recurrence and comparatively very little side effects as reviewed in the literature. This study is structured to determine the efficacy of talc pleurodesis in patients with recurrent spontaneous pneumothorax. Talc reacts with pleura to release a protein named monocyte chemoattractant protein 1, which aggravates the inflammatory reaction.[5] Successful pleurodesis is associated with declined pleural fibrinolytic activity.

Parenteral tetracycline is no longer available because of increasingly stringent manufacturing requirements. Therefore, alternative sclerosing agents have been used. Bethune[6] in 1935 introduced insufflation of iodized talc to achieve pleural symphysis. Since then, several reports[7-10] have demonstrated its effectiveness in preventing recurrent pneumothorax. In none of these reports did the majority of patients have a recurrent pneumothorax. The objective of this study is to present our experience with a low dose (2 g) of aerosolized talc for controlling recurrent spontaneous pneumothorax.

METHODS

This series consisted of 18 patients, 9 (50%) of them men, mean age 35.6 ± 13.3 (range 15-62) years, admitted to the Department of Surgery with pneumothorax. After their admission to the department of surgery, all

patients were shifted to the department of pulmonary medicine, Teerthanker Mahaveer Medical College and Research Centre, Moradabad. All patients had previous ipsilateral episodes; three of them (16.7%) had also experienced previous contralateral pneumothorax. Six of the patients had at least six ipsilateral pneumothoraces, but only one had a previous attempt at pleurodesis. Eleven pneumothoraces were right-sided, six were left-sided, and one was bilateral.

Thoracoscopy was done through the fifth intercostal space at the posterior axillary line. If the lung surface appeared normal or only had tiny blebs, 2 g of sterile asbestos-free talc was aerosolized throughout the pleural space. If cysts greater than 0.5 cm were found, a thoracotomy was performed, and talc was insufflated into the pleura space at the time of surgery. In the sequence, one or two chest tubes were inserted and clamped for 2 h. After this time, the tubes were unclamped, the fluid or the air was drained from the chest into the water seal suction unit, and the patients were encouraged to move within the limitations of the chest tube. The drains were removed when no air had escaped for 24 h. The talc was aerosolized by allowing air to flow through a talc containing reservoir attached to an insufflator. The insufflator was inserted through the thoracoscope, so that the talc could be aerosolized throughout the pleural space. The patients received medication before the thoracoscopy, and the procedure was performed under general intubation anesthesia. Because talc is a foreign material, treatment with a broad-spectrum antibiotic was started before the procedure and continued until the chest tubes were removed. Chest radiography was performed shortly after intracavitary therapy and repeated on the second postoperative day and at subsequent follow-up visits.

Success was defined as the absence of recurrent pneumothorax. Any air in the pleural space was regarded as a treatment failure.

RESULTS

At the time of thoracoscopy, one patient was found to have a large apical cyst. This patient was subsequently subjected to thoracotomy and talc insufflated at the time of the surgery (Figure 1).

The remaining 17 patients had thoracoscopy plus talc insufflation. Post thoracoscopy, all patients received a posterior chest tube. The average time to remove this tube was 4.9 ± 2.3 (range 3-12) days. Only (16.7%) needed an anterior chest tube and the median time that this tube was left in place was 3.0 ± 1.0 days. Insufflated talc was very effective in preventing recurrence of the pneumothorax. Only (5.6%) had a recurrence during the follow-up period. After a second treatment with talc, there has been no new recurrence during a follow-up of 10 months. None of the remaining patients (94.4%) had recurrence of pneumothorax within an observation period averaging 38.5 ± 28.1 (range 4-89) months. The follow-up for patients (66.7%) with no recurrence was more than 2 years and for 6 (33.3%) more than 5 years (Figure 2).

One patient had a bronchopleural fistula prior to thoracoscopy. The fistula closed spontaneously after the procedure, and the chest tubes were removed after 6 days.

The patients in the present series tolerated the thoracoscopy and the talc insufflations well. Two patients (11.1%) complained of severe pain in the immediate period after the aerosolized talc. No episodes of respiratory distress syndrome or pneumonitis occurred after talc pleurodesis. There were no long-term adverse effects of talc in this series. Specifically, there was no evidence of pleural thickening on the chest radiographs, and the patients did not complain of increasing exercise intolerance.

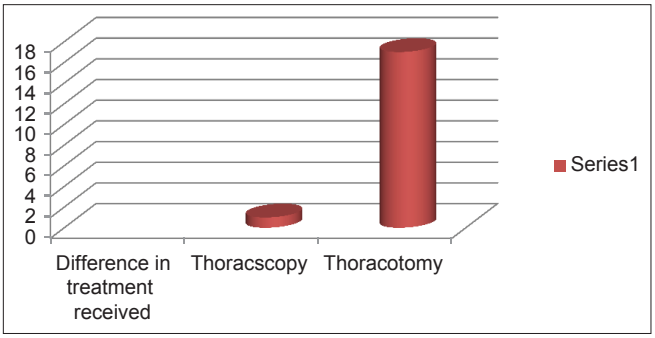

Figure 1: Difference in treatment received (thoracoscopy/ thoracotomy)

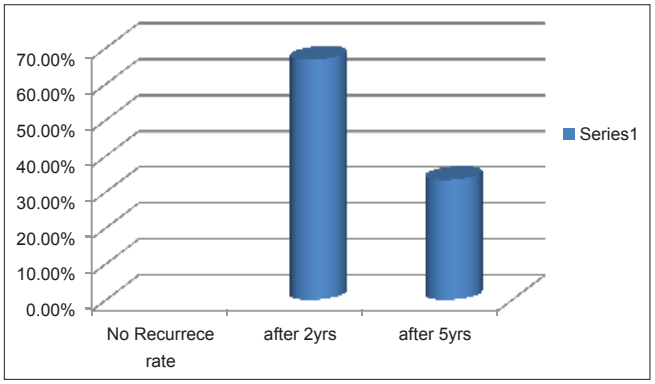

Figure 2: Decrease in recurrence rate of pneumothorax after 2 and 5 years period

DISCUSSION

The present study demonstrates that the intrapleural insufflation of 2 g of talc at the time of thoracoscopy is an effective means of treating recurrent pneumothorax. The efficacy is documented by the fact that the recurrence rate was only 5.6% despite a mean follow-up period of more than 3 years. One would expect most of the recurrences to develop within the first 3 years after the latest occurrence.[5]

Several reports have demonstrated that the recurrence rates can be decreased with the intrapleural instillation of sclerosing agents. The recurrence rate if no sclerosing agent is injected is approximately 40%.[9] The instillation of the intrapleural tetracycline significantly reduces the recurrence rates. Light *et al.*,[4] in a prospective multicenter study, reported that the recurrence rate in the tetracycline treated group (25%) was significantly less than that in the control group (41%).

Tassi *et al.*[11] observed only one recurrence (5%) in 20 patients treated with the intrapleural tetracycline with 1 to 3 years of follow-up.

Wied *et al.*[12] did not have any recurrence in 18 patients; however, the same group reported subsequently that 28% of the later group of patients suffered recurrence.[13] Doxycycline, another tetracycline derivative, is effective in the control of malignant pleuraleffusions.[14]

Bleomycin, an antineoplastic drug, is also an effective agent for controlling malignant pleural effusions, but it is not recommended for pneumothoraxbecause in the animal model, with normal pleura, it does not produce pleurodesis.[15] The rate of recurrence has been shown to increase after the first occurrence. Tribble *et al.*[16] did treat five patients with pneumothorax secondary to cystic fibrosis (including three with recurrent pneumothorax) and reported no subsequent occurrences. It appears that the intrapleural insufflation of talc is associated with relatively few side effects. The intrapleural administration of talc has been reported to cause acute pneumonitis[17] and adult respiratory distress syndrome.[18] Both of these reports involved only patients who had received the talc in a slurry, and in retrospect, we believe that they quite possibly had re-expansion pulmonary edema rather than an adverse reaction to talc. In the past, there was concern about the possibility that the asbestos in talc could lead to the development of malignant mesothelioma and other asbestos-related diseases. However, Lange *et al.*[8] studied 114 patients 22-35 years after talc pleurodesis for spontaneous pneumothorax and found no patients with mesothelioma. Additionally, asbestos-free talc is now available. There has also been concern that the intrapleural administration to young individuals could lead to progressive pleural thickening. Again the results of the study by Lange *et al.*[8] tend to discount this since the mean total lung capacity of patients who had received talc many years previously was 89% of predicted.

The recurrence rate in the present study using 2 g of talc was 5.6%, which is similar to the 8.3% reported by Almind *et al.*[9] after the administration of 5 g of talc.

CONCLUSION

The present study demonstrates that the intrapleural insufflation of 2 g of talc at the time of thoracoscopy is an effective means of treating recurrent pneumothorax. It is obvious from the fact that, that if no sclerosing agent is used, rate of recurrence is many times more than when we use the sclerosing agent like talc.

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Original Article

Prevalence of Obesity and Dietary Intake as One of the Determinant for Lifestyle Disorders in Bidar District: A Cross-sectional Study

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Abstract

Background: Obesity is one of the contributors to ill health which indirectly causes morbidity and mortality resulting from hyperlipidemia and glucose toxicity.

Objectives: This study was conducted to evaluate the correlation of obesity in the general population to the changing patient profile in view of increasing cases of lifestyle disorders such as hypertension, diabetes, and cardiac events. The objectives are to determine the prevalence of obesity with respect to the food intake, relationship of obesity with age, and to identify the predictors of obesity.

Materials and Methods: This community-based cross-sectional study conducted on 500 subjects, aged 20 years and above in Bidar district. Subjects were collected using multistage stratified random sampling technique. The obtained data were analyzed using the software statistical package stratified random sampling technique.

Results: As the age increases, it was observed that there is an increase in body mass index. The urban population were showing higher prevalence to obesity and in women without regards to the food intake and physical activity profile. The main predictors of the obesity were found to be as age, gender, and daily intake of saturated fatty acids. With the increase in the level of physical activity, it was observed a decrease in the prevalence of obesity (odd's ratio = 0.36).

Conclusion: Obesity is one of the most serious emerging public health problems in most of developing countries like India. This strongly indicates that intervention at the primary healthcare level, especially change in diet and physical activity like regular exercise are important for its prevention.

Keywords: Body mass index, Dyslipidemia, Obesity, Physical activity, Waist-hip ratio

INTRODUCTION

Health is a fundamental human right without distinction of race, religion and political belief, economic, and social condition. The work environment constituent an important part of man's total environment, so health to a large extent is affected by working condition. Though several types of environment exist, it is the physical environment that plays an important bearing on health.[1] Due to the changing food habits and lack of physical activity in the general population, obesity is becoming a leading cause of death worldwide, with increasing prevalence in adults and children. Obesity is preventable and can help prevent many lifestyle disorders like diabetes mellitus, hypertension if intervened early with appropriate measures. This becomes all the more necessary as authorities view it as one of the most serious public health problems of the 21st century.[2] Once considered a problem only in high-income countries, overweight and obesity are now dramatically on the rise in low and middle-income countries, particularly in urban settings. Bidar being a semi-urban center it is mainly consisting

mixed vegetarian and nonvegetarian eating population, the vegetarians mainly consuming Jowar (Sorghum). The changing food habits in the last two decades and emergence of lifestyle disorder may not be totally unrelated. Many low and middle-income countries are now facing a "double burden" of disease, i.e., malnutrition and burden of infectious diseases. They are simultaneously experiencing a rapid upsurge in chronic disease risk factors such as obesity and overweight, particularly in urban settings. It is not uncommon to find under-nutrition and obesity exists side by side within the same community and even within the same household. This double burden is caused by inadequate prenatal, infant and young child nutrition. The most significant long-term consequences of childhood and adolescent overweight and obesity are their persistence into adulthood with all their attendant health risks, such as dyslipidemia. Hyperinsulinemia, Type 2 diabetes, hypertension, cardiovascular disease, arthritis, and behavioral problems.[3-5]

Therefore, this study was undertaken to estimate the prevalence of obesity among the adult population of Bidar, a city in South India, and also to see its association with other factors such as socio-economic status, educational qualification, level of physical activity, and dietary intake.

MATERIALS AND METHODS

Study Population

The sampling frame consisted of the total population of Bidar district aged more than 20 years.

Study Design and Sample Size

This sample size required based cross-sectional study. The sample size required (n = 232) was calculated taking a prevalence of 6.2%, as reported in the five-city study from Medak, with a precision of 2.5% and a confidence level (CI) of 95%.[6,7] The formula used, $N = Z^2_{(1-a/2)}\, pq/d^2$ (where $Z_{(1-a/2)}$ was taken at 95% CI; P = prevalence of obesity, Q = 1-p; d = absolute precision. For this study, P = 6.2% Q_93.8%; d = 2.5%. Adding 10% for incomplete answers. The total number came out to be 257. Since it was multistage stratified random sampling, the design effect of 2 was included to minimize any error due to inherent variation in the population. The calculated sample size was multiplied by 2 to obtain the sample size of 514. The data were analyzed for 500 subjects only who had provided complete answers.

Sampling Technique

Urban Bidar has 33 wards and a total population of 1,72,877, according to 2001 census, and rural Bidar has 10 blocks and a population of 11,277,348, which means that about two-thirds of the total population of Bidar district is urban population.[8] Therefore, applying probability proportional to the size, out the urban population, and 170 were randomly sampling technique was used to select representative subject of Kanpur district. At the first stage, 8 wards were randomly selected to study the urban population. Similarly, to study the rural population, 4 blocks were randomly selected. At the second stage, 1 urban locality from each block was randomly selected. A total of 48 subjects from each urban locality/village was interviewed to complete the required sample size.

Selection of Subject

The households in very urban area/village were selected for the study by systematic random sampling. Depending upon the population of a particular urban locality/village, a random number was chosen, and every n^{th} household was selected for the study. This process was continued till the required sample size was completed. In every household, only member aged more than 20 years was randomly selected. Data collection was done from June 2011 to February 2012.

Data Collection

A pretested structured questionnaire was used to elicit the required information from the study participants. Informed verbal consent was taken from each of the participants.

Social class was calculated using modified Kuppuswamy scale in the urban population and Pareek scale in the rural population[9,10] physical activity can be expressed as increments of basal metabolic rate (BMR). In the present study, subject's BMR factor was calculated by questioning him/her about the type of activity and time spent in performing each activity in last 24 h. On the basis of the BMR facto, the level of activity was classified as follows: Average daily level of activity of adults classified as sedentary, moderate or heavy, expressed as a multiple of BMR (Table 1).

Respondents were defined as smokers if they were smoking at the time of the survey and had smoked more than 100 cigarettes in their lifetime.[11] An alcoholic was defined as a subject who suffers from alcoholism, generally taken to refers to chronic continual drinking or periodic consumption of alcohol which is characterized by impaired control over drinking, frequent episodes of intoxication, and preoccupation with alcohol and the use

Table 1: Sex-wise daily activity of adults as classified

Sex	Sedentary	Moderate	Heavy
Men	1.55	1.78	2.10
Women	1.55	1.64	1.82

of alcohol despite adverse consequences. A nonvegetarian was defined as any subject consuming non-vegetarian food items including eggs at least once a week or more.

The daily oil intake was calculated by asking for the average monthly consumption of different types of oil by the whole family and dividing it by the total consumption unit and then dividing it by 30 to calculate the average daily intake in g/person/day. Then, for each type of oil specific fractions of saturated, monounsaturated, and polyunsaturated oil were calculated using standard formulae to give the total of each type of fraction consumed in g/person/day.

Body weight was measured to the nearest 0.5 kg and height was measured to the nearest 0.5 cm. Body mass index (BMI) was calculated as weight in kg divided by the square of the height in meters. BMI was also calculated for the patients and siblings of the subject, if possible and the subject was classified as having a positive family history if either or these had a BMI ≥30 kg/m^2.

Data were analyzed using the software SPSS 10.01 for windows (IBM). Discrete data were analyzed using person's Chi-square test for non-normal distribution, and continuous data were analyzed using Student's test. The significance of various determinants was calculated by multivariate logistic regression analysis with presence of obesity as dependent variable and determinants as independent variable. Two-tailed $P < 0.05$ was considered significant.

Observations

The overall of obesity (BMI ≥30 kg/m^2) was observed to be 4.74% (95% CI: 4.73% to 4.75%). The prevalence of obesity was found to be significantly higher in the urban population (6.2%) as compared to rural (1.9%) and among women (7.2%) as compared to men (1.7%). The weighted average fro place was 4.76%, and the weighted average fro gender was 4.75%. In this study, 26.4% of the urban population and 14.3% of the rural population were overweight (BMI between 25 and 30 kg/m^2). The prevalence of overweight was 18.8% in men and 21.6% in women. The mean BMI (overall) was 21.0 ± 3.8 kg/m^2 and 22.4 ± 4.6 kg/m^2 in men and women, respectively. The mean BMI was significantly higher in men as compared to women in 40-90 years and 50-59 years age group. An increase in mean BMI was seen with increasing age up to 40-49 years in men and 50-59 years in women and thereafter, it showed a decline (Table 2).

The association between obesity and marriage was found to be significant ($P = 0.03$) (Table 3). Obesity was observed to be less common in nuclear families, but this difference was not significant. Educational ($P = 0.43$), socio-economic status ($P = 0.39$), smoking ($P = 0.43$), holism ($P = 0.61$), eating habits (0.55) as well as family history of obesity of ($P = 0.38$) were not found to be significantly associated with obesity. There was no association between the levels

Table 2: BMI levels in various age groups

Age (years)	Men			Women			*P* value
	Number of subjects	Mean BMI	SD	Number of subjects	Mean BMI	SD	
20-29	77	20.4	2.9	107	20.7	4.0	0.36
30-39	62	21.7	4.0	81	22.7	4.4	0.07
40-49	43	22.4	3.8	55	23.8	4.5	0.04*
50-59	21	21.8	4.7	24	26.0	4.9	<0.01*
>60	20	21.7	4.7	11	20.5	3.8	0.34
Total	223	21.4	3.8	278	22.4	4.6	<0.01*

Values are expressed as mean±SD, *P<0.05 is significant, SD: Standard deviation, BMI: Body mass index

Table 3: Association of determinants in obese and nonobese subjects (*n*=500)

Determinants	Number of cases (%)			Statistical test	*P* value
	Obese (*n*=24)	Non-obese (*n*=476)	Total		
Gender					
Female	19 (7.2)	258 (92.8)	277	χ^2=13.26	0.00*
Male	5 (1.7)	218 (98.3)	223		
Place					
Urban	20 (6.2)	312 (93.8)	332	χ^2=8.02	0.01*
Rural	4 (1.14)	164 (98.1)	168		
Marital status					
Married	21 (5.5)	386 (94.5)	407	χ^2=4.56	0.03*
Unmarried	3 (1.4)	90 (98.6)	93		
Family type					
Nuclear	15 (4.3)	343 (95.7)	358	χ^2=0.71	0.40
Joint	9 (5.8)	133 (94.2)	142		
Educational status					
Illiterate	8 (5.6)	147 (94.4)	155	χ^2=0.62	0.43
Literate	16 (4.3)	329 (94.2)	345		
Socio-economic status (class)					
I	1 (10.0)	6 (90.0)	7	χ^2=4.07	0.39
II	2 (2.9)	43 (97.1)	45		
III	8 (6.7)	112 (93.3)	120		
IV	9 (3.7)	243 (96.3)	252		
V	4 (5.7)	72 (94.3)	76		
Smoking					
Smoker	1 (1.2)	50 (98.8)	51	χ^2=2.51	0.16
Nonsmoker	24 (5.1)	425 (94.9)	449		
Alcoholism					
Alcoholic	0 (0.0)	14 (100.0)	14	χ^2=1.13	0.61
Nonalcoholic	24 (4.9)	462 (95.1)	486		
Vegetarianism					
Vegetarian	20 (4.9)	396 (95.1)	416	χ^2=0.34	0.55
Nonvegetarian	4 (3.8)	80 (96.2)	84		
Family history of obesity					
Positive	5 (6.8)	69 (93.2)	74	χ^2=0.76	0.38
Negative	19 (4.9)	407 (95.1)	426		
Physical activity					
Sedentary	20 (6.6)	292 (93.4)	302	χ^2=10.58	0.01
Moderate	4 (2.2)	136 (97.8)	140		
Heavy	0 (0.0)	48 (100.0)	48		

of education, socio-economic status. Subjects with a sedentary lifestyle had a significantly higher prevalence of obesity (6.6%) as compared to those with moderate (2.2%) or heavy level (0.0%) of physical activity. Table 4 shows that mean daily saturated fat intake of the obese population was significantly higher than nonobese, however, there was no significant difference between the mean daily intakes of mono or polyunsaturated fat in the obese and nonobese population.

Multivariate logistic regression analysis to remove the confounding effects of various factors revealed that age (odds ratio [OR] = 1.03, CI: 1.00-1.06) was a significant independent predictor of obesity (Table 5). Furthermore, females were about five times at increased risk of being obese as compared to males (OR = 5.35, CI: 1.81-15.75), and higher daily intake of saturated fat increased the risk slightly of physical activity resulted in a decrease in the prevalence of obesity (OR = 0.36, CI: 0.13-0.99).

Place of residence, marital status, smoking, and family history of obesity ceased to act as independent predictors of obesity after indirect standardization through multivariate logistic regression analysis.

DISCUSSION

The present study was an attempt to study the prevalence of obesity and the factors associated with it. The 7.2% prevalence of obesity among women in this study compares well with contemporary cross-section study using the same criteria (BMI ≥30 kg/m^2): 8.5% in Trivandrum, 7.1% in Calcutta, 8.3% in Bombay and 6.2% in Moradabad as reported in five city study, conducted in subjects aged 25 years and above.[6] However, among men (1.7%) in this study as compared to that in Trivandrum (7.4%), Bombay (7.2%) and Nagpur (5.0%).

The prevalence of overweight (BMI between 25 and 30 kg/m^2) in this study was 18.8% in men and 21.6% in women as compared to 32.0% and 35.0%, respectively, in the five city-study, which was considerably higher.[7]

An increase in BMI was seen with increasing age. A similar distribution of the mean BMI over the age groups and sex was seen in a study reported from Turkey.[12] Likewise, the present study has also reported a decrease in mean BMI in the people aged 60 years and above.

Our findings indicate that the marriage (P = 0.03) was associated with an increased risk of obesity as also observed in another study[13] from Iran (P < 0.001). However, unlike the present study, the Iranian study reports an association between the risk of obesity and history of parental obesity (P < 0.001). The results of this study regarding subjects with a sedentary lifestyle having a higher prevalence level of obesity as compared to those moderate or heavy level of physical activity (P = 0.01) were comparable with the five-city-study.[7]

The independent factors found associated with obesity using multivariate logistic regression analysis were comparable with studies from turkey[12] and Tehran[13] at that showed that age (per year), sex, illiteracy, and very low physical activity as the variables that affected obesity. A similar finding was reported the Iranian study where an inverse relationship was observed obesity and high-level occupational activity (OR = 0.44, P < 0.0001).[14] Surprisingly, the present study does not reveal any relationship between smoking or education status and obesity. The risk of obesity

Table 4: Dietary determinants in obese and nonobese subjects (*n*=500)

Fat intake (g/person/day)	Obese (*n*=24)	Non-obese (*n*=476)	Statistical *t*-test	*P* value
Total fat	31.1±12.6	25.9±13.6	1.28	0.22
SFA	6.6±5.7	4.2±5.7	2.54	0.01*
Monounsaturated fatty acid	16.1±33.5	16.5±9.2	0.06	0.95
Polyunsaturated fatty acid	6.9±5.6	8.6±7.7	1.51	0.13

Values are expressed as mean±SD, *P<0.05 is significant, df=499 for t-test, SD: Standard deviation, SFA: Saturated fatty acid

Table 5: Multivariate OR for the prevalence of obesity according in major determinants (*n*=419)

Determinants	B- coefficient	SE	OR	95% CI		*P*-value
				Lower	Upper	
Intercept	−3.49	2.76				0.26
Place (1=urban, 2=rural)	−0.21	0.40	0.80	0.36	1.77	0.59
Age (per 1 year)	0.03	0.01	1.03	1.00	1.06	0.02*
Gender (0=men, 1=women)	1.67	0.55	5.35	1.81	15.75	0.00*
Marital status (1=married, 2=unmarried)	−1.32	0.76	0.26	0.05	1.20	0.08
Smoking (0=absent, 1=present)	0.25	1.14	1.29	0.13	12.19	0.82
Family history (1=positive, 2=negative)	−0.77	0.45	0.46	0.18	1.13	0.09
Physical activity (0=sedentary, 1=moderate, 2=heavy worker)	−0.99	0.50	0.36	0.13	0.99	0.04*
SFA (per g/person/day)	0.05	0.02	1.05	1.00	1.00	0.03

*P<0.05 is significant, df=1; CI: Confidence interval; SE: Standard error, OR: Odds ratio, SFA: Saturated fatty acid

for women in the fourth quartile of saturated fatty acid (SFA) consumption was higher than that for those in the first quartile which was comparable to the increased risk of obesity with higher intake of SFA as seen in this study.

The present study was an attempt to study the prevalence of obesity and its associate factors. Due to the limitations of the resources, we were unable to conduct a study on a larger area and, therefore, the estimates of prevalence might not be strictly applied. Furthermore, the proportion of females in this study was higher than males which could not be controlled for since the selection of subjects was done by random sampling. Furthermore, possibility of females participating in the study is greater than those of males in the house to house survey because the males are usually out for work. A lower proportion of people in the age group 60 and above could be a result of higher mortality rate in this age group and the lower mean BMI may not be, therefore, truly representative of this age group.

Developing countries like India are being faced with the global pandemic of non-communicable diseases. The high prevalence of overweight, 18.8% in men and 21.6% in women, and an increasing prevalence of obesity of 4.7% in the urban population make it clear that overweight and obesity need to be ranked among one of the top priorities in national health programs. Since age is a risk factor, prevention Programs should start at earlier ages. There is also a need for health education Programs regarding adopting healthy eating and working lifestyles to regarding adopting healthy eating and working lifestyles to reduce BMI values and thereby the prevalence of obesity in the community. Further research is required to substantiate the impact of modifiable risk factors of obesity and the effect of primary prevention in the brining down the burden of obesity and subsequently reducing morbidity due to related noncommunicable diseases.

CONCLUSION

Obesity is the single most important predictor of ill health and morbidity in the general population with regards to new age life style disorders and an entity which can be effectively modified with interventions at both personal and community levels to bring about desirous results.

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Original Article

Microteaching of MBBS Students Presenting Seminars: An Observational Study

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Abstract

Introduction: Presentations are a must in every professional meeting. What can be done to improve them at the basic level was our concern. Student seminars are now a routine in medical institutes.

Aims and Objective: The aim was to evaluate the use of microteaching sessions for MBBS students presenting in seminars.

Materials and Methods: In this study, 4 seminars were conducted in different departments in a period of 3 months from March 2011 to February 2012. 12 students consented to participate. The students underwent one microteaching session before their final presentations. During this session, they presented in front of faculty of the same subject in the respective departments, they were given constructive feedback regarding their presentation for improvement in presenting skills. They were again assessed on the same points during the final presentation in front of all the batch students by the same faculty, and then they were asked to fill "self-evaluation forms." The faculty was asked to give feedback about the microteaching sessions and its efficacy in improving presenting skills.

Results: There was about 30% improvement in performing presenting skills by the students. Feedback was also taken from students about this exercise; almost all of them had a great overall experience. There is a drastic improvement both objective and subjective for the students in their presentation skills, especially with the introduction of these microteaching sessions, which may alternatively be called as "micro presenting" sessions for the students.

Conclusion: Apart from self-learning and improvement in presenting skills of presenting students, there is also large group learning for the audience students. Micro presenting sessions integrated two teaching-learning methods- microteaching and seminars. The faculty in our institute got apprised of the microteaching.

Keywords: Microteaching, Micro presenting, Presenting skills, Seminars, Teaching-learning methods

INTRODUCTION

Presentations have now a day's become a necessity in every conference/workshop for all professionals. Most of the doctors (i.e., health professionals) don't know how to prepare their presentation and if they know it, then they sometimes have difficulties in presenting in front of a large audience. What can be done for this problem is a concern?

Student seminar are now a routine in medical institutes as a small group teaching method.[1,2] Our aim was to evaluate the use of "microteaching" sessions for MBBS students presenting in the seminar before their final presentation.[3] Knowledge acquisition, skill acquisition, and transfer are the three different phases of microteaching.[4,5] This, we believe would improve the communication and specifically presentation skills of students and thereby of future health professionals, especially in front of large group.[6]

It would also sensitize the students and teaching faculty of the institute about advantages of microteaching.

MATERIALS AND METHODS

The study was conducted in NKP Salve Institute of Medical Sciences and Research Center, Nagpur. In this

study, 4 seminars were conducted in different departments of our tertiary care teaching medical institute in a period of 12 months from March 2011 to February 2012. Institutional Ethics Committee approval was taken before starting the project. Total 12 students consented to participate in microteaching sessions before presenting seminars. 4 students participated in pharmacology, 2 in microbiology, 2 in pathology, and 4 students participated in orthopedic seminar. These students were given the participant information sheet about the project before giving consent. The students who gave consent and then attended microteaching session were included in the study. The students underwent one microteaching session before their final presentations. The students were told about the presentation skills before the microteaching session. During this session, they presented in front of faculty of the same subject in the respective departments. They were given constructive feedback regarding their presentation for improvement in presenting skills by the faculty. The parameters in which they were assessed are given in Table 1. They were again assessed on the same points during the final presentation in front of all the students of their respective batch by the same faculty, and then they were asked to fill "self-evaluation forms" (Annexure 1). The faculty was asked to give feedback about the microteaching sessions and its efficacy in improving presenting skills (Annexure 2).

RESULTS

Students who underwent microteaching sessions were observed as per checklist and were again observed as per the same checklist in the final presentations.

A total of 12 students participated in the study, the results of their participation were tabulated according to the presenting skill they had performed during their presentations as assessed by the faculty. They are collectively as given in Table 2.

The Table 2 shows that, students were able to perform the presenting skills about 30% times more in their final presentations than in microteaching sessions. Presentation skills improved in the following fields-starting a presentation, changing emphasis, using nonverbal cues, summarizing. The fields where in spite of microteaching, students could not do well were – involving the audience by asking questions, allowing them to ask questions. The parameters which were not affected with microteaching were – using audio-visual aids and relevant content matter.

The feedback was taken from the 14 teaching faculty who participated in the microteaching sessions. As per the feedback forms 12 (85%) were aware of the concept of microteaching, only 1 (7%) amongst them was not aware about it. 13 (92%) found the concept useful for the presenting MBBS students. 10 (71%) thought that microteaching is feasible for the faculty. while 9 (64%) found the concept useful for the faculty, 5 (36%) say it may be helpful to some extent only. 8 (57%) i.e., Almost half of them thought that lack of time is the main obstacle for implementation of this remaining say lack of motivation. However, none feels that microteaching is not a good method or that there're any institutional factors hindering its implementation.

Feedback was also taken from students about their experience of this exercise; almost all of them had a great overall experience. They learnt presenting skills, some could overcome the stage fear, and most of them felt improved confidence levels. They realized the hard work needed to prepare for teaching and that controlling of students during the class is really a difficult task. Some of them found teaching to be really exciting.

Table 1: Presenting skills on which students were assessed

Skill	Presenter's action	Yes	To some extent	No
Set induction	Aroused interest in the beginning by relating to previous learning, throwing new ideas, questioning, etc.			
	Specified the objective of the presentation			
Planning	Organized material in a logical sequence			
	Use relevant content matter			
Presentation	Change the pace of presentation by shifting emphasis, joke etc.			
	Used non-verbal cues, eye contact etc.			
Pupil involvement	Allowed question from students			
	Asked questions			
	Solicited/raised questions			
	Rewarded pupil effort			
Use of AV aids	Used proper AV aids			
	Used the aids effectively			
Closure	Summarized most important points at the end of the session			
Lesson on whole was effective/ineffective				

AV: Audio-visual

Table 2: Percentage of skills performed by students

Student number	Presentation skill-actions					
	In microteaching session			Final presentation		
	Done (%)	To some extent (%)	Not done (%)	Done (%)	To some extent (%)	Not done (%)
01	55	26	17	82	4	05
02	63	22	14	84	15	0
03	46	34	26	72	23	03
04	71	23	05	81	16	01
05	22	42	35	85	1	04
06	40	41	18	90	7	1
07	50	26	23	82	10	07
08	44	37	17	73	19	7
09	17	58	23	38	43	17
10	45	18	35	47	52	0
11	35	45	18	78	21	0
12	40	38	21	64	35	0
Average score	44	34	21	73	21	4

DISCUSSION

Microteaching, a teacher training technique currently practiced worldwide, provides teachers an opportunity to perk up their teaching skills by improving the various simple tasks called teaching skills. With the proven success among the novice and seniors, microteaching helps to promote real-time teaching experiences. The core skills of microteaching such as presentation and reinforcement skills help the novice teachers to learn the art of teaching at ease and to the maximum extent.[4,7]

A microteaching exercise before presenting a seminar is a valuable tool to help students develop communication, critical-thinking, and problem-solving skills.[3,8] Further, it helps increase student learning, helps students to "think on their feet" and be reflective, provides an opportunity to have students analyze their own and fellow classmates' presentation methods and develops their skill in the provision of constructive feedback through peer assessment.[3] We tried using this technique for training of students with a dual purpose, learning and presenting. As per the above results, there is a drastic improvement both objective and subjective for the students in their presentation skills, especially with the introduction of these microteaching sessions, which may alternatively be also called as "micro presenting" sessions for the students. The word microteaching is used primarily for teachers; therefore, we propose a change in the terminology to "micro presenting." Although this method of teaching is like self-learning for preparing a presentation, it also involve small group learning methodology for presenting students by micro presenting in front of the faculty earlier and large group learning for the audience students. However, students still perceive small group learning to be more effective than large group learning.[1] The students were told about the presentation skills before the microteaching session, but still the improvement occurred only after their presentations, this implies that these presenting skills can be best learnt by doing those skills themselves rather than by any other method.[8,9] This also implies that such students who are learning to present skills from their undergraduate level, in the future will certainly have good presentations in various scientific or social gatherings which are a must for any health professional. Though there are possible chances of not providing proper feedback during the initial sessions, the skilled ability to evaluate and provide constructive feedback by the small group increases when there is an increase in the number of micro presenting sessions before the actual seminar.[10]

Furthermore, that with this exercise the faculty in our institute were appraised of the advantages of microteaching and almost all willingly agreed to participate in these micro presenting sessions.[11,12]

A limitation of the study were small sample size, involves a lot of time of the students as well as faculty to come together for both the sessions in a busy schedule and on few occasions the faculty who attended microteaching sessions were unable to attend final seminars and some who attended final were unable to attend microteaching sessions. These we had to exclude from our results.

Still considering this as a preliminary study, more educational research can be planned particularly for improving the quality of presentations by medical students.

CONCLUSIONS

Micro presenting sessions integrated two teaching learning methods-microteaching and seminar presentation. It

certainly improved the presentation skills of MBBS students. The faculty in our institute got appraised of the microteaching. All the medical students are going to become health professionals in the future, we recommend the introduction of micro presenting sessions before seminars for improving their quality of presentations.

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ANNEXURE 1

Microteaching self-evaluation form

Presenter: _____ Date: _____

Lesson topic: _____

- What I learnt from preparing and teaching this session?: _____
- My general overall feeling about this lesson:_____
- I feel my level of preparation for teaching this lesson was: _____
- I thought my peers responses to the lesson were: _____
- The most difficult component to teaching the lesson was: _____
- The most positive aspect of this experience was: _____
- I would rate the entire experience as a _____

ANNEXURE 2

Feedback form for faculty

Please tick mark for what you feel suit's best

1. Were you aware of the concept of microteaching before this session?
   - Yes ☐
   - To some extent ☐
   - No ☐
2. How do you find the concept for the presenting MBBS students?
   - Helpful ☐
   - To some extent ☐
   - Not helpful ☐
3. What do you think about feasibility of microteaching for teaching faculty?
   - Feasible ☐
   - Not feasible ☐
4. What do you think will be the obstacles for implementation of microteaching for faculty (instead of students)?
   - Lack of time ☐
   - Lack of motivation ☐
   - Not that good ☐
   - Institutional problems ☐
5. How do you find the concept of microteaching for teaching faculty?
   - Will be helpful ☐
   - To some extent ☐
   - Will not be helpful ☐
6. Are you willing to undergo microteaching sessions before your lectures/presentations?
   - Yes ☐
   - No ☐

Original Article

Knowledge, Attitude, and Practice of Contact Lens Users among Medical College Students in Tamil Nadu

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Abstract

Introduction: The aim of the study is to assess in medical students of Tamil Nadu the knowledge, attitude, and practice of contact lens wear and to highlight the complications of contact lens use and the correct methods to be followed.

Materials and Methods: Study was conducted by providing semi-structural questionnaire. Questions are in English and regarding the use of contact lens, maintaining cleanliness of contact lens, ocular complications due to use of contact lens, benefits using contact lens.

Results: Of total 600 students surveyed, 128 were wearing contact lens, 80 were females and 48 males. 9.3% were wearing for cosmetic purpose and 6.25% for refractive purpose and rest for both cosmetic and refractive together. Majority were wearing soft contact lenses. 92% have experienced some problem with contact lens use and the most common was discomfort followed by redness and irritation. The students were aware of cleaning material and used lens solution, but 5.4% used water when lens solution not available.

Conclusion: Majority of the participants did not know about these complications. There must be more education to the consumers about the contact lens care and complications related to contact lenses, which should be provided by all contact lens providers. There is a need to enact laws that will regulate dispensing of contact lenses by unqualified persons, as well as purchase or sale of contact lens.

Keywords: Contact lens, Medical students, Overwear syndrome

INTRODUCTION

Contact lenses are thin optical corrective lenses worn on the eye, resting on the surface of the cornea.[1] They cling to the film of tears over the cornea due to surface tension. Contact lenses are popular in young school and college students. Contact lenses are devices that can be worn to correct vision, or for cosmetic or therapeutic reasons.[2] According to survey in 2004, it was found that 125 million people use contact lens throughout the world.[3] Contact lenses provide better peripheral vision and can be used in the rain without causing any problem. All these reasons make contact lens ideal for sports and other outdoors activities. Diseases like keratoconus are treated with contact lens.[4] Another advantage of contact lens is that it eliminates prismatic effects of spectacles, and the field of vision is increased. The number of people who use contact lenses are increasing day by day yet people are not fully aware of various merits and demerits of contact lenses.[5] Dry eye, giant papillary conjunctivitis, corneal abrasion, corneal edema, corneal ulcer, keratitis, and neovascularization are common complications that contact lens wearers encounter.[6] The awareness about these complications was lacking in the younger generation, and 87% of these users preferred contact lens use in spite of the ocular problems due to cosmetic reasons.[7] Ocular health education especially knowledge in the correct and careful practice regarding contact lens wear can prevent complications resulting from the wearer's inappropriate behavior.[8] Contact lenses are usually safe as long as they are used correctly. Hence, we wanted to study whether medical students who are the future practitioners have the knowledge about the proper handling techniques of contact lens and make them aware of the complications.[9]

MATERIALS AND METHODS

A 1-year cross-sectional study was conducted in Chettinad University. Medical students and dental students were included in the study. There were total 400 medical students and 200 dental students included during the study period, out of which 128 students who have worn contact lens for any period were included for the study. Thus, the prevalence of contact lens wearers was 22%. After explaining the purpose of study, informed consent was obtained. Study was conducted by providing pretested, semi-structured questionnaire. Questionnaire was in English, and it contained questions about the use of contact lenses, how to maintain them and awareness of the complications they may encounter due to improper use of contact lenses. Data were collected and tabulated, and percentage was calculated and analyzed using SPSS software version 22.00.

RESULTS

Of total 600 students surveyed, 128 were wearing contact lens and 80 were females and 48 males. 9.3% were wearing for cosmetic purpose and 6.25% for refractive purpose and rest for both cosmetic and refractive together. Majority were wearing soft contact lenses. 64% of students wore contact lens for 5-10 h/day, 4.6% habitual overnight and 8.5% occasional overnight use. 92% have experienced some problem with contact lens use and the most common was discomfort followed by redness and irritation. The students were aware of cleaning material and used lens solution, but 5.4% used water when lens solution not available. 52.34% were using contact lens recently for less than a year and 45.31% for 1-4 years. 95% were aware of knowledge of washing hands before using contact lens. 52% were not aware of overwear syndrome. Many girls were not aware of side effects of kajal use, and they were using kajal with contact lens. 57% were aware of acanthamoeba infection by using water as lens solution. 21% have swum wearing contact lens. 73% preferred contact lens over spectacles even though they experienced side effects. Girls preferred contact lens over boys mainly for cosmetic reasons (Table 1).

Table 1: Questionnaire

Question	Number (%)
Purpose of contact lens use	
Refractive error	8 (6.25)
Cosmetic	12 (9.3)
Both	108 (84.3)
Type of contact lens	
Soft	124 (96.87)
Semisoft	4 (3.12)
Hard	0
Rigid gas permeable	0
Since how long are you using contact lens?	
Less than 1 year	67 (52.34)
1-4 years	58 (45.31)
more than 4 years	3 (2.34)
Duration of contact lens used?	
Daily 5-10 h	82 (64.06)
Daily 10-15 h	29 (22.65)
Occasional overnight use	11 (8.59)
Habitual overnight use	6 (4.68)
Have you experienced any of these symptoms of contact lens use?	
General discomfort	79 (61.71)
Redness, pain, watering	37 (28.90)
Other symptoms	3 (2.34)
No symptoms	9 (7.03)
Cleaning material used?	
Lens solution	121 (94.53)
Water/tap water	7 (5.46)
Do you remove contact lens before going to sleep?	
No	11 (8.59)
Yes	117 (91.40)
Do you wash your hands before handling the lens	
No	6 (4.68)
Yes	122 (95.31)
Use of contact lens beyond expiry date?	
No	123 (96.09)
Yes	5 (3.90)
Knowledge about overwear syndrome?	
No	52 (40.62)
Yes	76 (59.37)
Knowledge about side effect of kajal use?	
No	87 (67.96)
Yes	41 (32.03)
Knowledge about duration of solution used for cleaning contact lens?	
No	54 (42.18)
Yes	74 (57.81)
Knowledge about acanthamoeba infection due to use of water as cleaning material for contact lens?	
Yes	73 (57.03)
No	55 (42.96)
Swimming while wearing contact lens	
No	101 (78.90)
Yes	27 (21.09)
Which do you prefer? and why?	
Contact lens	93 (72.65)
Spectacles	35 (27.34)

DISCUSSION

There is no literature available about the prevalence and pattern of contact lens in medical students from South India, even though large numbers of young adults are wearing contact lenses. Chavan *et al.* study done in Maharashtra showed prevalence of contact in medical students was 17% which was less than ours.[10] Lee *et al.* from Singapore has reported that the prevalence of contact lens use was 8% in their country of age between 15 and 50 years. A study of prevalence of contact lens usage among medical students done by Tajunisah *et al.* was much lower than a similar study reported by Vidotti *et al.* from Brazil (27.4%).[9] Hence, it shows that the prevalence is increasing recently.

Majority of contact lens users were females like other studies, and the reasons were cosmetic.

According to Claydon *et al.,* the reasons of noncompliance in contact lens wear are lack of hand and lens-case hygiene and the over wearing of contact lenses, education was thought to be one of the main factors which will influence compliance. But the results show that the extra education offered had no significant effect on the compliance levels of the patients, and many were still not aware of expiry dates and about overwear syndrome.[11]

A study done by Curran *et al.* among 787 contact lens wearers revealed that only 30% cleaned their lens case daily and that too mainly with tap water only. Most ophthalmologists recommend that lens cases should be cleaned daily with fresh contact lens solution and allowed to air dry. The lens cases should be replaced at least every 90 days.[12] In our study, we found that some of the contact lens users were using tap water to clean the contact lenses. The results of these studies discussed above shows similarities with our current study which shows that many contact lens wearers are increasing their risk to infection and complications by not properly following the lens care methods.[13] It is important to change the storage solution as there is always the chance of contamination of pathogens. Moreover, when it is stored, pathogens multiply and adhere to the contact lens making the contact lens quite a good vector for infection.

Majority of students (96%) were using soft contact lenses as they are more comfortable and better-tolerated. Same was noted by Tajunisah *et al.* in his study 82% students were using soft contact lenses and Chavan *et al.* 94% were using soft contact lens.

In our study, 8% of the students were sleeping with the lenses, which might predispose to corneal infection. Another study by Feys also noted that in addition to poor hygiene, contaminated lens solution, and contamination of contact lens storage case, overwear syndrome also is the cause of bacterial keratitis.[14] People who are wearing contact lens while sleeping are usually more prone to eye complications due to a longer period of contact of the lens on the cornea as it causes corneal anoxia.[15] In the present study, 22% students were using contact lenses for more than 10 h. This observation is contradictory to observation of Chavan *et al.* as in their study 65.5% students were using contact lens for 10-12 h.

Students who use contact lenses for prolonged time have faced problems such as general discomfort (43.10%) and (20.68%) redness. Similarly, study by Unnikrishnan and Hussain has revealed that general discomfort (47.7%) and (19.2%) redness.[16] There are many ocular symptoms, a contact lens user can encounter such as dry eye or gritty sensation, redness, excessive lacrimation, eye pain, photosensitivity, and presence of haloes.[17,18] 68% of students did not know the side effects of kajal use in contrary with Chavan *et al.* where only 12% did not know. Kajal causes irritation and can aggravate dryness of eyes. Education should be given that removal of contact lens at the first sign of eye symptoms is very important for early recovery from the complications.[19]

Recommendations for contact lens wearers from the American Optometric Association:[20]

1. We should always wash and dry our hands before handling the contact lenses
2. We should carefully and regularly clean the contact lens as directed. Rub the contact lenses with fingers and rinse well before we soak the lenses overnight in sufficient multi-purpose solution so that it completely cover the lens
3. Lens should be stored in proper storage case and should be disposed every 3 months, and it should be cleaned after each use
4. Only fresh solution should be used to clean and store contact lenses, and the solution should not be reused
5. Should always follow the contact lens replacement schedule recommended
6. Contact lenses should be removed before swimming or entering a hot tub.

CONCLUSION

Contact lens can cause serious complications such as corneal opacities, vascularization, and ulcer. Many students did not know about these complications.[17] There is a need for more education to the contact lens users about the contact lens care and complications related to contact lenses, which should be provided by doctors before prescribing.[21] Education, improving communication, behavioral modifications are important to improve the compliance.

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Original Article

A Clinical Trial of Treatment of Uncomplicated Typhoid Fever: Efficacy of Azithromycin Versus Ceftriaxone

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Abstract

Introduction: Typhoid fever being a common and potentially fatal infection in children of developing countries, has found to have emerging resistance patterns for common drugs. Hence, there is a need for simple and cost effective therapy to have successful treatment and suppression of emerging drug-resistance.

Materials and Methods: A non-randomized case-control study was conducted in Pediatric Department of Cheluvamba Hospital, attached to Mysore Medical College and Research Institute, Mysore, over a period of 6 months from December 2012 to May 2013. The study included 100 children (2-17 years) with Widal-positive, uncomplicated-typhoid fever; out of which 50 children treated with low dose oral-azithromycin for 6 days, were compared with remaining 50 children treated with intravenous-ceftriaxone for 7 days. Every day each child was clinically evaluated, and study result was assigned as clinical and microbiological cure or failure at the end of the therapy duration. The descriptive statistical data was analyzed using SPSS-16.0. The $P < 0.05$ was taken as statistically significant.

Results: Duration in which child responded to treatment and became afebrile was less with azithromycin-treatment as compared to ceftriaxone-treatment, and it was statistically highly significant ($P = 0.000$). 96% of cases treated with azithromycin, attained defervescence by 5th day of treatment but, only 27% of cases treated with ceftriaxone attained defervescence by 5th day of treatment. One case of ceftriaxone-trial-group showed no microbiological-clearance of salmonella microorganisms at 10th day of treatment. Clinical cure was more early with azithromycin-treatment as compared to ceftriaxone-treatment, and was statistically significant ($P = 0.027$). Microbiological cure was not comparable in between cases treated with azithromycin and ceftriaxone ($P = 0.131$).

Conclusion: Hence, we conclude that, oral-azithromycin (10 mg/kg/day OD for 6 days) is more efficacious in the treatment of uncomplicated-enteric-fever in children and adolescents as compared to intravenous-ceftriaxone (100 mg/kg/day in 2 divided doses for 7 days).

Keywords: Azithromycin, Ceftriaxone, Cure, Defervescence, Typhoid fever

INTRODUCTION

Typhoid fever, systemic infection caused by *Salmonella typhi* and *Salmonella paratyphi*, is a common and sometimes fatal-infection among children of developing countries, with an incidence of 500 cases/1,00,000 populations (0.5%) and high mortality rate.[1,2] The World Health Organization has estimated that at least 12.5 million cases occur annually worldwide.[3,4]

For decades, chloramphenicol has been highly effective against *S. typhi and S. paratyphi*.[5] However, the widespread emergence of multidrug-resistant *S. typhi* has necessitated the search for other-therapeutic options.[6] Quinolone-resistant strains of *S. typhi* have begun to be reported. Ceftriaxone, a third-generation-cephalosporin, is highly effective against *S. typhi*; but as it is administered parenterally each time, it is considered less-than-ideal treatment alternative.

Studies have shown that neutrophil-concentrations of azithromycin are >100 times the serum-concentration. It is now found from other studies that oral azithromycin administered once daily appears to be effective for the

treatment of uncomplicated-typhoid-fever in children.[7] If these results are confirmed, the agent could be a convenient alternative for the treatment of typhoid fever, especially in developing countries where medical resources are scarce.

Hence, we provide a comparative study for a clinically-effective-drug in treatment of Uncomplicated-enteric-fever: Oral-azithromycin versus IV-ceftriaxone, with an objective to find a clinically effective drug for treating uncomplicated enteric fever.

MATERIALS AND METHODS

A total of 100 proven (Widal-positive) uncomplicated-enteric fever cases were taken up for the study in the age group of 2-17 years who were admitted in Mysore Medical College and Research Institute (MMC and RI), Mysore, over a period of 6 months from December 2012 to May 2013. All study subjects were enrolled in the study with consent of the parents, and a proforma was filled for each subject which included the demographic details of the patient, presenting-complaints, associated symptoms, Widal-test report, and documented temperature. The study group was divided randomly into two equal groups, and they received oral-azithromycin 10 mg/kg/day, OD for 6 days and IV ceftriaxone 100 mg/kg/day, in 2 divided doses (DD) for 7 days as the main treatment of typhoid-fever. A blood-sample was obtained for complete blood-count and Differential-count at baseline. Blood-culture was done on day 1 and 10 to correlate the treatment efficacy-clinically and microbiologically using standard culture methods (Xylose lysine deoxycholate-agar). Every day, each patient was clinically evaluated, and proforma was updated with respect to temperature (axillary), appetite, hepatomegaly, splenomegaly, constipation/diarrhea, headache, and abdominal-pain. Side-effects of azithromycin and ceftriaxone were looked for, and if they appeared, the drug was changed to a safer one and the subject was excluded from the study. Patient was hospitalized for entire treatment-period and next 3 days after therapy was completed, and the study result was assigned as clinical and microbiological cure or failure. The data being descriptive-statistics it was analyzed as contingency co-efficient/Chi-square test, Independent samples *t*-test using IBM SPSS (Statistical Package for the Social Sciences version 16.0, 2009). The $P < 0.05$ was taken as statistically significant.

RESULTS

A total of 100 patients in sex ratio of 1.2:1 (male: female) with uncomplicated typhoid-fever with Widal-positive results were enrolled in the study at the time of admission. Mean age of cases selected for azithromycin-trial was 8.5 years and that for ceftriaxone-trial was 7.3 years. There was sex ratio of 1.02:1 (male:female) for azithromycin-trial group and 1.3:1 for ceftriaxone-trial group.

Comparison of Symptoms and Signs

Demographic characteristics and results of pre-treatment laboratory-tests revealed no statistically significant differences between the two groups. Fever was a presenting symptom in all cases (mean duration 8.62 days in azithromycin-trial group; 11.1 days in ceftriaxone-trial group).

Comparison of Laboratory Parameters

Mean hemoglobin, total leukocyte-count and platelet-counts were 12.2 g/dL, 6,136/cu mm and 2.16 lakh platelets/cu mm respectively in azithromycin-trial group; 11.16 g/dL, 5609 leukocytes/cu mm and 3.8 lakh platelets/cu mm respectively in ceftriaxone-trial group. Leucopenia (white blood cells <4000/cu mm) was observed in 28% of azithromycin-trial group and 10.2%of ceftriaxone-trial group.

Comparison of Findings on Daily Assessment (Table 1)

Duration in which child responded to treatment and became afebrile was less with azithromycin treatment as compared to ceftriaxone treatment, and it was statistically highly significant ($P = 0.000$).

Mean time to become afebrile was 5.52 days for ceftriaxone-trial group and 2.72 days for azithromycin-trial group. On 5th day of treatment, 96% of azithromycin treated cases attained defervescence while only 27% in ceftriaxone treated cases.

Diarrhea was one of the presenting symptoms which subsided 100% by 3rd day in azithromycin treated cases as compared to 92% in ceftriaxone treated cases and was statistically significant ($P = 0.002$).

By 3rd day of treatment, 96% of cases were recovered from anorexia in azithromycin treated-cases as compared to only 76% in ceftriaxone treated-cases and it was statistically significant ($P = 0.000$).

Coated-tongue, which was common presentation equally in both the groups, was observed to normalize in a short-duration of time in azithromycin treated-case as compared to that by ceftriaxone ($P = 0.000$).

- Liver-size normalized much faster with azithromycin-treatment as compared to ceftriaxone.
- No adverse-reactions were observed with respect to azithromycin and ceftriaxone during the study period.
- The compliance with oral azithromycin was better compared to the intravenous ceftriaxone.

Comparison of Blood-culture Study (Table 2)

- Only 6% (6 of 100 study population) was blood-culture yield.

Table 1: Comparison of symptoms and signs between azithromycin and ceftriaxone trial groups on treatment

Clinical features	Resolution of symptoms and signs (*N* (%))							
	Day 1		Day 3		Day 5		Day 7	
	Azithromycin	Ceftriaxone	Azithromycin	Ceftriaxone	Azithromycin	Ceftriaxone	Azithromycin	Ceftriaxone
Fever	0 (0)	0 (0)	48 (96)	2 (4)	48 (96)	27 (54)	49 (98)	46 (92)
Abdominal pain	30 (60)	37 (74)	50 (100)	41 (82)	50 (100)	50 (100)	50 (100)	50 (100)
Constipation	50 (100)	45 (90)	50 (100)	49 (98)	50 (100)	50 (100)	50 (100)	50 (100)
Diarrhea	39 (78)	42 (84)	50 (100)	45 (90)	50 (100)	50 (100)	50 (100)	50 (100)
Melena	50 (100)	49 (98)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)
Anorexia	34 (68)	32 (64)	48 (96)	38 (76)	48 (96)	45 (90)	50 (100)	49 (98)
Coated tongue	22 (44)	21 (42)	44 (88)	25 (50)	49 (98)	44 (88)	50 (100)	49 (98)
Abdominal tenderness	50 (100)	43 (86)	50 (100)	45 (90)	50 (100)	50 (100)	50 (100)	50 (100)
Hepatomegaly	27 (54)	27 (57)	41 (82)	27 (54)	49 (98)	42 (84)	50 (100)	47 (94)
Splenomegaly	14 (28)	24 (48)	35 (70)	24 (48)	49 (98)	40 (80)	50 (100)	49 (98)

- One out of 50 (2%) azithromycin-trial groups and 5 out of 50 (10%) ceftriaxone-trial group yielded positive blood culture for salmonella, drawn on day 1 of admission.
- One case of ceftriaxone-trial group showed no clearance of salmonella microorganisms at 10th day of treatment.
- No isolate was determined to be resistant to either ceftriaxone, azithromycin or ciprofloxacin, 1 isolate was resistant to trimethoprim-sulfamethoxazole, 2 were resistant to chloramphenicol, and 3 were resistant to ampicillin.

Comparison of Outcome of Trials (Table 3)

- Clinical-cure was more early with azithromycin-treatment as compared to Ceftriaxone-treatment, and was statistically significant ($P = 0.027$) (Figure 1).
- Microbiological-cure was not comparable in between both the groups ($P = 0.131$). Microbiological-cure (100%) was achieved in a case treated with azithromycin; but out of five cases treated with ceftriaxone, only 4(80%) showed no salmonella growth on re-culture on 10th day.

DISCUSSION

The present study compares the efficacy of oral-azithromycin with Intravenous-ceftriaxone in treatment of uncomplicated enteric-fever cases aged 2-17 years, admitted in Cheluvamba Hospital attached to MMC and RI, Mysore.

The two groups – azithromycin and ceftriaxone trial-groups were comparable in all demographic-data, presentation and were not statistically significant. Severity of signs were equally distributed in both the groups. The presenting durations of fever in both treatment groups were within the time frames (8-11 days) reported in previous trials on the treatment of typhoid fever.[7-9]

Table 2: *In vitro* susceptibility of *S. typhi* isolates from culture positive subjects

Drug susceptible	Percentage
Amoxicilline	100
Cefixime	100
Ceftriaxone	100
Azithromycin	80
Chloramphenicol	30
Cotrimoxazole	16
Ampicillin	50
Ciprofloxacin	78
Ofloxacin	85

S. typhi: Salmonella typhi

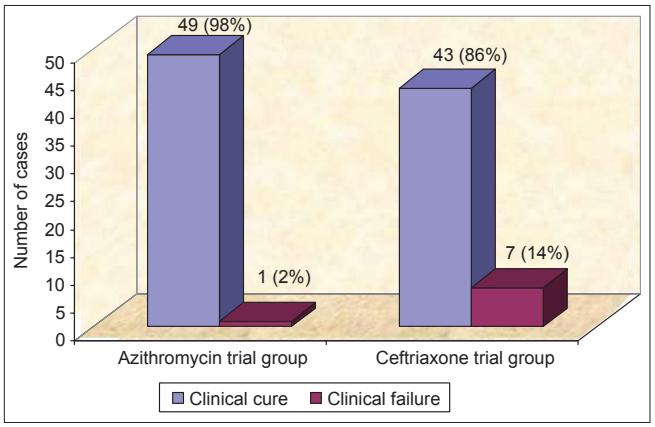

Figure 1: Comparison of clinical outcome of the study

In the current study blood-culture samplings were done before starting the first dose of antibiotic on day 1 of admission and another at 10th day of treatment, irrespective of the clinical outcome. However, other similar studies practiced intratherapeutic blood culture sampling on day 3 and at 7th day of the treatment.[10] The rate of persistent bacteremia found in the current study, i.e., 1 out of 5 positive cultures in ceftriaxone-trial group did not show bacterial clearance at 10th day blood culture, however, is not inconsistent with the findings of a study by Islam *et al.*, in which 65% of patients with typhoid-

fever who received chloramphenicol therapy still had *S. typhi* cultured from their blood after 3 days of therapy, compared with 0 of 28 patients who were treated with ceftriaxone.[11]

Another interesting finding was that *in vitro* resistance to azithromycin did not correlate well with its *in vivo* effectiveness against typhoid fever. This is possibly because susceptibility testing is based on serum drug levels, whereas, for typhoid-fever, a major mechanism of action is thought to be intracellular-killing, in which the azithromycin levels may be 100-fold greater than serum levels.[12,13] Similar result was obtained by Frenck *et al.*[10]

In the current study, there were no relapses of enteric fever in azithromycin-trial group but one case of relapse was documented which was earlier treated with an intravenous Ceftriaxone, during the study period. There were typhoid-relapses in ceftriaxone-treated cases reported in other similar studies.[10] The azithromycin-concentration within cells and its secretion into the biliary-tree, in conjunction with the long half-life of the drug, likely explain why relapses have not occurred when treating a principally intracellular infection such as typhoid fever.[8,14,15]

A study by Tribble *et al.* (1995), demonstrated that a 5-day course of azithromycin (20 mg/kg/day, with a maximum dose of 1000 mg/day) is effective against uncomplicated typhoid-fever in children and adolescents.[10,15]

Another study done by Agarwal (2000) concluded that a short-course (6 days) of azithromycin is safe and effective in treating uncomplicated enteric-fever.[16]

In our study, we used low-dose azithromycin of 10 mg/kg/day once a day dosage for 6 days, and tried to compare with intravenous ceftriaxone. One of the reasons for this is to reduce the possible side-effects related to the azithromycin usage, and this low dose is already found to be effective in typhoid fever in a study where no comparison was done.[17]

The compliance was better with oral-azithromycin as compared to the intravenous-ceftriaxone (based on parents' opinion; frequent need of intravenous-cannulation in ceftriaxone-trial groups for drug administration was cumbersome; frequency of administration was easier with azithromycin-trial group). Similar results were found in studies done by Frenck *et al.*[10,13,17]

A recent report from Vietnam demonstrated that the duration of azithromycin-therapy for uncomplicated typhoid fever in adults could be decreased to 5 days.[17]

Table 3: Comparison of clinical outcome of the study

Cure	Azithromycin trial group (%)	Ceftriaxone trial group (%)	*P* value
Clinical cure	49 (98)	43 (86)	0.027
Clinical failure	1 (2)	7 (14)	

The encouraging results from this trial prompted us to test whether a shorter-treatment course could also be used in children and adolescents.

Present study conveys the message that the clinical cure is better with oral azithromycin with a dose of 10 mg/kg/day, OD, for 6 days, as compared with the intravenous ceftriaxone 100 mg/kg/day in 2 DD for 7 days, and was statistically significant ($P = 0.027$); even though the microbiological-cure was comparable between the two groups ($P = 0.131$). Similar 5 other studies have demonstrated the effectiveness of azithromycin for the treatment of uncomplicated typhoid fever in children, adolescents, and adults. In each of the studies, clinical and microbiological cure rates have exceeded 90% without any serious adverse events or relapses of typhoid-fever (Table 3).[7,15-17]

Azithromycin appears to be an effective-drug for treating uncomplicated typhoid-fever in children with efficacy rate of >95%. Treatment failure rates of 9.3% have been observed in earlier studies on azithromycin.[18] Two other studies have reported a clinical-cure rate of 82% and 92%.[6,7,18] Sensitivity-pattern seen in our study is also similar to other Indian study hence, the importance of azithromycin.

CONCLUSION

Oral azithromycin (10 mg/kg/day OD for 6 days) is more efficacious in the treatment of uncomplicated-enteric-fever in children and adolescents as compared to intravenous ceftriaxone (100 mg/kg/day in 2 DD for 7 days).

Limitations of the Study

1. Blood culture yield was not good (only 6%) and was much less than the text described the sensitivity of blood cultures. Hence, we could not describe the microbiological outcome of this study effectively
2. This study included a small sample-size, hence further multicentric trials involving larger sample-size is warranted.

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Original Article

Humeral Shaft Fractures Requiring Different Modalities of Treatment: A Hospital-Based Analytical Study

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Abstract

Introduction: Since long the treatment of humeral shaft fractures have been conservative, which in now-a-days is not well-tolerated by patients. There has been a different type of modalities of treatment available such as nailing and plating. The objective of this study was to compare the results of both type of treatment modalities at a tertiary care level hospital.

Materials and Methods: This study was carried out in Department of Orthopedics at Teerthanker Mahaveer Medical College and Research Centre, Moradabad, UP, India, on 30 patients. Exclusion and inclusion criteria for selection of patient were made, in which we left those patients who were having genetic bone abnormalities. Comparison of both types of techniques used was made and compared using the Chi-square test, and test of significance was taken at ($P < 0.05$).

Results: Acceptability of both types of techniques was approximately same in both modalities of treatment, except that nailing technique took longer time to perform the surgery ($P < 0.05$).

Conclusion: Study concluded with the fact that plating method is more acceptable to patients due to less time taken in performing the surgery. In view of authors, the sample size should be more, and this study should be taken as reference study only and applying the results of this study to other patients, should well be used with caution.

Keywords: Analytical study, Bone plates, Fractures, Humerus

INTRODUCTION

Since long the concept of humeral shaft fractures has been conservative.[1-3] Advances in orthopedic surgery and harmful effects of conservative treatment like mal-union delayed union and non-union have shown that there are absolute indications of the surgical treatment for such type injuries.[4-6] The most common surgical treatment modalities available now-a-days are plates, nails (intramedullary and extramedullary), and external fixators. However, external fractures are used when associated injuries are of very critical nature.[7,8] Plates (bridging plates) are considered to be a good treatment approach and also yield good results.[9,10] Some complications associated with plating method divert orthopedicians to go for nailing treatment,[11] but this technique is also associated with its own shortcomings.[12]

There are very scarce studies available in the medical literature to compare these two trends, and that is the objective of our study to compare and contrast both modalities of treatment.

MATERIALS AND METHODS

In total, 30 patients were assessed, and all considered cases were addressed and operated by the same team within a period comprehending November 2013 to January 2014 at Department of Orthopedics, Teerthanker Mahaveer

Medical College & Research Center, Moradabad. The mean follow-up time was 6 months.

Inclusion Criteria

Patients selected for surgery:

1. Multiple trauma
2. Bilateral fracture of the humerus
3. Inadequate reduction on conservative methods.

Exclusion Criteria

Patients not included in the study:

1. Pathological fractures
2. Osteogenesis imperfecta
3. Any history of humeral fractures in last 2 years or any complication still persisting
4. Pregnant females
5. Injury of brachial plexus
6. Inability to get informed consent.

Of 30 patients included in this study, 16 were victims of motor vehicle accidents, and in other cases cause was mostly the aggression among young age groups as told by attendants of patients. Out of 30, 18 patients got fractured their right humerus and 12 fractured the left.

Along with humeral fracture patients also had multiple associated injuries, which were being looked after by doctors of the concerned department.

The kind of implant to be introduced was determined by team of doctors involved in the study, prior consent of patients and their relations and also seeing the feasibility of socioeconomic status. In total, 18 plates and 12 nails were finally used.

Applying routine surgical procedures for bridging plate and nailing whatever the technique used all patients were put on prophylactic antibiotic therapy.

To analyze the different modalities of treatment many factors were kept in mind, mentioned below:

1. Proper wound healing
2. Adequate reduction
3. Any associated nerve injury
4. Delayed union
5. Malunion
6. Time taken in surgery particularly (image enhancer use time)
7. Hospital stay
8. Post-operative complications
9. Range of motion of the joint and last but not the least patient's satisfaction level.

Statistical Analysis

Both modalities of treatment were compared using the Chi-square test. The test of significance was observed at ($P < 0.05$).

RESULTS

In this study, total 18 plates and 12 nails were finally used. The nailing was applied mostly in male patients (82.6%), but in case of plating it was (46.4%) only (Table 1, Figure 1).

Still regarding ages, the mean age for patients from nail group was 29.64 ± 2.4 years, ranging from 19 to 75 years. In the plate group, the average was 42.26 ± 6.8 years (Table 2).

The time taken for performing surgery was statistically significant between nailing and plating groups ($P < 0.05$).

Radiologically, using digital X-rays, there was no significant difference in bone union time starting between plating and nailing procedures. There was no case found in which implant did not work.

There was a great difference in image enhancer use time; in case of plating group it ranged from 78 to 130 s, while in case of the nailing group it ranged between 180 and 298 s. The analysis suggested that the average image enhancer use time for the group submitted to plate insertion surgery was significantly lower as compared to the group submitted to nail insertion surgery, with ($P < 0.05$).

Table 1: Treatment of modality used in male patients

Percentage of male patients in whom nailing was used as standard procedure	Percentage of male patients in whom plating was used as standard procedure
82.6	46.4

Table 2: Age-based selection of the procedure

Age in years in whom nailing was adopted as standard procedure	Age in years in whom plating was adopted as standard procedure
29.64	42.26

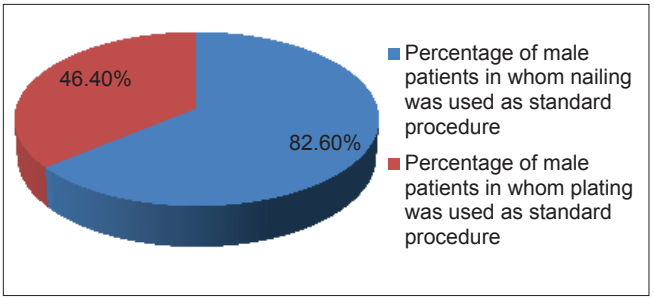

Figure 1: Treatment of modality used in male patients

The time of hospitalization was about 2 times more in plating when compared to the nailing group ($P < 0.05$).

Early and late post-operative assessment showed no obvious complications except one patient in plating group in whom wound leakage was observed in 2nd week, which was cured by appropriate antibiotic treatment.

DISCUSSION

Time for bone union depends on fracture type and type of implant employed in the surgery. Difference seen in union time between both groups showed no statistical significance, a result similar to some studies comparing the plate with the nail.[13] Due to the small sample size, it was not possible to statistically evaluate the effects of this combination in this study.

Time in surgery taken is an important method of analysis when comparing both types of treatment modalities. The most important factor causing a low surgery time in plating method is the image enhancer use time. This variable is the only factor found in our study, with a significant difference between the two groups.[12,14]

The time of hospitalization was about 2 times more in plating when compared to the nailing group ($P < 0.05$).

As shown by the results that there was no statistically significant difference in post-operative results, when compared at the end of 3rd month and the end of 6th month.

It is important to mention here that this is with a small number of samples, which restricts us to draw conclusion regarding the assessment of hospital stay time. On the other hand, if a variable is not statistically significant, it does not mean, that it has got no observatory significance.

CONCLUSION

From above the study, we concluded that basically there is not much difference, whether, we use nailing method or plating method. As we can see that hospital stay, patient convenience, post-operative status is almost same in both modalities of treatment, except for the time taken for surgery, which was more in nailing method. Still authors of the study are of the view to explore more deeply and compare both techniques a large sample of the patient will prove beneficial. Hence, the results of this study should be used with caution.

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Original Article

Assessment of Partially Edentulous Patients Based on Kennedy's Classification and its Relation with Gender Predilection

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Abstract

Background: A partially edentulous arches classification helps to identify possible combinations of teeth to edentulous ridges, thus facilitating discussion, communication and comprehension of the indicated prosthetic treatment among dental professionals, students and technicians. Kennedy's classification provides immediate visualization, recognition of prosthesis support and assessment of design features of removable partial denture.

Aims and Objective: The aim of this study was to assess the prevalence of the partially edentulous condition, along with the current treatment modalities in the South Indian population and to plan for further scope of improvement. To find the pattern of tooth loss and its relationship with gender and arches.

Materials and Methods: This is a cross-sectional study to be conducted among the patients of Thiruvallur district.

Study Population: Partially edentulous patients of age group of more than 20 years. Questionnaire is containing self-constructed 20 close-ended questions to be used for the partially edentulous patients. Data to be collected by investigator with structured questionnaire by face to face interview and thorough clinical examination. Pilot study was conducted on 30 patients. Questionnaire containing self-constructed 20 close-ended questions was used for testing feasibility, clarity, and validity of the questions.

Results: Kennedy's Class III was found to be the most common pattern of partial edentulism in both maxilla 40% and mandible 43% in this study. Kennedy's Class IV was the least common pattern of edentuism. Mandibular edentulism is more common than the maxilla. Women shows a higher proportion of edentulousness then male.

Conclusion: Kennedy's Class III partially edentuousness is found most commonly in this study.

Keywords: Kennedy's classification, Oral hygiene, Partially edentulousness, Tooth loss

INTRODUCTION

Teeth are the main functional component of the oral cavity. Teeth provide variety of function includes mastication, speech and esthetics. Absence of teeth in the oral cavity resulting in difficulty in chewing food, alteration of speech and poor esthetics, greatly affect the quality-of-life.[1,2] According to World Health Organization, adult should have a minimum of 21 functional teeth to provide good dietary intake.[3] Oral health plays a vital role towards the quality of life. Good oral health and prevention of tooth loss improves the diet and nutritional status.[4]

Tooth loss occurs in the oral cavity by various cause like dental caries, periodontal diseases, trauma, pulpal and peri-radicular diseases and various systemic diseases.[5] Tooth loss create space in the oral cavity that are called edentulous space. Edentulism whether partial or complete indicates the awareness and oral health of a particular population.[6] Edentulism also reflect the preventive dental treatment provided in populations. The partial prosthodontic replacement of missing teeth requires the restore the function.[7]

The variation in number and location of the edentulous space and its relation to the remaining natural teeth necessitates to classify the partial edentulous arches.[8] The

purpose of classification of partial edentulous arches provides, communication between dental colleagues, students, technician about the case, for planning good treatment, to design the partial denture. It also predicts the difficulties commonly occur with particular removable partial denture design.[9]

There are numbers of classification for classifying the partially edentulous arches. The common one are Cummer, Kennedy, Applegates, Neurohr, Bailyn, Wild, Skinner, Avant. All classification has advantages and disadvantages.[10,11] Among all classifications Kennedys classification is most commonly used and widely accepted because it provides immediate visualization, it allows the differentiation between tooth born and tooth tissue born partial denture.[8,12]

MATERIALS AND METHODS

This study was carried out at Department of Prosthodontics, of Priyadarshini Dental College and Hospital. Study was conducted randomly among 100 patients visited dental outpatient department. Patients were interviewed, and information was filled in structured pro forma.

Evaluation of partially edentuolousness according to Kennedy's classification and Applegate's modification was carried out. Thorough oral examination of both the dental arches of each patient was done after informed consent. Patterns of partial edentulism were recorded, and data collected was registered on to a pro forma. The same investigator was involved in interviewing and filling the pro forma who perform the oral examination.

Kennedy's classification:

1. Class-I: Bilateral edentulous area present posterior to remaining natural teeth
2. Class-II: Unilateral edentulous area present posterior to remaining natural teeth
3. Class-III: Unilateral edentulous area with natural teeth both anterior and posterior to it
4. Class-IV: Single but bilateral edentulous area present anterior to remaining natural teeth.

Sampling method: Simple random sampling.

Study design: Cross sectional study.

Inclusion criteria

Study population who satisfied following criteria were included in the study:

1. Patients above age of 20 years irrespective of sex, race, socioeconomic status having partially edentulism in either or both the arches
2. Individuals who were willing and cooperative for study.

Exclusion criteria

Patients are having complete edentulism and missing third molars. The single-examiner concept was followed to maintain the consistency and to prevent inter-examiner bias. The data that were collected was tabulated using a computerized spreadsheet (Microsoft Excel 2010; Microsoft, Redmond, Washington, SPSS version 16.0 Chicago, IL) and it was analyzed using descriptive statistics.

RESULTS

A total of 100 study population aged above 20 years, males and females were examined for the incidence of partial edentulousness among the maxillary and mandibular arches and for the type of Kennedy's classification which was present in the arches.

Out of 100 subjects, Patients having partially edentulousness in the maxillary arches found to be 73 and partially edentulousness in the mandibular arch found to be 77, thus indicating a higher incidence in the mandibular arch than in the maxillary arch.

Gender wise distribution in relation to Kennedy's classification in the upper arch shows 34 male and 39 females of which Class III was found to be most common (Table 1 and Figure 1).

Similarly, Kennedy's class in the lower arch revealed 36 males and 41 females (Table 2 and Figure 2). In the lower arch also Class III was most common.

An incidence of 56.7% was reported for Kennedy's Class III classification, followed by the Class II (18%), Class I (16.7%) and the Class IV (8.6%) classifications.

Distribution of various Kennedy's class in maxillary partial edentulous arch (Table 3 and Figure 3) and

Table 1: Gender distribution in various Kennedy's classes in maxilla

Gender	Class-I	Class-II	Class-III	Class-IV	Total
Male	3	11	16	4	34
Female	4	7	25	3	39
Total (%)	7 (9.5)	18 (24.6)	41 (56)	7 (9.5)	73

Table 2: Gender distribution in various Kennedy's classes in mandible

Gender	Class-I	Class-II	Class-III	Class-IV	Total
Male	10	5	9	2	26
Female	8	4	25	4	41
Total (%)	18 (23.3)	9 (11.7)	44 (58)	6 (8)	77

mandibular partial edentulous arch (Table 4 and Figure 4) is summarized.

DISCUSSION

Various systemic and local factors are associated with loss of tooth. Such factors are smoking, diabetes, dental caries, impacted teeth, pulpal and periodontal diseases. Among these factors, dental caries and the periodontal diseases are most commonly associated with tooth loss proved by many studies.[5,13]

In this study, Kennedy's classification were used as it's provide immediate visualization of the edentulous space, and easy description of the potential combination between ridge and teeth.[11]

Table 3: Distribution of various Kennedy's classes in maxillary arch

Type of partial edentulism in maxilla	Frequency	Percentage
Class I	3	4.10
Class II	0	0
Class III	18	24.65
Class IV	7	9.5
Class I modification 1	3	4.10
Class I modification 2	1	1.36
Class II modification 1	10	13.69
Class II modification 2	3	4.10
Class III modification 1	18	24.65
Class III modification 2	4	5.47
Class III modification 3	1	1.36

Table 4: Distribution of various Kennedy's classes in mandibular arch

Type of partial edentulism in mandible	Frequency	Percentage
Class I	15	19.4
Class II	3	3.9
Class III	17	22.07
Class IV	6	8
Class I modification 1	2	2.6
Class I modification 2	1	1.3
Class II modification 1	5	6.5
Class II modification 2	1	1.3
Class III modification 1	19	24.7
Class III modification 2	6	7.8
Class III modification 3	2	2.6

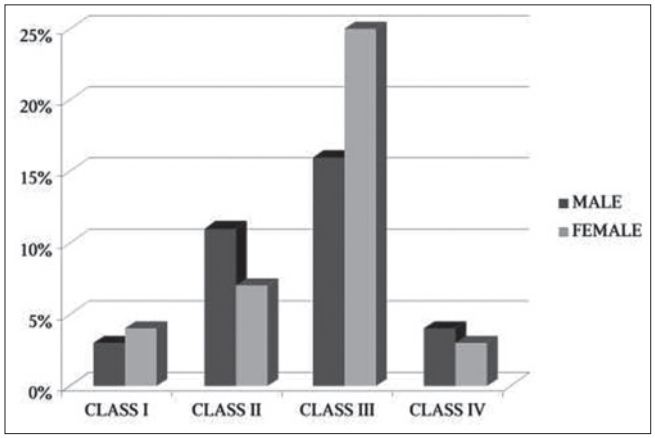

Figure 1: Gender distribution in various Kennedy's classes in maxilla

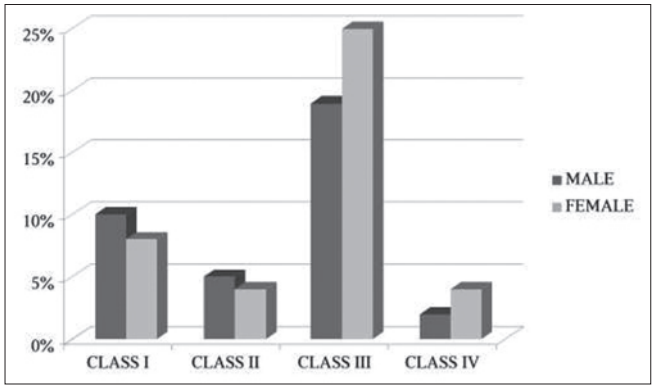

Figure 2: Gender distribution in various Kennedy's classes in mandible

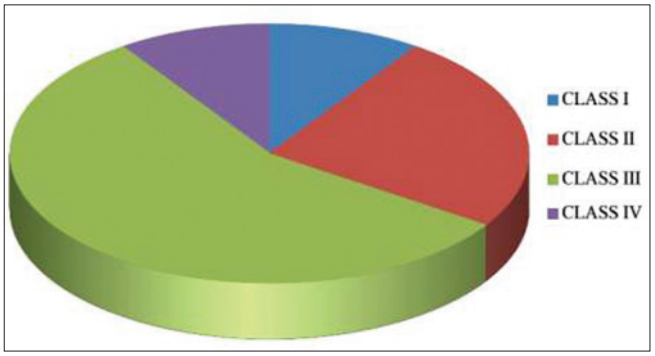

Figure 3: Pie chart of various types of partially edentulism in maxilla

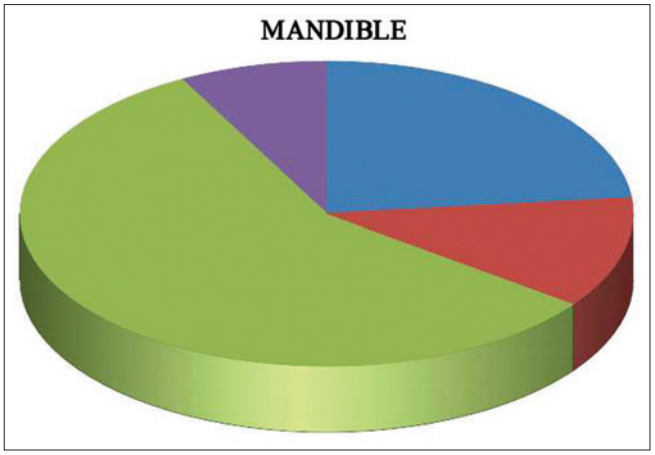

Figure 4: Pie chart of various types of partially edentulism in mandible

The results of our study indicate that the mandibular arch shows more edentulism than maxillary arch among our study population. This is in harmony with the study carried out by Curtis *et al.* at the University of California, School of Dentistry.[14]

Another study was carried out by Naveed *et al.*[2] the result of this study is also similar to our study, frequency of partial edentulism was higher in the mandibular arch being 67.4%, when compared to 63.2% in the maxillary arch.

In our study, the women shows higher proportion of edentulousness then male this result is concordance with study carried out by Sapkota[4] upper arch shows 70 males and 56 females of which Class III was found to be the most common, in lower arch revealed 67 males and 70 females, however many previous studies shows higher proportion of edentulousness in male then female.[15] These may be due to various socioeconomic factors, psychological factors, use of more sugars, smoking.

Kennedy's Class III was found to be the most common pattern of partial edentulism in this study. Kennedy Class III pattern of edentulism was most commonly encountered in both maxilla (56%) and mandible (58%). This result is in agreement with the study of Shah *et al.*[16] Kennedy's Class III in maxilla along with Kennedy's Class III in mandible was the most common combination with 51%. This result shows similarity with Al-Dwairi's study. In Al-Dwairi's study 200 patients of Jordan were examined, out of 200 patients in 150 patients had partially edentulous maxilla and mandible of which Class III Kennedy's classification was most commonly present in both mandible (45%) and maxilla (47%). Kennedy Class III in maxilla with Class III mandible was the most common combination with frequency 30%. The study results are in agreement with Al-Dwairi's study.[17]

Similar studies should be conducted at various centers of India, the information should be gathered, a national database of partial edentulous and the patterns of tooth loss are maintained, the oral health awareness program should be organized in the population where there is a greater amount of tooth loss and edentulousness. By doing so we reduce the incidence of partial edentulous and tooth loss all around the India.

CONCLUSION

This study conducted in limited patients of Thiruvallur district at Priyadarshini Dental College and Hospital indicates the oral health status of patients. The study concluded that among the Kennedy's classification, Class III is the most common.

Mandibular partial edentuism found to be more common than maxillary partial edentulism. Higher frequency of partial edentulism is suggestive of a greater need to create awareness among the population regarding the prevention of dental caries and maintenance of oral hygiene. It is essential that tooth loss should be avoided as far as possible as it ultimately affects our overall health. If teeth have to be extracted or teeth have to be replaced prosthodontic rehabilitation should be provided to restore the efficient function and form of teeth and to stabilize the arch.

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Original Article

Evaluation of the Chondroprotective Effect of an Ayurvedic Formulation Myostaal Forte Tablet in Experimental Model of Osteoarthritis in Rats

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Abstract

Background: Osteoarthritis is one of the prevalent and degenerative disorders of the joints that causes significant pain and functional disability. It is a disease in which not only the articular cartilage of the synovial joint is affected, but also the adjacent bone, ligaments, capsule, synovial membrane, and even peri-articular muscles are distressed.

Purpose: The purpose was to evaluate the chondroprotective effect of the formulation on the monosodium iodoacetate (MIA) induced arthritis in rats.

Materials and Methods: Osteoarthritis was induced in rats by giving a single intra-articular injection of 1 mg MIA. Three groups' viz. normal group, control group, and a test group were used to study the chondroprotective effect of myostaal forte in MIA induced osteoarthritis in rats. Each group had eight animals of either sex. Four animals from each treatment group were sacrificed and examined for the histopathological examinations on 14th day of treatment and remaining on the 28th day of treatment.

Results: In the myostaal forte treated group, the chondrocytes were present up to 50% and no synovial proliferation was observed which shows the protective effect of myostaal forte against chondrocytes damage. The swelling in the knee of the myostaal forte treated group was found significantly lower.

Conclusions: Myostaal forte has chondroprotective effect and palliates the inflammation and discomfort of the osteoarthritis.

Keywords: Chondrocyte, Myostaal forte, Osteoarthritis

INTRODUCTION

Osteoarthritis is a degenerative disorder of joints that causes significant pain and functional disability. Worldwide 630 million people or 15% population of the globe are affected with osteoarthritis. It is one of the most prevalent, disabling, chronic diseases affecting the elderly, estimated incidence of this severe radiographic disease is 30% in those aged 75 and above.[1]

Myostaal forte tablets (MFT) is a proprietary polyherbal formulation that is mainly recommended for pain relief in chronic disease conditions viz. arthritic disorders (osteoarthritis and rheumatoid arthritis), frozen shoulder, gout, lumbago, cervical spondylosis, lumbar spondylosis, etc. Its major ingredients include both Shallaki (*Boswellia serrata)* and Guggul (*Commiphora wightii). B. serrata* Roxb. is known as Kundur in Unani medicine, belongs to the family Burseraceae. It chiefly possesses anti-arthritic, anti-inflammatory, anti-hyperlipidemic, anti-cancer, hypoglycaemic, anti-asthmatic, analgesic, hepato-protective, etc., activities.[2] It is also reported that Guggul have the potential to relieve the osteoarthritic pain, regenerate the cartilaginous matrix and increase sub chondral bone components.[3]

The recommended dose of MFT is one tablet twice or thrice a day. In an *in vitro* study conducted on MFT in Department of Clinical Pharmacology, TNMC and BYL Nair Charitable Hospital, Mumbai to assess the anti-platelet and anti-inflammatory activities, MFT exhibited significant anti-inflammatory effect. Furthermore, Guggul (*C. wightii*, Syn. *Commiphora mukul*), one of the main ingredient of MFT exhibited chondroprotective effect in an experimental study.[4] Therefore, this study was planned to evaluate the chondroprotective effect of an ayurvedic formulation MFT in the experimental model of osteoarthritis in rats (Table 1).

Selection of Animals

Healthy young Wistar rats between 2 and 3 months of age (male and female) weighing 150-200 g were randomly selected and divided into the control and treatment groups. The females were nonpregnant, and all the animals were kept in the cages for 5 days prior to the start of the study to allow acclimatization.

Housing

The temperature in the experimental animal room was maintained at 22°C with relative humidity between 50% and 60%. Artificial lighting was provided which includes 12 h light, 12 h dark. All the animals were given complete standardized pelleted feed, and drinking water was supplied *ad-libitum*.

Induction of Osteoarthritis

The rats were anesthetized with ketamine hydrochloride, and osteoarthritis was induced by giving a single intra-articular injection of 1 mg monosodium iodoacetate (MIA) (crystal powder M = 185.96 g/mol, Germany, Sigma**)**. MIA was dissolved in physiologic saline and administered in a volume of 50 µL using a 30-gauge needle through the infra patellar ligament of the left knee.

Table 1: Composition of the MFT

Sanskrit name	Botanical name	Quantity/Tablet
Shallaki	*Boswellia serrata*	200 mg
Guggul	*Commiphora wightii*	100 mg
Ashvagandha	*Withania somnifera*	100 mg
Haridra	*Curcuma longa*	100 mg
Guduchi	*Tinospora cordifolia*	100 mg
Shunthi	*Zingiber officinale*	100 mg
Rasna	*Alpinia galangal*	75 mg
Musta	*Cyperus rotundus*	75 mg
Nirgundi	*Vitex negundo*	75 mg
Processed in		
Dashamoola kwatha	Generic ayurvedic formulation	150 mg
Eranda moola	*Ricinus communis*	75 mg
Punarnava	*Boerhaavia diffusa*	75 mg
Devdaru	*Cedrus deodara*	75 mg

MFT: Myostaal forte tablets

Design of Experiment

Three groups' viz. normal group, control group, and a test group were used to study the chondroprotective effect of MFT in MIA induced osteoarthritis in rats. Each group had eight animals of either sex. Four animals from each treatment group were sacrificed and examined for the histopathological examinations on 14th day of treatment and remaining on the 28th day of treatment. The dose for rats was calculated extrapolating the human therapeutic dose (HTD) using the following formula:

Dose in rats/200 g of body weight = HTD × 0.018

HTD = 1 tablet thrice a day (Average weight of tablet = 676 mg).

Administration of Doses

The test drug (MFT) was suspended in 1% carboxymethyl cellulose (CMC) solution in distilled water and administered using oral gavage. The normal control (NC) and the osteoarthritis control (OC) groups were given 1% CMC solution in distilled water as mentioned in the Table 2 for 28 days starting from day 1 after MIA injection.

Parameters under Study

Body weight

All animals were weighed on 1st, 7th, 14th, 21st, and 28th day of the study period.

Morphology

Morphology of the joint was observed on 1st, 7th, 14th, 21st, and 28th day by calculating the swelling of the joint based on synovial fluid volume with Vernier Calliper scale using the following formula:

Synovial fluid volume (mm^3) = $(a \times b^2)/2$

Where, a: Length in mm and b: Width in mm.

Histopathology

Animals were sacrificed in two batches, four number animals at 14th day and remaining four at 28th day by ether anesthesia at the time indicated. Soft tissues were removed from the left (osteoarthritic) legs, and patella was removed

Table 2: Study design

Groups	Number of groups	Therapeutic dose (mg/200 g of body weight)	Number of animals (8 animal/group)
NC	1	Saline water	8
OC	1	1% CMC	8
MFT treated	1	12.6	8

MFT: Myostaal forte tablets, OC: Osteoarthritis control, NC: Normal control, CMC: Carboxy methyl cellulose

from each knee to facilitate thorough fixation of the joint. Tissue samples were prepared for light microscopy using standard procedures.

The microscopic observations were done for chondrocytes damage area, chondrocytes necrosis, and inflammatory cells in synovial and synovial proliferation. The histopathological scoring was done according to the severity of the damage; the scores were given as slight = 1, moderate = 2, severe = 3.

RESULTS

Weekly Body Weight

The average body weight measured every week shows that after 14 days of the treatment, the rate of increase in the body weight of the OC group was lower than the weight of NC group animals whereas in the treated MFT group, the weight gain was equivalent to that of the normal rats as shown in Table 3 and Figure 1.

Morphology

The knee swelling was calculated based on synovial fluid volume using Vernier calliper scale. In the OC group, the swelling was more as compared to that of the MFT treated group during entire study period. In the MFT treated group, the swelling in the knee was observed till 14 day of the treatment which was gradually decreased to the normal levels equivalent to the volume of NC group animals on the 28th day of the study period. The swelling in the knee of the MFT treated group was found significantly lower than the OC group at the significance level of $P < 0.5$ when compared using one-way ANOVA *post-hoc* Tukey–Kramer test (Table 4 and Figure 2).

Histopathological Findings

Histopathological changes were assessed in all OC and MFT treated rats on 14th and 28th day of treatment and were compared with the knee histopathology of normal rat.

On 14th day of the treatment, the chondrocyte layer was found to be damaged more than 60% along with synovial proliferation and the presence of inflammatory cells in all the animals of OC group. On 28th day, the chondrocytes layer was completely damaged with synovial proliferation due to sepsis formation in the OC group rats, whereas in the MFT treated group on 14th day, the chondrocytes were damaged up to 40% with the presence of the inflammatory cells in only two animals and on 28th day, 50% of the chondrocytes were present and no synovial proliferation was observed. This difference can be contributed to the protective effect of MFT against chondrocytes damage.

The histopathology of OC group shows the presence of the inflammatory cells which were absent in the animals of MFT group on the 28th day of the treatment. The absence of the inflammatory cells indicates the suppression of the inflammatory response which can

Table 3: Weekly body weights of the animals with ±SE

Days	NC	OC	Myostaal forte
Day 1	128.37±0.8	128.75±1.05	128.25±1.4
Day 7	132±0.9	131.75±1.36	131.25±1.1
Day 14	136±0.6	133.12±1.67	135.12±1.04
Day 21	140.25±0.73	132.75±2.52	140±1.41
Day 28	143.25±1.1	135±2.85	142.5±0.95

NC: Normal control, OC: Osteoarthritic control, SE: Standard error

Table 4: Synovial fluid volume based on knee swelling

Days	NC	OC	Myostal forte
Day 1	1.85±0.056	1.95±0.11	1.83±0.05
Day 7	1.84±0.07	2.29±0.16	2.13±0.06
Day 14	1.85±0.005	2.46±0.17	2.07±0.05
Day 21	1.84±0.054	2.92±0.05	1.98*±0.056
Day 28	1.85±0.072	2.84±0.09	1.75*±0.9

*P<0.5 when compared with OC. NC: Normal control, OC: Osteoarthritic control

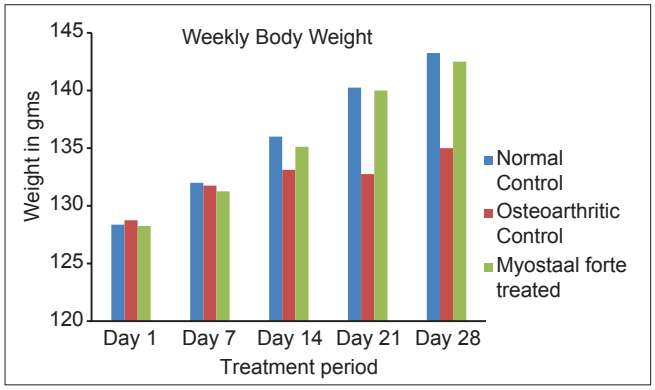

Figure 1: Average body weights

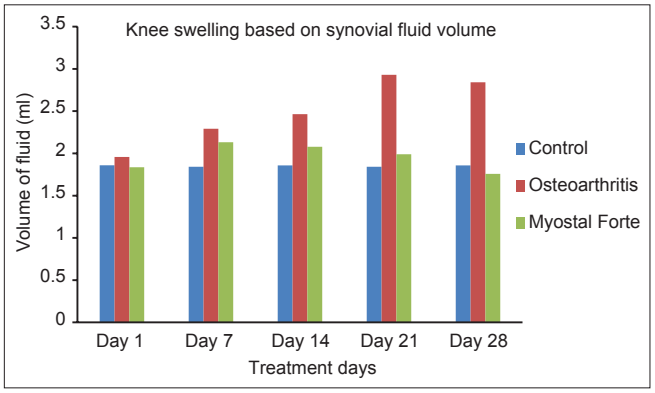

Figure 2: Synovial fluid volume based on knee swelling

be contributed to the anti-inflammatory activity of the MFT.

The total histopathological scoring for chondrocyte damage area, chondrocyte necrosis, inflammatory cells in the synovial and synovial proliferation for OC group was found to be 10 on 14th day and 12 on the 28th day of the treatment whereas it was 5.75 on 14th day and 2.75 on the 28th day of the myostaal forte tablet treatments shown in the Table 5 and Figures 3a and b.

DISCUSSION

Osteoarthritis is a degenerative disease associated with degradation of joint cartilage, structural changes, and pain in the knee joints. An experimental model of MIA induces osteoarthritis in rats in which the intra-articular injection of MIA inhibits glyceraldehye-3-phosphate resulting in disruption of chondrocyte metabolism and eventual cell death has shown a close resemblance to the pathophysiological conditions of the osteoarthritis in humans and helps in evaluation of various therapeutic agents.[5]

In this study, the MFT (*C. mukul* and *B. serrata*) a patent proprietary product of Solumiks Herbaceuticals has shown a significant action against chondrocytes damage in the rat model of MIA induce osteoarthritis. The animals of the osteoarthritic control group shown complete degradation of the chondrocyte layer, synovial proliferation, and the presence of inflammatory cells in synovial.[6,7]

Whereas, in the animals treated with MFT, chondrocyte layer was preserved up to 50% and inflammatory cells and synovial proliferation was absent on the 28th day of the treatment which reveals anti-inflammatory and chondroprotective action of MFT.

Of treated, control, and the normal groups, test substance has shown significant effect in the protection against chondrocyte damage in osteoarthritis. The absence of inflammatory cells with decreased synovial proliferation indicates the significant anti-inflammatory

Table 5: Histopathological findings

Areas	Score	Normal	OC		Myostaal forte	
			14 day	28 day	14 day	28 day
Chondrocyte damage area	+	0	1/4	0/4	1/4	4/4
	++	0	2/4	0/4	3/4	0/4
	+++	0	1/4	4/4	0/4	0/4
			2	3	1.75	1
Chondrocyte necrosis	+	0	0/4	0/4	2/4	4/4
	++	0	1/4	0/4	2/4	0/4
	+++	0	3/4	4/4	0/4	0/4
			2.75	3	1.5	1
Inflammatory cells in synovial	+	0	0/4	0/4	2/4	1/4
	++	0	1/4	0/4	0/4	0/4
	+++	0	3/4	4/4	0/4	0/4
			2.75	3	0.5	0.25
Synovial proliferation	+	0	0/4	0/4	0/4	2/4
	++	0	2/4	0/4	1/4	0/4
	+++	0	2/4	4/4	2/4	0/4
			2.5	3	2	0.5
Total score		0.00	10.00	12	5.75	2.75

Score: + Slight=1, ++Moderate=2, +++Severe=3. OC: Osteoarthritic control

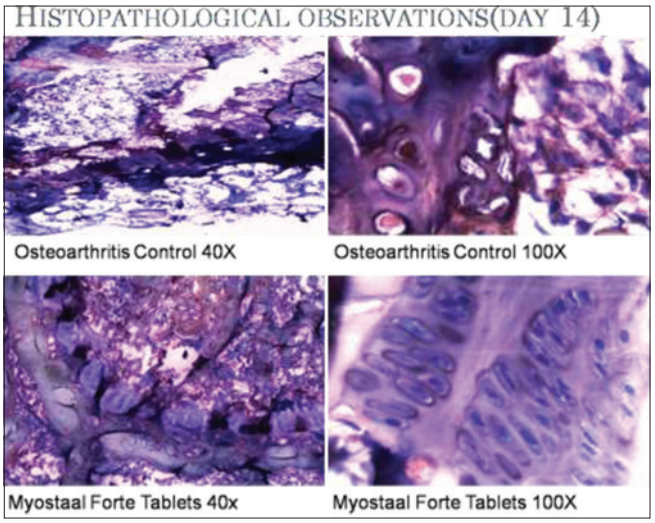

Figure 3a: Histopatological observations in the rat knee showing chondrocyte layer in the knee cartilage of osteoarthritic control, and myostaal forte treated rats, at ×40 and ×100 on 14th day of study

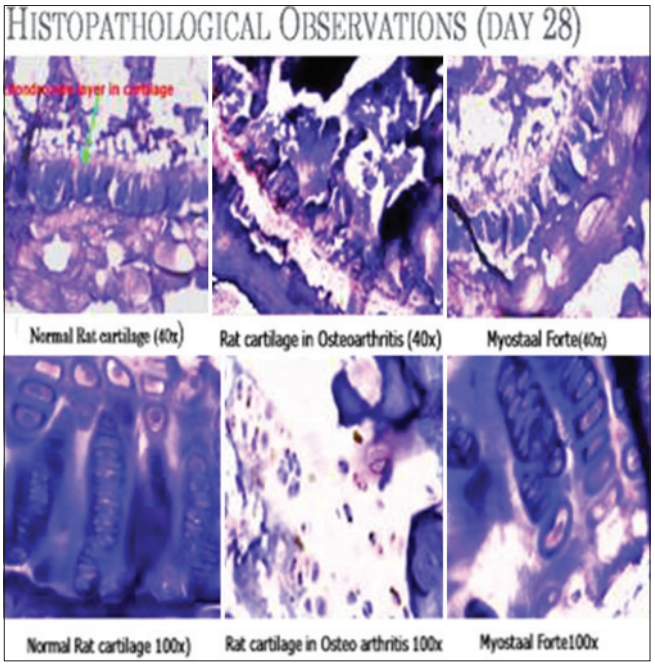

Figure 3b: Histopatological observations in the rat knee showing chondrocyte layer in the knee cartilage of normal control. Osteoarthritic control, and myostaal forte treated rats, at ×40 and ×100 on 28th day of study

and chondroprotective action of the MFT which can be helpful for the improvement of the quality-of-life in the osteoarthritic patients.

CONCLUSION

From the above results, it can be concluded that the MFT shows the time dependent protection against damage to the chondrocyte layer and palliate the inflammation and discomfort of the osteoarthritis.

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Original Article

Comparison of the Effectiveness of Intravenous Tramadol and Pethidine for Controlling Shivering During Epidural Anesthesia

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Abstract

Introduction: Shivering is a common and troublesome problem in the perioperative period, particularly during regional anesthesia. Perioperative shivering is detrimental to the patient in several ways - increase in oxygen consumption and metabolic rate, rise in plasma catecholamine levels leading to tachycardia and hypertension, increase in intracranial and intraocular pressures, the list can be elaborate.

Aims and Objectives: Pethidine has been used as an antishivering agent for several years, and this study aims to compare the efficacies of intravenous tramadol and pethidine in controlling shivering during epidural anesthesia.

Materials and Methods: This prospective, randomized, double-blind study was conducted in 116 ASA I and II physical status patients undergoing lower abdominal, urogenital, hip and lower limb surgeries. Sixty patients who developed shivering after administering epidural anesthesia were randomly divided into two groups and received either 50 mg tramadol or 25 mg pethidine intravenously. The disappearance and recurrence of shivering as well as hemodynamic and respiratory parameters were monitored at regular intervals.

Results: Upon analysis of data, we found that a complete disappearance of shivering in majority of patients took <5 min with tramadol compared with 10 min with pethidine that was statistically significant ($P < 0.05$). Recurrence of shivering was more with pethidine (33%) compared with tramadol (14%). Hemodynamic and respiratory parameters were comparable in both the groups. Adverse effects in the form of nausea and vomiting was slightly more with tramadol (20%) compared with pethidine (16%), which was not statistically significant ($P > 0.05$).

Conclusion: We came to the conclusion that though both tramadol and pethidine are equally effective in abolishing shivering during epidural anesthesia, tramadol is faster acting compared with pethidine, and the recurrence rate is much low.

Keywords: Epidural anesthesia, Pethidine, Shivering, Tramadol

INTRODUCTION

Central neuraxial anesthesia is the popular anesthetic technique for lower abdominal and lower limb surgeries. Around 40-60% patients under regional anesthesia develop shivering.[1,2]

Shivering can be very unpleasant and physiologically stressful for the patients undergoing complex surgeries. Mild shivering increases oxygen consumption to a level that is produced by light exercise, whereas severe shivering increases metabolic rate and oxygen consumption up to 100-600%. It may induce arterial hypoxemia, lactic acidosis, increased intra-ocular pressure and intra cranial pressure and will interfere with intraoperative as well as post-operative monitoring.[3-5] Shivering may be detrimental to patients with low cardiorespiratory reserves.[6]

Shivering during epidural anesthesia is usually preceded by core hypothermia, which can be prevented by maintaining

strict normothermia. This can be achieved by non-pharmacological measures like cutaneous warming and administration of warm intravenous (IV) fluids.

However, it is seen that even a small reduction in core temperature can trigger shivering.[7] Such cases have been treated with a variety of drugs including pethidine, clonidine, doxapram, chlorpromazine, butorphanol, fentanyl and ketanserin.

Recent studies have shown that tramadol hydrochloride, a synthetic, centrally acting opioid is also very effective in treating perioperative shivering.[8-10] Possibly like pethidine, it acts through the kappa opioid receptors. Another suggested mechanism is that tramadol exerts its antishivering action by inhibiting the reuptake of serotonin and norepinephrine in the spinal cord.

This study was conducted to compare the effectiveness of IV tramadol and pethidine in abolishing shivering during epidural anesthesia.

MATERIALS AND METHODS

A prospective, randomized, double-blind study involving 127 patients of ASA physical status I and II was conducted to compare the effectiveness of IV tramadol and pethidine in abolishing shivering during epidural anesthesia after obtaining institutional ethics committee approval. The study was conducted at MOSC Medical College Hospital Kolenchery during the 6 months period from June to November 2012. These patients were in the age group of 20-70 years and belonged to either gender. The proposed surgeries involved those of the lower abdomen and lower limbs.

After a proper pre-operative evaluation and with informed consent, lumbar epidural anesthesia was administered to these patients with standard technique. The IV fluids were stored at room temperature and administered with aseptic precautions. The room temperature was maintained at 22 ± 1°C. Supplemental oxygen was administered to all patients through simple face mask (4 L/min). The heart rate (HR), electrocardiography (ECG), respiratory rate, SpO_2, non-invasive blood pressure (NIBP) and both rectal and skin temperatures were monitored in all the patients.

Out of these 127 patients, 60 developed shivering of various grades (Table 1) after the administration of epidural anesthesia and they were randomly divided into two groups of 30 each. Group A patients received 1 mg/kg tramadol hydrochloride (diluted to 5 ml with normal saline) IV and Group B patients were given pethidine 0.5 mg/kg diluted to 5 ml with normal saline. The chief investigator was blinded to the drug used.

All patients were assessed for shivering, its disappearance, hemodynamic status and complications if any. ECG, HR, respiratory rate, SpO_2, NIBP and both rectal and skin temperatures were monitored in all the patients at intervals of 1 min till 10 min and thereafter every 10 min until the end of surgery. Recurrence of shivering was also noted, and an additional dose of either tramadol (0.5 mg/kg) or pethidine (0.25 mg/kg) was given to respective groups.

Statistical Methods

In this study, mean and standard deviation were calculated for each parameter in both the groups. Student's paired and unpaired *t*-test was used to find out the significant change in various parameters within the group and between the two groups.

$P < 0.05$ is considered to be statistically significant.

RESULTS

In our study, both groups were comparable with regards to age, gender, weight and ASA physical status (Table 2).

The above data (Table 3) shows that the average duration of surgery in both the groups were comparable**.**

Table 4 shows 60% cases in both groups had a sensory block level of T_8, which was comparable, and the difference was not statistically significant ($P > 0.05$).

During our study, we found that 60 patients out of 127 developed shivering (overall incidence of 47%).

Table 5 shows that the average time interval between block and onset of shivering in both the groups were almost

Table 1: Shivering grades

Grade 0	No shivering
Grade 1	Mild fasciculations on face or neck
Grade 2	Visible tremors involving more than one group of muscle
Grade 3	Gross muscular activity involving the entire body, bed shaking

Table 2: Demographic data

Parameters	Group A (tramadol) (*n*=30)	Group B (pethidine) (*n*=30)
Average age in years	43.48±14.24	41.84±13.69
Average approximate weight in kg	62.08±6.32	61.56±5.59
Gender (M: F)	22:08	23:07
ASA physical status (I: II)	17:13	16:14

same, and the difference was statistically not significant ($P > 0.05$).

The onset of disappearance of shivering was found at around 1 min and 3 min in tramadol and pethidine groups, respectively. Complete stoppage of shivering occurred much earlier in the tramadol group, i.e., more than 90% patients became shivering free in <5 min compared to pethidine group (>10 min). This difference was statistically significant ($P < 0.05$). Thus, IV tramadol abolishes shivering during epidural anesthesia faster compared with IV pethidine (Table 6).

Table 7 shows that before the onset of shivering the average HR in both groups is comparable. There is a significant increase in HR during shivering in both groups ($P < 0.05$). After arrest of shivering, the HR comes to baseline by 30 min in both the groups.

Table 3: Comparison of duration of surgery

Group	Average duration in min (mean±SD*)
Tramadol	174.2±30.91
Pethidine	170.8±31.4

*SD: Standard deviation

Table 4: Profile of levels of sensory block

Level of sensory block	Tramadol (*n*=30)		Pethidine (*n*=30)	
	Number	Percentage	Number	Percentage
T_6	8	26.67	7	23.33
T_8	18	60	18	60
T_{10}	4	13.33	5	16.67

Table 5: Comparison of time interval between block and onset of shivering

Group	Average time (mean±SD)
Tramadol	10.32±1.82
Pethidine	9.6±2.41

SD: Standard deviation

Table 6: Comparison of time taken for control of shivering

Time in minutes	*n*=30 (%)		*P* value	Statistical significance
	Tramadol	Pethidine		
1	16 (53.33)	1 (3.33)	<0.05	*S
3	27 (90)	9 (30)	<0.05	*S
5	28 (93.33)	18 (60)		
10	28 (93.33)	27 (90)		
20	28 (93.33)	27 (90)		
30	28 (93.33)	27 (90)		
40	28 (93.33)	27 (90)		
50	24 (80)	18 (60)		Recurrence of shivering
60	27 (90)	26 (87.67)		

*S: Statistically significant

Before the onset of shivering the average systolic and diastolic blood pressures (SBP and DBP) are comparable in both groups. There was no statistically significant change in average SBP and DBP either during or after the arrest of shivering in both the groups ($P > 0.05$).

Table 8 shows that before the onset of shivering, the average respiratory rate and SpO_2 levels were comparable in both groups. During and after the cessation of shivering their values, didn't show any significant change from the baseline in both the groups.

There was no significant change in core and skin temperatures in both groups either before or during shivering.

Recurrence of shivering was observed approximately after 50 min and the incidence of recurrence was 33% in the pethidine group, while only 14% in the tramadol group. This difference was statistically significant ($P < 0.05$). This was treated by repeating the particular drug in a reduced dose (Table 9).

Complications like nausea and vomiting was more with tramadol (20%) compared to pethidine (16.67%) while sedation was slightly more with pethidine (10%) compared with tramadol. However, these differences were statistically insignificant ($P > 0.05$).

DISCUSSION

Shivering is a common complication during epidural anesthesia, and several possible etiological mechanisms have been suggested. One postulated theory is that it develops due to core hypothermia, secondary to anesthetic-induced sympathectomy, which increases heat loss to the environment.[11] Another possible etiology is the stimulation of spinal cord temperature receptors by injection of cold local anesthetic agents.[12] A third theory suggests a direct action of anesthetic agent on the hypothalamic thermoregulatory centre.[7]

Even though shivering is triggered to increase the heat production so as to maintain a normal body temperature, it is detrimental to the patient in several ways. Shivering causes a marked increase in metabolic rate that in turn increases the oxygen consumption. It results in a rise in plasma catecholamine concentrations. This can produce deleterious effects in patients with marginal coronary reserve. Further, shivering increases the intracranial and intraocular pressures. Intense shivering is very uncomfortable to the patient, and even dental damage can occur. It will interfere with patient monitoring and the surgical procedure.

Table 7: Comparison of hemodynamic parameters between the two groups

Time	Mean±SD					
	Average HR		Average SBP		Average DBP	
	Tramadol	Pethidine	Tramadol	Pethidine	Tramadol	Pethidine
Before onset of shivering						
0 min	87.64±8.21	86.76±4.04	131.2±9.53	128.2±9.82	76.88±6.17	76.24±5.64
5 min	88.48±3.21	89.88±7.26	108.2±10.2	106.3±8.3	74.32±5.67	74.56±4.26
During shivering	102.5±8.58	104.6±6.28	106.6±9.82	107.2±10.1	74.0±5.14	73.34±3.4
After arrest of shivering						
0 min	99.91±7.28	100.2±5.62	106.2±8.23	104.5±9.32	74.4±5.26	72.08±2.79
5 min	93.2±8.64	95.23±7.62	105.32±7.6	106.34±9.71	75.8±4.12	73.04±2.84
10 min	88.32±7.45	90.2±6.74	106.4±8.32	105.45±10.3	75.6±5.29	72.24±3.47
30 min	86.2±7.09	85.34±7.1	110.34±7.61	112.6±10.42	74.04±5.90	72.96±3.32

SD: Standard deviation, HR: Heart rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

Table 8: Comparison of respiratory parameters

Time	Mean±SD			
	Average respiratory rate		Average SpO_2	
	Tramadol	Pethidine	Tramadol	Pethidine
Before onset of shivering				
0 min	16.4±0.96	16.32±0.85	98.72±0.98	99.72±0.54
5 min	16.7±0.76	16.52±1.50	99.08±0.4	99.36±0.49
During shivering	17.1±1.11	17.4±1.32	98.7±0.80	99.18±0.91
After arrest of shivering				
0 min	17.06±1.18	17.56±2.18	98.44±0.82	99.28±0.84
5 min	16.72±0.74	17.9±2.51	98.8±0.57	99.32±0.80
10 min	16.48±0.87	17.0±2.12	99.12±0.53	99.04±1.09
30 min	16.56±1.12	16.72±2.45	99.24±0.59	99.2±0.96

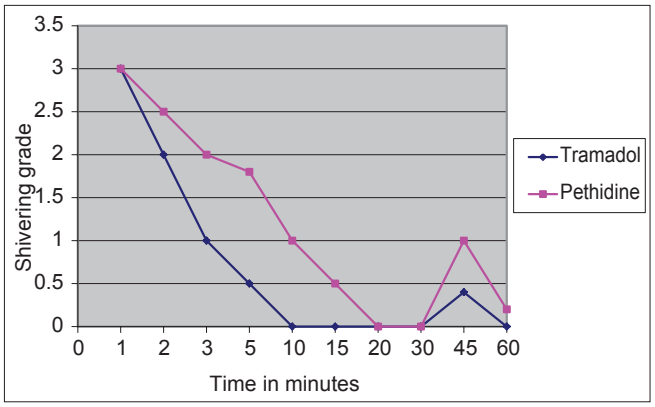
SD: Standard deviation

Table 9: Recurrence and side effects profile

Side effects	Tramadol %	Pethidine %
Recurrence of shivering	14	33
Nausea and vomiting	20	16.67
Sedation	6.67	10

Various nonpharmacological and pharmacological methods have been used to prevent body heat loss. Non-pharmacological methods include electrical heaters, forced air warmers, blankets, radiant heat and warming the operating room suite. The use of warm local anesthetic solutions and warming of IV fluids are also effective in reducing the incidence of shivering. Pharmacological methods like ketanserin, nefopam, pethidine, alfentanyl, doxapram, butorphanol, tramadol, chlorpromazine, clonidine, etc. have been tried and compared by many researchers. They have showed varying efficacies and some of these drugs have significant adverse effects.

In our study, we have compared tramadol, a synthetic opioid with pethidine that is considered as the gold standard for abolishing shivering under anesthesia. It has been postulated that tramadol abolishes shivering by inhibiting the reuptake of noradrenaline and serotonin, hence activating the descending inhibitory spinal pathways. It also modulates the activity of nucleus median raphe acting centrally on the mu opioid receptors predominantly with minimal effects on kappa and delta receptors. Pethidine acts primarily through kappa opioid receptors.



Graph 1: Profile of shivering and its control

In our study, we observed that the incidence of shivering during epidural anesthesia was 52%. We have observed that shivering disappeared by 1 min with IV tramadol and 5 min when using IV pethidine. Complete disappearance of shivering took 5 min with tramadol and nearly 10 min, while using pethidine. The success rate was 93.33% with IV tramadol and 90%, while pethidine was used. This shows that even though both agents are equally effective in abolishing shivering, tramadol acts much faster compared with pethidine (Graph 1).

We found that shivering results in a rise in HR, but there was no significant variations in hemodynamic and respiratory parameters when tramadol or pethidine was used. It has been postulated that shivering can result in an increase in basal metabolic rate and plasma catecholamine concentrations. This may be the reason for the rise in HR during shivering.

In our study, the average core temperature showed a fall of 0.7°C from the baseline in both the groups. Even though, this fall in core temperature is not statistically significant, it is sufficient enough to trigger shivering due to highly sensitive temperature regulating mechanisms. Skin temperature monitoring didn't show any significant variation before, during or after shivering in both the groups.

Recurrence of shivering was observed after about minutes, and its incidence was more in the pethidine group (33%) compared to tramadol group (14%). Recurrence of shivering was successfully treated with a second dose of a particular drug. The probable reason for recurrence of shivering could be low plasma concentration of the active drug when hypothermia is still persisting and individual variations in core temperature.

Adverse effects in the form of nausea and vomiting and sedation were minimal in both the groups.

CONCLUSION

We concluded from our study that the incidence of shivering (varying degrees) during epidural anesthesia was 52%. Both IV tramadol and IV pethidine are effective in abolishing shivering during epidural anesthesia, but tramadol is significantly faster in abolishing shivering. Recurrence of shivering was more when pethidine was used compared to tramadol (33% vs. 14%). Both tramadol and pethidine possess good cardiovascular and respiratory stability and lacks significant adverse effects. Under epidural anesthesia, we observed a slight fall in core temperature, which may be sufficient enough to trigger shivering due to highly sensitive thermoregulatory mechanisms. Prolonged shivering can result in a rise in HR, which can be detrimental to patients with poor coronary reserve. Oxygen supplementation during shivering may help in preventing arterial hypoxemia.

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Original Article

Comparative Evaluation of Clinical Efficacy of Manual and Powered Tooth Brush

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Abstract

Background: It is now universally contended that prevention and inhibition of plaque accumulation on the tooth surfaces are likely to cause a major breakthrough to achieve optimum periodontal health. In the view of great importance of plaque removal, a number of techniques has been advocated for effective utility of tooth brushing. This study is an endeavor to find out if powered brushing is better than manual brushing.

Aims and Objectives: This study was conducted to compare the efficacy of the manual toothbrush and powered toothbrush on 45 patients, in the age group of 19-23 years over a period of 28 days. The aim was to study the effect of the powered toothbrush (Braun 2D) and the manual toothbrush (regular advantage plus) on removal of supra-gingival plaque and improvement of gingival health.

Materials and Methods: The selected subjects were classified under two groups: Group A (manual tooth brushing) and Group B (powered tooth brushing) and the subjects were evaluated over a period of 28 days.

Results: Statistical evaluation of clinical observations was carried out. Highly significant difference between pre- and post-brushing mean values was seen in both Group A and Group B ($P < 0.001$).

Conclusion: The results of the study showed that the powered toothbrush demonstrated clinical and statistical improvement in overall plaque and gingival scores. This also proved that Braun 2D Powered toothbrush is safe, superior, and an effective alternative to the manual toothbrush in the overall improvement of gingival health.

Keywords: Manual toothbrush, Periodontal health, Plaque, Powered toothbrush

INTRODUCTION

The history of man's fight for health begins with known earliest existence, when he was completely at the mercy of nature with no effective means of combating its hazards. At present, enormous strides have been made for plaque control. However, periodontal disease still remains one of the widest spread of diseases affecting mankind. Supra-gingival plaque removal has been found to be remarkably effective in reducing total plaque specific subgingival species and showing sustained improvement in clinical parameters.[1]

Power (electric) toothbrushes were largely seen as a niche item mostly suitable for special populations when first introduced, but several decades of innovation and technological improvements have resulted in a new generation of power brushes with greater efficacy and patient-pleasing features that can enhance compliance. In particular, the oscillating-rotating class of power toothbrushes was found in an independent meta-analysis of over 42 clinical trials to show statistically superior anti-plaque and anti-gingivitis abilities versus a manual toothbrush.[2]

The popularity of power brushes has soared as consumers have discovered their robust cleaning ability coupled with ease of use.[3]

Yet there remains a subset of individuals who have been reticent to trade their familiar manual toothbrush

and style of brushing for the somewhat unique brush head feel and modes of action of most marketed power toothbrushes, despite evidence that power brushes have been shown to provide superior plaque reduction.[2-5]

Thus, the purpose of this study is to evaluate the safety and efficacy of the (Braun 2D) powered toothbrush for the removal of supra-gingival plaque and improving gingival health and to compare it to a regular manual toothbrush (regular advantage plus).

Aims and Objectives

The aim was to evaluate and compare the efficacy of powered toothbrush (Braun 2D) and a manual toothbrush (regular advantage plus).

MATERIALS AND METHODS

This study was conducted in the Department of Periodontics and Oral Implantology, Rama Dental College Hospital, and Research Centre, Kanpur. 45 patients in the age group of 19-23 years participated in the study.

Criteria for Patient Selection

1. Moderate to good oral hygiene (oral hygiene index-S, Greene and Vermilion, 1964)
2. No dental caries
3. No adverse habits (smoking and pan chewing)
4. No previous experience with a powered toothbrush
5. Patients undergoing orthodontics therapy and with complicated prosthesis were not included in the study
6. Patients should have a minimum of 20 teeth
7. Subject had to be free from systemic conditions that might influence the gingival status
8. Subject must not have used nonsteroidal anti-inflammatory drugs, corticosteroids, or antibiotics at least for a month before the start of the study.

Study Design

A total number of 45 subjects, 15 males and 30 females were included in the study. They were then classified under 2 groups.

Group A: Consisted of 11 males and 12 females. Each of these subjects was allocated a manual toothbrush, regular advantage plus and a tube of toothpaste. They were instructed to use the modified Bass method of brushing.

Group B: Consisted of 4 males and 18 females who were allocated a powered toothbrush and tooth paste. They were instructed to use a brush with the bristles perpendicular to the gingival margin or sulcus.

Experimental Design

The duration of the study was for 28 days. The subjects were asked to report to the dental office on 0 day, 7th, 14th, and 28th days. All the subjects who participated in the study, underwent oral prophylaxis and were advised to refrain from brushing their teeth for 24 h prior to their appointment on "0" day.

On "0" Day

Each subject was made to sit on the dental chair. The pre-brushing plaque score was recorded in the prepared proforma using the Turesky–Gilmore–Glickman modification of the Quigley–Hein Plaque Index (1970). The gingival status for each subject was assessed using the gingivitis component of Sigurd Ramfjord's periodontal disease index (1959) in relation to the six Ramfjord's teeth and gingival bleeding was assessed by the gingival bleeding index.[6]

Following this, each subject was instructed to brush his/her teeth with the allocated toothbrush and toothpaste and the brushing technique in which they were instructed (Group A - Manual toothbrush, Group B - Powered toothbrush) for 2 min in the dental clinic. Each subject was then re-examined after tooth brushing with the disclosing solution, and the post-brushing plaque score was recorded using the Turesky–Gilmore–Glickman modification of the Quigley–Hein plaque index. The subjects were then asked to rinse the mouth with water.

After having recorded the above parameters, each subject was then instructed to brush twice a day for 2 min at home with the allocated toothbrush and toothpaste, using the brushing technique which they were instructed to follow. Subjects were given appointments to return on the 7th, 14th, and 28th day with the advice to abstain from brushing for 24 h prior to each of these appointments. The subjects were then discharged from the dental clinic.

On the 7th, 14th, and 28th Day

On the 7th, 14th, and 28th day when the subjects returned to the dental clinic as appointed, the same experimental procedures were conducted, and the same clinical parameters were evaluated and recorded as on the day "0" and these were then submitted for statistical evaluation.

Statistical Methods Applied

Results were obtained, and they were subjected to statistical analysis.

- Changes in clinical parameters from 0 day to 28th day were calculated and compared using *t*-test on paired observation
- Comparison between Group A (manual) and

Group B (powered) was done using unpaired *t*-test (t-independent test)
- 95% confidence interval was provided for all the estimates.

Powered Toothbrush

The Braun 2D is a new approach in toothbrush design. Instead of being a motor driven regular toothbrush this new rechargeable brush offers the convenience of sustained rechargeable cleaning power, combined with the clinically proven benefits of a rotating power head with crisscross bristles.

Regular Advantage Plus

The manual toothbrush used in the study was advantage toothbrush. It is a soft bristle toothbrush. Each brush has tufts, and each tuft has 35 nylon filaments. The toothbrush is divided into power tip and action cup.

a) Power tip: Consists of eight tufts arranged in a round fashion with a single tuft in the center surrounded with seven tufts. Here, the filaments are long and angled to reach around back teeth and in between teeth for more effective brushing.
b) Action cup: This consists of 17 tufts. Eight tufts arranged in two rows. Each row consisted of four tufts. Three rows of three tufts each slowly tapering. These filaments simultaneously clean the tooth surface along the gum line. The diameter of the filament is 0.008 inch for both translucent and colored. Out of 180°, end rounding in 154.8°.

Armamentarium

1. Mouth mirror
2. Blunt straight probe
3. Ultrasonic unit
4. Dappen dish
5. Polishing paste and rubber cups
6. Disclosing solution (plaksee)
7. Regular advantage plus manual toothbrush
8. Braun 2D powered toothbrush.

RESULTS

This study was conducted in Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh. To compare the efficacy of the manual toothbrush and powered toothbrush on 45 patients, 15 males and 30 females in the age group of 19-23 years. The subjects were classified under two groups - Group A (manual toothbrush) and Group B (powered toothbrush). Statistical evaluation of clinical observations was carried out.

On day 0, the pre-brushing mean Plaque Index score for Group A was 1.56 and 1.77 for Group B (Table 1). While the post-brushing mean Plaque Index score for Group A was 0.61 and 0.81 for Group B. On 28th day, the pre-brushing mean Plaque Index score for Group A was 0.71 and 0.70 for Group B. While the post-brushing mean Plaque Index score for Group A was 0.17 and 0.13 for Group B. The trend in the decline in the pre and post-brushing Plaque Index scores for both Group A and Group B was also noticed on 7th and 14th day. In all the occasions, a highly significant difference between pre- and post-brushing mean value was seen in both Group A and Group B ($P < 0.001$). When comparing the Plaque Index scores for Group A subjects and Group B subjects, Group B subjects showed a borderline significance ($P = 0.052$). The percentage of bleeding surfaces for Group A reduced from 21.74% on day 0 to 1.48% on the 28th day and for Group B the percentage of bleeding surfaces decreased from 14.94% on 0 day to 0 on the 28th day (Table 2). Group B subjects showed a statistically highly significant ($P < 0.001$) reduction in the percentage of gingival bleeding surfaces when compared to Group A subjects.

DISCUSSION

Since bacterial plaque is the principal etiological agent for gingival and periodontal diseases, both prevention and treatment of these conditions must be based on a large extent on plaque control.[7] Daily plaque removal with a toothbrush is an important component of oral hygiene programs intended to prevent and treat periodontal diseases.[8]

This mechanical cleaning procedure is efficient, provided, the method used is sufficiently thorough and performed

Table 1: Comparison of pre- and post-brushing mean Plaque Index scores for Group A and Group B subject, 0, 7th, 14th and 28th day

Scores	0 day				7th day				14th day				28th day			
	Group A		Group B		Group A		Group B		Group A		Group B		Group A		Group B	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pre-brushing	1.56	0.44	1.77	0.34	1.53	0.54	1.43	0.56	0.88	0.37	0.98	0.45	0.71	0.31	0.70	0.44
Post-brushing	0.61	0.34	0.81	0.39	0.58	0.42	0.54	0.36	0.29	0.24	0.25	0.19	0.17	0.19	0.13	0.13

SD: Standard deviation

Table 2: The percentage of gingival bleeding surfaces for Group A and Group B

Groups	0 day	28th day
Group A	21.74	1.48
Group B	14.94	0
	P<0.001	*P*<0.001

regularly. Failure to comply and lack of technical skill of the patient lessens the effectiveness of conventional toothbrushes. In order to facilitate and improve the quality of tooth cleaning a number of electrical toothbrushes have been marketed.[9]

One of the primary reasons for the introduction of electric toothbrushes is to enhance cleaning of teeth, especially for people who are handicapped or who have poor manual dexterity. It is also of great use for those who are poorly motivated to brush their teeth.[10] In general, the brush head of powered toothbrushes tend to be more compact than conventional manual toothbrushes. Movement of the brush head is powered from single battery units, magnetostrictive devices or electric elements mounted in the handle or stem of the brush. In addition to the effect of mechanical brushing, the concept of utilizing low-frequency acoustic energy to generate dynamic fluid activity and perhaps a mild cavitational effect has been developed to provide a "beyond the bristle tip" cleaning activity. These acoustic vibrations have been shown to have a significant effect in reducing the ability of oral bacteria to adhere to hard surfaces and are capable of disrupting dental plaque.[11]

The result of this 4 weeks clinical trial demonstrates the effectiveness of the powered toothbrush 2D plaque removal and the manual toothbrush regular advantage plus in lowering plaque and gingivitis scores. Both clinically and statistically significant improvements in plaque and gingivitis scores were noted for both the manual and powered toothbrushes.

The time frame for this study was for 28 days (4 weeks), and the recordings were taken on the 0 day, 7th, 14th, and 28th day. This is in accordance with the studies designed by Killoy *et al.* 1989,[12] Khocht *et al.* 1992,[13] Stoltze and Bay 1994,[14] Van der Weijden *et al.* 1994,[15] where the safety and efficacy of the powered toothbrush with respect to plaque and gingivitis was assessed over a time period of 28 days (4 weeks).

Comparison of pre- and post-brushing mean Plaque Index scores of Group A and Group B on 0, 7th, 14th, and 28th day were found to be highly significant ($P < 0.001$). Thereby, indicating that both manual and powered toothbrushes effectively removed plaque on comparing the percentage of gingival bleeding surfaces between Group A and Group B showed a statistically highly significant reduction of bleeding surfaces to that of Group A.

CONCLUSION

The present study was aimed at comparing the efficacy of the powered toothbrush (Braun 2D) to that of a manual toothbrush (40 regular advantage plus) for removal of supra-gingival plaque and improvement in gingival health.

The results of this study showed that all subjects who participated in the study showed a reduction in Plaque Index scores and improvement in gingival health whether they used a powered toothbrush or manual toothbrush. It is noteworthy, however, that on the 28th day subjects who used powered toothbrush showed a better reduction in Plaque Index scores and improvement in gingival health.

Within the limits of the design of the study, it was possible to make the following conclusions:

1. Group A (manual toothbrush) and Group B (powered toothbrush) subjects showed a decline in the Plaque Index from day 0 to 28th day
2. When comparing the Plaque Index scores for Group A subjects and Group B subjects, Group B subjects showed a borderline significance ($P = 0.052$)
3. The gingival index scores for Group A and Group B subjects showed that there was a reduction in gingival inflammation in both groups
4. There was no statistical significance when the gingival index scores for Group A subjects and Group B subjects were compared
5. Group B subjects showed a statistically highly significant ($P < 0.001$) reduction in the percentage of gingival bleeding surfaces when compared to Group A subjects.

Though, the definite and gradual improvement in the reduction of plaque and health of gingiva in both groups was observed by the 4th week of this 28 days study. The results of the study showed that the powered toothbrush demonstrated clinical and statistical improvement in overall plaque and gingival scores. The findings of this study lend support to the argument that when compared with the manual toothbrush, the powered toothbrush has the potential to improve oral hygiene. Powered toothbrush offers an individual the ability to brush their teeth in a way that is optimum in terms of removing plaque and improving gingival health, thus conferring good brushing

technique on all those who use them, irrespective of manual dexterity or training. However, longitudinal studies are needed to assess the long-term effectiveness of these brushes on plaque and gingivitis.

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Original Article

Evaluation of Predisposing Factors of Urinary Tract Infections in Children: A Hospital-Based Study

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Abstract

Background and Objectives: Chronic renal failure is one of the most dreaded complications of urinary tract infections (UTI).

Aims and Objectives: The aim of the study was to access the predisposing factors and antibiotic resistance of such infections in pediatric patients at Teerthanker Mahaveer Medical College and Research Centre, Moradabad.

Materials and Methods: Mid-stream urine samples for culture were received from 123 children over a period of 12 months. Wet mount microscopy and culture on cysteine lactose electrolyte deficient medium were done to diagnose UTI. Identification was done by biochemical tests and antimicrobial sensitivity.

Results: Significant bacteriuria was found in 35 subjects. Male gender age < 1 year, vesicoureteric reflux disease and posterior urethral valve were common risk factors in children suffering from UTI. Pyuria was detected in 66 patients. The most common pathogens isolated were *Escherichia coli*, *Klebsiella* spp. Less common were *Enterococcus fecalis*, proteae, and *Pseudomonas aeruginosa*.

Conclusion: Children with male gender, age < 12 months spectrum of pathogens causing pediatric UTI in our center had a preponderance of nosocomial multi-drug resistant pathogens.

Keywords: *Escherichia coli, Klebsiella*, Urinary tract infections, Uropathogens

INTRODUCTION

Chronic renal failure is the most common cause of morbidity in long-term cases of urinary tract infections (UTI). *Escherichia coli* and *Klebsiella* are the most common causative agents[1] leading pathogens, but recently *Enterococcus* and *Staphylococcus aureus* have emerged as prominent agents.[2-4] Therapy for these children requires urine culture and appropriate antimicrobial sensitivity testing. In a study conducted by Narasimhan *et al.*, 52 children treated for UTI as the case of posterior urethral valves (PUV), 34 children showed renal scarring.[2] Physical growth of children is also associated with symptomatic UTI.[4] and pelvi-ureteric junction obstruction (PUJO) shown to be associated as most important cause attributed to this. In the present study, we put our attention on collecting the data on microbiological and antimicrobial resistance profile of all pediatric age group UTI patients presented at Teerthanker Mahaveer Medical College and Research Centre, Moradabad.

MATERIALS AND METHODS

In all cases of suspected UTI, urine culture was done using cysteine lactose electrolyte deficient agar[5] and wet mount microscopy done to detect pyuria.[6] Urine was cultured using a bacteriological loop on agar media, and colony count was made, leaving it overnight. After overnight culture colony forming units were evaluated. In some cases of females, repeat samples were asked for.[7,8] Diagnosis of pediatric UTI was made using Hellerstein[7] guidelines. Antibiotic sensitivity was put up by (Clinical and Laboratory Standards Institute) guidelines were used for antibiotic sensitivity.[9]

RESULTS

A total of 123 children with suspected UTI was evaluated in the study, of whom 35 (of different age group) had culture-proven UTI. Of 35 children, 24 were males (showing male preponderance).

Wet mount microscopy for the presence of bacteria in a significant amount per field was positive in 29 patients with sensitivity, specificity, of 78.6 and 57.4%, respectively. Significant pyuria alone was found in 18 patients with sensitivity, specificity, of 48.6 and 57.6%, respectively. Of the 29 patients in whom information about underlying disease was available, the most common underlying illnesses were PUV (28.2%), vesicoureteral reflux (VUR) (17.8.%), neurogenic bladder (6.2%), PUJO (3.3%), hydronephrosis (2.8%), stricture urethra (3.2%), recurrent UTI (2.6%), renal stone disease (1.9%). The remaining (34%) children had no predisposing conditions known to cause UTI (Table 1 and Figure 1).

The most common uropathogens isolated included *E. coli* (44.8%), and *Klebsiella pneumoniae* (16.6%).

There was no statistically significant difference ($P > 0.05$) in the susceptibility profiles of the isolates from various categories (surgical, medical, emergency, and Intensive Care Units).

Table 1: Common predisposing factors for UTI

Predisposing factors leading to UTI	Percentage
PUV	28.2
VUR	17.8
Neurogenic bladder	6.2
PUJO	3.3
Hydronephrosis	2.8
Stricture urethra	3.2
Recurrent UTI	2.6
Renal stones	1.9
Other causes	34

PUV: Posterior urethral valves, UTI: Urinary tract infections, VUR: Vesicoureteral reflux, PUJO: Pelvic-ureteric junction obstruction

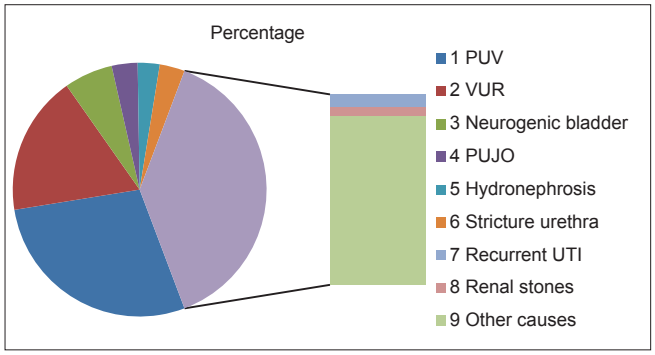

Figure 1: Common predisposing factors for UTI

DISCUSSION

Being the only Medical College and Research Centre in Moradabad area, our institute caters to those children who have been treated without much care in private clinics, which leads to admission of high-risk patients to our hospital.

Same is the condition in other states of India, but no specific study taking into consideration of children being carried out as we go through the literature.[10] As seen from our study, it comes forward that toddlers are very much susceptible to UTI, and predliction is more toward the male gender which is statistically significant at ($P < 0.001$). Causes predisposing to UTI are mainly in order of PUV, VUR, neurogenic bladder and PUJO etc.[1,2] *E. coli* (44.1%), and *K. pneumoniae* (16.6%) are the most common etiologic factors pertaining to pediatric UTI. Similar observations leading etiology of pediatric UTI have been noted in other studies also.[11] Other observation which needs discussion here that long-term introduction of urethral catheters are a potent source of spreading the infection.[12]

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Original Article

Association between Symptoms of Temporomandibular Disorders and Gender, Morphological Occlusion, and Psychological Factor in Dental Student's

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Abstract

Introduction: Temporomandibular disorders (TMD), is a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular joint, and the associated structures. The etiology of TMD in children and adolescents is considered multifactorial in nature and has been related to trauma, malocclusion, and oral parafunctional habits such as bruxism, nail biting, and non-nutritional sucking.

Purpose: The aim of this study was to investigate the prevalence of TMD in a sample of Dental students and its relationship to gender, occlusion, and psychological factors.

Materials and Methods: A total number of 150 subjects, aged 18-25 years were included in the study. The TMD degree was evaluated using an anamnestic questionnaire. Morphologic occlusion was evaluated according to angle classification. The level of anxiety was self-rated by using Zung self-rating scale.

Results: The results of this study imply that 23% of the subjects had mild to moderate degree TMD. Significant association could not be found between TMD and gender or occlusion. TMD was found to have statistically significant association with anxiety.

Conclusion: A high-prevalence of mild TMD was found in this student population. Various studies show that the anxiety had a statistically significant association with TMD. The present study suggests the importance of psychological screening of young adults as an adjunct to confirm the diagnosis of TMD so as to early treatment.

Keywords: Anxiety, Gender, Occlusion, Sex, Temporomandibular disorder

INTRODUCTION

Temporomandibular disorders (TMD), is a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular joint (TMJ), and the associated structures.[1] TMD is the most common cause of orofacial pain of a non-dental origin, having a multifactorial etiology. The major etiologic factors associated with TMJ as revealed by scientific literature[2] are occlusal disturbance, trauma, emotional stress, and parafunctional habits.

Most recently the combination of biologic and psychological aspects in etiologic theories about TMD has been termed as biopsychosocial.[2] Approximately 60-70% of the general population will have at least one of the signs of TMD at some stage in their lives; however, only about 5% actually seek treatment.

The purpose of this study was to find out the prevalence of TMD in dental students and its relationship to gender, occlusion, and psychological factor i.e., anxiety.

MATERIALS AND METHODS

Subjects

This study was carried out in VSPM's Dental College with the Ethical Committee approval consisting sample of 150 students with age ranging from 18 to 25 years was randomly selected from among the student population. After obtaining informed consent patient's clinical examination, was carried out. The presence and severity of TMD was determined using a self-administered anamnestic questionnaire (modified version of Helkimo's anamnestic index) composed of 10 questions regarding common TMD symptoms.

Anamnestic questionnaire

1. Do you have difficulty in opening your mouth?
2. Do you have difficulty in moving or using your jaw?
3. Do you have tenderness or muscular pain when chewing?
4. Do you have frequent headaches?
5. Do you have neck ache or shoulder pain?
6. Do you have pain in or about the ears?
7. Are you aware of noises in the jaw joints?
8. Do you consider your bite "normal"?
9. Do you use only one side of your mouth when chewing?
10. Do you have morning facial pain?

The scoring system was as follows:

- A score of "0" - the absence of symptoms; a score of "1" - an occasional occurrence,
- A score of "2" - presence of dysfunction, and a score of "3" - severe pain or bilateral symptoms.·(The score of "3" could only be given for questions 4, 6, and 7).

The sum of the scores was used to group the subjects into four categories as follows:

- TMD free: Score 0-3, mild TMD: Score 4-8, moderate TMD: Score 9-14, severe TMD: Score 15-23.
- Occlusion examination: Morphologic occlusion was evaluated according to angles classification (molar Classes I, II, and III).

Zung self-rating anxiety scale (SAS)

The level of anxiety was self-rated by using SAS. It was designed by William WK Zung to quantify the level of anxiety for patients experiencing anxiety related symptoms. It has 20 questions. Each question is scored on a scale of 1-4 (none or a little of the time, some of the time, a good part of the time, most of the time). There are 15 questions worded toward increasing anxiety levels and 5 questions worded toward decreasing anxiety levels.

The scores range from 20 to 80.

Normal range: 20-44, mild to moderate: 45-59, marked to severe: 60-74, extreme: 75-80.

Patients with congenital anomalies, trauma to TMJ are excluded from the study.

Statistical Analysis

Data were computerized and it was used for analysis. The percentages of subjects with TMD (of different grades of severity), malocclusion, anxiety, in both genders were calculated. Association between TMD degree and gender, occlusion, anxiety was tested using the Chi-square test. The significance level was set at $P < 0.05$.

RESULTS

Out of the 150 students 47 were male and 103 were female (Table 1). The number of female was greater than male, but statistically not significant. The association between TMD and occlusion shown in Tables 2 and 3. The majority of the subjects who had mild to moderate levels of TMD exhibited class I occlusion which was statistically not significant. According to our results, 23% of the subjects had TMD, but it was of mild to moderate degree. TMD was found to have statistically significant association with anxiety $P = 0.0023$ (Table 4).

DISCUSSION

In this study, 23% out of 150 subjects had some degree of TMD. Bonjardim *et al.*,[3] using the same questionnaire to evaluate TMD in university students, reported 50%

Table 1: Relationship between TMD degree and gender

TMD degree	Percentage of *n*	
	Male	Female
TMD free	40 (32)	82 (67)
Mild	7 (26)	19 (73)
Moderate	0	2 (1.94)
Severe	0	0
Total	47 (31.33)	103 (68.66)

Chi-square=0.64, *P*=0.42, TMD: Temporomandibular disorders

Table 2: Relationship between TMD degree and occlusion

Molar class	Percentage of *n*			
	TMD free	Mild	Moderate	Severe
Class I	98 (85.96)	15 (13.15)	1 (0.877)	0 (0)
Class II	17 (65.38)	8 (30.7)	1 (3.86)	0 (0)
Class III	8 (80)	2 (20)	0	0 (0)
Total	123 (82)	25 (16.66)	2 (1.33)	0 (0)

Chi-square=2.88, *P*=0.09. TMD: Temporomandibular disorders

Table 3: Relationship between TMD degree and male and female occlusion

Degree	Male occlusion (percentage of *n*)			Female occlusion (percentage of *n*)		
	I	II	III	I	II	III
TMD free	34 (89.47)	5 (83.33)	2 (66.66)	67 (83.57)	11 (68.75)	5 (71.42)
Mild	4 (10.52)	1 (16.66)	1 (33.33)	11 (13.75)	5 (31.35)	2 (28.57)
Moderate	0 (0)	0 (0)	0 (0)	2 (2.5)	0 (0)	0 (0)
Severe	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	38 (80.85)	6 (12.76)	3 (6.38)	80 (77.66)	16 (15.5)	7 (6.79)

Male Chi-square=0.46, *P*=0.49; Female Chi-square=1.81, *P*=0.17; Combined Chi-square=3.07, *P*=0.08. TMD: Temporomandibular disorders

Table 4: Relationship between TMD degree and anxiety

Anxiety level	Percentage of *n*			
	TMD free	Mild	Moderate	Severe
Normal	115 (85.18)	19 (14.74)	1 (0.74)	0 (0)
Mild to moderate	8 (53.33)	6 (40)	1 (6.66)	0 (0)
Marked to severe	0	0	0	0 (0)
Extreme	0	0	0	0 (0)
Total	123 (80)	15 (10)	2 (1.33)	0 (0)

Chi-square=9.28, *P*=0.0023. TMD: Temporomandibular disorders

subjects had some degree of TMD, thus our value is slightly lower than that. Bonjardim *et al.*[3] found that although the prevalence of TMD in young adults was high, the severity of the condition in this age group was low. In this study only 10%, of subjects presented as mild and 1.33% of subjects presented as a moderate degree of TMD and, consequently, needed care and treatment. This data lead us to suggest that TMD evaluation must be discerningly performed in order to identify those who actually could benefit from some intervention.

Out of the 150 students 47 were male and 103 were female (Table 1). The percentage of women (20.38%) with TMD is higher than that of men (14.86%); however, this difference was not statistically significant. The findings are similar to those as reported by Widmalm *et al.*[4] and Bonjardim *et al.*[3] that the higher prevalence of TMD signs and symptoms in females, with the disorder reported as being 3-6 times more common in women than in men.

In this study, no statistically significant association between morphologic occlusion and TMD degree was found (Tables 2 and 3). Present study results agree with that of several studies that have also failed to find strong evidence to support of the theory that occlusion plays a role in the etiology of TMD, particularly as the sole cause or the dominant factor.[3,5]

The most common occlusal feature as reported by McNamara *et al.*,[6] which have been associated with specific diagnostic group of TMD condition are skeletal anterior open bite, overjet >6-7 mm, retruded cuspal position/ intercuspal position slightly >4 mm, unilateral lingual cross bite, five or more missing posterior teeth. According to McNamara *et al.*,[6] relationship of TMD to occlusion is minor.

Present study has a statistically significant association between TMD degree and anxiety (Table 4). These outcomes are in agreement with Bonjardim *et al.*[3] stated that the anxiety plays an important role in TMD, acting as a predisposing or aggravating factor. Furthermore, anxiety may be an important factor in the perception of pain, with anxious subjects paying more attention to pain and thereby amplifying the perceived intensity. This possibility has been confirmed by other studies, which indicate that anxiety is related to increased pain. There is currently considerable evidence that stress and psychosocial factors play an important role in TMD. These disorders are often associated with psychological complaints (Fatigue, sleep disturbance, anxiety, and depression). Gatchel *et al.*[7] also reported that, various physiological disorders specially stress and depression can precipitate TMD. Altered emotional state and para functional behavior specially which increase muscle tension can lead to TMD.[8]

CONCLUSION

Present study has a high prevalence of TMD symptoms in the sample, even though the majority of the cases were classified as mild degree and anxiety was associated with TMD symptoms. Although a larger percentage of female than male had some symptoms of TMD, the difference was not statistically significant. Morphologic malocclusion (molar class, Angle's classification) was not associated with the presence of TMD symptoms. The present study suggests the importance of psychological screening of young adults as an adjunct to confirm the diagnosis of TMD so as to early treatment.

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Original Article

Endocrinological Evaluation of Melasma in Females of Western Uttar Pradesh Region

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Abstract

Introduction: Melasma is an acquired disorder, characterized by hypermelanosis, especially of the facial region. This study is undertaken to evaluate the role of hormones in etiopathogenesis of melisma.

Materials and Methods: A total of 75 female patients attending Dermatology Department were taken for this study. We included those patients who were in the age range of 15-50 years of age. Twenty subjects who were not having such disorder were used as control to evaluate the mean difference of hormone levels. Examination of all patients was done by wood's lamp.

Results: Out of 75 patients, only 69 patients could be evaluated for hormonal estimation. The frequency of epidermal melasma (46.5%) was highest. Malar pattern was the most common type of melasma was noted. Concentration of estrogen hormone was found to be significantly higher ($P < 0.01$) in melasma patients. Progesterone and prolactin hormone levels were raised but statistically non-significant ($P > 0.01$).

Conclusion: We concluded the study with the fact that estrogen is one of the causative factors in the development of melisma.

Keywords: Acquired, hormone, Wood's lamp

INTRODUCTION

Melasma is an acquired pigmentary disorder characterized by hypermelanosis irregular brown of sun-exposed areas especially the face.[1,2] Melasma is not gender specific but more commonly seen in females.[3,4]

Although sun exposure is most commonly associated with melasma, other factors (contraceptive pills[2,3] pregnancy,[5] hormonal treatment,[6,7] psychiatric drugs[2-4] weather conditions,[8] and last, but not the least genetic predisposition[3,4]) may aggravate it by increasing the tyrosinase activity.

Melasma is usually slow to develop and may take years to form a definite pattern like centrofacial, malar and mandibular (in order of its occurrence).[9]

Histopathologically epidermal, dermal and mixed type[2,4] of melasma are described. Wood's lamp access the depth of melanin pigmentation.[10,11] In the western part of Uttar Pradesh, diagnosis of melasma by hormonal evaluation is not done so far, so the current study is undertaken to determine the role of hormones in causation of melasma.

MATERIALS AND METHODS

The study was carried out over a period of 1 year in the Department of Dermatology Teerthanker Mahaveer Medical College and Research Centre, Moradabad. Seventy-five female patients of melasma with age between 15 and 50 years, presenting to the outpatient department were enrolled, after getting approval from the ethical committee of the institution and written informed consent.

Twenty females of matched criteria, were enrolled as controls. None of the patients or control subjects was on any oral/local medication. The pregnant and lactating females or patients on any hormonal therapy were excluded from the study. Patients with other systemic diseases were also excluded.

A detailed history and clinical examination of each patient was carried out. The personal data like family history of melasma, marital status, number of children, age of onset, use of anovulatory drugs and exposure to sunlight was recorded. Extent of involvement of melasma on body surface was also noted. Examination was performed by woods lamp to see the type of melasma. The results of routine investigations were recorded. Biochemical and hormonal parameters including serum estradiol, progesterone and prolactin levels were performed.

Samples were drawn during the follicular and the luteal phase. Estradiol, progesterone and prolactin were estimated radioimmunoassay technique.

The data were collected and *t*-test was used to compare the means and to find out the significance of the difference ($P < 0.01$) was considered significant.

RESULTS

Out of 75 patients, only 69 patients stayed till the end of the study. Out of 69 patients, 37 were married and 32 unmarried. Thirty-nine patients belonged to age group of 15-24 years, 24 were of 25-35 years and 2006 were in the age range of 36-50 years. Frequency of low socio-economic status was 54 while 15 belonged to lower-middle class. When asked 62 patients were having normal menstrual cycles.

There was 46.5%, epidermal melasma followed by 33.5% dermal and 20% mixed type respectively (Figure 1).

The number of cases with epidermal, dermal and mixed type in married patients were 14, 13 and 10, respectively. Among unmarried patients, 16 were suffering from epidermal, 13 from dermal and 3 from mixed type of melasma.

The malar pattern was observed in (64%) patients while centrofacial pattern was seen in (36%) cases (Figure 2).

Comparison of hormonal levels in follicular and luteal phases in patients of melasma and controls revealed that the concentration of estrogen was raised in melasma patients ($P < 0.01$).

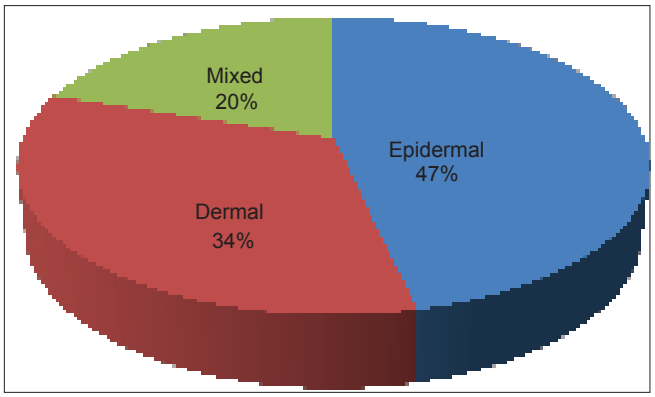

Figure 1: Percentage of three different type of melisma

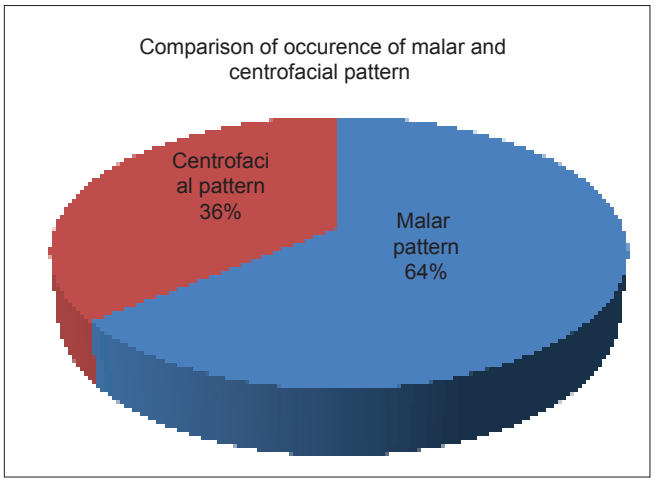

Figure 2: Difference in percentage of malar and centrofacial type of melasma

Out of 69 patients who completed the study, there were only two patients who had normal values of estrogen, progesterone and prolactin in all four phases. The remaining patients showed deranged values, with either an increase or decrease in the hormonal levels. This derangement was more associated with estradiol.

Regarding estradiol, only seven patients had normal values. The remaining 62 patients revealed deranged values of estradiol.

The maximum number of patients had raised values (normal = 52-220) pg/ml. The comparison of married patients with married controls did not have any significant difference in the levels.

The levels of progesterone were deranged in 38 patients, but when compared with controls, a non-significant difference ($P > 0.01$) was seen.

No alteration of prolactin levels was seen as 66 patients. Only three patients had increased values of prolactin.

DISCUSSION

The exact etio-pathogenesis of melasma is uncertain, but many studies have shown its relationship with certain hormonal levels.[4,5] Many other studies related it to exposure to sunlight,[6,12] medications,[3,4] mild ovarian dysfunction.[13,14]

In the present study, majority of patients had an age range of 15-24 years which is in accordance with other studies.[15,16] Lower-economic status females are more prone for melasma as compared to others, which is associated with their poor living conditions, more exposure to sunlight and poor nutrition, all these predisposing factors are also observed by.[3,17] Marital status of females is not a predisposing factor, but it occurs in females of reproductive age group, same observations were also seen.[15,18] Skin involvement in our study (malar pattern) correspond to the studies of.[6,10] Epidermal melasma as found commonest variety in our study well corresponds to studies of.[6,9,10] In our opinion, this may also be related to the levels of hormones i.e., estrogen, progesterone and prolactin. Estrogen showed a highly significant difference ($P < 0.01$) with normal (control females) indicating that raised estrogen levels must have some role in the causation of melasma although not established. Higher levels of estrogen in our study group corresponds to the study conducted by.[15] Some studies showed the reverse pattern of estrogen level, which was statistically significant also, which according to workers may be due to disturbances in endocrinological feedback mechanism.[7] There are reports of stress induced the melasma also.[19] Studies[20,21] have shown that melanocytes possess estrogen receptors this is the reason why estrogen is the key hormone in etiopathogenesis of melasma.

The present study gives an understanding about the role of hormones, particularly estrogen, in the causation of melasma. Further studies are needed to explore their role.

CONCLUSION

From the study carried out it can be concluded that along with other etiogenic factors like, sun exposure, pregnancy, drugs and weather conditions, etc. hormones also a major contributing factor in the causation of melasma, and in that estrogen is the causative factor. Knowing this fact will help dermatologist in making a strategy of treatment most effective for the patients.

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Original Article

Intranasal Steroid Spray and Montelukast in the Management of Adenoid Hypertrophy in Children

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Abstract

Introduction: Adenoid hypertrophy is a common disease in childhood causing nasal symptoms. Encouraging results were reported by the use of intranasal steroids with or without montelukast. Here, we evaluated the effectiveness of intranasal Fluticasone spray coupled with oral montelukast in the treatment of adenoid hypertrophy.

Aims and Objectives: The aim of our study was to assess the efficacy of intranasal steroid spray followed by oral montelukast in children with adenoid hypertrophy. This mode of treatment can be considered as an alternative to adenoidectomy weighing the risk-benefit ratio in terms of anesthetic and operative complications of adenoidectomy.

Materials and Methods: A total of 30 children in the age group of 4-7 years of both genders who attended the ENT department with symptoms related to adenoid hypertrophy were included in the study. Based on the history and symptoms, nasopharyngeal airway was evaluated by lateral neck radiograph, fiberoptic nasal endoscopy and computed tomography nasopharynx. Management was in the form of intranasal fluticasone spray 50 µg twice a day for 4 weeks followed by 50 µg daily at night for another 4 weeks. After 8 weeks of treatment with intranasal steroid spray, patient was put on oral montelukast 4 mg at night for another 2 months. All children were reviewed at 1-month interval. End result was tabulated based on the post-treatment symptomatic relief; follow-up neck radiographs and fiberoptic nasal endoscopy.

Results: From our study, 80% of the children had relief of their symptoms in 4 months of treatment with intranasal steroid spray followed by oral montelukast, thus alleviating the need for surgery.

Conclusion: This study proves the effectiveness of a combination of intranasal steroid spray and oral montelukast in the treatment of adenoid hypertrophy in children thus providing an effective alternative to surgical treatment.

Keywords: Adenoid hypertrophy, Fluticasonepropionate, Montelukast

INTRODUCTION

Adenoid is a lymphoid tissue located in the roof and posterior wall of the nasopharynx. Normally being a resistance center against respiratory infections, it may itself become a source of recurrent and chronic infection. Adenoid hypertrophy is a common childhood disease and cause symptoms such a mouth breathing, nasal obstruction, hyponasal speech, snoring as well as obstructive sleep apnea and otitis media with effusion (OME).[1] Adenoid hypertrophy was graded as Grade 1 only top segment of choana is obstructed (<25%), Grade 2 upper half of choana is obstructed (<50%), Grade 3 reaching up to Eustachian tube orifice partially obstructing it (<75%), Grade 4-choana is almost completely obstructed.[2]

Treatment for adenoid hypertrophy in children is determined according to the degree of airway obstruction and related morbidity. If surgical treatment is indicated, the individual risk-benefit profile of patients should be assessed in terms of anesthetic and operative complications. Although there are only few alternative options to surgical treatment, these can be considered helpful in lesser grades of adenoid hypertrophy especially in children whose parents are reluctant for surgery.

Evidence of a pathophysiologic link between adenoid hypertrophy and allergy suggest a possible role for intranasal steroid in their management.[3] Over the past years, good results have been reported regarding the use of intranasal steroids for chronic nasal obstructive symptoms due to adenoid hypertrophy in children.[4]

In this study, the effectiveness of Fluticasone propionate nasal spray followed by oral montelukast is assessed and thereby avoiding surgical treatment. Evidence of a pathophysiologic link between adenoid hypertrophy and allergy suggests a possible role for intranasal steroids in the management of adenoid hypertrophy.

Aims and Objectives

The aim of the study was to evaluate the efficacy of intranasal steroid-fluticasone nasal spray followed by oral montelukast in the treatment of children with adenoid hypertrophy taking into account the association of adenoid hypertrophy with allergy and allergic rhinitis. This also highlights the alternative option to surgery in the lesser grades of adenoid hypertrophy and in patients who are unwilling for surgery.

MATERIALS AND METHODS

The study was approved by the institutional ethics committee, and informed consent was obtained from parents. Inclusion criteria for the study were children in the age group of 4-7 years, of both gender with adenoid hypertrophy presenting with symptoms of nasal airway obstruction, mouth breathing, speech abnormalities, snoring, apneic spells and night cough. A detailed history and clinical examination was undertaken, and nasal airway obstruction was assessed with the help of lateral neck radiograph and fiberoptic nasal endoscopic examination.

Adenoid hypertrophy was graded as Grade 1 only top segment of choana is obstructed (<25%), Grade 2 upper half of choana is obstructed (<50%), Grade 3 reaching up to Eustachean tube orifice partially obstructing it (<75%), Grade 4 choana is almost completely obstructed.[2] Patients who had perennial or vasomotor rhinitis, who had undergone the adenoidectomy previously, those who had a history of chronic nasal bleeding, immunodeficiency and history of hypersensitivity, positive allergy to fluticasone, tonsillarhypertrophy, history of OME, anatomic defects in the nose, craniofacial abnormalities such as cleft palate and cleft lip, Down's syndrome, neurologic diseases and cardiovascular diseases were excluded from the study.

Symptom scale was scored before and after treatment. In the study, nasal airway obstruction, mouth breathing, snoring, nasal speech, and apnea were graded as follows: 0 - None, 1 - sometimes, 2 - often, 3 - day long and night long. Night cough was scored as 0 - none, 1 - mild, 2 - moderate, 3 - severe.[4] Tonsil size of the patient was recorded, and tympanometry test was also performed. Parents were taught the proper way of nasal spray administration.

Patients were reviewed after 1 week, 3 weeks and 8 weeks during the fluticasone spray therapy and then at monthly intervals for 2 months during montelukast treatment.

OBSERVATIONS AND RESULTS

At the beginning of treatment and at the end of 8 weeks treatment with Fluticasone, symptoms of nasal airway obstruction were assessed. Significant improvement was observed in terms of nasal airway obstruction, mouth breathing, speech abnormalities, snoring, apnea and night cough at the end of 8 weeks. Further radiologic and endoscopic evaluation was done at the end of the total 4 months treatment. The average value was calculated separately for each symptom both before and after treatment. At the end of 4 months treatment, average total symptoms dropped from 11 to 3 (Chart 1).

After 8 weeks of fluticasone spray therapy, out of the 30 patients, 18 patients showed almost complete relief of their symptoms (60%). They were then put on oral montelukast for another 2 months with follow-up every month. At the end of 4 months, all the 18 children were totally free of their symptoms and correlated with radiologic and endoscopic findings. Six patients who had a recurrence of symptoms on and off after tapering of fluticasone spray were put on oral montelukast for 2 months. At the end of completion of treatment, they were clinically and radiologically cured (20%).

A 6 of the 30 patients (20%) had no relief even after the 8 weeks therapy with Fluticasone spray and were advised

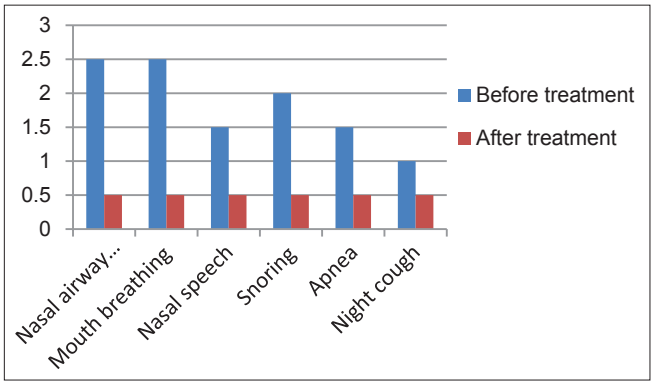

Chart 1: Grading of symptoms before and after treatment

adenoidectomy. All these six patients had a Grade 4 obstruction. Of these six patients, three were willing for surgery (10%) and were relieved of their symptoms and was on the follow-up for 4 months. Three of the six patients who refused surgery (10%) were getting symptoms on and off and were treated symptomatically. No steroid therapy was given after 8 weeks.

Of the study population, 24 patients (80%) had complete relief from symptoms with a combination of treatment with intra nasal steroid spray and montelukast whereas six patients (20%) did not show any improvement. They were put on other modalities of treatment including adenoidectomy. All the 20% had a Grade 4 obstruction (Chart 2).

DISCUSSION

The successful use of intra nasal steroid spray in children with adenoid hypertrophy was first introduced by Demain and Goetz.[4] Although it is not yet clear by which mechanism the steroids reduce the nasal airway obstruction, there are some plausible theories. Some of these include reduction of adenoid size directly by lympholytic effect, the anti-inflammatory effect of steroids help to reduce the adenoidal and nasopharyngeal inflammation, or they reduce the possibility of the adenoid acting as an infection reservoir.[5] Studies which prove the fact that adenoid tissue includes many glucocorticoid receptors and messenger RNA strengthen the probable mechanism.[6] The importance lies in the proper application of the nasal spray. In our study, after 8 weeks of treatment with intranasal steroid spray, 60% of the patients had complete relief from their symptoms.

Cysteinyl leukotrienes (Cys LT) are endogenous mediators of inflammation and play an important role in allergic airway disease by stimulating bronchoconstriction, mucus production, mucosal edema and inflammation, airway infiltration by eosinophil's and dendritic cell maturation that prepares for future allergic response. Montelukast inhibits these actions by blocking Type 1 Cys LT receptors found on immunocytes, smooth muscles and endothelium of the respiratory mucosa. It was initially marketed to be used as a maintenance therapy for asthma and subsequently was found to be useful in allergic rhinitis.

In our study, after the 8 weeks steroid therapy, children were put on oral montelukast 4 mg for 2 months with follow-up every month. Eighty percentage of the patients in our study had complete relief of their symptoms after the completion of treatment at 4 months. Of the 80%, 20% of the patients who had a recurrence of symptoms after tapering off Fluticasone spray also responded well to oral montelukast and were completely cured.

Lateral neck radiographs and fiberoptic nasal endoscopy proved to be very effective in assessing the nasal airway. Lateral neck radiography was interpreted by the method of Cohen and Konak.[7] According to this method, the thickness of the soft palate in its superoanterior part (SP) and the airway column immediately posterior to it were measured, and AC/SP ratio was calculated. The measurement was done about 1 cm below the upper end of the soft palate in children >3 years and 0.5 cm in younger children. A radiological example is demonstrated (Figure 1).

Degree of obstruction was graded as follows: AC/SP >or = 1 - Grade 0 or no obstruction. AC/SP = 0.5-0.99 - Grade 1 or mild obstruction. AC/SP = 0.01-0.49 - Grade 2 or severe obstruction. AC/SP = 0 - Grade 3 or total obstruction.

Since the children in our study were in the age group of 4-7 years, a fiberoptic nasal endoscopy also could be done

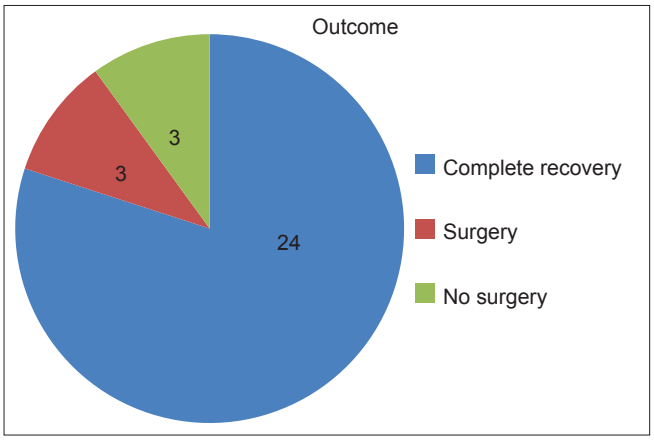

Chart 2: Outcome of treatment

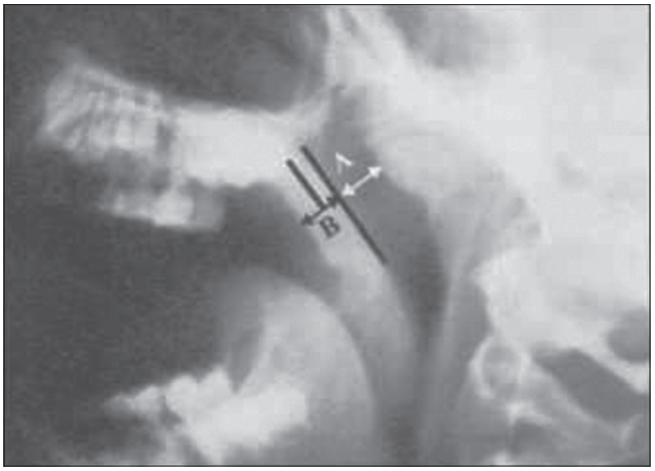

Figure 1: X-ray (soft tissue nasopharynx)

pre and post-treatment without much difficulty in 90% patients.

From our study, 80% of the children had total relief of their symptoms in 4 months of treatment with intranasal steroid spray followed by oral montelukast, thus alleviating the need for a surgical procedure. We did not observe any side effects of treatment in any of these children during the steroid-montelukast therapy.

CONCLUSION

This study proves the effectiveness of intranasal steroid spray used in a proper way and oral montelukast in the treatment of adenoid hypertrophy in children. This provides an effective alternative to surgical treatment especially in children whose parents are reluctant to surgical modality of treatment.

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Original Article

Comparison of Induction Characteristics of Propofol-Lipuro and Etomidate-Lipuro in Cardiac Patients in Non-cardiac Surgery

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Abstract

Background: Induction of anesthesia is a critical period in cardiac patients. The anesthetic induction techniques for these patients are usually based on considerations such as hemodynamic stability and minimizing intubation stress response. Aim of the present study was to compare induction and recovery characteristics and hemodynamic parameters of etomidate-lipuro and propofol-lipuro in cardiac patients.

Materials and Methods: In a prospective, randomized, double blind study, 60 cardiac patients of American Society of Anesthesiologists Grade II and III in the age group 40-70 years of either sex scheduled for elective non cardiac surgery were divided into two groups of 30 each. Premedication was given as injection glycopyrrolate, midazolam, and fentanyl. Induction was done with injection propofol-lipuro 2 mg/kg in Group A and injection etomidate-lipuro 0.3 mg/kg in Group B followed by injection rocuronium hydrobromide 0.6 mg/kg for intubation and anesthesia was maintained with 40% O_2, 60% N_2O, and 0.5-2% isoflurane. Two groups were compared with respect to pain on injection, the induction time, myoclonus and apnea. Hemodynamics, bispectral index scale, $ETCO_2$, SPO_2, and electrocardiography were monitored before induction of anesthesia, immediately after induction, at intubation and at 1, 3, 5 min, and every 10 min interval till the end of surgery.

Results: Incidence of apnea, pain on injection and induction time was less, but myoclonus and post-operative nausea and vomiting was more in Group B as compared to Group A. The mean heart rate was comparable in the two groups. The mean systolic blood pressure measured up to 15 min was on the lower side in Group A as compared to Group B. The mean diastolic blood pressure up to 5 min was on lower side in Group A as compared to Group B. Recovery time and steward recovery score was comparable in both the groups.

Conclusion: Etomidate is a better alternative to propofol as an induction agent in cardiac patients because of hemodynamic stability, less injection pain and faster induction.

Keywords: Etomidate-lipuro, Hemodynamics, Myoclonus, Propofol-lipuro

INTRODUCTION

The anesthetic induction techniques for cardiac patients are usually based on considerations such as hemodynamic stability, effects on myocardial oxygen supply and demand and minimizing intubation stress response.[1,2] over the years there has been a continuous search for better and safer intravenous agent. Propofol, an alkyphenol derivative, provides rapid onset and short duration of action.[3-6] It causes considerable reduction in systemic vascular resistance and arterial pressure, therefore, leads to moderate to severe post-induction and pre-intubation hypotension.[3-5,7,8] Etomidate is a hypnotic agent with minimal histamine release and very stable hemodynamic profile. However, pain on injection and myoclonus are the most common side effects.[9,10] Pain on injection, venous irritation and hemolysis has been abolished by new-fat emulsion of etomidate (medium chain triglycerides and soyabean named etomidate-lipuro) but the incidence of myoclonus was not reduced with the new preparation.[11] Bispectral index scale

(BIS) is used to measure the depth of anesthesia which is associated with significant changes in mean arterial pressure and heart rate.[12] In most of the previous studies, Propofol and etomidate were used in cardiac patients undergoing cardiac surgeries.[9,13,14] In these studies,[5,14-17] either no premedication was given or benzodiazepines or opioids alone were used as premedication, but we have used both in the present study. Scant literature is available where these two drugs were used for non-cardiac surgeries. After reviewing the previous studies, the present study was done to compare the hemodynamic responses, induction and recovery characteristics of propofol and etomidate in cardiac patients posted for non-cardiac surgeries.

MATERIALS AND METHODS

It was a prospective, randomized, double blind study, in which 60 cardiac patients are having coronary artery disease, hypertension or treated arrhythmias of American Society of Anesthesiologists (ASA) Grade II and III in the age group 40-70 years of either sex, scheduled to undergo non-cardiac surgery under general anesthesia were included after approval from Institution's Ethical and Scientific Committee. The patients with valvular heart disease, persistent arrhythmias, suppressed immune function and known adrenal insufficiency, history of steroid use in preceding 6 months, allergy to the study drugs, pregnancy, nursing mothers and epilepsy were excluded from the study. Written and informed consent was taken from all the patients included in the study. The patients were randomly divided by computer generated random numbers into two groups of 30 each. Group A (n = 30) received injection propofol-lipuro 2 mg/kg body weight intravenously and Group B (n = 30) received injection etomidate-lipuro 0.3 mg/kg body weight intravenously for induction. The coded syringes contained either propofol-lipuro or etomidate-lipuro 20 ml each, were prepared by another anesthesiologist to assure proper blinding.

The day before surgery, a detailed pre-anesthetic check-up was carried out in every patient. History, general physical examination along with detailed systemic examination was done. Assessment of airway was done as per Mallampatti grading. Patients were asked to restrict fluids and solids by mouths at least 6 h before the operation. The night before surgery, all patients were given tablet alprazolam 0.5 mg and tablet ranitidine 150 mg orally. On the day of surgery, patients were shifted to operation theatre and injection glycopyrrolate 0.2 mg intramuscularly 45 min before surgery was given as a premedication. Intramuscular route was used to avoid sudden changes in heart rate associated with intra venous route. Multiparameter monitor was attached, and monitoring was started. Baseline heart rate, systolic blood pressure (SBP), diastolic blood pressure (DBP), electrocardiography (ECG), SPO_2, and BIS were recorded. After venous cannulation, all patients were pre-hydrated with 7 ml/kg body weight of ringer lactate solution. Injection midazolam 0.04 mg/kg body weight and injection fentanyl 2 μg/kg body weight intravenously was given just before induction. One hundred percentage of oxygen was given for 3 min via a face mask, and patients were induced with the study drugs.

In Group A, the patients were given injection propofol-lipuro 2 mg/kg body and in Group B, patients were given injection etomidate-lipuro 0.3 mg/kg body weight intravenously over 30-60 s. Time taken to produce loss of eyelash reflex was taken as an induction time. Injection rocuronium hydrobromide 0.6 mg/kg intravenously was given to facilitate endotracheal intubation with appropriate sized endotracheal tube, which was performed 90 s after giving the injection. After checking and securing the endotracheal tube, anesthesia was maintained with 40% oxygen, 60% nitrous oxide and 0.5-2% isoflurance. Injection rocuronium 0.15 mg/kg body weight was repeated accordingly to maintain relaxation during surgery. If duration of surgery was more than 40 min, then injection fentanyl 1 μg/kg body weight was repeated. Isoflurane was discontinued 5 min before completion of surgery, and nitrous oxide was stopped just before reversing the neuromuscular blockade with injection neostigmine 0.05 mg/kg body weight plus injection glycopyrrolate 0.01 mg/kg body weight intravenously. After oropharyngeal suctioning, extubation was done, and 100% oxygen was given using face mask. Patients were sent to the recovery room in fully conscious state with vital signs within normal limits and reflexes intact. Rescue antiemetic in the form of injection metoclopramide 10 mg slow I/V was given, if two or more episodes of vomiting occurred. Diclofenac suppository 100 mg/rectum was given for pain relief and if needed rescue analgesia in the form of injection tramadol 50 mg slow I/V was given in the post-operative period.

Monitoring

During the induction, any pain on injection, cough, laryngospasm, bronchospasm, apnea, the induction time (time in seconds from the start of injection to loss of eyelash reflex) and any involuntary movements were noted.

Heart rate, non-invasive SBP and DBP, pulse rate, pulse oxygen saturation, end tidal carbon dioxide, ECG and bispectral index values were recorded before giving premedication, before induction of anesthesia, immediately after induction of anesthesia, at intubation and 1, 3, and 5 min after intubation and thereafter every 10 min till completion of surgery.

At the end of the procedure, recovery was monitored by Steward Score of recovery which was taken as: Conscious level: 2 - awake, 1 - responding to stimuli, 0 - not responding to stimuli. Airway *maintenance*: 2 - coughing on command, 1 - maintaining a good airway, 0 - airway needs maintenance. Movement of limbs: 2 - moving limbs purposefully, 1 - nonpurposeful movements, 0 - not moving limbs.

Recovery time (time to spontaneous eye opening or telling names) was noted.

Any episode of nausea and vomiting and any other side effect or complications were recorded.

Statistical Analysis

The data from the present study was systematically collected, compiled and statistically analyzed to draw relevant conclusions. The patient characteristics (non-parametric data) were analyzed using the "Chi-square tests" while the inter group comparison of the parametric data was done using the "unpaired *t*-test." The *P* value was determined to finally evaluate the levels of significance. The $P < 0.05$ was considered significant at 5% significance level; $P < 0.01$ was considered significant at 1% significance level and a $P < 0.001$ was considered highly significant. Effect size was calculated taking into consideration induction time, incidence of apnea, and incidence of pain on injection and the power achieved was 95.66%, taking alpha error probability 0.05.

RESULTS

In the present study, two groups were comparable with respect to age, sex, weight, ASA grade, duration and type of surgery and baseline vitals (Table 1). Open cholecystectomy was the most commonly performed surgery in both the groups. During the induction, pain on injection occurred in 8 (26.7%) patients in Group A and in 2 (6.7%) patients in Group B but the difference was statistically non-significant ($P = 4.320$). Apnea was observed in 27 (90%) patients in Group A and in 20 (66.7%) patients in Group B ($P = 4.812$). More patients had involuntary movements after giving etomidate injection (16.7%) as compared to propofol injection (0%) $P = 5.455$. None of the patient had cough, larngospasm, bronchospasm and cyanosis during induction of anesthesia. Mean induction time in Group A was 72.00 ± 2.60 s and in Group B was 69.83 ± 2.019 s and the difference was statistically significant ($P = 0.001$) (Figure 1).

The mean heart rate measured at various time intervals was comparable in the two groups ($P > 0.05$) as shown in Figure 2 and Table 2. In propofol-lipuro group clinically significant bradycardia was observed in two 2 (6.7%) patients immediately after induction and in none of the patients in etomidate-lipuro group.

Table: 1 Demographic profile of patients in Group A (propofol) and Group B (etomidate)

Patient profile	Group A (*N*=30)	Group B (*N*=30)	*P* value	Significance level
Age in years	53.90±7.131	54.00±7.022	0.957	NS
Sex ratio (%)				
Male	4 (13.3)	6 (20)	0.480	NS
Female	26 (86.7)	24 (80)		
Weight in kilogram	65.90±14.209	65.67±10.350	0.942	NS
ASA grade (%)				
II	24 (80)	25 (83.3)	0.111	NS
III	6 (20)	5 (16.7)		
Duration of surgery in minutes	46.83±2.451	46.50±2.330	0.333	NS

NS: Non-significant, ASA: American Society of Anesthesiologists

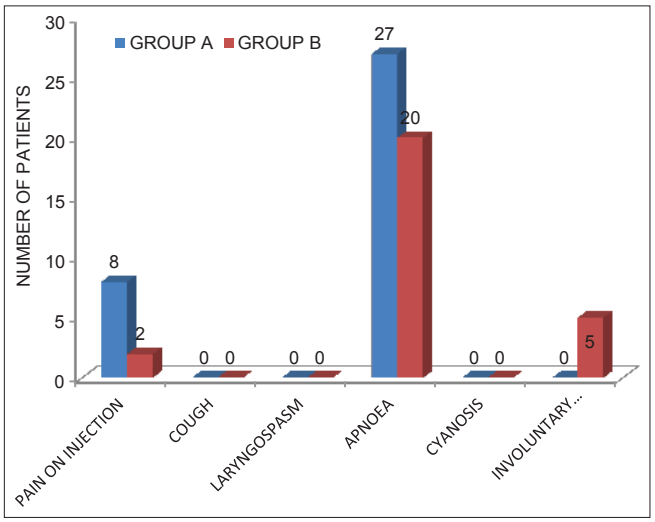

Figure 1: Induction characteristics of Group A (propofol) and Group B (etomidate)

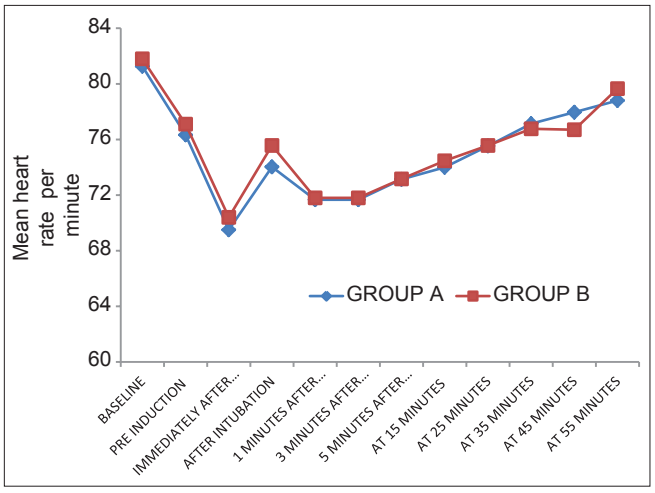

Figure 2: Mean heart rate measured at various time intervals in Group A (propofol) and Group B (etomidate)

Table 2: Hemodynamic parameters at various time intervals in Group A (propofol) and Group B (etomidate)

Time interval	Mean heart rate			SBP			DBP		
	Group A	Group B	*P* value	Group A	Group B	*P* value	Group A	Group B	*P* value
Baseline	81.27±3.581	81.80±3.943	0.585 NS	135.27±7.056	134.53±7.464	0.697 NS	79.13±5.138	79.73±4.948	0.647 NS
Pre induction after premedication	76.33±3.898	77.10±4.139	0.463 NS	130.20±6.692	129.53±6.822	0.704 NS	74.73±4.683	75.20±4.859	0.706 NS
Immediately after induction	69.37±4.189	70.53±3.501	0.247 NS	109.93±7.922	116.20±7.563	0.003 S	64.93±4.059	68.73±3.129	0.000 HS
After intubation	74.03±3.662	75.57±3.830	0.118 NS	117.60±7.361	127.60±6.996	0.000 HS	69.20±3.662	72.07±4.741	0.011 S
1 min after intubation	71.67±4.054	71.80±3.145	0.887 NS	121.53±6.185	128.00±6.539	0.000 HS	71.60±3.539	73.87±4.577	0.036 S
3 min after intubation	71.67±4.180	71.80±3.699	0.896 NS	123.33±5.809	129.40±6.521	0.000 HS	73.80±3.800	75.53±4.718	0.123 NS
5 min after intubation	73.13±3.997	73.166±4.227	0.975 NS	124.60±4.847	130.20±6.354	0.000 HS	74.00±4.000	76.47±6.050	0.068 NS
At 15 min	74.00±4.299	74.47±4.769	0.692 NS	126.40±±5.263	129.07±6.028	0.073 NS	74.80±4.382	76.93±5.699	0.109 NS
At 25 min	75.53±3.411	75.57±4.423	0.974 NS	126.20±6.110	128.86±5.981	0.093 NS	75.73±4.417	76.80±6.940	0.480 NS
At 35 min	77.13±3.674	76.77±4.666	0.736 NS	126.47±5.673	128.53±6.410	0.191 NS	76.67±5.313	76.87±5.476	0.886 NS
At 45 min	77.96±3.736	76.70±4.194	0.222 NS	126.60±6.060	129.40±6.605	0.092 NS	76.67±4.467	77.13±4.629	0.693 NS
At 55 min	77.97.80±3.737	76.70±4.195	0.360 NS	129.67±5.827	129.73±6.782	0.968 NS	79.13±4.659	79.93±4.533	0.503 NS

NS: Non-significant, S: Significant, HS: Highly significant, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

The mean SBP and DBP measured before induction was stable and comparable in two groups ($P > 0.05$). Immediately after induction, SBP and DBP decreased in both the groups but fall was significantly more in the propofol group as compared to etomidate group. After intubation blood pressure increased slightly in both groups but remained on the lower side in the propofol group as compared to etomidate group. Later on at 1, 3 and 5 min after intubation SBP remained significantly low in the propofol group than in the etomidate group ($P = 0.000$). At 1 min after intubation DBP was significantly low in Group A as compared to Group B ($P = 0.36$). After that SBP and DBP remained stable and were comparable in both the groups till the end of the procedure as shown in Figure 3 and Table 2.

Mean respiratory rate, end-tidal carbon dioxide, mean saturation of oxygen, BIS (Figure 4) measured at various time intervals were comparable in both the groups. None of the patient had arrhythmias or any ECG changes in both groups. After completion of surgery, recovery was assessed by Steward recovery score. Score was comparable in both groups. All patients achieved score of six at 15 and 30 min post-operatively in both groups (Figure 5). Mean recovery time in both groups was comparable (in Group A was 14.57 ± 1.006 min and in Group B was 14.60 ± 0.855 min, $P = 0.891$) and patients had a quite recovery in both groups. Five patients in the propofol group and seven patients in the etomidate group had nausea and vomiting in the post-operative period and difference was statistically non-significant ($P > 0.05$).

DISCUSSION

Induction of anesthesia is a critical period in cardiac patients. The deleterious effects of anesthetic agent in patients suffering from cardiac diseases are well known.[13] In the present study, both groups were comparable with respect to the demographic profile, duration and type of surgery and baseline hemodynamic parameters. Rapid induction without any serious side effects is a valuable characteristic that is wanted from an ideal induction agent. The main findings of the present study showed that pain on injection, incidence of apnea and induction time was less, but myoclonus and post-operative nausea and vomiting was more with the use of etomidate as compared to propofol.

In the present study, the induction time in Group A was 72.00 ± 2.600 s and in Group B was 69.83 ± 2.019 s. In a study done by Zhang and Sun,[18] using fentanyl and etomidate for induction, the time to loss of consciousness was 70.0 ± 15.6 s. In a similar study done by Wilhelm *et al.*,[19] using fentanyl as premedication with propofol and etomidate, the induction time was 74.9 ± 20 s in the propofol group and 72.3 ± 24.0 s in the etomidate group. Results of the present study were consistent with the above studies. Pain on injection was observed more in the propofol group as compared to etomidate group. These results were consistent with the study done by Sowinski *et al.,*[20] where pain on injection occurred in 4.5% patients in the etomidate group and in 27% patients in the propofol group. Ayuso *et al.*,[21] also observed that the incidence of pain on injection was 27% with the use of propofol-lipuro. Nyman *et al.*[17] found that the pain on injection occurred in 5% patients with etomidate-lipuro and in 47.5% patients with propofol and lidocaine. Incidence of apnea during induction was more in the propofol group (90%) as compared to etomidate group (66.7%) in the present study. Miner *et al.*,[22] observed that in non premedicated patients when induction was done with either etomidate 0.1 mg/kg

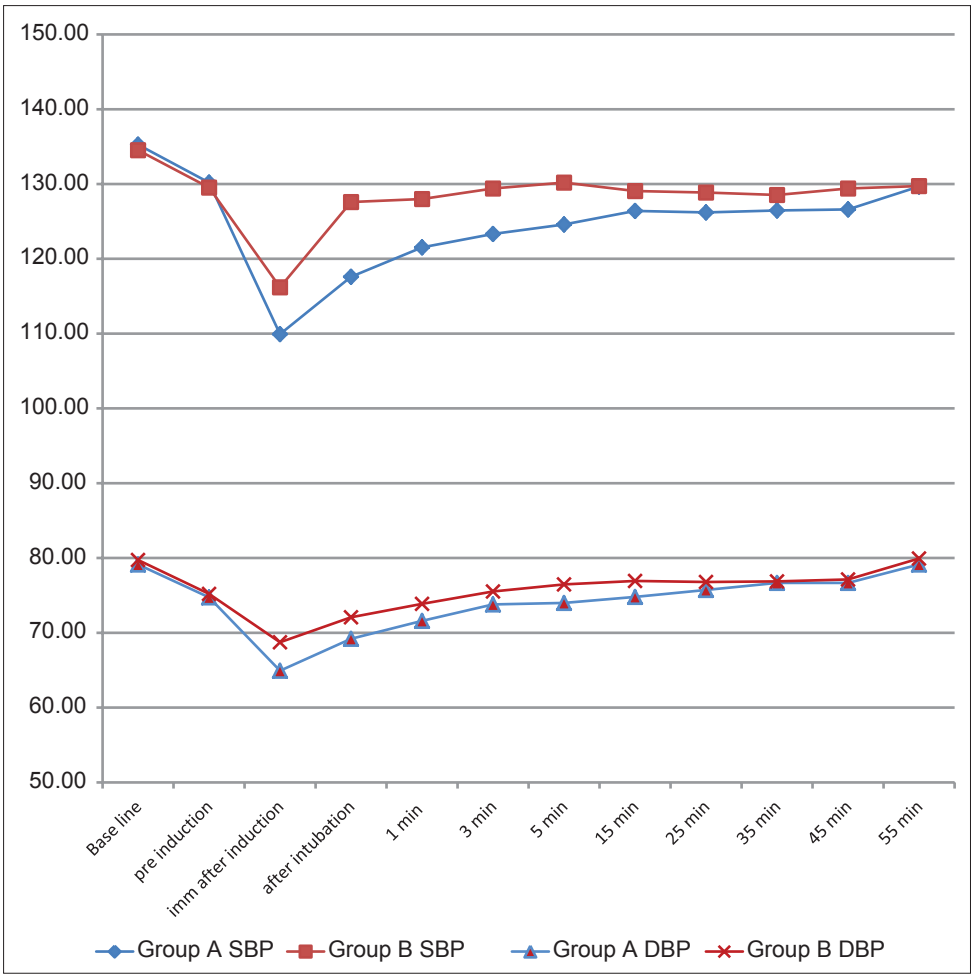

Figure 3: Systolic blood pressure and diastolic blood pressure in Group A (propofol) and Group B (etomidate)

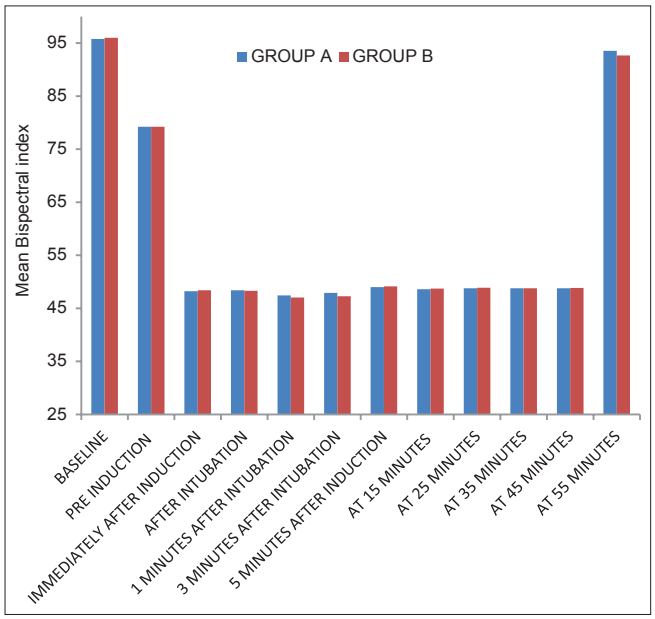

Figure 4: Mean bispectral index scale at various time intervals in Group A (propofol) and B (etomidate)

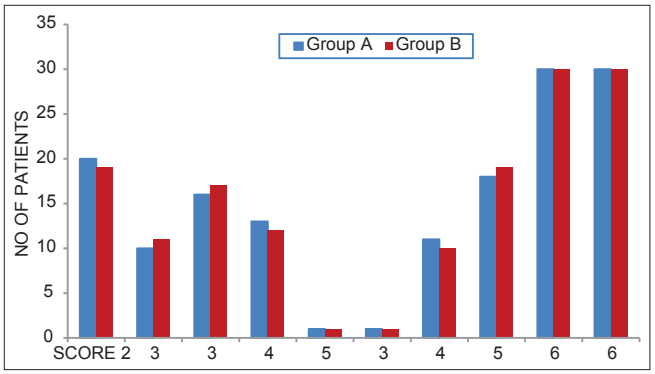

Figure 5: Steward recovery score measured at various time intervals in Group A and Group B

or propofol 1 mg/kg body weight, subclinical respiratory depression occurred in 43.3% patients in the etomidate group and 42.4% patients in the propofol group. Higher incidence of apnea in the present study could be due to the use of fentanyl and midazolam as premedication, and also, the doses of etomidate and propofol used were higher than

this study. Involuntary movements during induction were observed in none of the patients in the propofol group and were observed in 5 (16.7%) patients in the etomidate group. Miner *et al.*[22] also found that incidence of myoclonus was more in the etomidate group (20% patients) as compared to propofol group (1.8% patients). Similarly, Sowinski *et al.*[20] demonstrated increased incidence of myoclonus with the use of etomidate Carlos and Innerarity,[16] used fentanyl and atropine as premedication before induction with etomidate and observed that the frequency of involuntary movements was reduced.

Hypotension induced by propofol is mediated by inhibition of symphathetic nervous system and impairment of baroreflex regulatory mechanisms. Etomidate conversely maintains hemodynamic stability through preservation of both symphathetic out flow and autonomic reflexes.[23] The mean heart rate measured at various time intervals was comparable in the two groups at all measured intervals. In propofol-lipuro group clinically significant bradycardia was observed in 2 (6.6%) patients immediately after induction and in none of the patients in etomidate-lipuro group. These results were similar to the results of the studies done Singh *et al.*[13] and Ghafoor *et al.*[24] The mean SBP measured at various time intervals up to 15 min was on the lower side in the propofol group as compared to etomidate group and 5 (16.7%) patients had a significant fall in blood pressure on induction in the propofol group. These results are consistent with the previous studies.[25,26] Skinner *et al.*[5] observed that there was a significant reduction in SBP following induction in the propofol group and a significant rise in SBP following intubation in the etomidate group. Rise in SBP post-intubation was less in the present study which may be due to the use of fentanyl as premedication as it blunts the hemodynamic responses to intubation. The mean DBP measured at various time intervals up to 5 min was on the lower side in the propofol group as compared to etomidate group. Criado *et al.*,[26] used etomidate (0.45 mg/kg) in non-premedicated patients and there was a significant decrease in DBP at 3 and 10 min interval after induction. Mean respiratory rate, mean end-tidal carbon dioxide and mean saturation of oxygen was comparable in both groups at various time intervals. BIS at all measured intervals was comparable in both groups. Results are consistent with the results of the study done by Shah and Harris[27] and Kim *et al.*[12] Incidence of nausea and vomiting was more in the etomidate group which was almost similar to the results of the study done by St. Pierre *et al.*[28] Steward recovery score at 3, 6, 10, 15 and 30 min was comparable in both the groups. The mean recovery time in Group A (propofol) and in Group B (etomidate) was comparable, and all patients had a quiet recovery. No complication and side effects were observed in both groups in the post-operative period.

Limitations

In the present study, we did not analyzed, the changes in serum cortisol levels during the post-operative period. There is only a transient decrease in serum cortisol levels after a single dose of etomidate thus apprehension regarding adrenal suppressive action of a single dose of etomidate is ill founded.[29]

CONCLUSION

Both intravenous induction agents can be used for anesthetizing cardiac patients, but etomidate-lipuro was better about to faster induction, less incidence of apnea, less incidence of pain on injection and hemodynamic stability as compared to propofol-lipuro. Major drawback with the use of etomidate was a higher incidence of myoclonus and post-operative nausea and vomiting. Hence, it was concluded that etomidate is a better alternative to propofol for induction in cardiac patients.

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Original Article

Significance of Dyslipidemia in First Incidence Coronary Syndrome: A Retrospective Cohort Study

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Abstract

Background: Dyslipidemia is a very common feature of first time cardiac care unit (CCU) admissions all over the world and its direct correlation to the acute coronary syndrome is widely known. However, prevalence of dyslipidemia in Bidar district has not been studied or documented.

Objectives: The objectives of the study were to determine dyslipidemia prevalence in the first episode coronary heart diseases (CHD) cases and to determine the pattern of distribution of risk factors in this temporal relationship.

Materials and Methods: It is a hospital based retrospective cohort study conducted at BRIMS Teaching Hospital, Bidar. Data for the 3 years period (June 2011-June 2014) were collected from the case sheets of CCU admissions. Out of the 1000 admissions to the CCU over the 36 months period, 337 case sheets were examined as these were the ones with first episode CHD etiology. Furthermore, lipid profile was available for 74 patients only and hence they were included in the study (n = 74). Only first episode CHD were considered.

Results: Dyslipdemia was present in 67.6% of first episode CHD cases. Age, sex, and occupational profiles were enumerated and cross-tabulated to examine their influence on dyslipidemia. Males showed a greater predisposition toward developing dyslipidemia (70.8%). With respect to occupation, males involved in semi-skilled labor had a higher degree of lipid profile abnormality (87.5%). Dyslipidemia among working women was higher (75%) when compared to housewives (40%). This association was found to be statistically significant (P = 0.025). History of diabetes, hypertension, alcohol and smoking habits were also considered for the analysis. Heart disease patient with a history of diabetes showed a high dyslipidemia (100%), the association being statistically significant (P = 0.008). lipid profiling among hypertensive showed an aberration, where in the prevalence of the abnormal profile was lower (54.5%). This association was found to be statistically significant (P = 0.05). However, an association for dyslipidemia was forthcoming among smokers (73.7%).

Conclusion: This study shows significant association of dyslipidemia with diabetes, history of alcohol consumption and the working profile of a woman.

Keywords: Acute coronary syndrome, Coronary heart disease, Dyslipidemia, Lipoproteins

INTRODUCTION

The four major risk factors for coronary heart disease (CHD) are hypertension, diabetes mellitus, dyslipidemia and cigarette smoking. The relationship between elevation in total cholesterol (TC) and low-density lipoprotein cholesterol (LDLC) and the incidence of atherosclerotic cardiovascular disease (CVD) is proved. An inverse relationship exists between high-density lipoprotein cholesterol (HDLC) level and incidence of atherosclerotic CVD. Elevated sclerotic plaque formation and growth plaque distruption.[1]

An integral aspect of clinical management includes target based therapy for established CHD patients and preventive strategies targeted at healthy individuals at high risk. Public health measure is imperative to tackle the burden of dyslipidemia and subsequent CHD in the community.

Age, sex, religion, family history, physical inactivity socio-economic status and geography are some of the demographic variables, influencing the lipid profile of an individual. Diabetes, hypertension, body mass index, menopause, smoking and alcohol are some of the biochemical. Habitual parameters which affect the same.

Unlike diabetes and hypertension, lipid profile testing is not performed routinely. It is more often tested at the time of hospital admission. This practice could hasten the effect of dyslipidemia on the incidence of heart disease.

David Wood's analytical report shows that over the age of 55 years, women have higher TC than men.[2]

In comparison to the European, American and Asian populations, the prevalence, incidence and mortality from CHD in Indian are 2-4 folds higher at all ages and 5-10 folds higher in those <40 years of age.

In a hospital based study from Chennai, 75% patients with myocardial infarction had plasma cholesterol levels <200 mg/dl. Levels of plasma cholesterol even lower than 150 mg/dl has been reported among Indian with coronary artery disease. The plasma TC level among the expatriate Indians with coronary artery disease living in UK has been found to be lower as compared to that in the natives.[3]

Meta-analyses have suggested that hypertriglyceridemia is an independent risk factor for CHD, even after adjustment for HDLC levels. There exists an inverse relationship between the plasma HDLC and CHD risk, as HDLC attenuates the atherogenicity of LDLC.[3] Indians have a significantly lower HDL and higher triglyceride (TG) concentrations. This unique dyslipidemia profile in Indians may be related to an ethnic predisposition or the dietary patterns prevalent in India.

Besides the extreme prematurity, CHD in Indians follows an accelerated, diffuse and malignant course. Indian physicians had a lower level of HDL compared to US born physicians (36.2 ± 7.0 mg% vs. 40.3 ± 8.2 mg%, $P < 0.01$). TG levels were significantly higher among young Indians when compared with the local population of Malaysia ($P < 0.02$).[4]

In a large cross-sectional study, prevalence of CHD risk factors in an industrial population was compared a sample survey of the general population from urban Bidar and Rural Medak. Hypercholesterolemia (>200 mg%) was seen in 30.9% of industrial men, 21.7% of industrial women, 36.8% of urban men, 39.7% of urban women, 16.3% of rural men and women respectively.

Progressive urbanization has role to play in the pattern of dyslipidemia, which is currently seen among Indians. This was demonstrated by a survey general population from urban Bidar and neighboring rural Medak. TC >200 mg% was found in ~40% of urban population as compared with ~17% of the rural population. TG >150 mg% was found in ~42% of urban population as compared with ~31% of the rural population.[5]

A study by Udawat *et al.*,[6] shows the prevalence of dyslipidemia to be 89% in diabetic patients.

Ghee intake may modify the HDLC levels and thereby impart a protective action against CHD. Fatty acid composition of ghee shows that it contains 62% saturated and 35% mono-unsaturated fats.

In cross-sectional survey of rural population in Andhra Pradesh, a lower prevalence of CHD was found in men who consumed more than 1 kg ghee/month (odds ratio [OR] 0.23, 95% confidence interval 0.18-0.30, $P < 0.001$). Multivariate analysis also confirmed this association ($P < 0.001$).[5]

Coconut oil is the most saturated of all fats containing 92% saturated fatty acids. About 74% of SAFA in coconut oil ones that increase cholesterol levels. Its' index thrombogencity is seven folds higher. Coconut oil is consumed excessively in South India where incidentally the prevalence and incidence of CHD is the highest resported.[4]

MATERIALS AND METHODS

A hospital based retrospective cohort study was conducted at BRIMS Teaching Hospital, Bidar during June-2011. Data for the 3 year period (June 2011-June 2013) was collected from the case sheets of cardiac care unit (CCU) admissions. Out of the 1000 admission of the CCU over the 36 months period, 337 case sheets were examined as these were the once with first episode CHD etiology. Furthermore, lipid profile was available for 74 patients only and hence they were included the study ($n = 74$).

Only first episode CHD cases were included as subsequent admissions would have practiced control measures for dyslipidemia. Some of the socio-demographic variables considered as risk factors included age (years), sex and occupation. Among males, occupation was stratified as being involved in agriculture, semi-killed (labor) or other (Government, private and business) work. Among females, occupational classification included either being a housewife or working in nature.

Among the biochemical/lifestyle risk factors, ever diagnosed diabetics and/or hypertensive were considered. Furthermore, history of smoking and alcohol consumption were included to study the casual association.

The labeling of dyslipidemia was done according to National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP III) guidelines (National Heart Lung, Blood Institute instituted).[7] Current international cut-point for dyslipidemia (NCEP ATP III) have been depicted in Table 1.

The statistical software "MedCalc" was used for the bivariate and multivariate analysis of data. Microsoft word and excel have been used to generate graphs, tables etc.

Observations

Dyslipidemia was present in 67.6% of first episode CHD cases (Figure 1).

Age, sex and occupational profiles were enumerated and cross tabulated to examine their influence on dyslipidemia (Table 2). In this study, increasing age profile did not show an association with the propensity toward developing an abnormal lipid profile. Males showed a greater predisposition toward developing dyslipidemia (70.8%). With respect to occupation, males involved in semi-skilled labor had a higher degree of lipid profile abnormality (87.5%).

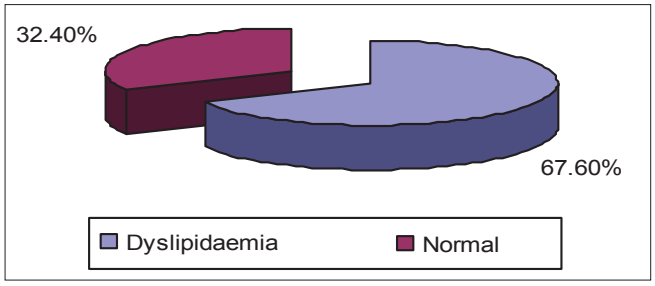

Figure 1: Incidence of dyslipidemia among first episode coronary heart disease cases

Table 1: Current international cut-points for dyslipidemia (NCEP ATP III)

Lipid fraction	Cut-point values for primary prevention (mg/dl)	Cut-point values for secondary prevention (mg/dl)
TC	<200	<200
LDLC	<130	<100
HDLC	>40	>40
TC/HDL ratio (CHD)	<4.5	<3.5
LDL/HDL ratio	<3	<2.5
TG	<150	<150

NCEP: National Cholesterol Education Program, ATP III: Adult Treatment Panel, LDLC: Low density lipoprotein cholesterol, HDLC: High density lipoprotein cholesterol, TC: Total cholesterol, TG: Triglyceride, CHD: Coronary heart diseases

Lipid profiling showed a higher percentage of abnormality among working (75%) when compared with housewives (40%). This association was found to be statistically significant ($P = 0.025$).

History of diabetes, hypertension, alcohol and smoking habits were also considered for the analysis (Table 2). Hart disease patients with a history of diabetes showed a high prevalence of dyslipidemia (100%), the association being statistical significant ($P = 0.008$). Lipid profiling among hypertensive shows an aberration; wherein the prevalence of an abnormal profile was lower (54.5%). This association was found to be statistically significant ($P = 0.05$). The influence of alcohol consumption on lipid profile showed an unequivocal association in this study (63.6%), when compared with patients who did not consume alcohol (69.6%). However, an association for dyslipidemia was forthcoming among smokers (73.7%).

Statistical analysis (bivariate analysis): Fisher-exact/Chi-square analysis revealed statistical significance for working females, diabetics and hypertension. The association for other variables was not significant.

Table 2: Vibariate analysis of the variables associate with lipid profile

Characteristic	Number of cases (%)			
	Total (*n*=74)	Normal lipid profile (*n*=24)	Abnormal lipid profile (*n*=50)	*P* value
Age (years)				
≤45	19 (26.5)	4 (22.2)	15 (77.8)	0.28
46-55	22 (29.4)	7 (30)	15 (70)	
≥56	33 (44.1)	13 (40%)	20 (60)	
Sex				
Male	52 (70.6)	15 (29.2)	37 (70.8)	0.287
Female	22 (29.4)	9 (40)	13 (60)	
Occupation				
Male				
Agriculture	22 (41.7)	9 (40)	13 (60)	0.079
Semi-skilled	17 (33.3)	2 (12.5)	15 (87.5)	
Others	13 (25)	4 (33.3)	9 (66.7)	
Females				
Housewife	11 (50)	7 (60)	4 (40)	0.25*
Working	11 (50)	2 (25)	9 (75)	
Diabetes				
Present	9 (11.8)	0 (0)	8 (100)	0.008*
Absent	65 (88.2)	24 (36.7)	42 (67.3)	
Hypertension				
Present	24 (32.4)	11 (45.5)	13 (54.5)	0.05*
Absent	50 (67.6)	13 (26.1)	37 (73.9)	
Alcohol consumption				
Present	24 (32.4)	9 (36.4)	15 (63.6)	0.549
Absent	50 (67.6)	15 (30.4)	35 (69.6)	
Smoking				
Present	41 (55.9)	11 (26.3)	30 (73.7)	0.142*
Absent	33 (44.1)	13 (40)	20 (60)	

*Statistically significant association

Table 3 shows the findings of multivariate analysis indicating an undermined risk for ≥ 56 years age group patients toward developing an abnormal lipid profile (OR = 0.58). Females also showed an undermined risk for dyslipidemia (OR = 0.74). However, statistical significance was not noted for either of the variables. The variable occupation (male and females) was not included in the model, as working females had already shown a significant association on bivariate analysis. In this study, as none of the diabetics had normal lipid profile, the standard error of diabetic was large and hence not included in the logistic model. An undermined risk was noted for hypertensive (OR = 0.43), which reinforced the aberration found during bivariate analysis. However, the significance found for this association during bi-variate analysis ($P = 0.05$) disappeared in the multivariate model ($P = 0.08$), which probably reflects the biological implausibility of the relationship. The association of history of smoking with abnormal lipid profile showed an over mined risk (OR = 2.38), but was not significant. The association of alcohol consumption with an abnormal lipid profile showed a significantly undermined risk (OR = 0.26), which is a distinct aberration in this study.

DISCUSSION

Dyslipidemia was prevalent among 67.6% of first episode CHD cases. This study result is in contrast to the hospital-based study from Bangalore,[3] wherein 75% patients with myocardial infarction had plasma cholesterol levels <200 mg/dl.

Table 3: Multivariate logistic regression analysis to predict the abnormal lipid profile

Variable	Number of cases (%)		Multivariate (%)		
	Normal lipid profile (*n*=24)	Abnormal lipid profile (*n*=50)	*P* value	OR	95% CI
Age in years					
≥56	13 (40)	20 (60)	0.28	0.58	0.21-1.57
Sex					
Female	9 (40)	13 (60)	0.623	0.74	0.22-2.49
Occupation					
Male					
Agriculture	9 (40)	13 (60)			
Semi-skilled	2 (12.5)	15 (87.5)			
Others	4 (33.3)	7 (66.7)			
Females					
Housewife	7 (60)	4 (40)			
Working[1]	2 (25)	9 (75)			
Diabetes					
Present[2]	0	9 (100)			
Hypertension					
Present	11 (45.5)	13 (54.5)	0.08	0.43	0.16-1.1
Alcohol					
Present	9 (36.4)	15 (63.6)	0.34[3]	0.26	0.07-0.91

[1]As working females already showed a significant association, they were not included in the model, [2]Standard error of diabetics is large and hence not included in the logistic model, [3]Statistically significant. OR: Odds ratio, CI: Confidence interval

Socio-demographic variables such as age, sex and occupation were considered in enumerating the profile of dyslipidemia patients. Lipid profile abnormality among patients aged ≥56 years was lower (60%) when compared to the younger age groups (70% and 77.8% among 46-55 years and ≤45 years respectively). This undermined risk although not significant on the multivariate model (OR = 0.58), could be an aberration in this study as biologically age related deterioration of the lipid profile homeostasis is usually expected. Male sex had a greater prevalence of dyslipidemia (70.8%), possibly depicting genetic predisposition. As in the prior case of age, no statistical significance was found for this variable also. The undermined risk of females in the multivariate model, was not significant (OR = 0.74).

Among males, semi-killed (labor) workers had a higher preponderance for dyslipidemia (87.5%) when compared with agricultural and other category workers (government, private and business). The labor class usually expends energy in physical work, which ideally should burn calories in the body and thus enables a normal lipid profile. However, the contrasting results in this study reaffirms. Among the belief that dyslipidemia has a multifactorial causation. Among females, a larger percentage of working women showed an abnormal lipid profile (66.6%) wherein work related stress and consumption of adhoc junk foods could be a causal factor. As the relation showed a highly significant association on bivariate analysis, it was not included in the multivariate model.

Lifestyle morbidities/habits such as history of diabetes, hypertension, alcohol and smoking were also considered. Dyslipidemia was prevalent among all the diabetic's variable was large (considering non of the diabetics had a normal lipid profile), it was not included in the multivariate model, dyslipidemia prevalence among hypertensive was lower than that among patients with normal blood pressure. The undermined risk noted for hypertensive in the multivariate model (OR = 0.43), reinforces the aberration found during bivariate analysis. However, the significance found for this association during bivariate analysis ($P = 0.05$) disappeared in the multivariate model ($P = 0.08$), which reflects the biological implausibility of this relationship. The variability of associations in this study suggests that the etiologic origin for these morbid conditions (diabetes, hypertension and dyslipidemia) could be of difference genetic markers.

Bivariate analysis showed that dyslipidemia prevalence was unequivocal among patients consuming or abstaining from alcohol (63.6% and 69.6% respectively). However, the multivariate model showed a significant preponderance of alcoholics for dyslipidemia. This result reinforces the finding from other studies that alcohol consumption predisposes a genetically susceptibility individual toward developing dyslipidemia. Patients who were habitually smoking cigarettes showed a higher prevalence of dyslipidemia (73.7%). However, the association did not show significance after controlling the other factors during multivariate analysis. This result is a paradox, as tobacco intake predisposes dyslipidemia in an individual as much as alcohol intake does. However, sometimes patients tend to under-report during the course of history taking in inpatient wards or human error may confound the gathering/documentation of patient related information.

In a gist, this study shows significant association of dyslipidemia with being a working woman, diabetic and having a history of alcohol consumption.

CONCLUSION

This study shows significant association of dyslipidemia with diabetes, history of alcohol consumption and the working profile of a woman.

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Original Article

A Comparative Study of Outcome of Small Incision Cataract Surgery in Eyes with and without Pseudoexfoliation Syndrome

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Abstract

Background: Pseudoexfoliation (PEX) syndrome involve all the structures of anterior segment of eye causing many clinical and surgical complications. Many recent studies have also demonstrated a higher rate of complication during and after cataract surgery. Hence, we planned the present study to compare the intraoperative and post-operative complication in eyes with PEX syndrome with eyes without this syndrome operated by small incision cataract surgery (SICS).

Aim: To determine the complications of SICS in eyes with PEX syndrome compared with eyes without this syndrome.

Materials and Methods: A retrospective single center comparative study was conducted on patients who underwent SICS between June 2013 and May 2014 at Shri Gurugovind Singh Tricentenary Medical College, Budhera, Gurgaon. Demographic parameters (age, sex, medical and ophthalmological history), clinical features (visual acuity, intraocular pressure [IOP], slit lamp findings) before and after surgery, and surgical complications were analyzed and compared to a control group without this syndrome.

Results: Hundred eyes of 100 patients were included in the study. The patients were divided into two groups. Fifty eyes with PEX syndrome and 50 eyes without PEX (control group). The rate of surgical complications were not statistically different between the two groups intra-operatively (zonule instability) and post-operatively (corneal edema, raised IOP, inflammation). Poor pupillary dilatation in spite of standard mydriatic drops and non-steroidal anti-inflammatory drugs was significantly more common in PEX syndrome group. Both groups had improved visual acuity, with no statistically significant difference in the best-corrected visual acuity at 3 months follow-up.

Conclusion: SICS in eyes with PEX syndrome is not associated with a statistically higher rate of surgical complication in our study. However, PEX required optimized surgery. Poor pupillary dilatation common in PEX group made subsequent steps of surgery very difficult due to poor peripheral visualization. Best corrected visual acuity after surgery was similar in two groups, but PEX group required more time to attain this maximal visual acuity.

Keywords: Complications, Pseudoexfoliation syndrome, Small incision cataract surgery

INTRODUCTION

Pseudoexfoliation (PEX) material at pupillary border along with PEX glaucoma was first reported by Lindberg (1917).[1] Vogt in 1925 introduced the term "exfoliation superficial is capsule anteriores."[2] Later Dvorak-Theobald in 1954 introduced the term "PEX of the lens capsule" as it was discovered that the flocculent material lies on the lens capsule, ciliary body and zonules.[3]

PEX syndrome is an age related systemic disease with primary ocular manifestation characterized by deposition of whitish-gray fibrillogranular amyloid like material on the anterior lens capsule, zonules, cilliary body, pupillary margin of the iris, corneal endothelium, anterior vitreous and trabecular meshwork.[4,5] Various clinical features seen by slit lamp examination are, in the cornea PEX material may be seen as aggregates on the endothelium. Descemet's membrane appear thickened with irregular excrescences

mixed with diffuse melanin deposition on the endothelium. Specular microscopy may reveal a reduced number of endothelial cells and cell polymorphism.[6] In iris PEX material is seen as grayish-white flakes at the pupillary margin, and there is pigment loss at pupillary ruff. On transillumination, the ruff has a moth eaten appearance and defect can be seen in midperipheral area. It has been suggested that hypoxia may be the primary event contributing to the development of PEX material.[7] Iris hypoxia can cause atrophy of the iris pigment epithelium, stroma and muscles and thus the reduced response to mydriatics.[8] The frequency of ocular hypertension and glaucoma is also found to be considerably higher in eyes with PEX than in those without this syndrome.[9] The deposits of PEX material and melanin pigment throughout the trabecular meshwork, schlem's canal and collector channels probably increase aqueous outflow resistance, and this is likely to be the main reason for the elevated intraocular pressure (IOP) in PEX syndrome. A classic finding on lens is fibrillogranular material aggregate on anterior lens capsule.The characteristic pattern consist of three different zones. The central disc equivalent in size to the pupillary diameter surrounded by a clear zone and then a peripheral band which may have radial striations.[10] PEX material may be detected on the cilliary process and zonules. Zonular attachment to the cilliary process and lens may be weakened. In advanced cases, the zonular suspension to the lens is weakened to such an extent that phacodonesis occurs.[11] Mild aqueous flare may be seen. The blood aqueous barrier is also affected and as a consequence, the total aqueous protein concentration is higher in these patient.[12]

As a systemic disorder of the extracellular matrix PEX syndrome involve all the structures of the anterior segment of the eye causing many clinical and surgical complications. Many recent studies have also demonstrated that patients with PEX syndrome have a higher rate of complication during and after cataract surgery compared to patients without this disorder.[13,14] We planned the present study to compare the intra-operative and post-operative complication in eyes with PEX syndrome with eyes without this syndrome operated by small incision cataract surgery (SICS).

MATERIALS AND METHODS

A retrospective, randomized, single center, comparative study was conducted on the patient who underwent cataract surgery by SICS technique between May 2013 and June 2014 in the Ophthalmology department of tertiary care hospital Shri Gurugovind Singh Tricentenary Medical College, Budhera, Gurgaon. All the patients with a history of meiotic use, traumatic cataract, complicated cataract, high myopia, glaucoma, previous ocular surgery, preexisting retinal pathology were excluded from the study.

Pre-operatively a detailed history was taken, best-corrected visual acuity was measured using snellen's visual acuity chart. IOP was measured by applanation tonometer, detailed slit lamp examination was done and PEX deposits were looked for on the cornea, iris, pupillary margin and after dilatation on the anterior lens capsule. The amount of pupillary dilatation after instilling mydriatic-cycloplegic drops was noted and recorded as poorly dilating (<5 mm), partially dilating (5-7 mm) or fully dilating (>7 mm). Cataract was graded using "lens opacity classification system." Fundus was evaluated using 90D lens and indirect ophthalmoscope.

Topical antibiotic drops was instilled before the surgery, and pupill were dilated with mydriatic-cycloplegic drops (tropicamide and phenylephrine) and non-steroidal anti-inflammatory (flurbiprofen) drops were used to maintain the dilatation. All the patients were operated by the same surgeon. Peribulbar block with 4 ml of 2% xylocain and 2 ml of 0.5% bupivacain with 150 units/ml of hyaluronidase was given. Povidone-iodine 5% was instilled into the conjunctival sac. A fornix based conjunctival flap was made. Scleral incision was made with Bard parker knife, superiorly or temporally depending on the keratometric reading. Sclerocorneal tunnel was constructed with a crescent blade. Side port entry made, trypan blue (0.1%) was injected intra-camerally to stain the anterior lens capsule.Using needle cystitome, continuous curvilinear capsulorhexis was done. Gentle and through hydrodissection was performed to separate cortex from nucleus. Nucleus was delivered by viscoexpression. Irrigation and aspiration was done with Simcoe's two-way irrigation and aspiration cannula. Rigid, single piece, biconvex polymethylmethacrylate posterior chamber intraocular lens with optic diameter of 6.5 mm with dialing holes were used and implanted in the bag using kelman mc pherson forcep. All pre-operative findings or complications were documented. Post-operatively, patients were put on topical antibiotic and steroid, tapered over 6-8 weeks depending upon the post-operative inflammation. Anti-glaucoma medication (oral acetazolamide, timolol + brimonidine topically) were used in specific cases. Post-operative finding of visual acuity, IOP and slit lamp evaluation on day 1, 1 week, 1 month and the monthly interval for 3 months were analyzed.

RESULT

Hundred eyes of 100 patients were included in the study. The patients were divided into two groups, Group A included 50 patients with PEX syndrome and Group B included 50 patients without PEX syndrome (control group).

In Group A 24 patients (48%) were in age group 60-70 years and 26 patients (52%) in age group 70-80 years. In Group B

36 patient (72%) were in age group 60-70 years and 14 patients (28%) in age group 70-80 years. Male-female ratio was 3:1 with 38 males and 12 females in Group A and 3:2 in with 30 males and 20 females in Group B (Tables 1-5).

Table 1: Pre-operative findings

Clinical feature	Group A	Group B
Mean IOP	16±2 mmHg	14±2 mmHg
Cornea	Clear	Clear
Pupillary dilatation	<5 mm-3 5-7 mm-20 >7 mm-27	>7 mm-50
Zonulodialysis	Nil	Nil

IOP: Intraocular pressure

Table 2: Intraoperative findings

Clinical features	Group A	Group B
Zonular instability	8	Nil
Vitreous loss	3	Nil
IOL implantation	3-anterior chamber IOL 47-in the bag posterior chamber IOL	50-in the bag posterior chamber IOL

IOL: intraocular lens

Table 3: Post-operative day 1

Clinical features	Group A	Group B
Visual acuity	≥6/12-15 ≤6/18-35	≥6/12-45 ≤6/18-5
IOP>20 mmHg	10	2
Corneal edema	12	4
Inflammation (cells>+2)	7	1
Retained lens matter	3	Nil
Damage to sphincter pupillae	4	Nil

IOP: Intraocular pressure

Table 4: Follow-up-1 month

Clinical features	Group A	Group B
IOP>20 mmHg	Nil	Nil
Corneal edema	4	Nil
Inflammation (cells>+2)	3	Nil
Visual acuity	≥6/12-43 ≤6/18-7	≥6/12-50

IOP: Intraocular pressure

Table 5: Follow-up 3 months

Clinical features	Group A	Group B
IOP>20 mmHg	Nil	Nil
Corneal edema	1	Nil
Inflammation (cells>+2)	Nil	Nil
Visual acuity	≥6/12-47 ≤6/18-3	≥6/12-50

IOP: Intraocular pressure

DISCUSSION

The present study was performed to determine the complications of SICS in eyes with PEX and to compare it with eyes without this syndrome. The age group of patients in Group A in this study was between 60 and 80 years which is similar to the finding of Tarkkanen and Alfaiate *et al.* who found that the prevalence of PEX increases with age and it is seldom seen before the age of 50 years.[15,16] Male female ratio in Group A was 3:1 with 38 males (76%) and 12 females (24%) which is in coraboration with the findings of Pranathi *et al.* who studied PEX in Indian population and found it to be more common in male gender.[17] Other studies have shown it to more common in the female population like Kozart and Yanoff, Avramides *et al.*[18,19] This may be because presentation for cataract surgery is more in the male population than females as seen on comparing with the control group which also has male, female ratio of 3:2.

In the present study, the most frequent problem encountered pre-operatively was rigid pupil present in 46% cases of Group A, which was also seen in the study done by Streho *et al.* who found the incidence to be 26%.[20] Other authors who did a similar study like Carpel, Alfaiate *et al.* found the incidence to be 94.1% and 48.4% respectively.[21,16]

In our study pre-operatively all the patients had normal IOP and clear cornea whereas in immediate post-operative period raised IOP, corneal haze and anterior segment inflammation was significantly more in PEX group which may be due to reduced endothelial cell count, increased surgical time and handling in this group.Visual acuity attained was significantly less in Group A on post-operative day 1, but there was no significant difference between the two groups at 3 months follow-up which is similar to the finding of Sarda *et al.*, Stefan *et al.*, Shingleton *et al.* who also concluded that the best-visual acuity after surgery was similar in the two groups, but PEX group required more time to attain this maximal visual acuity.[22-24]

During per-operative period zonular instability was seen in 16% of patient associated with vitreous loss and anterior chamber lens implantation in 6% of patient which was also demonstrated in the study of Jawad *et al.*, Shingleton *et al.*, Shastri and Vasavada who calculated the rate of vitreous loss to vary between 0% and 11%.[14,24,25]

Other complications seen in our study in PEX group are retained lens matter in 6% of cases and damage to sphincter pupillae in 8% of cases. Other authors like Jawad *et al.*, Pranathi *et al.* have reported similar incidence rate of these complications.[14,17]

CONCLUSION

Cataract surgery in PEX syndrome is known to be associated with more complications during surgery. Poor pupillary dilatation was the most common problem in eyes with PEX syndrome. Intra-operatively zonular instability, vitreous loss and post-operatively corneal edema, anterior segment inflammation, retained lens matter and damage to sphincter pupillae were more common in PEX group, but statistically there was no significant difference between the two groups. The mean visual acuity was similar in the two groups, but PEX group required more time to attain this maximal acuity. In addition proper follow-up of the patient after surgery was needed to evaluate endothelial cell function, IOP and inflammation.

Conclusively SICS in eyes with PEX syndrome is not associated with a significantly higher rate of surgical complications in our study, however it requires a optimized surgery.

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Original Article

Bone Resorption in Chronic Otitis Media

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Abstract

Introduction: Chronic otitis media (COM) is a common condition seen in patients attending the ENT clinics and out patient's department, especially in the developing country like India.

Aims and Objectives: To study the pattern of bone erosion as well as to identify areas of the temporal bone that are resistant to erosion based on intraoperative findings in cases of both active mucosal and active squamosal type of COM.

Materials and Methods: This study was carried out in Department of ENT, Teerthankar Mahaveer Medical College and Research Centre, Moradabad for period of 1 year. A total of 46 cases of COM of both active squamosal and active mucosal type were included in this study, and the intraoperative findings of these cases were studied regarding the pattern of bony erosions.

Result: Out of 46 patients of COM selected for this study, 18 (39.1%) had active mucosal, and 28 (60.9%) had active squamous epithelial type of COM. Mastoid was found to be sclerosed in 41 (89.1%) cases and pneumatic in 5 (10.9%) cases. The ossicles were found to be damaged in 40 (80.7%) cases with the incus being most commonly involved ossicle. Fallopian canal was found to be dehiscent in 15 (32.6%) cases with a horizontal portion of the facial nerve exposed in 10 (21.7%) cases. The lateral semicircular canal had performed fistula in 8 (17.4%) cases. Jugular bulb was found to be exposed in 2 (4.3%) cases and carotid canal was dehiscent in one case.

Conclusion: There was no clear cut pattern of bony resorption in cases of COM. The magnitude of resorption was higher in cases of cholesteatoma. The ossicles were found to be most commonly involved.

Keywords: Bone resorption, Cholesteatoma, Chronic otitis media

INTRODUCTION

Chronic otitis media (COM) is a common condition seen in patients attending the ENT clinic especially in the developing country like ours. It is defined as a long standing infection of mucoperiosteal lining of a part or whole of the middle ear cleft, characterized by ear discharge, a permanent perforation and varying degree of hearing loss. Histopathologically,[1] COM is defined as irreversible mucosal changes within the middle ear cleft.[2]

Both types of COM have potential to incite resorption of bone.[3] This propensity for bony resorption is greater in cases of active squamosal type of COM because of the presence of cholesteatoma.[4] Various hypotheses have been postulated to establish the molecular mechanism which triggers bone resorption in COM.

The proposed mechanism for resorption of bone is chronic middle ear inflammation which leads to elaboration of a variety of molecular factors including cytokines such as interleukin-1 (IL-1), IL-6 and tumor necrosis factor alpha (TNF-α), growth factors, prostaglandins, neurotransmitter and nitric oxide. In the last decade, it has been established that whatever be the triggering factor activation of osteoclast remains the final common pathway that induces bone resorption in both active squamosal as well as in active mucosal type COM. TNF-α also produces neovascularization and hence granulation tissue formation. COM is thus an inflammatory process with defective wound healing mechanism.[5]

Longer these inflammatory processes stay in the middle ear, the more harmful it is.[6] Initially, this is confined to the

ossicular chain and scutum. As it expands, erosion of the otic capsule, fallopian canal and tegmen can occur. There is no clear cut pattern in which this bony destruction occurs. Some areas invariably show erosion whereas others resistant to erosion even in cases of extensive cholesteatoma.

MATERIALS AND METHODS

This study was carried out in Department of ENT, Teerthankar Mahaveer Medical College and Research Centre, Moradabad, a total of 46 cases of COM (both active squamous and active mucosal type) were included in this study. Of these 26 (56.5%) were female patients and 20 (43.5%) were male patients. The selected patients were subjected to the detail history, complete ENT examination including otomicroscopic examination to precisely establish the pre-operative diagnosis of active squamosal and active mucosal type of COM. Inactive cases of COM were excluded from the study. These patients underwent pure tone audiometry to know pre-operative hearing status of the patient and X-ray mastoid lateral oblique view to assessing pathology and surgical anatomy of mastoid. Computed tomography scan was done in selected patients who had complications of COM.

These patients were subjected to various types of mastoid surgery depending on pre-operative evaluation of the patients and intraoperative findings regarding the extent of resorption of bone were observed.

RESULT

A total of 46 patients of COM selected for this study were divided into active mucosal and squamosal type. Of these 18 (39.1%) were classified as active mucosal type, whereas rest 28 (60.9%) were classified as active squamosal type of COM (Figure 1).

All these patients complained of ear discharge and varying degree of hearing loss ranging from mild to the profound degree. Dead ear was observed in 3 (6.5%) cases. 6 (13.0%) presented with subperiosteal mastoid abscess while 8 (17.4%) cases had mastoid fistula at the time of presentation. 3 (6.5%) presented with facial palsy and 5 (10.9%) patients had vertigo with positive fistula test. One case each had a history of meningitis and cerebral abscess (Table 1).

Out of the total number of patients, 6 (13%) underwent cortical mastoidectomy with reconstruction, 13 (28.2%) atticotomy with Type III tympanoplasty, 24 (52.1%) underwent modified radical mastoidectomy and 3 (6.5) underwent radical mastoidectomy. (Figure 2) 43 (93.4%) cases were carried out through postaural approach and the rest 3 (6.6%) cases end aural approach was used.

The mastoid was found to be sclerosed in 41 (89.1%) cases and pneumatic in 5 (10.9%) cases. Korner's septum was found to be present in 1 (2.2%) case. Tegmen plate was found to be dehiscent in 5 (10.9) cases. Low lying Dura was seen in 8 (17.4%) cases whereas antiposed sinus was observed to be present in 12 (26.1%) cases. Dura exposed at multiple sites in (13.0%) cases with exposure of posterior and middle cranial fossa.

Regarding ossicular chain status it was observed that ossicles were damaged in the majority of cases. Incus was

Table 1: Cases presenting with complication at the time of presentation

Symptoms and complications	Number of cases	Percentage
Ear discharge and hearing loss	46	100
Subperiosteal mastoid abscess	6	13
Mastoid fistula	8	17.40
Facial palsy	3	6.50
Vertigo	5	10.90
Cerebral abscess	1	2.20
Meningitis	1	2.20

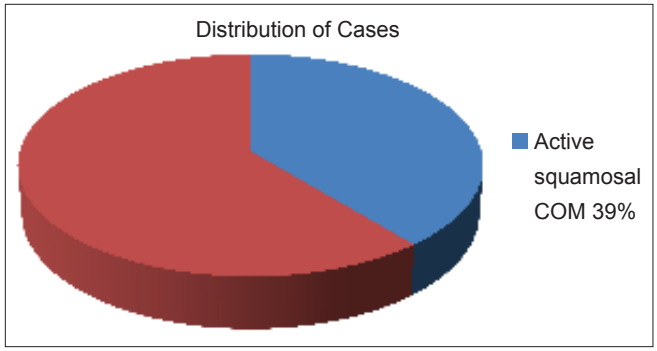

Figure 1: Distribution of active chronic otitis media cases

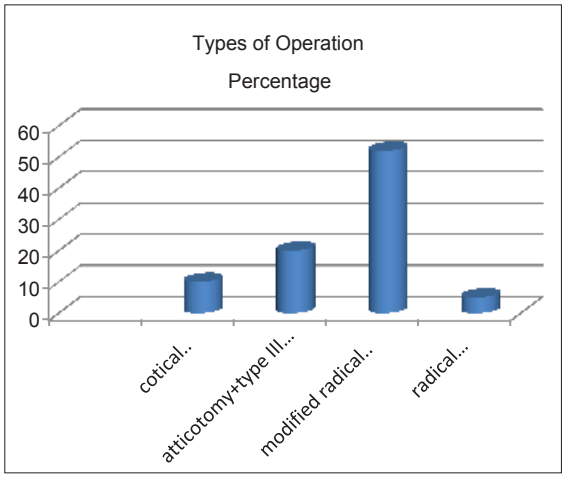

Figure 2: Types of operation performed

found to be most commonly involved either eroded or completely absent. 40 (87.0%) cases showed involvement of incus in some form. Stapes superstructure was found to be eroded in 13 (28.3%) cases. Malleus was found to be involved in 11 (23.9%) cases, showing that, of all the ossicle, this is most resistant to erosion. Ossicular chain was found to be intact in 6 (13%) cases.

Fallopian canal was found to be dehiscent in 15 (32.6%) cases with labyrinthine segment found to be dehiscent in one case. Horizontal portion of the facial nerve exposed in 10 (21.7%) cases while vertical portion was found to be dehiscent in four cases. The lateral semicircular canal had performed fistula in 8 (17.4%) cases.

In tympanic cavity, jugular bulb was found to be exposed in 2 (4.3%) cases in hypotympanum. In an incidental finding, it was seen that carotid canal was dehiscent in one case with exposure of internal carotid artery in antero-inferior segment of tympanic cavity.

It was also observed that petrous apex was most resistant to erosion, with none of the cases in the study showing its involvement. This was attributed to the high density of bone in this region and also due to the fact that prevalence of pneumatization is low. Hence, infection in sclerotic or marrow-containing petrous apices is uncommon.

DISCUSSION

Active mucosal and active squamous epithelial COM (cholesteatoma) are dangerous because of their potential to incite resorption of bone. Various hypothesis have been postulated to establish the molecular mechanism which triggers bone resorption in COM. In the past decade, it has become evident that activation of osteoclast is the common pathways that induce bone resorption in cholesteatoma as well as in active mucosal type COM. Initially, this confined to the ossicular chain and scutum. As cholesteatoma expands, erosion of the otic capsule, fallopian canal and tegmen can occur.

In this study, 46 patients of COM, both active mucosal and squamosal type were studied. Most of these cases were neglected cases where disease process was present for more than 2 years. Near about 50% of the cases had some form of complication of COM at the time of presentation. This was mainly due to unawareness on account of poor socio-economic condition as well as a lack of proper health care facility in adjoining areas.

The aim of this study was to study the pattern of bone erosion as well as to identify areas of the temporal bone that are resistant to erosion based on intraoperative findings. It was observed that no clear-cut pattern existed regarding the extent of bone resorption in cholesteatoma. Some areas invariably showed erosion whereas others were resistant to erosion even in case of extensive cholesteatoma.

In this study, it was seen that mastoid sclerosed in 41 (89.1%) cases. Incus was the most common ossicle to be involved, followed by stapes and malleus. Ossicles were found to be intact in 6 (13%) cases. These findings were consistent with findings of previous studies.[6,7]

A total of 15 (32.6%) cases showed involvement of fallopian canal most commonly dehiscent in the horizontal segment. This may not be only due to the disease process but can also be attributed to the fact that this portion is naturally dehiscent in 15-30% cases.[8] Fistula was observed to be present over lateral semicircular canal in 8 (17.4%) cases. Jugular bulb was found to be exposed in two cases while internal carotid artery was found to be exposed in one case. Petrous apex was observed to be most resistant to bony resorption with none of the above cases showing its involvement. This was attributed to the high density of bone in his region and also due to the fact that prevalence of pneumatization is variable in this part of the temporal bone.[9]

CONCLUSION

a) Bone resorption can take place without the presence of a cholesteatoma
b) The magnitude of resorption is higher in cases with cholesteatoma
c) Some areas invariably show erosion whereas others are resistant to erosion even in cases of extensive cholesteatoma
d) Ossicular chain is the most vulnerable to bony resorption
e) Petrous apex is most resistant to bony resorption.

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Original Article

Sexual Dysfunctions in Rural Population as Indicators of Psychiatric and Addiction Problems

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Abstract

Introduction: Sexual response is a psychosomatic process. Sexual dysfunctions are very common among people, but most of these cases remain undetected due to lack of awareness. Patient acquired knowledge related to sexual functioning from newspapers, magazines, friends, and from roadside information which may be misinterpreted by patient leading to exacerbation of pre-existing anxiety related to sexual functioning.

Aims and Objectives: Assessment of sexual dysfunctions and co-morbid illnesses in patients with primary presenting complaints of sexual problems in a rural area.

Materials and Methods: The study was carried out at psychiatry outpatient department (OPD) of tertiary care centre in a rural area. Patients came with primarily with sexual problems were informed regarding the study, and their consent was taken. Socio-demographic profile of patients noticed in semi-structured performa. Then detail clinical history and examination diagnosis of problems were made according to ICD 10 DCR. After that patients with suspected medical or surgical co-morbidities were referred for management of respective ailments.

Result: Of all subjects 87% patients were male. The mean total duration of sexual symptoms was 19.7 months. 52% of the patients visited OPD within a year of presenting sexual symptoms. Major sexual dysfunctions were premature ejaculation (PME) (26%), low libido (26%), PME + erectile dysfunction (22%), and Dhat secretion (22%). Common psychiatric morbidities were mild depression (30%), generalized anxiety disorder (26%), mixed anxiety depression (22%), and nicotine dependence (28%). Only 17% of subjects did not have any psychiatric morbidity and found to have only medical morbidity along with sexual dysfunction.

Conclusion: Psychiatric co-morbidity is common in patients presenting with sexual dysfunctions. Patient with psychiatric and addiction problems may present primarily with sexual problems especially in a rural population. Addressing excessive worry related to sexual functions and treatment of co-existing psychiatric illness is important in treatment planning of such cases.

Keywords: Anxiety, Co-morbidities, Depression, Erectile dysfunction, India, Premature ejaculation, Rural, Sexual dysfunction

INTRODUCTION

Sexual dysfunction covers the various ways in which an individual is unable to participate in a sexual relationship as he or she would wish. There may be a lack of interest, lack of enjoyment, failure of the physiological responses necessary for effective sexual interaction (e.g., erection), or inability to control or experience orgasm.

Sexual response is a psychosomatic process; and both psychological and somatic processes are usually involved in the causation of sexual dysfunction. It may be possible to identify an unequivocal psychogenic or organic etiology, but more commonly, particularly with such problems as erectile failure or dyspareunia, it is difficult to ascertain the relative importance of psychological and/or organic factors. In such cases, it is appropriate to categorize the condition as being of either mixed or uncertain etiology.[1]

Misinterpretation of Sexual Dysfunctions

Sexual disorders are among the most prevalent psychological disorders in the general population. Sexual dysfunctions though being very common among people, still a large number of cases remain undetected. Its reason can be

attributed to the conservative Indian society. Due to this, vulnerable people trying to seek knowledge regarding sexual functioning approach easily accessible inappropriate sources available in the market. Resulting in people getting sexually educated through highly unreliable sources namely newspapers, magazines, peer group, or from roadside information, which can be easily misinterpreted, thus exacerbating pre-existing anxiety related to sexual functioning and performance.

Verma *et al.* (1998) analyzed data on 1000 consecutive patients' sexual disorders at All India Institute of Medical Sciences attending the psychosexual clinic. They found premature ejaculation (PME) (77.6%) and nocturnal emission (71.3%) frequent problems followed by a feeling of guilt about masturbation (33.4%), small size of the penis (30%), and erectile dysfunction (ED) (23.6%). Excessive worry about nocturnal emission, abnormal sensations in the genitals, and venereophobia was reported in 19.5%, 13.6%, and 13% of patients, respectively.[2]

Nakra *et al.* (1977) studied sexual disorders in 150 male referred patients with the primary complaint of disorder of potency considered to be psychogenic of a teaching general hospital. About three-fourth of the patients who masturbated developed potency disorders and guilt associated with masturbation was found in about 43%. Nocturnal emission was found in 95% of the patients and adolescent homosexual contacts in 16% and among 69% and 39%, respectively, had feelings of guilt with it. 64% of the subjects considered loss of semen to be harmful.[3]

These two studies correspond to the saying "Little knowledge is a dangerous thing." Thus, there is a need to make people aware about "What actually is meant by sexual dysfunction," "What are the symptoms," "When should they report to psychiatrist for consultation," etc. It's time that haze of misconceptions from common man's mind should be cleared, and they should be provided with authentic knowledge about the sexual functions.

Common Sexual Dysfunctions

Avasthi *et al.* (1994) did a study, 66 male patients with psychosexual dysfunction with respect to sociodemographic and clinical variables. Respectively, 30% of patients reported of ED, 12% of PME, 45% combination of ED and PME, and 9% of Dhat syndrome.[4]

Gupta *et al.* (2004) clinically assessed 150 patients attending dermatology outpatient department (OPD) for psychosexual problems. The most common among them was ED (34%) followed by PME (16.6%), Dhat syndrome (15.3%), and nocturnal emission (14%).[5]

Sexual Dysfunctions and Co-morbidities

Patients presenting primarily with sexual dysfunctions often have associated co-morbidity. Association of depression and sexual dysfunctions is quiet common. Loss of libido is frequently and consistently associated with major depression.[6]

Sexual dysfunction is especially common among people who have anxiety disorders. In some cases, very first presentation of anxiety-related problems is as a case of sexual dysfunction. For instance, a patient with generalized anxiety may first clinically present as a case of performance anxiety or ED. Pain during intercourse is often a co-morbidity of anxiety disorders among women.[7]

Above two studies highlight the importance of assessment and treatment of co-morbidities while planning management of sexual dysfunctions. In many cases, treating underlying co-morbidity has been successful in alleviating symptoms related to sexual activity. Treating underlying co-morbidity also hastens the treatment process.

MATERIALS AND METHODS

Objective of the Study

The aim of the study was to assess sexual dysfunctions and its relationship with associated co-morbid illness in patients primarily presenting with sexual problems.

Methodology of the Study

The study was conducted on patients presenting primarily with sexual problems in OPD of tertiary care center situated in a rural area of India, after taking ethical committee clearance. Other departments were informed to send the patient with sexual disorders to psychiatry OPD for assessment and treatment. The subjects of study were 54 newly registered male and female patients presenting primarily with sexual problems and who gave consent to be part of the study. Patients who are known case of psychiatric illnesses were excluded from the study.

A semi-structured performa was used in the study to record socio-demographic profile of patients. Clinical interviews and examinations were conducted by consultant psychiatrists to assess sexual dysfunctions and presence of psychiatric illness. Appropriate data needed for the study were collected. After that patients with suspected medical or surgical co-morbidities were referred for management of respective ailments and feedback regarding medical or surgical problems recorded from other consultants.

The data collected during the study were entered in the Microsoft excel format and were analyzed using SPSS

10 version Microsoft software Statistical Package for the Social Sciences (SPSS-IBM). Frequency distribution for categorical variables and measures of mean along with a standard deviation for continuous variables were calculated.

RESULTS

Results of the Study

Most of the referral cases (70%) received from dermatology, general surgery, and general medicine departments. Only few cases (30%) came directly to psychiatry OPD. The result of this study states that the mean age of the total subjects of the study visiting for consultation (irrespective of their sex) was 31.85 years (Table 1) with 85% of them between 20 and 40 years of age group (Table 2). 87% of total subjects were males (Table 3).

The mean total duration of sexual symptoms was 19.7 months (Table 4). 52% of the patients visited OPD within a year of presenting symptoms and 40% within 1-5 years (Table 5). Major sexual dysfunctions were PME (26%), low libido (26%), PME + ED (22%), Dhat secretion (22%), and ED (4%) (Table 6).

Common psychiatric morbidities were mild depression (30%), generalized anxiety disorder (26%), mixed anxiety depression (22%), and nicotine dependence (28%). Only 17% of subjects did not have any psychiatric or addiction morbidity (Table 7). Even in patients who were not having any psychiatric or addiction problem frequently had misconceptions related to sexual functioning, penis size, semen consistency, and masturbation.

Approximately, 83% of the patients did not have any physical morbidity. Around 15% of subjects had hypertension or diabetes (Table 8). Nine patients have more than one co-morbidity (psychiatric, addiction, or medical).

Table 1: Age of the study patients

Duration	Minimum	Maximum	Mean
Age (in years)	21.5	55	31.8

Table 2: Age group distribution of study patients

Age groups	Frequency	Percentage
20-30	31	57.4
30-40	15	27.8
40-50	4	7.4
50-60	4	7.4
Total	54	100

Table 3: Sex distribution of the study patients

Status	Frequency	Percentage
Male	47	87
Female	7	13
Total	54	100

Table 4: Duration of sexual symptoms

Duration	Minimum	Maximum	Mean	Standard deviation
Time (in months)	2	60	19.7	14.1

Table 5: Group distribution of duration of sexual symptoms

Duration	Frequency	Percentage
<1 year	28	52
1-5 year	22	40
>5 year	4	7
Total	54	100

DISCUSSION

In this study, mean age of patients was 32 years, stating that sexual dysfunctions are common among middle adulthood. The results also highlight that more than 80% were married

Table 6: Sexual dysfunctions in study patients

Diagnosis	Frequency	Percentage
PME	14	26
PME+ED	12	22
ED	2	4
Low libido	14	26
Dhat secretion	12	22
Total	54	100

PME: Premature ejaculation, ED: Erectile dysfunction

Table 7: Psychiatric morbidities in study patients

Diagnosis	Frequency	Percentage
Mild depression	16	30
Generalized anxiety disorder	14	26
Mixed anxiety and depressive disorder	12	22
Nonorganic vaginismus	3	5.5
Nicotine dependence	15	28
Harmful use of health supplements (containing caffeine)	3	5.5
Alcohol dependence	2	3.7
No psychiatric or addiction morbidity	9	17

Table 8: Physical morbidities in study patients

Diagnosis	Frequency	Percentage
Amenorrhea	1	1.85
Phimosis	1	1.85
Hypertension	4	7.4
Diabetes	4	7.4
No physical morbidity	45	83

men stating that sexual dysfunctions are mostly diagnosed during married life or phase of being sexually active.

Of all patients, 51% of the patients report to doctors within a year of appearing symptoms but at the same time, the average duration of symptoms was around 20 months. This inconsistency may be because of poor response to treatment of the primary doctor, hesitancy in referring patients to specialist or treatment by quacks. The reason may be any but ultimately it's the patient at losing end. This brings in the importance of taking sexual history, same time focusing on co-morbidities.

Major sexual dysfunctions included PME, low libido, PME + ED, Dhat syndrome, and ED, which are similar to findings of Avasthi *et al.* (1994).[4]

There are common risk factor categories associated with sexual dysfunction for men and women which include the following: General health status of the individual, the presence of diabetes mellitus, the presence of cardiovascular disease, concurrence of other genitourinary disease, psychiatric/psychological disorders, other chronic diseases, and sociodemographic conditions.[8]

In our study, psychiatric morbidities such as anxiety and depressive disorders are common with sexual dysfunctions similar to studies of Bartlik *et al.* (1999) and Coretti and Baldi (2007).[6,7] Sexual response is a psychosomatic process.[1] Hence, treatment of psychological co-morbidities will bring improvement in disorders of sexual response. It may also reduce the duration of treatment and improve treatment outcome for sexual dysfunctions.

Wig (1960), coined the term "Dhat syndrome," characterized by vague somatic symptoms and guilt attributed to semen loss through nocturnal emissions, urine and masturbation though there is no evidence of loss of semen.[9] This "semen loss" related psychological distress has been extensively reviewed by Prakash (2007).[10] In our study, 22% subject were suffering from Dhat syndrome unlike study done by Gupta *et al.* (2004), who found 15.3% of study subjects suffering from Dhat syndrome.[5] Which may be explained by predominant rural population in our study. For the treatment of Dhat syndrome Chadda and Ahuja (1990) advocated psycho-education and culturally informed cognitive behavioral therapy.[11] Bhatia and Malik (1991) found anti-anxiety and anti-depressant drugs better as compared to psychotherapy.[12]

There is a lack of research in identifying the prevalence of psychiatric, addiction, surgical, and medical problems-related risk factors in patients primarily presenting with sexual dysfunctions. One study found that working on modifiable risk factors such as obesity and sedentary lifestyle significantly improve ED in 40-70 years of the male population.[13] There is a need to identify risk factors in patients primarily presenting with sexual dysfunction and response after control in modifiable risk factors with further studies.

CONCLUSION

Psychiatric and addiction morbidities are common in patients presenting with sexual dysfunctions. In the treatment, focus should be on cause of the sexual dysfunctions and co-morbidities, which can be psychological, medical, or combined (psychological and medical) in origin.

In India, due to lack of knowledge and stigma especially in a rural population, people do not seek a consultation for psychiatric and addiction problems. But same time, sexual symptoms, which are common with psychiatric and addiction problems, bring them for medical attention. Thus, psychiatric referral provides a unique opportunity for evaluation and treatment of such cases. It may also save patient money and time by minimizing required investigations.

Sometimes, it is a combination of psychiatric, addiction, and medical problems, which lead to sexual problems in patient. Such cases are therapeutic challenge for physicians, if not assessed and treated for co-morbid illnesses properly. It is better to have some designated referral department for such patient in hospitals, where they can be assessed and treated for psychiatric problems.

In India, many Government Medical College run Marital and Sexual Clinic in Psychiatry Department, but such designated department or services are frequently lacking in private hospitals. Considering the high prevalence of psychiatric and addiction co-morbidities, such cases can be referred for a psychiatrist opinion for better therapeutic outcomes.

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Original Article

Screening for Silent Myocardial Ischemia by Application of Exercise Stress Test: An Observational Cross-Sectional Study

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Abstract

Introduction: Silent myocardial ischemia can be detected using cardiac stress testing. Present study has been carried out by treadmill testing to determine the incidence of the ischemic heart disease (IHD) in asymptomatic individuals with risk factors for coronary artery disease (CAD) and to find out any correlation between multiple CAD risk factors and incidence of IHD in asymptomatic individuals.

Materials and Methods: Eighty-nine asymptomatic patients (age ranges between 20 and 70 years) with important risk factors for CAD were subjected to exercise stress testing (EST).

Results: In total, 21 (23.6%) patients had shown positive treadmill stress test from the study group (89 patients). Maximum number of patients having diabetes mellitus as a sole risk factor (28%) showed positive treadmill test results. Treadmill test was positive in more number of patients having multiple risk factors as comparable to that of only one risk factor.

Conclusion: EST is a simple, easily reproducible, noninvasive, low-cost procedure with relatively good predictive value that can be widely used for CAD detection in the general population. The goals of screening are to improve the quality-of-life and life expectancy through the early detection of CAD.

Keywords: Exercise stress testing, Diabetes, Hypertension, Silent myocardial ischemia, Smoking

INTRODUCTION

Mostly, patients of myocardial infarction (MI) present with significant symptoms and come to the hospital for treatment. However, some individuals have an asymptomatic MI that is identified by the presence of Q-waves in electrocardiogram (ECG). The proportion of silent MIs ranges from 22% to 40%.[1]

Noncommunicable diseases are responsible for most of the mortalities in today's world, and just over half of these are as a result of ischemic heart disease (IHD). The costs of treating this disease and the indirect costs resulting from lost work and wages are substantial.[2]

Almost similar scenario is seen in Indian population which is more prone for IHDs and most of the times; the first episode is the fatal one. Various risk factors are held responsible for the development of IHD that includes hypertension, diabetes, smoking, dyslipidemia, obesity, etc.

Myocardial ischemia is defined as a transient and reversible decrease in oxygen to myocardium, responsible for the following events: Initially, hemodynamic changes followed by kinetic changes (elevated end-diastolic left ventricular pressure), metabolic (lactate production), electrical (repolarization change), and clinical (chest pain) events. Silent myocardial ischemia (SMI) is characterized by lack of final clinical event.[3]

Due to its predictive power, exercise stress testing (EST) has received much attention in recent years. Among asymptomatic individuals, those with an abnormal ECG response during exercise have a substantially higher risk of developing manifest coronary heart disease than those with a normal ECG response.[4]

Functionally, EST determines whether the coronary circulation can increase oxygen supply to the myocardium in response to increased demands that are increased during exercise by increases in systolic pressure, contractile state, and heart rate.[5] It also assesses exercise capacity. In the absence of anemia or disease in the lungs, peripheral circulation or nervous system, the major determinant of exercise capacity is thought to be the heart's ability to increase its output.

SMI can be detected using cardiac stress testing. SMI has been defined as exercise-induced ST depression of >1 mm in the absence of coronary artery disease (CAD) symptoms.[6] Patients with a resting ECG suggestive of ischemia or infarction should undergo stress testing. Furthermore, asymptomatic patients with diabetes and two or more cardiovascular risk factors should also undergo stress testing.[7]

Present study has been carried out by treadmill testing to determine the incidence of the IHD in asymptomatic individuals with risk factors for CAD and to find out any correlation between multiple CAD risk factors and incidence of IHD in asymptomatic individuals.

MATERIALS AND METHODS

Present study was a cross-sectional observational type of study undertaken at Teerthanker Mahaveer Medical College and Research Center, Moradabad, Uttar Pradesh, India from April 2012 to March 2014. We included asymptomatic patients with risk factors for CAD (age ranges between 20 and 70 years of age), attending out-patient Department of Medicine in Teerthanker Mahaveer Medical College and Research Centre, Moradabad. Study has been approved by the Institutional Ethical Committee. Informed consent was taken from each subject participating in the study.

Thus, the study population includes randomly selected asymptomatic patients with important risk factors for IHD like chronic cigarette smoking, obesity, dyslipidemia, Type 2 diabetes mellitus (DM), hypertension, family history of myocardial ischemia at <60 years of age without ECG evidence of IHD. Patients with the history of angina pectoris, MI, Type 1 DM, morbid medical conditions like chronic obstructive pulmonary disease, osteoarthritis, thyrotoxicosis, severe hepatic, renal or metabolic disorders and those patients unwilling to complete exercise test were excluded from the study.

Each patient selected for this treadmill stress testing was evaluated with a detailed history and physical examination pertaining to CAD risk factors. Instructions were given to patients regarding overnight fasting, discontinuation of smoking 1 day before the EST. In addition, instructions about modifying the doses of any medications were given. Patients were told to wear comfortable loose clothing and comfortable shoes. Laboratory investigations like complete hemogram, urine analysis, liver and kidney function tests, blood sugar levels, lipid profile, 12 lead ECG were done on fasting blood sample of each patient.

Procedure

Treadmill testing was performed on asymptomatic patients with risk factors for CAD. Just prior to testing, pulse and blood pressure were recorded in the supine and standing position, and 12c lead ECG was taken. The entire procedure was explained to the patient in detail. Patients were instructed to report immediately when they experience unusual or significant symptoms (e.g., chest pain, dizziness etc.) during exercise. Furthermore, patients were also assured that they may request termination of exercise prematurely, whenever necessary.[8]

Twelve ECG leads were recorded every minute, and blood pressure was measured at rest and the end of each step during exercise. Ventilatory oxygen consumption was estimated by exercise duration expressed in multiples of resting requirements (metabolic equivalents [METs]). The test was stopped when one of the following end-points was reached: Target heart rate, 85% of the predicted heart rate (220 beats/min age in years); severe fatigue; systolic blood pressure reduction; hypertensive response (systolic blood pressure increase 0.250 mmHg and/or diastolic blood pressure 0.115 mmHg).

Results in the form of total exercise time, percentage of maximum heart rate achieved, exercise tolerance, work done in METs, the hemodynamic response, arrhythmias, and chronotropic response were noted.

Interpretation was done as per guidelines of Darrow (1999).[9]

RESULTS

Eighty-nine asymptomatic patients (age ranges between 20 and 70 years) with important risk factors for CAD were subjected to EST in Teerthanker Mahaveer Medical College and Research Center, Moradabad, Uttar Pradesh.

64.04% patients were in the age group of 50 years and above, and 35.96% were below 50 years (Table 1 and Figure 1).

The treadmill test was done in all patients showing any of the above-mentioned risk factors.

Table 1: Distribution of cases according to risk factors

Risk factor	Total cases
DM	41
Hypertension	39
Smoking	16
Dyslipidemia	14
Family history of IHD	7
Obesity	15

IHD: Ischemic heart disease, DM: Diabetes mellitus

Table 2: Results of the treadmill test (age-wise distribution)

Age (years)	Positive EST	Negative EST	Total
20-29	-	4	4
30-39	2	5	7
40-49	5	16	21
50-59	6	21	27
60-69	8	22	30
≥70	-	-	-
Total	21	68	89

EST: Exercise stress testing

Table 3: Results of treadmill test (risk factor-wise distribution)

Risk factor	Positive EST (%)	Negative EST	Total
Diabetes mellitus			
Isolated	7 (28)	18	25
>1 risk factor	8 (50)	8	16
Hypertension			
Isolated	5 (18.5)	22	27
>1 risk factor	5 (41.7)	7	12
Smoking			
Isolated	1 (14.3)	6	7
>1 risk factor	2 (22.2)	7	9
Dyslipidemia			
Isolated	1 (20)	4	5
>1 risk factor	2 (22.2)	7	9
Family history of IHD			
Isolated	0	3	3
>1 risk factor	1 (25)	3	4
Obesity			
Isolated	1 (14.3)	7	8
>1 risk factor	1 (12.5)	6	7

EST: Exercise stress testing, IHD: Ischemic heart disease

In total, 21 (23.6%) patients had shown positive treadmill stress test from the study group (89 patients). Of 21 positive treadmill tests, 14 patients (66.7%) were above the age group 50 years (Table 2, Figure 2).

Table 3 shows that the maximum number of patients having DM as a sole risk factor (28%) showed positive treadmill test results. Also from Table 3, it seems very clear that treadmill test was positive in more number of patients having multiple risk factors as comparable to that of only one risk factor. It shows that there are more chances of having underlying IHD in asymptomatic patients with multiple risk factors for coronary heart disease as comparable to that of single risk factor for the same.

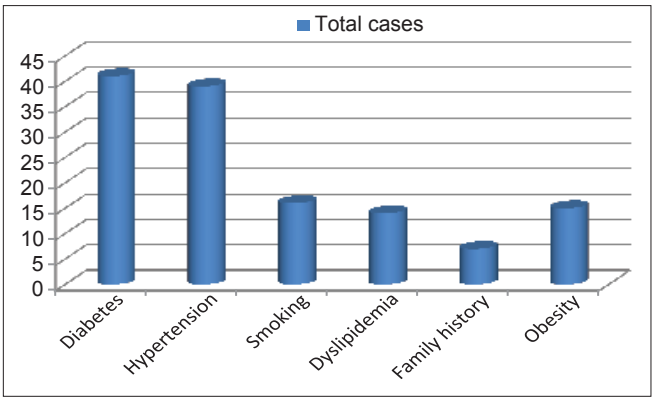

Figure 1: Distribution of cases according to risk factors

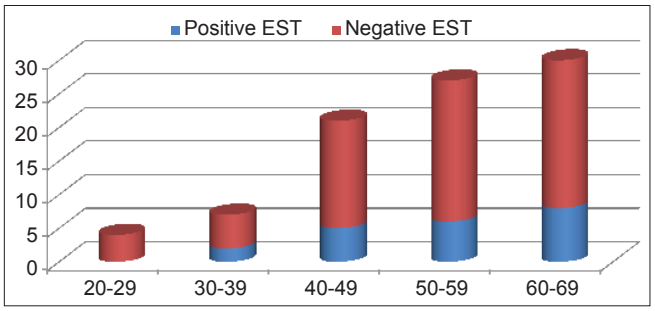

Figure 2: Results of the treadmill test (age-wise distribution)

DISCUSSION

In today's world, the EST is an important simple, easily reproducible, noninvasive investigation for assessing myocardial ischemia that may help to diagnose and for treatment of patients of CAD.

Silent CAD is an important cause of premature death of patients. In approximately 18% of patients with CAD, sudden death is the first and only manifestation.[3]

Main risk factors for IHD are DM, smoking, hypertension, obesity, family history, and dyslipidemia. In patients with DM, CAD is the main cause of mortality and accounts for more than 75% of deaths. SMI is even more frequent, leading to delayed diagnosis and at the time of the diagnosis, disease presents with a more advanced stage.[3] Endothelial dysfunction secondary to DM leads to an inappropriate coronary flow response to increasing metabolic needs of myocardium. Increased threshold of pain perception in diabetic patients, (probably due to enhanced beta-endorphins) and impaired autonomic nervous system may also contribute. The prevalence of

SMI in the diabetic population is variable ranging from 13% to 56%.[10,11]

Smoking (a major IHD risk factor) can induce atherogenesis by carbon monoxide production, stimulates adrenergic system by nicotine thus raising both blood pressure and myocardial oxygen demand. Smoking also induces fall in protective high-density lipoprotein.[12] All the above-mentioned risk factors can induce atherogenesis directly or indirectly.

Agarwal *et al.* (1981) studied 50 subjects and observed positive stress test in 22% cases investigated with important coronary risk factors of age group 40-62 years.[13] Wackers *et al.* (2004) investigated 1123 asymptomatic subjects with DM (age ranges between 50 and 75 years). The subjects undergone either stress testing and clinical follow-up or follow-up only. They observed that total 113 patients were having silent ischemia including 83 with regional myocardial perfusion abnormalities.[14] According to Wahab (2005), prevalence of IHD increases with advancing age. Diabetes poses a substantial threat for development of IHD. If hypertension is also associated, it will substantially increase the risk of both micro-vascular and macro-vascular complications. Decrease in mean systolic blood pressure (10 mmHg) was associated with 12% reduction in risk for any complication related to diabetes, 15% to death and 11% for MI.[15]

In the present study, 89 asymptomatic patients with important risk factors for CAD were subjected to EST. 23.6% patients showed positive EST, which is nearly similar to that of Agarwal *et al.* (22%),[13],Wackers *et al.* (22%).[14]

EST is beneficial in patients at high risk of CAD to determine prognosis and for identifying individuals who may benefit from revascularization. Early screening and intervention in patients with silent ischemia may improve long-term survival.[16]

Patients with a good exercise time on EST should be instructed to report persistent symptoms and for modifications in lifestyle to decrease effects of risk factors. Longer exercise capacity on the treadmill was protective of cardiac events and mortality.[17] In a recent study of 9191 patients, proved that reduced exercise capacity on EST was associated with increased risk for cardiovascular events.[18]

In the present study, there was increasing trend of positive EST with age which was in accordance to study of Wahab[15] In the present study, maximum patients of DM (28%) had positive EST. We can conclude that DM is the most important risk factor for IHD. We have not compared our results with gold standard method that is coronary angiography. Further studies are recommended for evaluating the EST along with comparison with more definitive procedures.

Therefore, early CAD diagnosis can be achieved by screening of SMI, progress in detection, and treatment of CAD can be helpful, which will lead to more effective management and a decrease in cardiovascular complications and mortalities.

CONCLUSION

EST is a simple, easily reproducible, noninvasive, low-cost procedure with relatively good predictive value that can be widely used for CAD detection in the general population. The goals of screening are to improve the quality-of-life and life expectancy through the early detection of CAD.

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Original Article

Study of Clinical, Radiological, and Bacteriological Profile of Community-Acquired Pneumonia in Hospitalized Patients of Gajra Raja Medical College, Gwalior, Central India

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Abstract

Background: The true incidence of pneumonia acquired in the community is unknown, but this is a common clinical problem worldwide especially in developing countries and remains a leading cause of death in India.

Aims and Objectives: The aim and objective of the study were to check clinical, radiological, and bacteriological profile of patients of community-acquired pneumonia (CAP).

Materials and Methods: The present study was undertaken in Department of Medicine Gajra Raja Medical College & Associated J.A Group of Hospital, Gwalior, Madhya Pradesh. For the study, 120 indoor patients of >15 years of age group were selected from Medicine Department, diagnosed as CAP. The study conducted from September 2011 to October 2012. In all studied patient's chest-X-rays, routine laboratory test, sputum, and blood culture were done.

Results: Despite the use of standard protocols, microbiological diagnosis of CAP was confirmed only in 55 (45.5%) of patients by sputum and blood culture. Sputum was the most common etiological source of organism isolation (44) followed by blood (11), *Streptococcus pneumoniae* was the commonest pathogen 20 (36.4%). Followed by *Klebsiella pneumoniae* 16 (29.%), *Staphylococcus aureus* 11 (20%) and other Gram-negatives bacilli* 8 (14.5%.) *(*Haemophilus influenzae* 5.5%, *Pseudomonas* 1.8%, *Acinetobacter* 1.8%, *Enterobacter* 1.8%, *Escherichia coli* 1.8%, *Citrobacter* 1.8%). CAP was found predominantly in males (67.5%) and elderly age group (68.3%). Maximum number of patients presented with cough (92.5%), fever (90%), dyspnea (59.2%), expectoration (55%), pleuritic chest pain (14.2%), most common predisposing factors associated with CAP in the following chronological order-smoking (40.8%) > chronic obstructive airway disease (35.8%) > cardiovascular disease (16.7%) > alcoholism (12.5%) > diabetes mellitus (6.7%) > neurological disorders (2.5%). Lobar pneumonia especially right lower lobe consolidation was the most common radiological finding observed in 48.3% patients, followed by left lower lobe infiltration ($P < 0.0001$).

Conclusion: *S. pneumoniae* was the most common pathogen, but the emergence of the higher incidence of Gram-negative organism specially *K. pneumoniae* has occurred in our geographical area (India). Age, smoking, and underlying co-morbid conditions especially chronic obstructive pulmonary disease were significantly associated with the development of CAP ($P < 0.01$). Radiographic changes usually cannot be used to distinguish bacterial from the nonbacterial pneumonia.

Keywords: Bacteriology, Blood culture, Chronic obstructive pulmonary disease, Community-acquired pneumonia, Radiology smoking, Sputum culture

INTRODUCTION

Pneumonia is a disease known to mankind from antiquity. Pneumonia defines as, "This is an acute inflammation of the pulmonary parenchyma that can be caused by various infective and noninfective origin."[1]

Despite the availability of potent antibiotics, community-

acquired pneumonia (CAP) remains common and serious illness with significant morbidity and mortality, both in developing and developed countries. In the United State, pneumonia is the sixth leading cause of death.[2-4] Estimates of the incidence of CAP range from 4 to 5 million cases per annually, which is about 20% of these require hospitalization. But the problem is much greater in developing countries where the pneumonia is the most common cause of hospital attendance in adults.[5] Though definite statistics are lacking, pneumonia remains a leading cause of death in India.[6] The mortality rate of the pneumonia patient in outpatient setting is low, in the range of 1-5%, but among patient who require admission to Intensive Care Unit is approaches 25%.[7-10] With the beginning of the antibiotic era, the mortality rate leveled off and remained fairly constant. This mortality rate is heavily weighted against elderly. This prediction of pneumonia for elderly is not new and led William Osler in 1898 to describe as "pneumonia is a special enemy of old age." The cause of CAP is often difficult to establish. Despite the progress made in the diagnosis of pneumonia, it takes a few days to identify the causative micro-organism in the blood or sputum samples and the etiology of half of all patients with CAP remains uncertain.[3] In order to reach logical therapeutic decisions physicians need reliable data on the relative prevalence of different etiology agent in the patients "area of residence," in addition to the clinical, laboratory, and radiological finding.[7] Because the relative frequency of etiological agents varies among different geographical areas.

There are various studies conducted to describe its clinical, bacteriological, and radiological features in different population group, whether these inferences hold good for our population is a pertinent question. In view of this, we need to study CAP in our setting, and by the mode of this study we will help in early detection of disease, and clinical, bacteriological, and radiological profile of pneumonia acquired in the community admitted in our geographical area.

MATERIALS AND METHODS

This prospective study was carried out in the Department of Medicine, J.A. Group of Hospital, Gajra Raja Medical College, Gwalior, Madhya Pradesh.

Source of Data

For the study admitted patient, above 15 years of age group were selected from Medicine Department, diagnosed as CAP. The study conducted during a time period of 1 year from September 2011 to October 2012.

Sample Size

120 indoor patients of CAP were included in the study after informed consent.

Inclusion Criteria

New and progressive pulmonary infiltrates on chest radiograph with at least two of following four:

1. Fever (temperature >37.8°C)
2. Production of purulent sputum
3. Cough (H/O <4 weeks)
4. Leukocytosis (white blood cell count >10,000/cumm).

Exclusion Criteria

1. Patient with hospitalized pneumonia
2. Patient with aspiration pneumonia
3. Patient with pulmonary infarction, pulmonary tuberculosis, immune-compromised.

All included patient were subjected for a detailed history and clinical examination. Standard protocol was used for collection of sample, in all the patients' chest-skiagram posterior-anterior view, routine laboratory test, sputum, and blood culture were done. All efforts were made to obtain sputum within 24 h of admission. In patients who could not expectorate sputum spontaneously, sputum was induced by nebulization with 3% hypertonic saline. And after collection of sputum, it was immediately sent to micro-biology department for culture on blood agar and MacConkeys agar media. Two blood culture samples were also obtained from each patient from different sites of body 30 min apart and inoculated on appropriate agar medias at 37°C for 48-72 h.

Statistical Analysis

Significance was evaluated by Student's *t*-test and Chi-square test and $P < 0.05$ was considered as significant. The statistical software namely SPSS 11.0 and Systal 8.0 (IBM, Ibs chicago)were used for the analysis of the data.

RESULTS

The study group consisted of 120 patients, among whom 81 (67.5%) were males, and 39 (32.5%) were females. Age of patients ranges from 15 to 85, with the mean age 52.36 ± 16.77 years. Most patient 82 (68.3%) of CAP were elderly belong to >50 years age group (Table 1).

Cough was the most common symptom present in (92.5%) patients, followed by fever (90%), dyspnea (59.2%), expectoration (55%), and chest pain (14.2%). Chest pain was more common in younger than elderly age group patients (Table 2).

In study, chronic obstructive airway disease was the most common (35.8%), predisposing conditions. Other were cardiovascular disorders (16.7%), congestive cardiac failure (16%), diabetes mellitus (DM) (6.7%), neurological conditions (5.8%), and chronic liver disease (2.5%).

Among habits, smoking was the most commonly noted in (40.8%) patient, followed by alcoholism in (12.5%) patients. Maximum smokers and drinkers were elderly belong to > 50 years age group (Table 3).

Lower lobe of the right lung was most commonly involved in CAP ($P < 0.0001$). 19.8% chest skiagram showed bilateral involvement of lungs. We did not found any correlation between involvement of particular lung field and causative micro-organism (Tables 4 and 5).

The overall establishment of etiological diagnosis was possible only in 55 (45.8%) cases of CAP. Rates of isolation of organisms were by sputum culture 44 (36.7%), and by blood culture 11 (9.1%). The most common organism isolated was *Streptococcus pneumonia* 20 (36.4%) followed by *Klebsiella pneumonia* 16 (29%), *Staphylococcus aureus* 11 (20%), *Haemophilus influenzae* and other Gram-negative bacilli constitutes about 8 (14.5%) (Tables 6 and 7).

DISCUSSION

Age/Sex Incidence

In the study, 120 patients were observed, and majority of patients 81 (67.5%) were males in comparison to the female population which were 39 (32.5%). The male to female ratio is 2:1. Mean age of patients was 52.36 ± 16.77 years. 82 (68.3%) belong to > 50 years of age group. It is well-documented that pneumonia incidence rises sharply with extremes of age.[11,12]

This could be attributed to the well-established fact that majority of predisposing risk factors like cigarette smoking,

Table 1: Pattern of age and gender distribution of patients in CAP

Age in years	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
≤20	0	0.0	4	10.3	4	3.3
20-29	4	4.9	5	12.7	9	7.5
30-39	8	9.9	6	15.4	14	11.7
40-49	7	8.7	4	10.3	11	9.2
50-59	21	25.9	10	25.6	31	25.8
60-69	23	28.4	4	10.3	27	22.5
>70	18	22.2	6	15.4	24	20
Total	81	67.5	39	32.5	120	100
Mean±SD	55.72±14.70		45.38±18.74		52±17	

SD: Standard deviation, CAP: Community-acquired pneumonia

Table 2: Pattern of clinical features in patients with CAP

Clinical features	Age group <50 year (*n*=38)		Age group >50 year (*n*=82)		Total (*n*=120)		*P* value	Inference*
	Number of patients	%	Number of patients	%	Number of patients	%		
Cough	35	92.7	76	92.1	111	92.5	0.92	NA
Fever	34	89.5	74	90.2	108	90	0.92	NA
Dyspnea	17	44.7	51	62.2	71	59.2	0.29	NA
Expectoration	21	55.3	45	54.9	66	55	0.91	NA
Pleuritic chest pain	10	26.3	7	8.5	17	14.2	0.01	HA
Nausea/vomiting	2	5.3	7	8.5	09	7.5	0.60	NA
Altered mental status	0	0.0	4	4.9	04	3.3	0.08	A

*NA: Not associated, HA: Highly associated, A: Associated, CAP: Community-acquired pneumonia

Table 3: Correlation of predisposing risk factors in patient with CAP

Risk factors	Age group <50 year (*n*=38)		Age group >50 year (*n*=82)		Total (*n*=120)		*P* value	Inference*
	Number of patients	%	Number of patients	%	Number of patients	%		
Smoking	03	7.9	46	56.1	49	40.8	<0.0001	HA
COAD	03	7.9	40	48.8	43	35.8	<0.0001	HA
Cardiovascular disorders	06	15.8	14	17.1	20	16.7	0.84	NA
Alcoholism	02	5.3	13	15.9	15	12.5	0.03	A
DM	0	0.0	08	9.8	08	6.7	0.007	HA
Liver disease	0	0.0	03	3.6	03	2.5	0.1	NA
CVA	01	2.6	02	2.4	03	2.5	0.71	SA

*NA: Not associated, HA: Highly associated, A: Associated, CAP: Community-acquired pneumonia, COAD: Chronic obstructive airway disease, CVA: Cerebrovascular accident, DM: Diabetes mellitus

Table 4: Chest X-ray findings in patients with CAP

Radiological finding	Number of patients	Percentage
Lobar pneumonia	96	80
Bronchopneumonia	20	16.7
Interstitial pneumonia	4	3.3
Pleural effusion	8	6.7

CAP: Community-acquired pneumonia

Table 5: Chest X-ray pattern of patients with CAP

Chest X-ray report	Number of patients	Percentage
Right upper lobe	9	7.8
Right middle lobe	7	5.8
Right lower lobe	58	48.3
Left upper lobe	4	3.3
Left middle lobe	8	6.7
Left lower lobe	19	15.8
Multiple lobar involvement	15	12.5

CAP: Community-acquired pneumonia

alcoholism, chronic obstructive pulmonary disease (COPD), coronary artery disease, etc., more common in middle-aged and elderly predominantly in males. This is in accordance to the earlier studies like Liberman *et al.*,[13] Shah *et al.*,[14] Bansal *et al.*[15]

Presenting Complaints

The majority of patients were presented with cough 92.5% (n = 111), fever 90% (n = 108), dyspnea 59.2% (n = 71) and followed by expectoration, chest pain, gestrointestinal symptoms, and altered mental status in 55%,14.2%, 10.9%, and 3.3%, respectively. This fact supported by some Indian and the Western studies.[7,14,15]

Predisposing Factors

The most common identified risk factor were smoking (40.8%), COPD (35.8%), cardiovascular diseases (16.7%), followed by alcoholism (12.5%) and DM (6.7%) ($P < 0.05$), all of the above-mentioned predisposing factors altering the local and systemic respiratory defense mechanisms, predisposing to lung infection that has been well-documented. Although it is not different from identified risk factors from India and the West.[2,14-16]

Investigations

In a study, the microbial diagnosis of CAP was confirmed only in 45.8% patients. This could be due to the limited use of laboratory tests. In a study, we only used sputum and blood culture as diagnostic tools to identify the culprit organism causes pneumonia.

44 (36.7%) isolated by sputum, and 11 (9.2%) by blood culture. But this is another fact that even with the use of extensive laboratory testing and various invasive procedures, etiological confirmation could be achieved only in 45-70% patients.[3,13] The most common isolated pathogen was *S.*

Table 6: Pattern of micro-organism isolation from sputum culture in patients with CAP

Micro-organism from sputum culture	Number of isolated organisms	Percentage
S. pneumoniae	16	36.4
K. pneumoniae	14	31.8
S. aureus	09	20.4
H. influenzae	02	4.5
Pseudomonas	01	2.3
Acinetobacter	01	2.3
E. coli	01	2.3
Total	44	36.7

S. pneumoniae: Streptococcus pneumoniae, K. pneumoniae: Klebsiella pneumoniae, S. aureus: Staphylococcus aureus, H. influenzae: Haemophilus influenzae, E. coli: Escherichia coli, CAP: Community-acquired pneumonia

Table 7: Pattern of micro-organism isolation from blood culture in patients with CAP

Organism from blood culture	Number of isolated organisms	Percentage
S. pneumoniae	04	36.4
K. pneumoniae	02	18.2
S. aureus	02	18.2
H. influenzae	01	9.1
Enterobacter	01	9.1
Citrobacter	01	9.1
Total	11	9.2

S. pneumoniae: Streptococcus pneumoniae, K. pneumoniae: Klebsiella pneumoniae, S. aureus: Staphylococcus aureus, H. influenzae: Haemophilus influenzae, CAP: Community-acquired pneumonia

pneumoniae accounting for 36.4%. Next common was *K. pneumoniae* which accounts for 29.1% this followed by *S. aureus*, and other Gram-negative bacilli 20%, 14.5%, respectively (Gram-negative bacilli includes *H. influenzae*, *Pseudomonas, Acinetobacter*, *Escherichia coli*, *Enterobacter, Citrobacter* accounting 5.5%, 1.8%, 1.8%, 1.8%, 1.8%, 1.8%, respectively). As per some Indian studies, over last three decades have reported higher incidence of Gram-negative organisms among culture positive pneumonia.[17-20] We also obtained more number of Gram-negative organism by culture compared with some earlier western studies.[21] The radiological data in our study showed a predominance of lobar pneumonia in 96 (80%) patients followed by bronchopneumonia in 20 (16.7%) and interstitial pneumonia in 4 (3.3%) patients. Radiological data ($P < 0.0001$) of our study emphasized by similar studies done by Torres *et al.*[22] Bansal *et al.*[15] Chest film showing infiltrates is necessary to establish the diagnosis of pneumonia. But radiographic changes usually cannot be used to distinguish bacterial from the nonbacterial pneumonia.

CONCLUSIONS

The study was undertaken in Department of Medicine Gajra Raja Medical College & Associated J.A. Group of Hospital, Gwalior, Madhya Pradesh with the objective

to know the prevalence of etiological microorganism of CAP, clinical presentation of patients, and correlation between involvement of particular lung field with causative micro-organism. And the study concluded: *S. pneumoniae* was the most common pathogen incriminated in CAP, but the emergence of the higher incidence of Gram-negative organism especially *K. pneumoniae* has occurred in our geographical area. Typical symptoms (cough, expectoration, dyspnea) were common in both young and elder age group patients, but atypical symptoms e.g. altered mental status was commonly found in the elder population. A practical conclusion of clinical interest is that an effort has to be made to take chest radiographs, to exclude the possibility of pneumonia in elderly patients presented in hospital with delirium. Chest film showing infiltrates is necessary to establish the diagnosis of pneumonia. But radiographic changes usually cannot be used to distinguish bacterial from the nonbacterial pneumonia.

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Original Article

Otological Assessment in Basal Skull Fractures: An Observational Study

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Abstract

Introduction: Motor vehicle accidents and other road traffic accidents are common causes of skull base injuries. In skull base injury temporal bone involvement is a necessary phenomenon, which based on the type and impact of force leads to a different type of ontological complications. The aim of this study is to evaluate and treat those otological complications.

Materials and Methods: A total of 40 cases of skull base fractures were included in this study. Before including in the study otolaryngological examination was made by the authors of this study, and Institutional Research and Ethical Committee approval was also taken. A careful history and examination (both clinical and radiological) was done to access the type and extent of complications. In the case of life-threatening complications, immediate surgery as required was performed.

Results: In fractures of skull base occipital bone was most commonly involved (48%) and frontal bone the least (8%). Temporal bone involvement was seen in 22% of cases. Otohematorrhea (34/40) and hearing loss (18/40) were the most common complications observed.

Conclusion: We concluded the study with the fact, that temporal bone injury is the usual phenomenon associated with basal fractures of the skull and before going to surgical treatment immediately, except in life-threatening cases, we should wait for some time as most of the complications resolve within a specific period of time.

Keywords: Accident, Facial nerve, Skull base, Temporal bone

INTRODUCTION

Anatomical knowledge of base of the skull is of prime importance in understanding the complications that arise from temporal bone fractures. There are many important intracranial structures it-self are present in the petrous part of the temporal bone. Knowledge of these vital structures is of utmost importance to otolaryngologist and head and neck surgeons. In India alone approximately 12,000,000 patients are admitted as new cases of head injury whereas in UK, the number is little less.[1]

It has been noted that there is approximately 20% temporal fractures occur secondary to skull injuries, with more chances of unilateral fractures when compared to bilateral.[2]

On the basis of direct of impact temporal bone fractures are categorized into longitudinal and transverse type. In longitudinal type, middle ear components are more involved while in transverse type internal auditory canal is most frequently involved. However, it may also vary with the thrust that occurs at the time of injury.[3]

The force of impact and direction of impact at the time of injury ultimately decides the fate of complications occurring secondary to temporal bone fractures.

MATERIALS AND METHODS

A total of 40 cases of basal skull fractures who were admitted in the Emergency Department, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India were taken for this

study. Patients who were taken for this study were selected on the basis of both, clinical and radiological confirmation. Institutional Ethical and Research Committee approval was taken before starting the study. A careful history was obtained from the attendants of patients, many of which were included on the basis of history alone while others were evaluated by radiological imaging and then included in the study group.

Patient follow-up for inclusion in the study was carried out as under after proper resuscitation.

a. Examination of head, neck and vertebral column
b. Evaluation of associated injuries
c. Any history or on examination blood from an external ear (Hemotympanum)
d. Accumulation of blood around eyes.

Radiological examination of basal fractures of the skull done by high-resolution imaging modality.

RESULTS

The patients of all age group from school going to near 90 years were taken for the study. However, some older patients and their relative were not confirmed about the exact age. There were 12 females, and 28 males were included in the study. In basal fractures of skull most common bone involved was occipital 48% and least was in frontal 8%. Temporal bone injury was present in 22% of cases. As evaluated at the time of examination following sign and symptoms could be noted in these patients. These were evaluated and shown in Table 1 and Figure 1.

DISCUSSION

Fractures involving base of the skull are life threatening.[4] They vary from hearing loss, hemotympanum, vertigo, facial nerve injuries etc.[2,3,5-7] Temporal bone fractures are associated with hearing loss, the degree of which is related to direction and force of the injury. If impact of injury is transverse, it leads to sensorineural loss, and if longitudinal it leads to conductive type.[8] In our study, we noted that 18 out of 40 patients suffered conductive type of hearing loss. However, in a study conducted by,[9] there was more sensorineural deafness, which may cause due to different force of and direction of impact. We found that about 76% recovered from conductive type of hearing loss in next 6 months, due to recovery of intracranial pathways. The patients who were not able to recover from deafness were provided hearing aid. In this study 25% patients suffered cerebrospinal fluid (CSF) rhinorrhea, they were put on antibiotics. Most of the patients recovered with the use of antibiotics except three patients who developed meningitis as a sequel to it. Facial nerve injury occurred only 1 out of 40 patients in our study, but in a study conducted by[10] facial nerve injuries occurred to the extent of 4.2%. According to (Chang and Cass, 1999) most facial nerve injuries occur due to intra-neural hematoma.[11] In our study, 2 (5%) patients suffered carotid injury, the results of our study are very similar to that performed by[12] CSF rhinorrhea occurred in about 25% of cases in this study. Otic capsule injury is one of the causative factor for this.[13]

CONCLUSION

Temporal bone involvement is usual in basal skull fractures. Temporal bone involvement accentuates various ontological complications, based on the direction and impact of force leading to longitudinal and transverse type of temporal bone fractures. These fractures associated complications require surgical intervention. Evaluation of surgical intervention depends on the fact, that whether this complication requires urgent intervention (life-threatening) or it may be taken at a later stage (waiting for complication to resolve it-self like facial nerve injury) etc. We as the authors of this study recommend complete clinical and radiological investigation before making your decision for going immediate surgery or delaying it for some time.

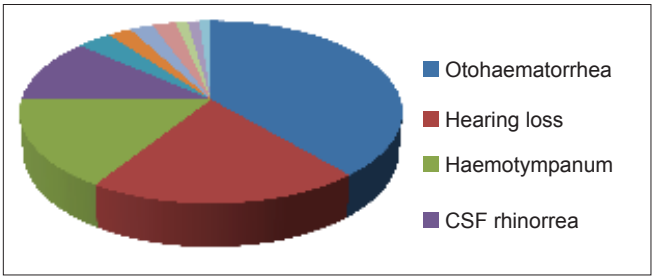

Figure 1: Otological complications in temporal bone fracture in descending order

Table 1: Otological complications in temporal bone fracture in descending order

Otological complications in descending order	Number of patients
Otohematorrhea	34
Hearing loss	18
Hemotympanum	14
CSF rhinorrhea	10
Meningitis (late occurrence)	3
Vertigo	2
Chorda tympani injury	2
Carotid injury	2
Facial nerve palsy	1
Tinnitius	1
Cholesteatoma (late occurrence)	1

CSF: Cerebrospinal fluid

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Original Article

Vitamin D Status and Type 2 Diabetes Mellitus in Indians: A Case–Control Study

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Abstract

Introduction: In India, vitamin D deficiency and diabetes mellitus (DM) are highly prevalent, this study was carried out to assess the vitamin D status of the study population (by measuring serum 25-hydroxyvitamin D (25(OH)D) levels, and to test the hypothesis whether patients with Type 2 DM have lower levels of vitamin D when compared with that of age and sex matched controls.

Materials and Methods: In the present study, we investigated 274 subjects (age ranges between 25 and 60 years) in two groups selected randomly. The first group included 157 cases, subjects with Type 2 DM (newly detected to 25 years), and second group included age and sex matched 117 controls. Vitamin D status was evaluated by measuring serum (25(OH)D) concentration.

Results: About 80.3% subjects were found vitamin D deficient with levels of 25(OH)D ≤ 30 ng/ml. 81.5% cases and 78.6% controls were vitamin D deficient. Mean value of vitamin D among cases was 21.01 ± 8.67 ng/ml and among controls 19.46 ± 9.42 ng/ml, which was not statistically significant.

Conclusion: Vitamin D deficiency is highly prevalent in Indian subcontinent. Inverse relationship was not found between serum 25(OH)D levels and Type 2 DM.

Keywords: Indians, Type 2 diabetes mellitus, Vitamin D, 25-hydroxy vitamin D

INTRODUCTION

Deficiency of vitamin D has been associated with increased risk of developing Type 2 diabetes mellitus (DM) and cardiovascular diseases.[1] Vitamin D deficiency is highly prevalent in our country. About 70% of adults in both rural and urban areas were found showing manifestations of vitamin D deficiency.[2,3] According to International Diabetes Federation, the diabetes prevalence in India is likely to increase by 2025 from 40.9 million to 70 million.[4]

Vitamin D is synthesized in the skin from exposure to sunlight or can be obtained through dietary intake that functions as a steroidal hormone after conversion in the renal tubule to its active form 1-25-hydroxyvitamin D (25(OH)D) by 1-alpha-hydroxylase enzyme. It is a well-known fact that natural sources of vitamin D in foods are not adequate for normal body requirements. Therefore, formation of vitamin D through exposure to sunlight in skin is the major source of vitamin D.[5] It suggests that there should be a low prevalence of vitamin D deficiency in tropical countries. However, various studies had shown that the human tendency of avoiding sunlight or clothing which prevents sunlight exposure is the reasons for highly prevalent vitamin D deficiency.[6-8]

Various studies throughout the globe support the hypothesis that low vitamin D status (as assessed by circulating [25(OH)D] levels), is associated with insulin resistance, impaired glucose intolerance and thereby vitamin D deficiency may be associated with higher risk of development of Type 2 DM.[9-11]

Recently, various prospective studies have reported such a significant relationship between high levels of vitamin D (25(OH)D) and lower incidence of DM.[12-14] However, some other studies reveal no such type of association.[15-17]

India is a tropical country, and atmosphere is sunny throughout the year. However, literature search shows

that the data regarding the status of vitamin D in adult Indian population is scarcely available. Since, both Type 2 diabetes and deficiency of vitamin D are highly prevalent in Indian population, this study was carried out to assess the vitamin D status of the study population by measuring serum 25(OH)D levels, and to test the hypothesis whether patients with Type 2 DM have lower levels of vitamin D when compared with that of age and sex matched controls.

MATERIALS AND METHODS

In the present study, we investigated 274 randomly selected subjects of 25-60 years of age. This was a case-control observational study conducted from March 2013 to February 2014. There were two groups. The first group included 157 cases, subjects with Type 2 DM of varying duration (newly detected to 25 years), and second group included 117 controls, subjects who were age and sex matched. This study was approved by the Institutional Ethics Committee, and written consent was obtained from all the participants. Patients attending department of medicine, TMMC and RC, Moradabad, Uttar Pradesh, India were recruited as cases. While patient's attendants and staff of TMMC and RC were the sources from which controls were recruited. Demographic and necessary clinical data were collected according to the performa.

None of the subjects was taking vitamin D preparations or any drugs known to interfere with vitamin D metabolism. None of them had past or present history of hepatic or renal disorders. Vitamin D status was evaluated by measuring serum 25(OH)D (primary circulating form of vitamin D). Serum concentration of 25(OH)D is a good reflection of cumulative exposure to sunlight and dietary intake of vitamin D, and is widely regarded as a robust "gold standard" indicator of vitamin D status.[18] If serum concentration of 25(OH)D was ≤ 75 nmol/L or, ≤ 30 ng/mL, then case is considered as vitamin D deficiency. Serum concentration above this level is vitamin D sufficiency.

Anthropometric measurements such as weight, height and waist circumference were taken. Weight and height were measured using calibrated digital weighing scales and stadiometer, respectively. Clinical laboratory measurements included estimation of fasting blood sugar levels, hemoglobin A1c (HbA1c), lipid profile, and 25(OH)D levels. Serum glucose was measured by enzymatic method with hexokinase whereas immunoturbidometry was used to estimate HbA1c. Lipid profile was estimated by enzymatic calorimetric assay. Serum 25(OH)D was also measured by using enzyme immunoassay. All measurements were conducted by trained staff, and quality checks were regularly conducted.

In the present study, descriptive observational statistical analysis has been carried out. Continuous measurements are presented on mean ± standard deviation (minimum-maximum) and results on categorical measurements are presented in number (%).

RESULTS

Our study included 274 subjects, with 157 being cases and 117 controls. Both the groups were comparable to each other in demographic variables such as age, sex. Mean age of controls was 44.03 ± 7.64 years, and that of cases was 48.04 ± 8.56 years. Majority of study subjects were in 35-60 years age group. Duration of DM among cases varied from newly detected to 25 years.

Co-morbidities in both groups were documented with 86 of 157 cases, and 26 of 117 controls had dyslipidemia. Of 157 cases, 104 (66.2%) had hypertension (Table 1 and Figure 1).

Mean waist circumference in cases was 88.62 ± 9.58 cm, while in controls it was 82.54 ± 8.69. Mean body mass index in cases was 26.06 ± 4.57, while in controls it was 24.92 ± 3.96 (Table 2).

Of 274 subjects, 220 were found to have vitamin D deficiency with levels of 25(OH)D ≤ 30 ng/mL. 128 cases and 92 controls were vitamin D deficient, whereas only 18 cases, and 20 controls were vitamin D sufficient (> 30 ng/mL) (Table 3 and Figure 2).

Table 1: Incidence of co-morbid conditions

Comorbid conditions	Number (%)	
	Cases (*n*=157)	Controls (*n*=117)
Dyslipidemia	86 (54.8)	26 (22.2)
Hypertension	104 (66.2)	32 (27.3)
Asthma	2 (1.3)	1 (0.85)
Hypothroidism	5 (3.2)	3 (2.56)

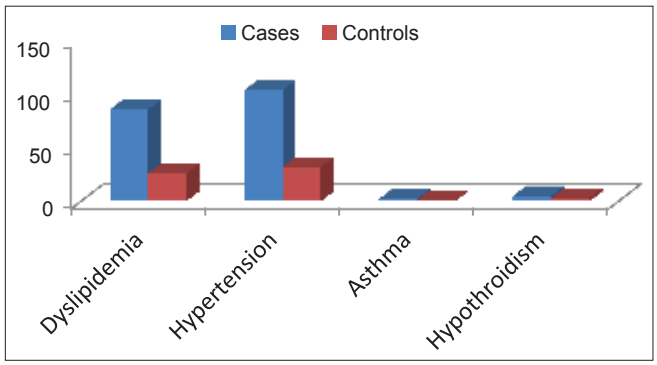

Figure 1: Incidence of co-morbid conditions

Table 2: Comparison of various anthropometric and blood glucose variables

Variables	Cases	Controls
Waist circumference	88.62±9.58	82.54±8.69
BMI (kg/m^2)	26.06±4.57	24.92±3.96
SBP (mmHg)	137.22±16.26	126.74±10.89
DBP (mmHg)	83.79±8.96	81.79±7.36
HbA1c	8.34±2.03	6.01±0.92

BMI: Body mass index, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, HbA1c: Hemoglobin A1c

Table 3: Vitamin D status

Vitamin D	Cases (*n*=157) (%)	Controls (*n*=117) (%)
≤30	128 (81.5)	92 (78.6)
>30	18 (11.5)	20 (17.1)
Mean±SD	21.01±8.67	19.46±9.42

SD: Standard deviation

Mean value of vitamin D among cases was 21.01 ± 8.67 ng/mL and among controls 19.46 ± 9.42 ng/mL, which was not statistically significant.

DISCUSSION

In the present study, we estimated vitamin D status of diabetic subjects of the Moradabad city of Uttar Pradesh (India). Results show highly prevalent vitamin D deficiency in this area and inverse relationship between vitamin D status (serum 25(OH)D levels) and Type 2 DM was not found.

About 80.3% of subjects of study population were found to be having vitamin D deficiency. Some of the previous studies from India also documented highly prevalent vitamin D deficiency.[2,3,19] Various factors can be attributed for this poor vitamin D status among Indians such as lack of adequate sun exposure, darker skin pigmentation, obesity, and predominantly vegetarian dietary habits.

No statistically significant difference was found in the mean values of vitamin D levels among cases and controls in the present study (21.01 ± 8.67 ng/mL and 19.46 ± 9.42 ng/mL respectively). Ishida *et al.*[20] also observed similar findings in their study and found out that 25(OH)D and 1, 25(OH)D levels were not significantly different in diabetic patients when compared with that of controls. Scragg *et al.*[21] also stated that no inverse association between vitamin D status and Type 2 DM in non-Hispanic blacks was present, despite their poor vitamin D status. However, in some ethnic populations (non-Hispanic whites and Mexican Americans), the inverse association was very much evident. They conclude that this could be due to altered vitamin D endocrine system and low sensitivity to vitamin D in blacks related to ethnicity. Pittas *et al.*[22] in a meta-analysis

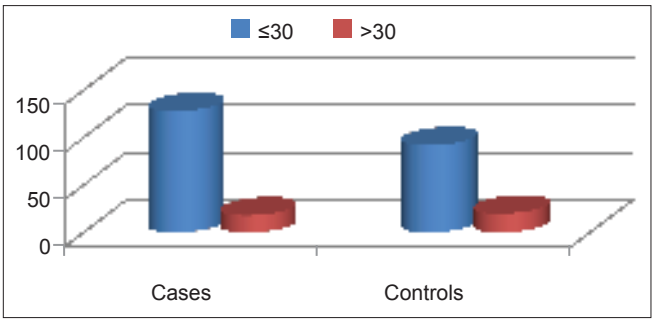

Figure 2: Vitamin D status

have also stated that the inverse association was not very consistent between serum 25(OH)D levels and prevalent Type 2 diabetes.

Inverse relationship between vitamin D status and diabetes was not found in the present study. This can be attributed to ethnic variations and highly prevalent vitamin D deficiency in this area. Possibly other factors like small sample size, cross-sectional study design, dietary habits can also be attributed for this phenomenon.

CONCLUSION

Deficiency of vitamin D is highly prevalent in Indian subcontinent. Inverse relationship between vitamin D status and Type 2 DM was not found in the present study. To establish a conclusive association between vitamin D status and subjects suffering from Type 2 DM, population-based prospective studies and larger interventional studies using sufficiently higher doses of vitamin D over a longer period and using larger sample size should be done.

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Original Article

A Systematic Review of the Advantage of Doppler Ultrasound in Arteriovenous Access Creation and Maintenance

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Abstract

Introduction: Assessment of autogenous arteriovenous (AV) access with pre-operative arterial and venous diameter with duplex mapping and a post-operative evaluation of flow rates and vessel diameter with reference to maturation time and usability.

Materials and Methods: A total of 67 patients who underwent arteriovenous fistula (AVF) creation during the period of March 2011-March 2012 who required hemodialysis, underwent segmental upper extremity duplex ultrasound with mapping of arteries and veins.

Results: The functional patency of 62.9% noted with total failures of 37.1%, including immediate, early and primary failures. In our study, the complication rate was 11.3% including all types. Infection (3.2%) and venous hypertension (3.2%) being the most common.

Conclusion: AV access mapping increases the creation and maintenance of autogenous AV access. Pre-operative vessel mapping provides useful information regarding the choice of AVF and decreases the incidence of negative exploration. Serial surveillance of AV access reduces the risk of thrombosis and prolong access survival by early detection and treatment of asymptomatic stenosis.

Keywords: Arteriovenous fistula, Color Doppler, End stage renal failure, Ultrasonography

INTRODUCTION

End stage renal disease (ESRD) patients who undergo long-term hemodialysis (HD) need a permanent and reliable vascular access. The majority of patients with ESRD have anatomy suitable for arteriovenous fistula (AVF) creation. Clinical examination supplemented with duplex Doppler vessel mapping plays a crucial role in the evaluation of the anatomy to plan dialysis access in a given patient. Access planning should take into consideration the overall health status and longevity of the ESRD patient on dialysis and potential for the access failure.[1]

There are three types of HD access: Autogenous AVF, arteriovenous prosthetic graft, and central venous catheter. Among these types, mature autogenous AVF is known to be the best HD method with promising good long-term patency rate and low morbidity rate.[2,3] However, with an increasing number of elderly patients and patients with co-morbid conditions such as vascular disease and diabetes mellitus (DM) in the hemodialysis population, the creation and maintenance of a patent and well-functioning AVF have become a real challenge to nephrologists and vascular surgeons.[4]

Objectives

To assess the usability of the autogenous AV access with reference to pre-operative arterial and venous diameter with duplex mapping and a post-operative evaluation of flow rates, maturity of AV access by duplex ultrasonography.

MATERIALS AND METHODS

Patients who required chronic HD underwent segmental upper extremity duplex ultrasound with mapping

of arteries and veins during the period of March 2011-March 2012. Written consent was obtained from all the patients.

The study was a prospective non-controlled study with a total of 67 patients who underwent AVF creation at our institute, out of them 5 patients were lost for follow-up. Hence, 62 patients finally formed the study group.

The patient's history of the potential factors that may complicate the creation of an AVF, which includes a record of all the venipunctures and procedures involving the upper and lower extremities, any previous history of thrombosis, and the use of central venous catheters were all recorded.

Physical Examination

Radial artery and Ulnar artery and the brachial artery pulse were examined for rate, rhythm, volume, condition of the arterial wall with equality of blood pressure on both arms. Allen test: The ulnar artery is sometimes difficult to palpate. Hence, Allen test was performed to check for patency of the palmar arches. A tourniquet was placed on the upper portion of the arm. The patients were asked to close and open repeatedly the hand to increase venous engorgement. The cephalic and basilic vein in the arm, antecubital area and forearm were also assessed.

Inclusion Criteria

1. All the patient, whose veins were inadequate for native AVF on physical examination.

Exclusion Criteria

1. Patient whose veins were inadequate for the creation of native AVF on AV mapping
2. Patients whom are planned for AV grafting.

In age distribution maximum numbers of patients were in the age group of 50-59 years, i.e. 38.8% (26, $n = 67$) and the least number of patients were in 20-29 age groups, i.e., 6.0% (4). Another 7.5% of patients were of 30-39 and 70-79 age group. In gender distribution male patient (64.2%, 43) were more than female (35.8%, 24). Maximum number of patients (85.1%, 57) had DM as a comorbid condition with hypertension (80.6%, 54) as the second comorbidity only 2.9% (2) of the patient had adult polycystic kidney disease. Internal jugular vein (IJV) access was the highest (65.7%, 44) mode of hemodialysis access, the patients presented with. Radiocephalic fistula (RCF) (16.4%, 11) was the second highest mode of previous hemodialysis access. i.e., earlier failed access. All the patients referred for access were already on dialysis either with a central line/previous failed access. None was referred earlier. i.e., before the patient had become dialysis dependent.

All patients underwent Doppler ultrasonography of the selected limb using high-resolution gray scale and color Doppler ultrasonography. The patients were examined with a 10 MHz linear probe at an incidence angle of 60° in the supine positions during the rest and after applying a tourniquet to assess the distensibility of veins. The cephalic vein and its tributaries were recorded to note the caliber of the veins. Also the proximal draining veins such as subclavian, brachiocephalic and also the basilic, axillary, jugular veins were checked. All measurements made by same observer. Internal diameter of the radial and brachial artery was measured by B-mode ultrasonography.

The pre-operative diameter criteria used for adequate upper extremity surgical results at our institution are (a) all arteries 2.0 mm or larger and (b) all veins, both in the forearm and upper arm, 2.5 mm or larger for AVF creation, or veins 4.0 mm or larger for graft creation.[5] Anteroposterior vessel diameters are measured in the transverse plane, with a minimum amount of pressure on the vessel.

We considered the following general guidelines before access placement;

- Selection of the non-dominant arm
- Placement of the access distally to preserve proximal sites, avoiding atherosclerotic arteries
- Long segment vein to allow for variation in puncture sites.

Procedure

AVF was constructed under local anesthesia. A longitudinal incision proximal to the styloid process was placed in creation of radio cephalic AVF. A transverse incision was placed just below the cubital crease for performing a brachiocephalic AVF. All patients underwent end to side anastomosis with 6-0 prolene. Wound closed in two layers without drain.

Statistical Analysis

The Pearson correlation between vein and artery with flow rates was performed for 1st and 3rd month. The correlation between diameter of vein and flow rate at 1st month was observed very large with $r = 0.702$: $P < 0.001$.

The correlation between diameter of artery and flow rates at 1st month was observed very large with $r = 0.702$; $P < 0.001$. The correlation between diameter of vein and flow rates at 3rd month was observed large with $r = 0.586$; $P < 0.001$. The correlation between diameter of vein and flow rates at 3rd month was observed large with $r = 0.655$; $P < 0.001$. This indicates that the initially arterial diameter also matters in the flow rates.

Student's *t*-test was performed to assess the diameter of the vein between functional patency and failures. The diameter of the vein was 3.18 (standard deviation [SD]: 0.72) for functional patency pre-operatively, and it was 2.39 (SD: 0.36) for failures. It was observed that diameter of the vein was significantly less in failures, compared to patency ($P < 0.001$). The diameter of the vein at 1st month for functional patency was 3.99 (SD: 0.87) and 2.93 (SD: 0.38) for failures. Again it was observed the diameter of the vein was significantly less in failures compared to patency ($P = 0.003$). The diameter of the vein at 3rd month for functional patency was 4.34 (SD: 0.94) and 3.20 (SD: 0.84) for failures. But the diameter was not significantly less in failures compared to patency ($P = 0.100$). The pre-operative arterial diameter was 3.26 (SD: 0.88) for functional patency and 2.49 (SD: 0.57) for failures. It is observed that arterial diameter was significantly less in failures compared to patency ($P < 0.001$).

The Chi-square/Fisher exact has been performed to assess the significance of the association between age, gender, comorbid conditions, previous HD access, procedure undergone and outcomes. Age > 50 years is positively associated with failures (73.9% vs. 26.1% for < 50 years) with $P = 0.247$. (But not statistically significant). Male patients had more failures 52.2% compared with 47.8% in females. But the patency rate was more in males (69.2%) compared with females (30.8%). $P = 0.179$ (but statistically not significant). Diabetic patients had more failures (91.3%) compared to hypertensive patients (73.9%). ($P = 0.464$ for DM, $P = 0.334$ for hypertensive), but statistically not significant. Presence of an IJV line had a maximum number of failure of fistula (91.3%) that is statistically significant value ($P = 0.001$). Patients who underwent RCF had more failures (86.9%) compared to brachiocephalic (13.0%) which was statistically significant ($P = 0.003$).

Follow-up Care

Post-operative care protocol was as follows. The patient was monitored for the presence of a hematoma/bleeding from the operated site and thrill suggesting working status of the fistula.

Post-operatively patients were followed-up with serial color Doppler studies at 1st and 3rd month for flow rates, diameter of the vein, distance of the vein from the skin, presence of stenosis, and complications.

Determination of Clinical Outcome

Fistula adequacy was defined prospectively as the ability to sustain HD with two needles and blood flow of at least 350 mL/min on at least six dialysis sessions assisted in 1 month.[5]

A fistula was considered inadequate access for dialysis if it[6] clotted before it could be used,[7] was still not useable for dialysis 6 months after its construction,[8] or was converted electively to an AV graft prior to being used for dialysis. Fistula adequacy was deemed indeterminate if the patient died, received a kidney trans-plant, or was lost to follow-up before the fistula could mature. Primary access failure was defined as access that never achieved the adequacy for dialysis.

RESULTS

Majority of the patients were in the age group of 50-59 years ($n = 67$, 26, 38.8%) followed by (5), 7.5% in 30-39 and 70-79 age groups and the least number (4, 6%) of patients were in 20-29 age groups. Male patients were predominant (43, 64.2%) than female (24, 35.8%) patients.

DM (57, 85.1%) was the leading co-morbid condition with hypertension (54, 80.6%) being the second co-morbidity, only (2) 2.9% of patient had adult polycystic kidney disease. IJV access was the highest (44, 65.7%) mode of previous hemodialysis access, followed by RCF (11, 16.4%) (Figure 1).

All the patients referred for access were already on dialysis. 62.7% (42) and 37.3% (25) of the patients underwent RCF and brachiocephalic fistula respectively. 73% (49) and 26.9% (18) of patients underwent fistula creation on the left and right side respectively. Average diameter of the artery in mm was 2.94 (SD: 0.84) and vein was 2.88 (SD: 0.69) pre-operatively. The average diameter of the vein was increased to 3.83 (SD: 0.89) and 4.29 (SD: 0.96) in the 1st and 3rd month respectively (Figure 2). The arterial diameters were ranging from 1.60 to 5.10 mm and the venous diameters from 2.0 to 5.50 mm pre-operatively. The venous diameters ranged from 2.60 to 6.80 in 1st month and 2.60-7.0 mm in 3rd month.

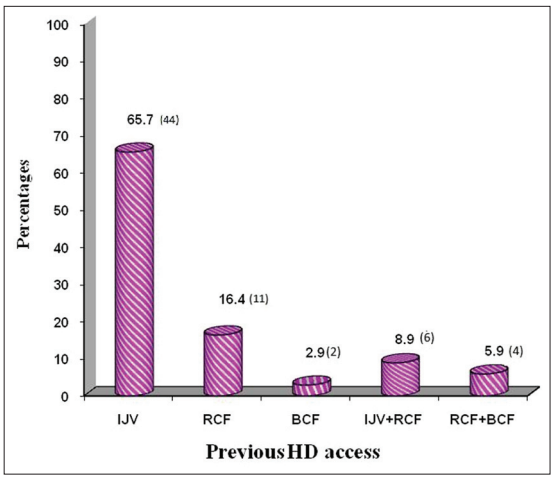

Figure 1: Previous hemodialysis access

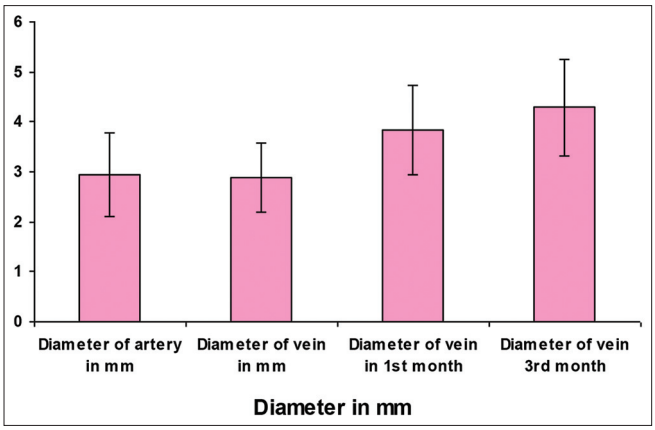

Figure 2: Diameters of artery and vein at 1st and 3rd month

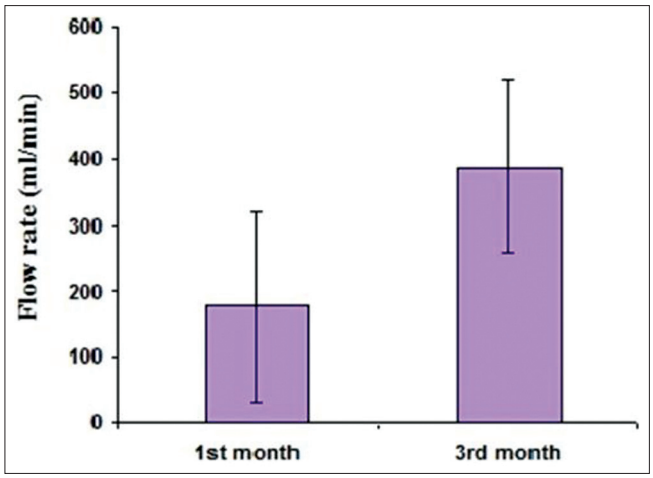

Figure 3: Flow rates in the vein at 1st and 3rd month

The flow rates (mL/min) in the vein was average of 387.42 (SD: 131.58) in 1st month with a range of 214.0-789.0 (mL/min) (Figure 3). The average flow rates (mL/min) in 3rd month was 444.84 (SD: 145.82) with a range of 176.0-893.0 mL/min. This shows that the flow rates improved from 1st month to 3rd month. The minimum distance of vein from the skin (in cm) at 1st month was 0.39 (SD: 0.16) the range being 0.18-0.76 cm (Figure 4). The distance of vein (in cm) from skin at 3rd month was also 0.39 (SD: 0.75) the range being 0.18-0.81. This indicated that the maturation indicator of venous distance from the skin achieved at the initial month only.

The patients with <2.0 mm vein diameter were not taken into study 59.6% of patients had venous diameter between 2 and 3 mm pre-operatively. About 40% of patients had venous diameters between 3.0 mm and above. At 1st month the only 17.4% of patients had venous diameter between 2 and 3 ms. There was a significant increase in a number of patients with diameters between 3 mm and above, i.e., 82%. At 3rd month, the venous diameter of patients between 2 mm and 3 mm was only 5.1%, and the percentage of patients with venous diameters between 3 mm and above had increased to 94.9% at 3rd month (Figure 4). The mean diameter of the vein pre-operatively was 2.88 (SD: 0.69) had improved to 3.83 (SD: 0.89) at 1st month, further improved to 4.29 (SD: 0.96) at 3rd month that was statistically significant ($P < 0.001$).

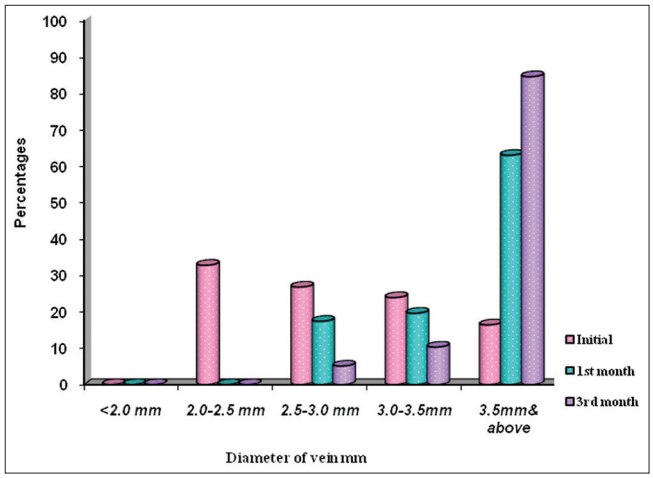

Figure 4: Percentage increase in diameter of the vein from time of surgery to 3rd month

Outcome

There was functional patency of 62.9% (32) noted with total failures of 37.1% (23), including immediate, early and primary failures (described earlier) (Table 1). In our study, the complication rate was to only 11.3% (7) including all types. 88.7% (55) of patients did not have any complications during our study period. Infection (2, 3.2%) was treated by appropriate antibiotics and observation. Venous hypertension (2, 3.2%) underwent central venous angioplasty and stenting in one patient and angioplasty alone in another patient.

Comparative Study

The data with the current study was compared with Robbin *et al.*[9] and Allon *et al.*[10] (Table 2).

The average age incidence with current study was 53.04 years, 54 years in Robbin *et al.* but 72% of patients in Allon *et al.* were of 65 years of age. The male population in current study was compared to Robbin *et al.* (64% vs. 39%), but the female population was comparable (35.80% vs. 30%). The female population was 46% in Allon *et al.* The incidence of diabetes was more in present study (85.10% vs. 61%) compared to Robbin *et al.* The incidence of Hypertension was 85.10% in current study, but not mentioned in comparative studies. The incidence of previous access procedure was 65.7% and 75 patients had previous access. Maximum number patients underwent RCF 62.7% versus 48% compared to Allon *et al.* The duration of the current study was 24 months and it was 17 and 23 months respectively in Allon and Robbin *et al.*

Table 1: Outcome percentage of patency and failure rate of AV access

Outcome	Number of patients (*n*=62)	%
Functional patency	39	62.9
Failures	23	37.1
Immediate failure	16	25.8
Early failure	5	8.1
Primary failure	2	3.2

AV: Arteriovenous

Table 2: Comparative statistics of the primary study with two other studies

	Current study	Robbin *et al.*	Allon *et al.*
Duration of the study (in months)	24	23	17
Age (in years)	53.4	54	65
Incidence of male (%)	64	39	-
Incidence of females (%)	35.8	-	30
Diabetes (%)	85.1	61	-
Hypertension (%)	80.6	-	-
Radio cephalic (%)	62.71	-	48
Venous diameter for patency (in mm)	4.34±0.97	4.9±0.2	-
Venous diameter for failure (in mm)	3.2±0.84	3.4±0.2	-
Functional patency (%)	62.90	-	54

The mean venous diameter for patency in current study was 4.34 ± 0.94, versus 4.9 ± 20 in Robbin *et al.* The mean venous diameter for failure in current study was 2.93 ± 0.38 at 1st month and was 3.20 ± 0.84 at 3rd month. It was 3.4 ± 20 in Robbin *et al.*

The increase in size of the vein was 3.5 mm or more at 63% at 1 month and 84.6 % at 3 month in current study and it was 4 mm or more at 54% at 2 months, 59% at 3 months, 56% at 4 months in Robbin *et al.*

The mean flow rates for patency was 464 mL/min in current study and 780 mL/min in Robbin *et al.* The mean flow rates for failures in current study was 253.5 mL/min and it was 418 mL/min in Robbin *et al.* The functional patency in current study was 62.90% versus 54% compared to Allon *et al.* Early failure was comparable with Silva *et al*[5]. at 8.10% versus 8.30%. There was no mention of immediate or primary failure by Robbin or Allon *et al.*, which was 25.80% and 3.20% respectively. The complication rate was 11.30% in current study but there were no complications in Silva *et al.*[5,9]

DISCUSSION

It is generally accepted that an autogenous AVF is the best option, with the lowest infection and the highest primary patency rates, but takes several weeks to mature.

Wrist (radiocephalic) and elbow (brachiocephalic)[11] primary fistulae are the preferred types of access because of the following characteristics:

- Superior patency to other accesses after they are established and matured
- Lower complication rates compared with other access options, including lower incidence of stenosis, infection, and vascular steal phenomenon.[12-24] In most cases, flow increases early (1st week), with little additional increase as the fistula matures. Failure of fistula flow to increase is a sign of access dysfunction.[9,25]

Clinical guidelines provided by National Kidney Foundation-Dialysis Outcomes Quality Initiative state that imaging is only necessary in certain patients; venography is indicated where there is suspicion of central venous stenosis or trauma, and in patients with multiple previous access attempts.[26] Despite these guidelines, up to one third of access procedures either fail or do not mature well enough to be useful for dialysis.

There is recent evidence that pre-operative duplex ultrasound evaluation can not only increase the utilization of native AVF for dialysis access but also allow optimal AVF site selection. Ultrasound is being increasingly utilized, as it is readily available and relatively cheap.[1] But has a major limitation of being unable to assess central vein patency so that contrast venography may still be needed if a central venous stenosis or occlusion is suspected. In patients in whom iodinated contrast is contraindicated, magnetic resonance venography and carbon dioxide venography have recently become available as alternatives.

Criteria for Successful AVF Construction

The arm is scanned proximal to distal, with and without a tourniquet. Veins should be thin walled, vary in size with respiration, collapse completely on compression with the transducer, and augment with distal compression.

Vessel depth, internal diameter with and without the tourniquet, continuity with the deep system and the presence of any stenosis or thrombosis should be assessed. Veins should dilate by approximately 50% with a tourniquet.

Venous diameter is an important determinant of fistula outcome. Successful maturation of wrist AVF was higher if the cephalic vein diameter was > 2.0 mm.[27] Although a precise threshold has not been established, a minimum venous diameter (with a tourniquet) of 2.5 mm is usually advised for AVF.[11]

Internal arterial diameters at different levels, as well as calcification and abnormal arterial wall thickening

should be recorded. The arterial waveforms are evaluated proximally as well as distally and the normal waveform should be a triphasic, high resistance flow with no evidence of dampening, which could indicate a proximal stenosis.

The normal diameter of the radial artery is 2.0-3.5 mm. A minimum diameter of 2 mm is now usually advised. Above this diameter, there seems to be no correlation between arterial diameter and fistula success.[11]

Fistula Blood Flow Rate

The ability to maintain adequate blood flow during HD is another crucial determining factor in AVF maturity. In the United States, HD is typically performed at a dialysis blood flow rate of 350-450 mL/min, for 3.5-4 h 3 times/week. A fistula blood flow rate < 350 mL/min cannot sustain the desired dialysis blood flow rate and therefore results in inadequate dialysis. Blood flow rate has been measured to be at least 350-500 mL/min in normally functioning AVFs. Lin *et al.*[28] found a mean blood flow rate > 634 mL/min in the 2nd post-operative week in 152 patients with successful RCF. Mean blood flow rate in successful AVFs was reported by Wong *et al.*[27] to be approximately 650 mL/min at 12 weeks.

The overall accuracy of the blood flow criteria is optimal (75-76%) for values of 400-500 mL/min. The blood flow rate through the fistula must exceed the minimum acceptable dialysis blood flow rate of 350 mL/min by at least 100 mL/min to ensure successful use of the fistula for dialysis, or the vein could collapse during HD. Factors such as venous diameter sand depth from the skin also determine whether a fistula is successful. For this reason, not every fistula that meets the blood flow criteria is usable for dialysis.

CONCLUSION

The pre-operative vessel mapping provides useful information regarding the choice of AVF. It leads to increased creation and use of native AVFs as well as the incidence of negative exploration. Pre-operative ultrasound assessment predicts AVF patency and maturation for dialysis. Venous diameter is an important criterion in the pre-operative mapping sonogram. Pre-operative arterial diameter and disease is important in predicting the success rate of forearm fistulas particularly the radial artery. Access surveillance duplex scanning at 4 and 12 weeks post-operatively has a high sensitivity and specificity for final outcome of fistula. Serial surveillance of arteriovenous access reduces the risk of thrombosis and prolong access survival by early detection and treatment of asymptomatic stenosis.

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Review Article

Botoxonomics: A Palliative Prick

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Abstract

In the present century, botulinum toxins (BTs) have gone from the deadly poison to remarkably versatile therapeutic agent. Botulinum is derived from the Latin word "botulus," meaning sausage, and botulism was originally called "sausage poisoning" because it occurred after ingestion of poorly prepared blood sausage. It works by inhibiting the release of acetylcholine at neuromuscular junction interrupting the contraction process of the muscles and causes a temporary paralysis. Blockade is temporary, after which there is a return of neuromuscular function. BT can be used for the treatment of temporomandibular disorders, bruxism, correction of a gummy smile, black triangle and it can also be used to relieve patients with facial pain, including treating trigger points. Indications of botulinum for oral and maxillofacial esthetics are to improve dental lip lines and smile lines. Other cosmetic indications are crow feet, eye hooding, hyperhidrosis, glabellar lines, etc. The benefits of this toxin have made a sensation for the artists and celebrities along with common people nowadays. Although it has a few adverse effects, it has generally proven to be therapeutic and safe.

Keywords: Aesthetics dentistry, Botolinum toxin, Treatment

INTRODUCTION

Botulinum toxin (BT) is a protein and neurotoxin produced by the bacteria *Clostridium botulinum*. It is the most acute toxic substance known, and can lead to botulism, a serious and life-threatening illness in humans and animals causing acute paralytic attack on ingesting affected food. Justinus Kerner described BT as a "sausage poison" and "fatty poison," as the bacterium produced poisoning due to improperly prepared meat products.[1] It was Kerner, who first ascertained a possible therapeutic use of BT and coined the name botulism. In 1897, Emile van Ermengem discovered that a bacterium is a producer of the botulin toxin, which he named *C. botulinum*. In 1928, Tessmer Snipe and Hermann Sommer for the first time purified the toxin. In 1949, Arnold Burgen's group discovered, through an elegant experiment, that BT blocks neuromuscular transmission through decreased acetylcholine release.[1] Although chemically, botulinum is of seven different types, there are two forms of BT available commercially, Type A (Botox, Dysport and Xeomin), and Type B (MyoBloc) that are used for various cosmetic and medical procedures. The Food and Drug Administration (US) has only approved BT Type A for treatment of cervical dystonia (severe neck muscle spasm), severe primary axillary hyperhidrosis (excessive axillary sweating), blepharospasm (spasm of the eyelids) and temporary improvement in the appearance of moderate to severe glabellar lines (wrinkles). Type B BT has approval for cervical dystonia. More recently, BT has been suggested as part of the armamentarium for the management of various orofacial conditions, and a considerable body of literature has been developed describing or investigating its efficacy and safety.[2]

METHODS

Botox is available in a freeze-dried powder that clumps at the bottom of the vial. During reconstitution, the rubber seal on the vial should be wiped with an alcohol swab before injecting the desired volume of normal saline using a 5 mL, 25-guage needle syringe. Botox should be reconstituted after the journey. Agitation during transport may denature

the toxin and greatly reduces its duration of action. The entire solution may be given intramuscularly and not subcutaneously due to the presence of neuro-muscular junctions at the former site where the main mechanism of action of this toxin takes place. One mL insulin syringes can be used for injecting the solution as it gauges the dose accurately in minute quantities. A safe and reproducible injection point for BT around the converging area of the three muscles has been proposed and proved effective in clinical applications.[3]

Clinical Applications in Dentistry

The first-line treatment approach for temporomandibular disorders (TMDs) includes physiotherapy, exercises, behavioral type therapy, oral appliances, anti-inflammatory medications or some combination of these and rarely surgical intervention is indicated. BT can be a useful adjunct, particularly when these have failed to provide adequate relief, particularly in cases involving muscular hyperactivity. In treating temporomandibular joint (TMJ) dysfunction, the injection route may be either intraoral or transcutaneous, depending on the anatomic position of the targeted muscle. The superficial muscles, masseter and temporalis, may be palpated and injected externally according to anatomic landmarks.[4] Depending on the target muscle, dose of 10-50 U of Botox Type A per site with a total dose of 200 U in the masticatory system can be injected. Dose can be increased to 400 U maximum if other sites in the head and neck are included in the injection protocol. It may have a place as an adjunct to appropriate physical therapy in some cases of whiplash injury. Although there is a paucity of supportive research, there is a suggestion that BT may also have a supportive role in TMJ surgery.[4,5]

BT has useful treatment in refractory myofascial pain syndrome and have shown promise in various superficial neuropathic pain syndromes. Presumably BT work by breaking the spasm/pain cycle, giving the patient "window of opportunity" for traditional conservative measures to have a greater beneficial impact, but several studies suggest that a direct anti-nociceptive effect distinct from any reduction in muscle spasm may be at play. The major benefit of BT compared with standard therapies is duration of response. BT cannot be considered as "first line" treatment for any pain application; however, in refractory cases in which nothing else has helped, BT may offer the patient and physician a chance for improvement and perhaps even cure.[6-8] The dreaded "black triangle" usually tops the list of dentists' frustration after the preparation of crowns, bridges, and especially after implant and periodontal surgery. The patients are disappointed at the esthetic results because of the lost tissue. By injecting BT in these areas, it literally plump up papilla and is a minimally invasive way to create proper and more pleasing gingival contours. This is a very minimally invasive approach to a very difficult dental situation, and it completely satisfies the needs of the patient and gives the dental operator a very successful treatment outcome (Figure 1).

When an excess of gingiva superior to the maxillary anterior teeth is displayed upon full smile, it is termed a gingival smile. It is known by a variety of terms including – Gummy smile, high lip line and full denture smile.[9] This can be treated by targeting the levator labii superioris aleque nasi muscle. This muscle may be identified by asking the patient to move the tip of his nose. Injection of between 1 and 3 units of botoxat each superior medial naso-labial fold will relax this muscle. Without the elevation provided by this muscle, the upper lip will be lowered enough to cover the upper portion of the teeth, while the patient is smiling (Figure 2). Improvement of this area may be enhanced with a filler substance used adjunctively to diminish prominent superior naso-labial folds. The "downturned smile" can misrepresent emotions, imparting a sad or concerned appearance. This may be corrected with injecting BT into posterior aspect of the depressor angulioris muscle. This permits the zygomaticus muscle to act unopposed and elevate the corners of the mouth to a horizontal, more aesthetically pleasing position[10] (Figure 3). This muscle can be identified for injection by palpating along the jawline as the patient frowns or pulls down the corners of the mouth and the average dose of botoxis between 3 and 5 units per side.

BT has been shown to be effective in the management of sialorrhea. This involves the injection into the salivary glands, usually with electromyographicguidance.[10,11] Cases have been reported that intra-glandular injection of BT, into the submandibular glands, was helpful. Jongerius *et al.* reported that maximal salivary flow rate from the

Figure 1: Black triangles corrected by botulinum toxin (a) Before (b) After

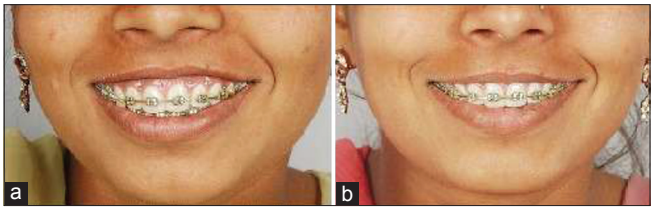

Figure 2: Correction of gummy smile after botox injection (a) Before (b) After

combined sublingual and submandibular glands was reduced by 51-63% in three of the four cases.[12] The clinical application of BT for the cosmetic purposes started after the effectiveness for treatment of blepharospasm. In 1989, the US Food and Drug Administration approved BT A for use in treating strabismus, blepharospasm, and hemifacial spasm in patients older than age 12 years. The first description of BT for the treatment of glabellar frown lines was in 1992. At that time, the use of this potent neurotoxin for cosmetic indications was an interesting footnote to treat strabismus, torticollis and other dystonias. Subsequently, physicians began to study and use the BT for a variety of cosmetic indications. Today, BT is the most commonly performed cosmetic procedure in the world.[13]

DISCUSSION

C. botulinum is a sporeforming, obligate anaerobe whose natural habitat is soil, from which it can be isolated without undue difficulty. The species *C. botulinum* consists of 4 genetically diverse groups that would not otherwise be designated as a single species except for their common characteristic of producing BT. BT exists in 7 distinct antigenic types that have been assigned the letters A through G. The toxin types are defined by their absence of the cross neutralization (e.g. anti-A antitoxin does not neutralize toxin Types B-G). In addition to

Figure 3: Correction of downturn smile by botulinum toxin (a) Before (b) After

C. botulinum, unique strains of *Clostridium baratii* and *Clostridium butyricum* have the capacity to produce BT. BT is a simple di-chain polypeptide that consists of a 100 kd "heavy" chain joined by a single disulfide bond to a 50 kd "light" chain. The toxin's light chain is a Zn++ - containing endopeptidase that blocks acetylcholine - containing vesicles from fusing with the terminal membrane of the motor neuron, resulting in flaccid muscle paralysis. The lethal dose of BT for humans is not known but can be estimated from primate studies. By extrapolation, the lethal amounts of crystalline Type A toxin for 70 kg human would be approximately 0.09-0.15 μg intravenously or intramuscularly, 0.70-0.90 μg by inhalation, and 70 μg orally.[14]

The toxin acts by preventing the release of acetylcholine from pre-synaptic vesicles at the neuromuscular junction resulting in the inhibition of muscular contraction. This blockade is temporary, varying from 3 to 4 months, after which sprouting of new axon terminals result in a return of neuromuscular function. Therefore, treatment with BT cannot be considered curative, but a palliative and symptomatic approach to the management of the problem. The toxin has also shown to block acetylcholine release at parasympathetic nerve terminals.[15] BTs work at the neuro-muscular junction through a four-step process (Figure 4):

1. Binding: The toxin must dissociate from the complex and attach to the target site
2. Internalization: The free toxin is internalized into an acidic vesicle
3. Membrane translocation into the cytosol: The light chain is released into the cytosol
4. Enzymatic cleavage of target protein: The light chain disrupts the specific target fusion protein complex responsible for vesicular docking on the inner surface of the cellular membrane, preventing acetylcholine release.[16]

Botox is a lyophilized BT A synthesized in bacterial culture as a single long chain protein nicked by bacterial proteases to produce the free toxin. It is purified from the culture solution by a series of acid precipitations to a crystalline

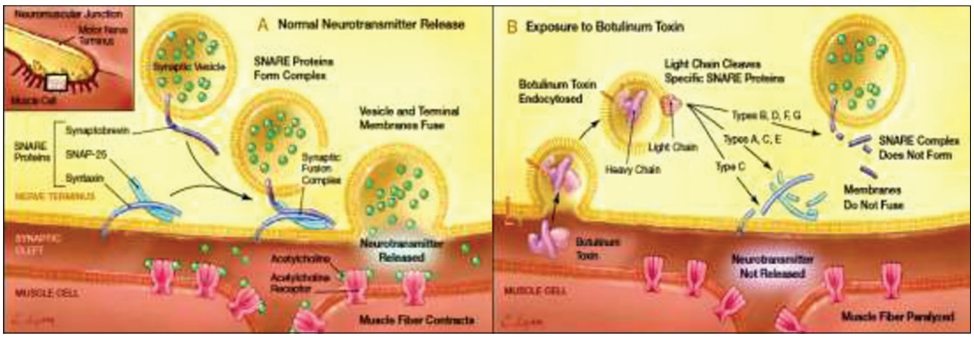

Figure 4: Botulinum toxin work at the neuro-muscular junction by blocking acetylcholine release at parasympathetic nerve terminals

complex consisting of the active protein and an associated hemagglutinin protein. The complex is re-dissolved in a solution of saline and albumin and sterile filtered (0.2 l) before vacuum drying. 100 U of BT A in a complex of 900 kd with 0.5 mg of human albumin and 0.9 mg of sodium chloride. The 100 U vial represents approximately 1ng of actual neurotoxin protein. It is recommended that BT A be stored in a freezer (5°C). It must be reconstituted with saline before injection. Myobloc (BT B) is produced by fermentation of *C. botulinum* Type B (bean strain) as a non-covalently associated neurotoxin complex with hemagglutinin and non-hemagglutinin proteins. After the fermentation process, the neurotoxin complex is purified through a series of precipitation and chromatography steps. Myobloc is marketed as a clear to light yellow solution in 3.5 mL glass vials with 2500, 5000, or 10,000 U of BT B (always at a concentration of 5000 U/mL) in 0.05% human serum albumin, 0.01 M sodium succinate, and 0.1 M sodium chloride at a pH of approximately 5.6. A 5000 U vial has approximately 10 ng of toxin protein.[16]

BT is the most poisonous substance known. A single gram of crystalline toxin, evenly dispersed and inhaled, would kill more than 1 million people, although technical factors would make such dissemination difficult.[14] BT A injections are well tolerated by most, an occasional patient finds these injections both painful and anxiety provoking. Various techniques have been described to reduce injection discomfort including topical refrigerants, nerve blocks and topical anesthetic creams. Although these modalities may be effective, they have a variety of disadvantages among them, including cost, time to onset, skin irritation and allergic skin reactions.[17]

CONCLUSION

BT has certainly been demonstrated to have significant value in the management of some types of orofacial pain, particularly myogenous TMDs in cases where the patient is unresponsive to the less invasive therapeutic modalities or, at times, in conjunction with them. Similarly, it has been proven effective in cases of severe sialorrhea. Cosmetic applications of the toxin have been well demonstrated in some areas such as correction of a gummy smile and black triangle. Although the drug is considered generally safe, there are a number of uncommon, relatively mild adverse reactions, but more recently, some severe, potentially life threatening side effects, distant from the site of injection have been described. Therefore, patients should be properly informed prior to consenting. The practitioner must ensure that the treatment is within his or her scope of practice and that he or she has the appropriate training, not only to administer the drug, but to deal with potential adverse effects.[3]

Hence BT can be certainly considered as a palliative prick.

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Review Article

Use of Acupuncture as a Novel Practice in the Management of Dental Diseases: A Review

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Abstract

Dentistry has undergone a sea change over the years. Many modalities have been tried and tested for the relief of pain and inflammation with varying success rates. However, the role of acupuncture in dentistry is less explored horizon. Acupuncture is among the oldest healing practices in the world, is a part of traditional Chinese medicine. It is the best-known complementary and alternative therapy. Originated in china for more than 3000 years ago and is practiced throughout the world. Acupuncture practitioners stimulate specific points on the body by inserting thin needles through the skin called acupoints. These points serve as a tunnel to deeper circulating channels and stimulating these points activates the body's natural healing ability. This paper reviews the possible role and application in the field of dentistry.

Keywords: Acupuncture, Chinese medicine, Dental diseases, Ying and Yang theory

INTRODUCTION

Acupuncture is derived from Latin word (acus-needle, pungere-to prick) is one of the complementary and alternative medicine techniques used to treat a variety of diseases and disorders.[1] It is the Chinese practice of piercing specific areas of the body with fine needles to relieve pain, to induce surgical anesthesia and for therapeutic purposes.

Acupuncture defined by the medical practice as inserting fine dry needles into the skin to stimulate specific anatomic points in the body (called acupoints). The acupoints are thus stimulated to regulate, correct and balance the flow of energy (Qi) in the body to restore health.[2] Depending upon the problem being treated acupuncture techniques may include solid needles, electro-acupuncture, moxibustion, acupressure, lasers and transcutaneous nerve stimulation for disease prevention, treatment and maintenance of health.

HISTORY

Acupuncture is a technique, originated in China for more than 3000 years ago[3-5] and involves the insertion of needles into various parts of the body with the intention of curing disease.[4] It is now practiced throughout the world, particularly in China, Korea, and Japan. In the United States, acupuncture started gaining popularity in the early 1970s.[1]

Traditional Chinese medicine (TCM), which encompasses many different practices, is rooted in the ancient philosophy of Taoism and dates back more than 5000 years. The practice of TCM is a unique view of the world and the human body that is different from Western medicine concepts. This view is based on the ancient Chinese perception of humans as microcosms of the larger, surrounding universe-interconnected with nature and subject to its forces.

The human body is regarded as an organic entity in which the various organs, tissues, and other parts have distinct functions, but are all interdependent. In this view, health and disease related to balance of the functions.

The theoretical framework of TCM has a number of key components:

- Yin-yang theory: The concept of two opposing, yet complementary, forces that shape. The world and all life - Is central to TCM

- In the TCM view, a vital energy or life force called Qi circulates in the body through a system of pathways called meridians. Health is an ongoing process of maintaining balance and harmony in the circulation of Qi
- The TCM approach uses eight principles to analyze symptoms and categorize conditions: Cold/heat, interior/exterior, excess/deficiency and yin/yang (the chief principles).

TCM also uses the theory of five elements - Fire, earth, metal, water, and wood - To explain how the body works these elements correspond to particular organs and tissues in the body.[6] Each of them has its specific role in helping to maintain a harmonized condition and good health of an individual.[2]

The traditional acupuncturist's skill lies in identifying the precise nature of the underlying disharmony and selecting the most effective treatment. The choice of acupuncture points will be specific to each patient's needs.

Traditional acupuncture can also be used as a preventive measure to strengthen the constitution and promote general well-being.[7] Other TCM therapies include moxibustion, cupping, Chinese massage; mind-body therapies such as Qi Gong and Tai Chi; and dietary therapy.

TCM emphasizes individualized treatment. Practitioners traditionally used four methods to evaluate patient's condition: Observing especially the:
- Tongue
- Hearing/smelling
- Asking/interviewing
- Touching/palpating (especially the pulse).[6]

SCIENTIFIC BASIS OF ACUPUNCTURE

The theoretical background of acupuncture therapy based on the metaphysical concepts of Qi and Yin–Yang balance seems to conflict with the practice of Western medicine that is based on anatomical, physiological, and biochemical evidence. Since the introduction of acupuncture therapy into modern Western medicine, numerous studies have been carried out to investigate and explain the scientific basis behind it.[8]

The basic idea behind acupuncture, according to ancient theory, is that energy flows within the human body and can be stimulated to create balance and health. The energy flow (or vital force)-called Qi and pronounced "chee"-moves throughout the body along main channels known as meridians.[3] Meridians are the invisible channels, which are composed of 14 main meridians.[2] These meridians represent the major organs and functions of the body although they do not follow the exact pathways of nerves or blood flow.[3]

The authors proposed that stimulation of acupuncture points can relieve pain by causing "hyper-stimulation analgesia," which can be explained by the concept of "gate control theory of pain."

Activation of A-δ and C afferent fibers through acupuncture point stimulation send signals to the spinal cord with local release of dynorphin and enkephalins. Upon reaching the midbrain, both excitatory and inhibitory mediators are activated in the spinal cord. Neurotransmitters like serotonin, dopamine and nor epinephrine are produced causing pre- and post-synaptic inhibition of pain transmission. When the signals reach the hypothalamus and pituitary gland, adreno corticotropic hormones and endorphins may be produced.[8]

Acupuncture Needles

Acupuncture needles are typically made of stainless steel wire. They are usually disposable sterile involves minimal risk of infection. Needles vary in length between 13 and 130 mm (0.51-5.1 inch), with shorter needles used near the face and eyes, and longer needles in more fleshy areas; needle diameters vary from 0.16 mm (0.006 inch) to 0.46 mm (0.018 inch) with thicker needles used on more robust patients. Thinner needles may be flexible and require tubes for insertion. The tip of the needle should not be made too sharp to prevent breakage, although blunt needles cause more pain. Apart from the usual filiform needle, there are also other needle types, which can be utilized, such as three-edged needles and the nine ancient needles.

Needling Technique

The skin is sterilized with alcohol and the needles are inserted, frequently with a plastic guide tube. Needles may be manipulated in various ways, e.g. spun, flicked, or moved up and down relative to the skin. Since most pain is felt in the superficial layers of the skin, a quick insertion of the needle is recommended (Figure 1).

The skill level of the acupuncturist may influence how painful the needle insertion is, and sufficiently skilled practitioner may be able to insert the needles without causing any pain.[9]

De-Qi Sensation

The arrival of Qi or De Qi refers to the transmission of a needling sensation along the meridians, which is often described by the patient as soreness, numbness, fullness, warm sensations or aching as a result of needle

manipulation. This is perceived by acupuncturists as a needle grasp sensation, which is key in achieving therapeutic efficacy.[8]

APPLICATION IN DENTISTRY

Post-Operative Pain

Complex networks of nerve fibers are found in dental pulp within the tooth and the periodontium surrounding it, and pain is quickly elicited when stimuli activate these nerve endings. The management of dental pain is first to identify and remove the cause (such as caries and gingival inflammation), followed by any analgesic medication. According to TCM theory, local acupuncture points on facial regions such as ST6 Jiache, ST7 Xiaguan and distant points like LI4 Hegu Figure 2 can be used to treat dental pain.[8,10] They belong to the stomach and large intestine meridians, which converge at the facial region and linkup with the maxillary and mandibular teeth. Acupuncture point LI4 Hegu, which is located on the radial side of the second metacarpal bone on the dorsum of the hand, can elicit an analgesic effect on the orofacial region.[8] Acupuncture regulates the flow of vital energy through the body.[11]

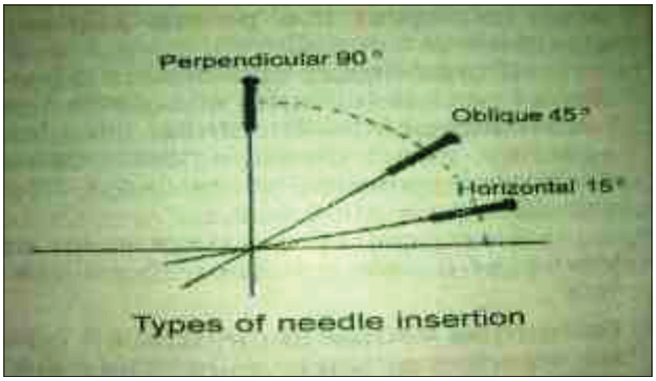

Figure 1: Needle technique

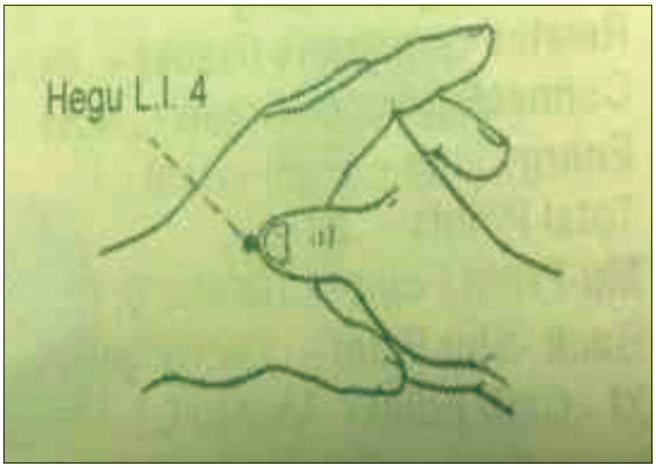

Figure 2: Post-operative pain

Trigeminal Neuralgia (TN)

TN is a neuropathic disorder characterized by episodes of intense pain in face, originating from the trigeminal nerve. According to the international association for the study of pain defines TN as "sudden usually unilateral brief stabbing recurrent pain in the distribution of one or more branches of the fifth cranial nerve. Acupuncture points GB14 Yangbai and EX-HN5 Taiyang are used if the ophthalmic branch is affected, ST2 Sibai and ST3 Juliao are used if the maxillary branch is affected and ST6 Jiache and ST7 Xiaguan Figure 3 are used if the mandibular branch is affected. These acupuncture points seem to coincide with the distribution of the nerve branches.[8] The protocol utilized local points of TH17 and 21, GB2, SI18, ST2, 3 and 7, GV26 and LI20. Systemic points include TH5, LI4, ST36, ST44, ST45 and LIV3. Auricular acupuncture points were also used. By inserting acupuncture needles in well-defined points, it is possible to restore the free flow of energy and the patient is cured.[12]

Xerostomia

Xerostomia (dry mouth) decrease in or total lack of saliva is a serious condition affects approximately 40% of adults over 50. For xerostomia patient's quality of life is often impaired profoundly. Etiology is multifactorial medications especially opioids, diuretics, anticholinergic antihistamines, endocrine disorders, autoimmune disorders and radiation therapy. Symptoms include rampant caries. Oral mucosal infections, difficulty in eating, speaking and swallowing, altered taste sensation and difficulty in wearing dentures.[13] Acupoints were selected according to the principles of TCM. Local (ST-3, ST-4, ST-5, ST-6, ST-7, GB-2, SI-19, TB-21), Figure 4 distal (LI-4, LI-11, LR-3, ST36, KI-5, GV-20) and auricular acupoints were also included.[14] After acupuncture treatment patients with xerostomia increases the salivary flow rate.[13]

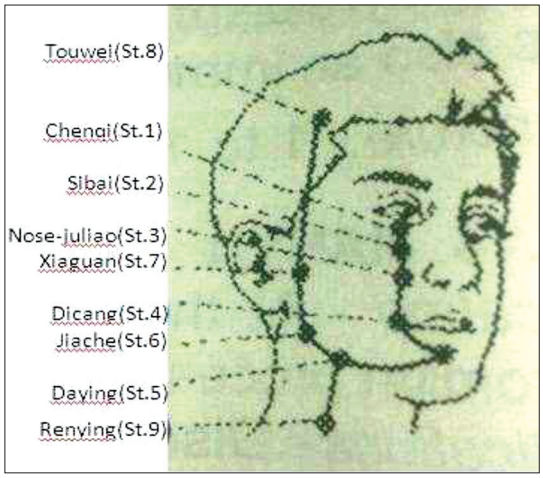

Figure 3: Trigeminal neuralgia

Temporomandibular Disorders (TMDs)

TMDs is a term which includes a group of conditions that affect temporomandibular joint (TMJ), the muscles of mastication and the associated head and neck musculoskeletal structures.[8] Effective treatments for TMJ disorder is difficult to achieve since the condition is related to a variety of aspects of both the mind and body. The recommended acupuncture points (ST-6, ST-7, SI-18, GV-20, GB-20, BL-10 and LI-4) Figure 5.[15] Acupuncture therapy helps to relieve the pain and discomfort associated with the conditions, especially if they are muscular in origin. It also helps in muscle relaxation and reduces muscle spasms. Relaxing the lateral pterygoid muscles can reduce the anterior displacing force on the meniscus of TMJ and help to minimize TMJ clicking.[8]

Bell's Palsy

Bell's palsy is an idiopathic, acute peripheral-nerve palsy involving the facial nerve which supplies all the muscles of facial expression. Patients with Bell's palsy typically complain of weakness or complete paralysis of all the muscles on one side of the face. The facial creases and nasolabial fold disappear, the forehead unfurrows, corner of the mouth droops, eyelids will not close and lower eyelid sags. On attempted closure, the eye rolls upwards (Bell's phenomenon). Eye irritation often results from a lack of lubrication and constant exposure. Tear production decreases. Food and saliva can pool in the affected side of the mouth and may spill out from the corner. Acupuncture points are Jiache (S6) Dicang (S4) (Corresponding to buccinator and angle of the mouth), and Zanzhu (B2), Sizhukong (SJ23) (corresponding to eyebrow). Yanbai (G14), Yifeng (SJ17) and Jingming (B1) Figure 6.[16] Acupuncture helps in the treatment of Bell's palsy by reducing inflammation, by promoting the release of vascular and immunomodulatory factors. Enhancing local microcirculation, by increasing the diameter and blood flow velocity of peripheral arterioles.[17] Increase the excitability of nerves and to promote the regeneration of nerve fibers.[8]

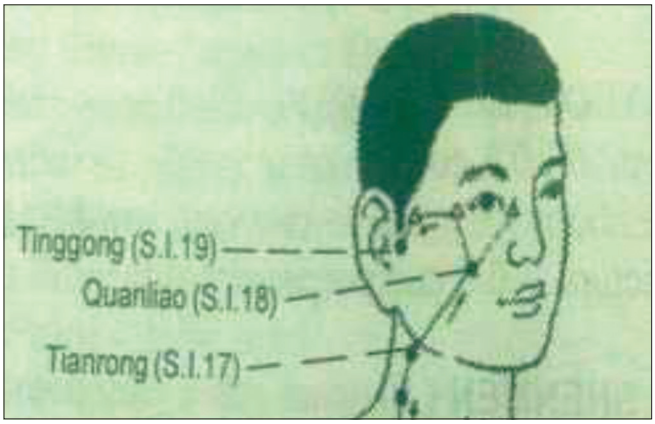

Figure 4: Xerostomia

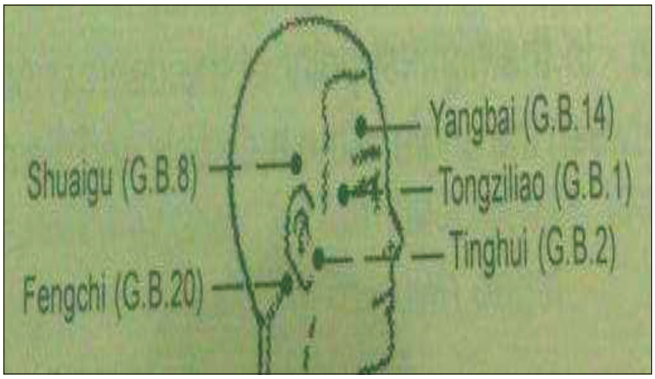

Figure 5: Temporomandibular disorders

Gag Reflex

Gagging has been defined as an ejector contraction of the muscles of the pharyngeal sphincter. It is a normal protective reflex designed to protect the airway and remove irritant material from the posterior oropharynx and the upper gastrointestinal tract.[18] Its causes can be somatic, brought about by stimulating certain trigger areas in the oral cavity or psychogenic, which is induced by thought stimulus modulated by higher brain centers. Hyperactive gag reflex can be a hindrance to dental procedures, such as taking of alginate impression for denture fabrication. The use of acupuncture points like PC6 Neiguan and CV24 Chengjiang Figure 7 have been reported to significantly reduce gag reflex. Auricular acupuncture has also been suggested for treating severe gag reflex and the role of acupuncture as a method of controlling the gag reflex is safe and quick.[8]

Lichen Planus

Lichen planus is a common chronic immunological inflammatory mucocutaneous disorder that varies in appearance from keratotic (reticular or plaque) to erythematous and ulcerative. Exact etiology is unknown psychological stress, increased anxiety, immunological disturbances, infections and genetic predisposition.[19] Acupuncture points (GV20, GB20, BL13, 17, 20, HT.7,

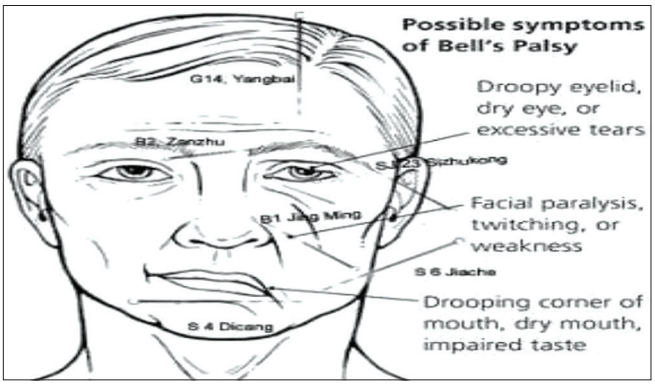

Figure 6: Bell's palsy

PC.6, SP.6, 10, ST.36, LI.4,11) Figure 8. Acupuncture is an effective method for the treatment of lichen planus.[20]

Advantages[21]

1. Acupuncture is a non-invasive treatment.
2. Almost all patients or people in discomfort can undergo acupuncture treatment.
3. It provides relief to the patient from physical as well as mental ailments.
4. In an attempt to eliminate the root causes of a health problem, the treatment examines the entire human body and its relation to the environment.
5. Acupuncture is one of the most natural forms of alternative medicine during which endorphins are released into the blood stream in order to achieve maximum pain relief.
6. The treatment helps remove toxins and helps fast healing, because it increases blood flow, when the needles are inserted into the strategic locations of the human body.
7. Since acupuncture works on the vital energy (Qi) points of the body, it restores and maintains the overall health

Disadvantages

1. Acupuncture is safe only when it is performed by a trained and licensed acupuncturist.

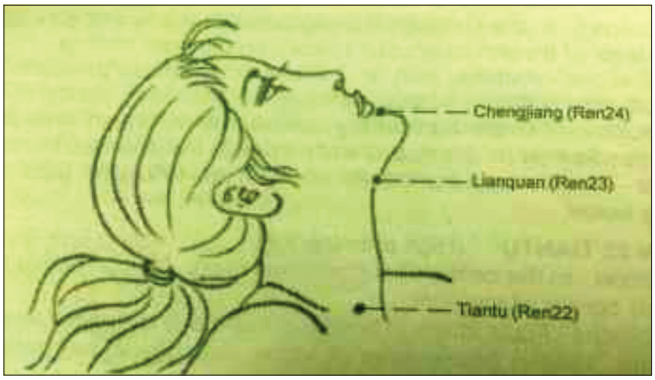

Figure 7: Gag reflex

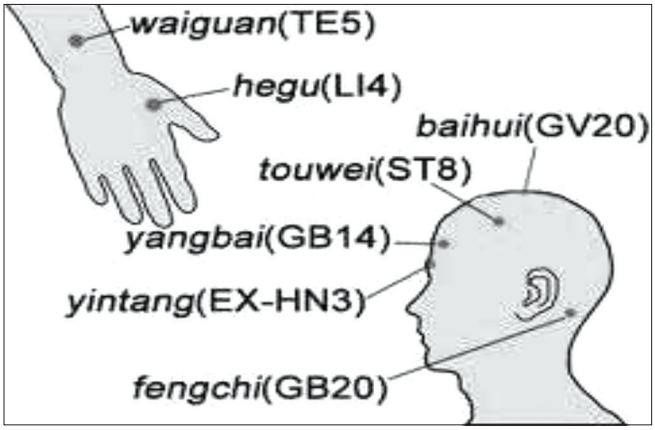

Figure 8: Lichen Planus

2. The needles for the treatment should be non-toxic and used only once. They should be properly labeled and sealed. The patient may suffer from various infectious diseases if the needles are re-used or not sterile.
3. Improper placement of the needle can lead to bleeding, swelling and painful sensation and infection in the acupunctured areas of the body.
4. Acupuncture is not recommended for damaged body parts, such as broken bones.
5. The treatment is not recommended for people suffering from bleeding disorders and patients on blood thinners.
6. Patients could experience a little amount of soreness post-treatment

Recommendations[3]

1. Dentists should only treat their patients with acupuncture after obtaining the relevant knowledge and ability.
2. Acupuncture should only be employed after a thorough diagnosis of the patient's condition. Meanwhile, employment of conventional therapies may be considered as appropriate.
3. A separate informed consent for acupuncture may be required.
4. Standard infection control procedures must be in place. Single use of needles must be employed.
5. As it is the case with all therapeutic measures, the use of acupuncture has to be documented appropriately and detailed records must be kept.
6. Multidisciplinary research into the effective use of acupuncture in dentistry is encouraged

CONCLUSION

Acupuncture is safe, quick, inexpensive and non-invasive when performed correctly. Dental practitioner are now equipped with more weaponry, i.e., by using acupuncture in the treatment of dental diseases, especially when dealing with post-operative dental pain and dental anxiety situations, and in the treatment of patients who are allergic to anesthetics and wish to avoid the use of drugs.

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Case Report

Herpes Zoster Leading to Viral Osteomyelitis or Neuralgia Inducing Cavitational Osteonecrosis? – A Case Report and Review of Literature

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Abstract

Herpes zoster infection is considered to be a reactivation of varicella zoster infection. Herpes zoster involving the trigeminal branch leads to various complications like post herpetic neuralgia, osteomyelitis, tooth exfoliation, pulp necrosis etc. The purpose of this paper is to highlight the case of a 75-year-old patient suffering from herpes zoster with exposed necrotic mandibular alveolar bone. Based on the history and clinical examination a provisional diagnosis of herpes zoster of right V3 division of the trigeminal nerve with viral osteomyelitis of right mandible and a differential diagnosis of neuralgia inducing cavitational osteonecrosis was given.

Keywords: Herpes zoster, Neuralgia inducing cavitational osteonecrosis, Viral osteomyelitis

INTRODUCTION

The scope of diagnosis of herpes zoster of the trigeminal nerve falls under all dental specialists. A thorough knowledge of this disease will prevent unnecessary and delayed treatment for the patient. During the prodromal stage of this disease in particular, the only presenting symptom may be odontalgia which may prove challenging to a clinician who is not familiar with herpes zoster of the trigeminal nerve.[1] Postherpetic neuralgia (PHN); the most common complication of herpes zoster infection is easily recognized. Other developmental anomalies such as irregular short roots and missing teeth, periodontitis and calcified and devitalized pulps are difficult to diagnose.[2] Herpes zoster has also been found associated with peri-apical lesions and resorption of roots.[3] The term 'osteomyelitis,' which was introduced by Nelaton[4] in 1844, implies an infection of the bone and marrow. Osteomyelitis most commonly results from bacterial infections, although fungi, parasites, and viruses can affect the bone and marrow. The chronicity of osteomyelitis is multifactorial. The lowered oxygen tension produced due to ischemia of the infected area and sequestrum creates an anaerobic atmosphere that antibiotics cannot penetrate and effectively reduces the bactericidal activities of polymorpholeukocytes. The antibiotics fail to reach the organisms as the lowered vascularity reduces the rate of diffusion, despite therapeutic concentrations.[5]

CASE REPORT

A 75-year-old patient complained of pain in his lower right back tooth region since 3 months. Patient gave history of vesicular eruptions 3 months back which turned into ulcerations and healed with hyperpigmentation in the right side of his face, as well as the right ear. He also gave a history of hearing impairment since 15 days. Patient gave history of exfoliation of teeth in right mandibular region 2 months back. No relevant medical history was present. Patient revealed history of smoking bidi since 30-35 years, one-pack bidi per day.

Extra-oral Examination

On an inspection: Multiple areas of hyperpigmentation seen in the right middle and lower one-third of the face along the

distribution of the mandibular division of the trigeminal nerve. Evidence of pus discharge from the right ear was present. Area of hypopigmentation was seen in the right half of lower lip extending into the chin. Area of hypopigmentation was also seen over the right side of the scalp (Figures 1 and 2).

On palpation: Lesional area was tender present. Pus discharge was seen from his left ear. No evidence of altered sensation was present.

Intra-oral Examination

On an inspection: There was evidence of exposed yellow colored necrotic bone of right mandibular alveolus extending from canine to retro molar region which was covered with slough (Figure 3). There was the presence of a bulla of approximately 3 cm ×1.5 cm in size associated with depappilation over the right dorsum of the tongue that did not cross the midline (Figure 4). Diffuse melanotic pigmentation was seen over bilateral buccal mucosa and upper and lower labial mucosa.

On palpation: The exposed, slough covered bone was tender with a sharp margin. The buccal and lingual alveolar mucosa was separable from underlying bone. Bulla over the dorsum of the tongue was soft in consistency and nontender.

Hard Tissue Examination

1. Teeth present: 11-18, 21-28, 31-37, 41
2. Root stumps: 26, 27
3. Decayed tooth: 17, 18.

Based on history and clinical findings we gave a provisional diagnosis of herpes zoster of right mandibular division of the trigeminal nerve with viral osteomyelitis of right mandible.

We gave a differential diagnosis of neuralgia inducing cavitational osteonecrosis (NICO) and chronic diffuse sclerosis osteomyelitis.

Investigation

Orthopantomograph revealed area of irregular osteolytic lesion extending from 41 to 48 region and gradually merging with adjacent bone. The right edentulous alveolar margin was irregular and ragged with evidence of decortication. The alveolar bone adjacent to the osteolytic lesion showed evidence of sclerosis. Well defined radiolucency was also seen at the apex of 33 suggestive of peri-apical granuloma (Figure 5).

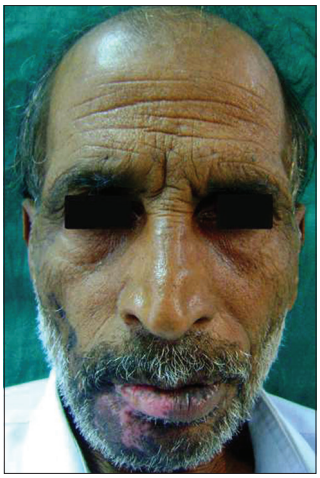

Figure 1: Frontal profile of patient

Figure 2: Lateral profile highlighting areas of hypo and hyperpigmentation

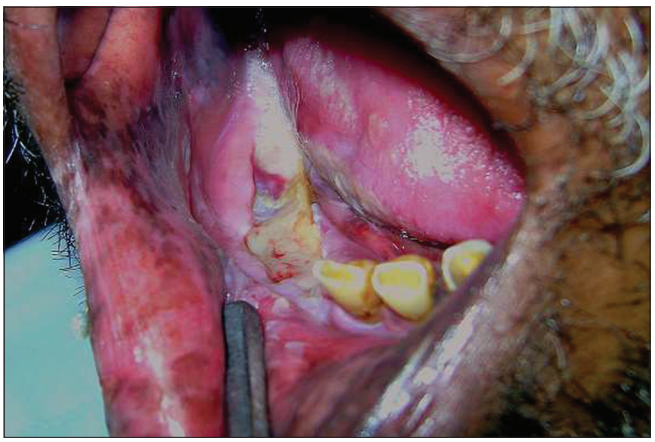

Figure 3: Necrosed right mandibular alveolus

DISCUSSION

There are two common forms of varicella zoster virus disease: Chicken pox (varicella) and shingles (herpes zoster). Chicken pox is the primary infection. The virus remains in a dormant state after the initial infection until it gets reactivated decades later. The subsequent reactivation is herpes zoster.[6]

Chicken pox and herpes zoster are contagious. The cells of the respiratory tract and conjunctiva get infected. The

Figure 4: Bullae over right dorsum of tongue

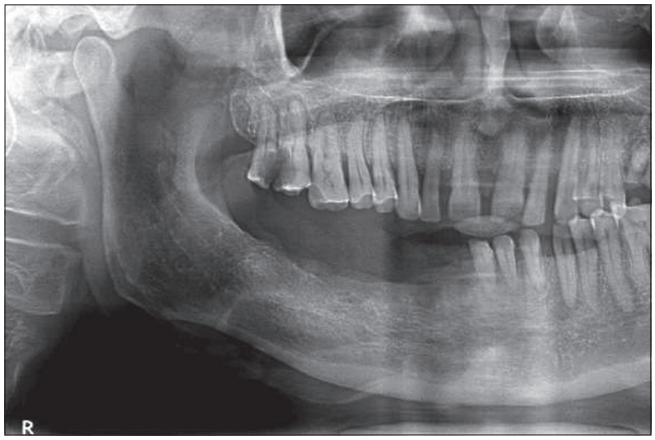

Figure 5: Cropped panoramic radiograph of right mandibular alveolus

virus is carried through the body via the bloodstream and lymphatic system to the epidermis. The virus finally comes to rest in the perineural satellite cells of the dorsal nerve root ganglia where it remains in a latent state. A contagious person has crusted lesions with no drainage.[7]

Three diagnostic stages of herpes zoster infections:
Patients with herpes zoster infections usually progress through three stages: (1) prodromal stage, (2) active stage (also called as an acute stage) and (3) chronic stage.[8,9] Some patients do not form vesicular eruptions of the active stage, but do develop pain restricted to a dermatome, and this has been termed zoster sine herpete which makes proper diagnosis difficult.[10]

The prodromal syndrome stage manifests as burning, knife-like prickly sensations occurring in the skin as a result of degeneration of nerve fibrils from viral infection activity. The rash of the active stage may arise either in a few hours to several days of the prodromal stage.[8,9]

The active stage is accompanied by generalized malaise, headache, low-grade fever and sometimes nausea. Erythematous papules and edema progress to vesicles in 12-24 h, finally leading to pustules within 1-7 days. Dried pustules become crusted and falloff in 14-21 days, resulting in hyper pigmented or hypopigmented scarring. Hemorrhagic necrosis causes loss of the epidermis and variable amounts of dermis.[8,9] Intraoral lesions usually appear after the cutaneous rash. Pain is very low when the rash is active, but may increase during crusting and scale phase. However, as a rash and scales clear the pain subsides.[8]

The stage of chronic pain syndrome is termed PHN. In PHN pain may occur beyond the period of healing, often lasting from months to years, even decades.[8,9,11] PHN pain has three distinct components: (1) A constant deep pain; (2) a brief recurrent shooting or shocking tic-like pain; (3) a sharp radiating sensation evoked by very light touching of the skin, known as allodynia.[12]

The most common oral complications associated with this condition are PHN, facial scarring, developmental anomalies, exfoliation of teeth and osteonecrosis of the underlying jaw bone (NICO). Oral physicians should have a thorough knowledge about the presentation of this condition, as 20% of the cases of herpes zoster infect the trigeminal nerve.[13]

NICO is a sequel of the action of several local factors which impair vascularization of the affected region of bone.[14] It was defined as a neurogenic pain syndrome caused by decreased bone vascularization with consequent tissue necrosis and formation of bone cavities difficult to see by imaging exams.[14,15] Along with edema of bone marrow and regional ischemic osteoporosis, ischemic necrosis may lead to the development of NICO.[16]

The continuity of chronic infectious processes triggered after tooth extraction in alveolar processes both of jawbone and mandible led to bone tissue necrosis and formation of cavities.[17,18] Professionals hardly associated facial pains to neuralgias or to bone origin, classifying pains with no dental origin as psychogenic.

The initial series of studies reporting asymptomatic cavitary bone lesions difficult to diagnose by conventional methods was published in 1976.[19] In 1926, Wilfred Harris, the neurosurgeon presented an etiologic theory where a chronic, low-intensity maxillomandibular bone infection surrounding some trigeminal branches could cause constant orofacial pain. This abnormal pain was due to neural degeneration or demyelination generating an anomalous nervous impulse.[14] Advanced imaging diagnosis processes and the study and detection of

genetic changes showed that decreased bone marrow blood flow causing bone cavities also include as a cause of NICO. Genetic mutations associated with NICO would predispose patients to thrombophilia and hypofibrinolysis.[20,21]

Two major theories for NICO etiopathogenesis have been suggested by some authors: One is infectious, considering bacteria as major disease-causing agents; the other is ischemic which has as its major cause bone tissue infarction due to lack of blood irrigation.[14,22]

Development Mechanism and Etiology

The mechanism of development of NICO is under study. However, the five triggering factors associated with NICO[14] are described below:

1. Local or systemic immunodeficiency which impairs local infection elimination
2. Presence of specific pathogenic bacteria impairing vascularization leading to infarction and necrosis
3. Lack of tissue vascularization leads to bone marrow infarction making odontogenic infections easier
4. Lack of neutrophils and/or macrophages would lead to decreased chemotaxis and phagocytosis, promoting infections
5. Lack or decrease of bone growth factors and a change in tissue pH, decreasing osteoinducing potential.

Researchers have concluded that hereditary factors are also associated with NICO as is seen in hereditary forms of thrombophilia and hypofibrinolysis.[13,15,16] 71% of NICO cases are caused by various factors like trauma, alcohol abuse, estrogen, prednisone, pregnancy, lupus erythematosus, sickle cell anemia, and use of chemotherapy for malignant neoplasias. Smoking and atherosclerosis are less commonly associated.[23]

Osteomyelitis and inanition are rarely associated with NICO.[24] Bisphosphonates are potential risk factors especially for patients undergoing tooth exractions, as they induce osteoclast apoptosis and inhibit the release of growth factors and other bone matrix factors.[25,26]

Histological Exam

The histopathologic picture depends on the duration and the intensity of blood flow decrease in the medullary bone. Dilated and sinusoidal medullary capillaries depict features of bone marrow edema, blood vessels with serous exudates, adipocytes, ischemic myelofibrosis in between fat cells and a slight dispersion of chronic inflammatory cells in regions of myelofibros trabecular bones appear viable, however inactive, thin and largely spaced. Some researchers consider presence of microinfarctions as hallmark signs of osteonecrosis.[16]

Masses of stained globular calcified necrotic debris similar to those generated by rotary tools may be seen. However, these are more peripheral in tissue fragments, which allows for their differentiation.[14,15,22]

Sometimes periapical and panoramic X-rays are not enough for an accurate NICO diagnosis.[14]

Studies[14,15] publishing NICO radiographic findings report the presence of light and discrete radiolucent areas, just like soap bubbles, and the radiopaque areas appear in the shape of cotton. It is possible to radiographically observe the lack of normal bone tissue healing, with the presence of lamina dura close to the alveolus, in the regions corresponding to the zones where teeth had been extracted.

It was reported by the same authors[14,15] that ischemic osteonecrosis is difficult to see in conventional X-rays, however when present it appears as a radiolucent area and there may be a weak oval central sclerosis surrounded by a thick radiolucent circle which is also surrounded by a thick sclerotic ring however poorly distinct, being also described as "bull's eye lesion."

Bone scintigraphy using technetium 99 is the golden standard for a bone marrow ischemia diagnosis. This technique is still being used although being expensive and needing intravenous contrast injection, in addition to resulting in 30% of false-negatives.[14,27,28]

An ultrasonography bone densitometer purportedly detects and precisely images porosity of the bone to aid medical professionals in diagnosing bone marrow edema syndrome, NICO, osteomyelitis and periodontal pockets of the buccal bone. However, there are no articles on the effectiveness of the device published in peer-reviewed medical journals.[29]

Treatment

Recommended therapy for herpes zoster should include (i) patient isolation, (ii) local management of skin lesions, (iii) control and elimination of pain, (iv) limitation of the extent, duration and severity of the disease with antiviral agents and (v) treatment of PHN.[8,9]

Isolation: Patients with herpes zoster infections are contagious to persons at high-risk. The contagion is transmitted as varicella zoster virus (chicken pox). Herpes zoster patients remain contagious until scaling and crusting have taken place.[8,9]

The skin: Management includes the application of open wet dressings followed by lotions. Gauze or a cloth soaked in cool water is applied to the rash area for 30 min, 3-6 times a day. However, occlusive ointments should be avoided.

Creams and lotions containing corticosteroids are not recommended.[8]

Pain: The acute pain of herpes zoster infection can be reduced during the prodromal phases by analgesics, such as acetaminophen, codeine and nonsteroidal anti-inflammatory agents. However, these analgesics are notoriously ineffective for the chronic PHN phase.[8,9]

Anti-viral drug therapy: Once a diagnosis of herpes zoster infection has been determined, anti-viral must be swift and precise. Acyclovir has been proven to decrease the duration and severity of the herpes zoster infection in the acute phase drastically, if treatment is started within 48 h of the onset of the rash.[8,9,1]

Acyclovir is beneficial in treating zoster infections due to its much higher rate of phosphorylation in herpes infected cells. Acyclovir also proves to be less toxic than other anti-viral drugs.[8] Dosage of 800 mg 4 times a day for 10 days remains the standard of care. Research has shown that dosages of up to 800 mg 5 times have been given with even more promising results.[30]

Specifically to address the acute stage of herpes zoster (famciclovir), for immunocompromised patients (valaciclovir) are used. In the former, the dosage is 500 mg every 8 h for 7 days; for the later it is 1 g 3 times daily for 7 days.[30-32]

PHN: Standard analgesic narcotic combinations are not effective in patients with PHN. The treatment for PHN pain includes the topical use of capsaicin cream (zostrix), transcutaneous nerve stimulation, topical anesthetics, injected local anesthetics, and low-dose amitryptiline.[9] Treatment is decided based on clinical and imaging exams. Complete resection of the painful bone tissue or bone marrow curettage is done followed by placing a sponge impregnated with antibiotics.[14,15,17,18] Local infiltration with tetracycline alone or combined with cephalexin has shown 90% improvement.[17]

The effects of warfarin and stanozolol have been studied in patients with NICO and have been proved to be effective. However, these drugs have relieved pain in just 5% of cases. Various authors presented cases on herpes zoster with osteomyelitis of bone, which are being summarized in Table 1 below for highlighting the untoward complication of herpes zoster.

CONCLUSION

Herpes zoster infection clinically presents as vesicular eruption along a specific dermatome. Various complications of herpes zoster include bone osteomyelitis and NICO. A case of herpes zoster of right mandibular nerve with viral osteomyelitis of right mandible as its complication is highlighted in this paper. Follow-up of such patients is very crucial due to its long-term complication.

Table 1: Various case reports on herpes zoster leading to alveolar necrosis highlighting old age and male predilection[33-39]

Authors	Age/sex of patient	Clinical features
Kim *et al.*	1st case - 78 years/male	Skin lesion along right maxillary and mandibular division pain and mobility of the mandibular right canine impaired healing and osteonecrosis of mandible after extraction of canine
	2nd case - 77 years/male	Skin lesion along the right mandibular division followed by sore gingiva in right mandibular canine premolar region with exposed cortical bone beneath it
	3rd case - 74 years/male	Lesions along the maxillary distribution followed by multiple mucosal vesicles and ulcer formation on the left palate together with mobility of the remaining teeth and alveolar bone resorption in edentulous state except the maxillary right and left central incisor, lateral incisor, and canine
Arikawa *et al.*	74 years/male	Vesicles and pustules on the right side of the lower lip, chin, cheek and external ear. Ulceration on the right side of the soft palate, buccal mucosa, and tongue. 44 days after the onset, the mandibular right lateral incisor, canine, and left lateral incisor were markedly loose and periodontal attachment tissue was necrotic
Onem *et al.*	76 years/male	Hyperesthesia over the vesico-bullous lesions on the left trigeminal nerve. The alveolar process became exposed in the premolar area of left mandibulary bone
Mendieta *et al.*	63 years/female	Redness of the alveolar mucosa and gingiva of the lower right quadrant with multiple well-delimited and painful erosive lesions affecting the attached gingiva around the teeth. 2 weeks later, lower right canine and lower right first premolar had class III mobility, flow of purulent exudate from the gingival sulcus,. Due to extensive necrosis there was no interdental alveolar bone
Kashinath and Shekar	58 years/male	Vesicular eruptions along the right maxillary division followed with open tooth socket with respect to 13 tooth region and exposed alveolar bone with respect to 14, 15, 16 region along with receded palatal gingival margin with respect to 14, 15, 16
Sharma *et al.*	44 years/male	Vesicular lesions along left maxillary and mandibular division followed by Odontalgia, alveolar bone necrosis and the spontaneous exfoliation of multiple teeth in left mandible and maxilla
Kwamin *et al.*	26 years/woman	Painful skin eruptions on the right face 4 months earlier. These progressed into the right cheek and then to the jaw causing severe toothache in the lower anterior teeth which became increasingly painful and mobile. The periodontium covering 41-44 was necrotic with roots exposed. The involved teeth were grossly mobile and held in place by the lingual alveolar mucosa and fibrous strands

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Case Report

Sacrococcygeal Teratoma: A Case Report with Its Embryological Basis

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Abstract

Teratomas are the tumors which are composed of tissue from all three embryonic germ layers. They may be benign or malignant, and are usually found in the midline. Sacrococcygeal teratoma is a common neoplasm which develop early in fetal life. It usually presents as a large mass extending from sacrum in the neonatal period. Diagnosis of which may be established by prenatal ultrasonography (USG). Perinatal morbidity and mortality are the risks associated with this defect. The present case had a big lump in the sacrococcygeal region. Further investigation including X-ray and USG of the effected region were done to confirm the diagnosis. The anamaly and its developmental basis is reported in this article.

Keywords: Investigations, Sacrococcygeal teratoma, Teratoma

INTRODUCTION

Sacrococcygeal teratoma (SCT) is a tumor that arises from remnants of the primitive streak, which normally degenerates and disappears. It is the most common germ cell tumor of childhood. It is derived from pleuripotent cells of the primitive streak and often contains various types of tissues (e.g. bone, nerve, hair). SCT occurs more commonly in females and usually becomes malignant during infancy (must be surgically removed by age of 6 months).[1] The tumor has been classified based on the location and degree of intrapelvic extension.[2] It arises from the Hensen's node which is made up of totipotent primitive cells.[3] It has malignant potential which parallels the age of the patient at presentation.[4] Complete resection of the tumor soon after birth provides an excellent prognosis.[5,6]

CASE REPORT

The case came from Department of Obstetrics, District Hospital, Sagar. It was a male child born by vaginal delivery, but with complications at the time of parturition. The neonate died immediately after birth. Complete examination of the case revealed a large mass in the sacrococcygeal region which had solid consistency. No other defect or deformity was reported (Figure 1).

Radiological investigation of the case was done which revealed (Figure 2):

1. Round soft tissue mass
2. With sclerotic material in it attached with an inferior part of the body
3. Rest of the bones are normal.

Ultrasonography (USG) of the Case was Done

On USG, a large heterogeneous predominantly solid mass with areas of cystic changes, heterogeneous echogenicity consistent with fatty changes seen at sacrococcygeal region. There are multiple hyperechoic foci within the mass sign of calcification (Figures 3 and 4).

DISCUSSION

The earliest record of SCT was in the cuneiform tablet of the Babylonian Chaldeans between 625 and 539 BC.[3,5] This neoplasm has been shrouded in mystery since then. The Chaldeans regarded this protuberance in the new

Figure 1: Case of sacrococcygeal teratoma

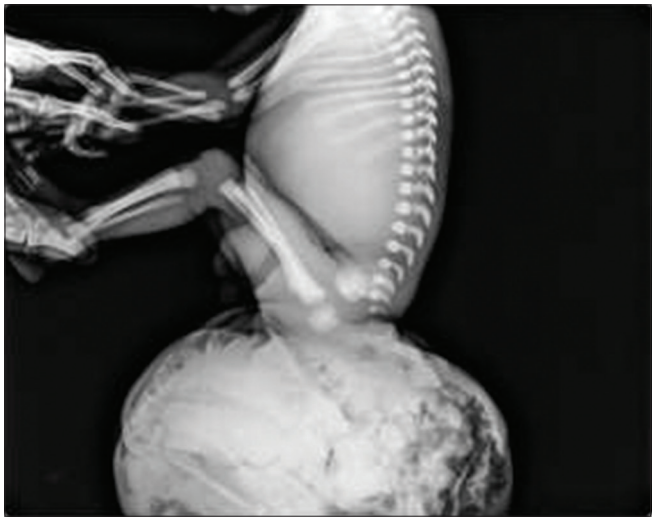

Figure 2: Lateral view of the present case showing the lesion

born infant as an omen of prosperity rather than a medical curiosity.[5] In certain African cultures, these babies are regarded as monsters, demons and babies from rivers, deities and sexual misconducts and as such a taboo to have such a baby.[7,8] Such babies are subjected to all forms of inhuman treatment and become victims of infanticide soon after birth.[7,9] Today, much is known about this interesting tumor. It is known to be a germ cell tumor and considered as a displaced ovum or a *fetus-in-fetu*.[5]

Figure 3: Ultrasonography of the case under study

Figure 4: Ultrasonography of the same case

Remnant of the primitive streak may persist and give rise to SCT. SCT have an incidence of 1 in 35,000. Most effect (80%) are female.[10] These tumors may also arise from primordial germ cells that fail to migrate to the gonadal ridge.[11] Although most of the tumor is usually external with a minimal intrapelvic presacral component, there is a spectrum of tumor distribution and ranges to the extent of being entirely presacral, with no visible external component. As such, a digital rectal examination of a neonate with care to feel the normal presacral space may be an important screening technique.[12]

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Case Report

Evaluation of Diode Laser in the Treatment of Fibroepithelial Polyp: A Case Report

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Abstract

Laser first came into light in 1960 and has been used extensively in various fields of medicine. Since it's invention, it has been experimented with in dental field and varying results have been seen, but now, with the advancements in the use of lasers, its utility is being recognized in the dentistry as well. Lasers are widely used for a number of procedures like cavity preparation, scaling and root planning, surgical procedures like excision of soft tissue growths etc. Improved healing, hemostasis and sutureless excisions are some of the many advantages of laser over conventional treatment modalities. It is because of these advantages that laser is becoming more and more popular as a treatment option in various aspects of dentistry. We hereby present a case report, where we have used diode laser for surgical management of a fibroepithelial polyp, because of its many advantages over conventional methods. Fibroepithelial polyp is most commonly seen at the site of trauma in mouth or in other areas of body. This polyp is usually not harmful and does not grow in size. However, at times, these tags may need to be surgically excised for aesthetic and functional purposes or for the fear of malignancy.

Keywords: Diode laser, Fibroepithelial polyp, Surgical excision

INTRODUCTION

Chronic and recurrent tissue irritationcauses excessive tissue response resulting in reactive lesions that are clinically and histopathologically categorized as non-neoplastic swellings. Some of the common examples are pyogenic granuloma, fibrous epulis, peripheral giant cell granuloma, fibroepithelial polyp, peripheral ossifying fibroma, giant cell fibroma, pregnancy epulis, and commonly manifest in the gingival.[1,2] Almost all lesions in the oral cavity that are called fibromas are not true neoplasms but are mere fibrous overgrowths caused by chronic irritation. Many authors therefore prefer the term fibroepithelial polyp or fibrous hyperplasia for these type of lesions.[3] There are many treatment modalities that can be used for these hyperplasic tissues such as the conventional scalpel excision, electrical surgery and the recently recognized laser surgery. Diode lasers is very commonly used in a variety of surgical procedures and has many advantages such as reduced scar formation, less pain and bleeding, and reduced chances of infection.[4] Lasers have been used in medicine and dentistry since early 1960s (Husein 2006). Laser, or light amplification by stimulated emission of radiation, is a device that generates a high-intensity parallel beam of monochromatic electromagnetic radiation. There are different types of lasers that are currently being used in dentistry depending on their wavelength range and their absorption. Carbon dioxide (CO_2), erbium-Yttrium-aluminum-garnet (YAG) lasers are absorbed by water because of which there is minimal penetration responsible for fast heating, with effective removal of soft and hard tissue. CO_2 lasers are mainly used as laser scalpels for the excision of tumors from soft tissues.[5] Laser wavelengths such as neodymium: YAG CO_2, and diodes have also been used successfully for various procedures.[6]

We are thus presenting a case report evaluating the efficacy of diode laser in the surgical management of fibroepithelial polyp with excellent and satisfactory result without any report of recurrence or need for a separate histopathological examination.

CASE REPORT

A 34-years-old male patient reported with the chief complaint of swelling in the left cheek region since 2 years, which was initially small in size but has gradually increased to attain its present size. There was no associated pain or secondary changes seen. The patient did not give any significant past medical and dental history.

On inspection a swelling measuring approximately 2 cm in diameter was seen on the left buccal mucosa irt 36 and 26. The swelling was pedunculated, the superficial mucosa and the surrounding area was normal (Figure 1).

On palpation, the swelling was non-tender, mobile, firm in consistency with well-defined margins.

Diode laser of 980 nm wavelength was used for the surgical excision. The laser was used in continuous mode at 2 W (Figure 2). The polyp was surgically excised using laser (Figure 3). A slight char tissue at the base of the wound was seen, this char acts a bio protective plug that has prevented bleeding and also helps to prevent infection in such wounds (Figure 4). The absence of bleeding was the most evident feature of this wound. The borders were rolled out and these borders flattened out later. The biopsy confirmed the case to be that of fibroepithelial hyperalsia (Figure 5).

The patient was recalled for follow-up after 7 days. On the 7th day follow-up, granulation tissue was seen which was sign of secondary healing (Figure 6). After 1 month, complete resolution of the lesion was seen (Figure 7).

Figure 1: Fibroepithelial polyp irt left buccal mucosa

DISCUSSION

The most common group of oral mucosal pathologies include benign neoplasm and hyperplastic fibro-epidermal tumorous lesions. The etiologies include long-term irritation, occlusal trauma, ill-fitting prosthetic appliances and habitual cheek biting. They are usually asymptomatic and in most of the cases, they remain unchanged for many years. Clinically, these reactive lesions often present diagnostic challenges to the diagnostician because they imitate various groups of pathological process. Although they are clinically similar, they differ in their histopathological features. They are often termed as "epulides" if they remain confined only to the gingiva. Almost all the fibromas of the oral cavity are not true neoplasms, but mere fibrous overgrowths caused by chronic irritation.[7] Many authors therefore prefer the term fibroepithelial polyp or fibrous hyperplasia for these type of lesions. Cooke named all such swellings of the mucosal surface as "polyp" (fibro epithelial polyp), with maximum

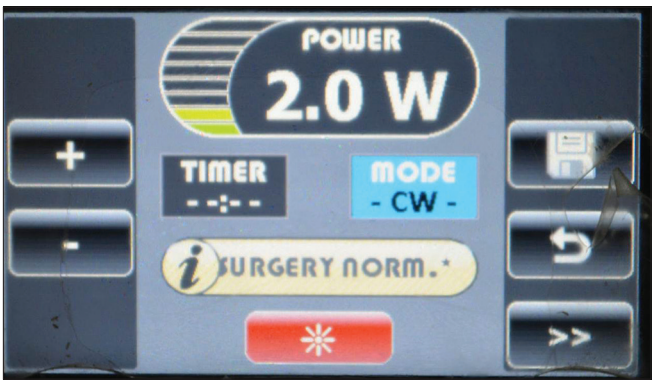

Figure 2: Laser settings

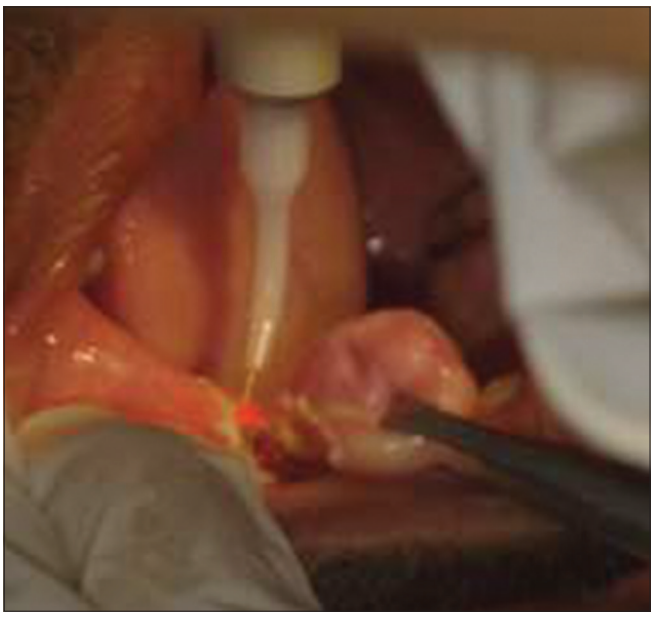

Figure 3: Surgical excision of fibroepithelial polyp using diode laser

Figure 4: Post surgery carbonization present at the base of the wound

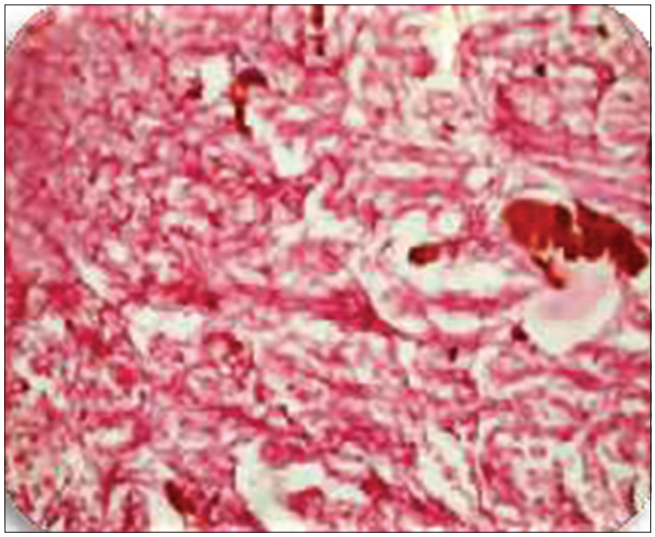

Figure 5: Histopathological slide showing bundles of collagen formation and moderately cellular connective tissue confirming the diagnosis of fibroepithelial polyp

number of lesions occurring long the line of occlusion.[8] Histological features include a focal sub-epithelial mass of fibrous connective tissue which contains interlacing or parallel bundles of collagen, with occasional vascular channel and inflammatory infiltrate. The fibroblast are narrow, elongated and relatively few. Recurrence rate of such lesions is very low.[9]

There are many different kinds of treatment modalities that may be followed for management of these hyperplastic tissues, such as scalpel excision, electrical surgery. In most cases where conventional surgery is done, complications such as intraoperative bleeding, difficulties in wound

Figure 6: Seven day follow-up showing healthy granulation tissue at the floor of the wound

Figure 7: One month follow-up showing complete healing of the wound

healing and maintenance of sterility during surgery are very commonly seen. With the recent advancements and developments in the field of lasers diode lasers has become the choice of treatment for excision of such benign tissue growths. Diode lasers have been used in a variety of soft tissue surgical procedures mainly because of its ability to decontaminate and bactericidal property which is responsible for lesser pain and swelling and post-operative analgesia. Other advantages includes reduced scar formation and lesser bleeding which provides a bloodless

field thus allowing the surgeon to get a better view of the field of operation.

As a result of improved healing and hemostasis, intraoral laser wounds can often be left without sutures, healing by secondary intention which is the most effective healing method when the wound involves multiple layers of mucosa.

In the present case we evaluated the advantages of diode laser for the treatment of fibro epithelial polyp, where the results that we obtained were excellent. The patient did not report recurrence of the tissue growth thereby eliminating the need for another histopathological examination.

CONCLUSION

Diagnosis of such reactive hyperplastic gingival lesion is based on formulation of a correct differential diagnosis to allow accurate evaluation and management of these lesions. These lesions must be clinically and histologically differentiated from precancerous, developmental and neoplastic lesions. Laser is often used as a successful treatment modality for obtaining biopsy specimens. The application of lasers as a substitute of soft tissue surgeries is also gaining more and more recognition. Laser treatments have been shown to be superior over conventional mechanical approaches because of its ability to easy ablate, decontaminate and better hemostasis, as well as less surgical and post-operative pain in soft tissue management.

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Case Report

Bronchial Carcinoid: A Case Report

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Abstract

Carcinoid tumors are tumors of low-grade malignancy. They constitute about 1-2% all lung tumors. The tumor is considered to be of Kulchitsky origin belonging to diffuse endocrine system. Most cases are seen in adults and present as slow growing polypoidal mass in major bronchus leading to hemoptysis and pulmonary infection due to blockage of distal bronchi. The present case is a 65 years male, smoker who presented with cough, breathlessness and hemoptysis. Radio imaging and cytology revealed neoplastic lesion in the right bronchus. During the hospital stay, the bronchial mass was expectorated with a bout of hemoptysis that on histopathology and immunohistochemistry showed features of typical carcinoid tumor. The case is presented for its rarity and unusual course of events in the form of expectoration of bronchial mass.

Keywords: Bronchial carcinoid, Kulchitsky origin, Mass expectoration

INTRODUCTION

Carcinoid tumors are neuroendocrine tumors derived from entero chromaffin or Kulchitsky cells, which are widely distributed in the body.[1] Carcinoid tumors may develop in many locations in the body, but most often they are found in small intestine (26%), respiratory system (25%) and appendix (19%).[2] They are characterized histologically by positive reaction to silver stains and to markers of neuroendocrine tissue, including neuron specific enolase (NSE), synaptophysin and chromogranin.[3] Bronchial carcinoid tumors termed (incorrectly) as bronchial adenomas in the past are uncommon pulmonary neoplasms.[4] They make up 1-2% of all lung tumors.[5] They often arise in persons who are younger than is usual for lung cancers and male to female ratio is 1:1.

CASE REPORT

A 65 years male who was chronic smoker presented with

- Breathlessness, cough with expectoration and hemoptysis since 1 year
- Anorexia and weight loss since 1 month.

General examination: Within normal limits

Systemic examination: Decreased air entry at base of right lung.

Bronchoscopy showed: Polypoidal mass at right main bronchus near to carina.

High-resolution computed tomography (CT) thorax showed: Mass lesion at right parahilar region with collapse of lung - Suggestive of carcinoma lung

Pleural fluid and sputum examination were negative for malignancy. However brush cytology and CT guided fine needle aspiration cytology (FNAC) from the bronchial mass revealed clusters of monomorphic tumor cells with round nuclei showing salt and pepper appearance of nuclear chromatin (Figure 1).

During his hospital stay, patient had severe bout of cough and hemoptysis and the bronchial mass was expectorated.

The mass was received in Department of Pathology, MIMER Medical College, Talegaon Dabhade.

On gross: The mass was polypoid, 4 cm × 2 cm × 2 cm, blackish and hard in consistency (Figures 2 and 3).

On histopathology: Diagnosis of typical carcinoid was given which was confi rmed by positivity for chromogranin, synaptophysin and NSE on immunohistochemistry (IHC) (Figures 4-6).

DISCUSSION

In neuroendocrine tumors, three grades based on histologic features and biologic behavior are currently recognized-Grade I or typical carcinoid, Grade II or atypical carcinoid and Grade III or small cell carcinoma/ large cell carcinoma.[6]

Typical carcinoids occur in both sexes with equal frequency and the age at onset ranges from childhood to 9th decade.

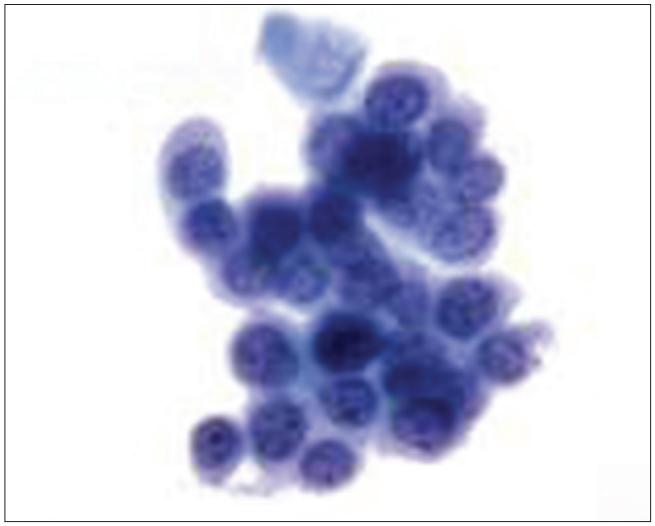

Figure 1: Photomicrograph of fine needle aspiration cytology smear showing monomormphic tumor cells with salt and pepper appearance of nuclear chromatin (H & E, ×40)

Figure 2: Polypoid tumor mass 4 cm × 2 cm × 2 cm

Figure 3: Cut section of tumor mass showing blackish areas

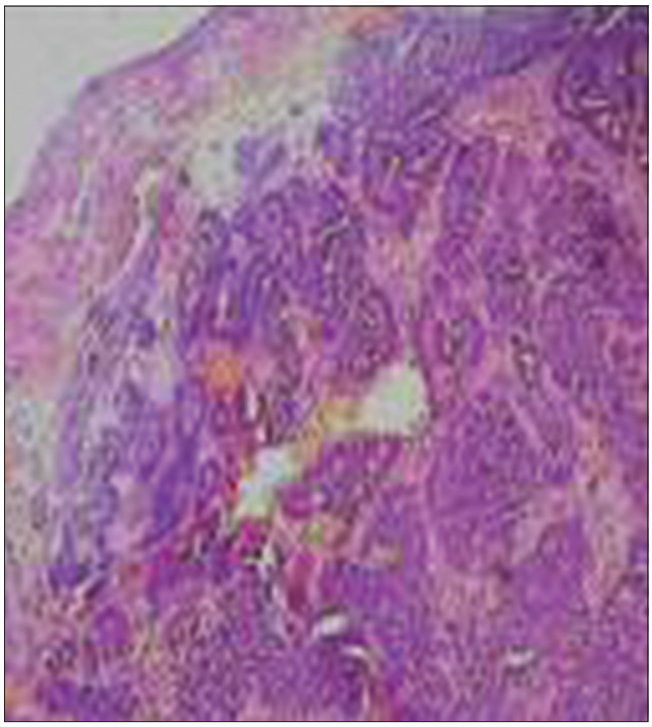

Figure 4: Photomicrograph showing tumor mass covered with intact bronchial mucosa. Tumor cells are arranged in organoid pattern (H & E, ×40)

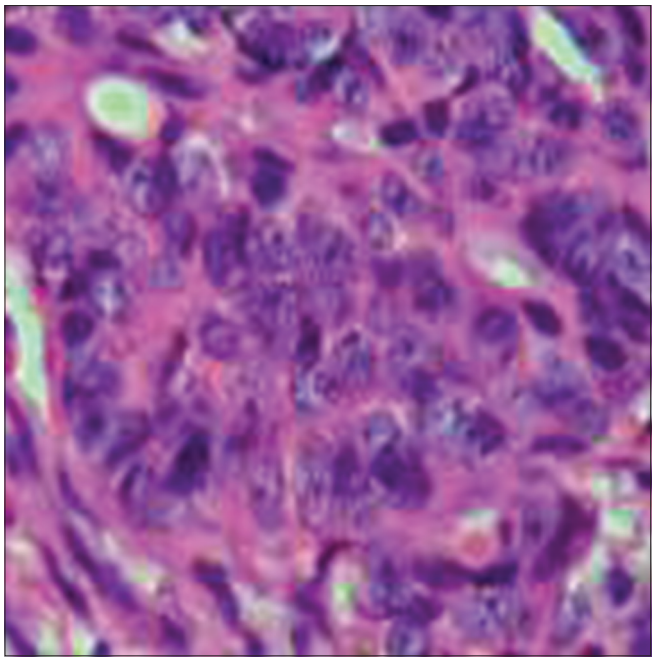

Figure 5: Photomicrograph showing tumor cells with characteristic salt and pepper appearance of nuclear chromatin (H & E, ×40)

They show no association with smoking. However, atypical carcinoids occur in older patients with smoking as a risk factor. Many patients with typical carcinoid are asymptomatic, but dyspnea, cough and hemoptysis may occur particularly in central lesions.[6,7]

Usually, clinical features include local symptoms due to angulation or obstruction and hepatomegaly due to liver metastasis.[8]

Our patient was a 65-years-old male, chronic smoker who presented with breathlessness, cough with expectoration and hemoptysis.

The bronchial mucosa overlying carcinoid tumors is frequently intact or may show squamous metaplasia. Therefore, cytological examination of sputum is frequently negative and only brushings or FNA of the lesion may succeed in harvesting large number of malignant cells.[6]

In present case brush cytology and CT guided FNAC showed clusters of monomorphic neoplastic cells with round to oval nuclei showing salt and pepper appearance of nuclear chromatin.

Mostly, these tumors arise in main to the segmental bronchus, but tumors of peripheral origin are occasionally seen.[9]

Grossly, the tumors are polypoid, tan to yellow, 0.5-8 cm in diameter and covered with intact bronchial mucosa.[9,7]

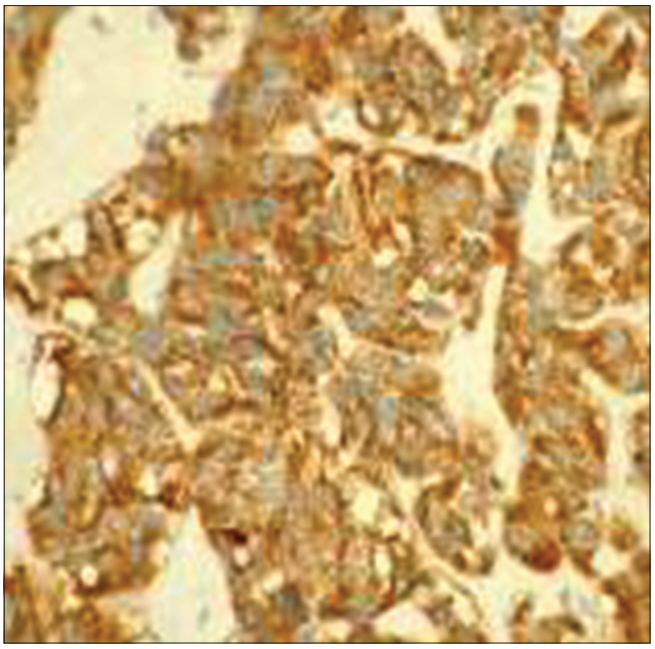

Figure 6: Photomicrograph showing tumor cells with positivity for chromogranin (immunohistochemistry, ×40)

Histologically typical carcinoid exhibit an organoid pattern and the nuclear chromatin of the tumor cells showing "salt and pepper" appearance. According to recent WHO classification, atypical carcinoid differs from typical carcinoid by the presence of punctuate coagulative necrosis and or mitotic indices ranging from 2 to 10 mitosis/10 high-power fields. In both typical and atypical carcinoid the stroma is vascular.[3] Carcinoid tumors whether typical or atypical stain positively for chromogranin, synaptophysin, and NSE.[6]

In the present case, the tumor was located in right main bronchus and was polypoid, measuring 4 cm × 2 cm × 2 cm. Histologically features of carcinoid tumor with occasional mitotic figure were seen. Areas of necrosis were not seen. IHC was positive for chromogranin, synaptophysin and NSE. Hence, the diagnosis of typical carcinoid was given.

Treatment of typical carcinoid is surgical and usually involves lobectomy or pneumonectomy with lymphadenectomy.[6,7] Metastases are usually to regional lymph nodes however distant metastases to bone can also occur and liver involvement may be associated with carcinoid syndrome.[6]

At the time of diagnosis 10-15% of typical carcinoid and 40-50% of atypical carcinoid present with lymph node metastasis. Typical carcinoids have an excellent prognosis, and overall 5 and 10-year survival rate are 90-98% and 82-95% in typical carcinoid and only 61-72% and 35-39% in atypical carcinoid.

With metastatic disease chemotherapy can be given with cisplatin based or streptozocin based regimen with moderate effectiveness.[7]

In the present case, carcinoid syndrome or metastases were not seen.

Unfortunately, our patient went home against medical advice. Hence, further follow-up was not possible.

CONCLUSION

Differential diagnosis of carcinoid tumors includes separation from other neuroendocrine tumors and a wide variety of other tumors. Tumors like sclerosing hemangioma, paraganglioma, glomus tumor and adenocarcinoma may resemble carcinoid. IHC is helpful in making the final diagnosis. After separation of typical carcinoid from atypical carcinoid, stage is the most important prognostic factor. However, even with lymph node metastasis typical carcinoid carries an excellent prognosis. Therefore, it is very important to distinguish between typical and atypical carcinoid.

In the present case, the diagnosis of typical carcinoid was given. The case is presented for its rarity and unusual course of events in the form of expectoration of the bronchial mass.

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Case Report

Non-small Cell Carcinoma of the Lung with Isolated Bilateral Adrenal Metastasis: Imaging and Review of Literature

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Abstract

Adrenal metastases are common in patients suffering from non-small cell lung cancer (NSCLC) accounting up to 40% in advance cases, in contrast to 20-45% of all cancer patients. Unilateral adrenal metastases is frequent while bilateral adrenal metastases especially isolated cases are exceedingly rare and diagnosed incidentally during staging of patients with lung cancer. Bilateral adrenal involvement only accounts 3% at the time of diagnosis. Here we present a case of isolated large bilateral adrenal metastases from NSCLC patient who was symptomatic at presentation, treated with common anticancer drugs without any complications and along with we also describing relevant imaging findings and literature review.

Keywords: Anticancer drugs, Isolated bilateral adrenal metastasis, Non-small cell lung cancer

INTRODUCTION

Lung cancer is leading the cause of cancer-related death in both male and female[1] and 70-80% is constituted by non-small cell lung cancer (NSCLC). Long-term survival of the patients are limited when there is systemic dissemination of cancer even after surgical or medical treatment.[1,2] The adrenal glands are a common site for systemic spread for NSCLC, others include breast cancer, renal cancer, bowel cancer, melanoma, and lymphoma.[1] The adrenal metastases seen around 10% of NSCLC at the time of initial diagnosis. Unilateral adrenal metastases is frequent, but bilateral adrenal involvement in the case of lung cancer is not common and is usually associated with diffuse systemic spread of the primary.[3] In contrast to this, we discuss the case of locally advanced NSCLC presenting with symptomatic isolated large bilateral adrenal metastasis without other organs involvement. This isolated spread is due to lymphatic dissemination by retroperitoneal channels or early veno-occlusive entrapment of tumor emboli by adrenal glands. Such a large adrenal mass poses serious complication, although rare, like spontaneous hemorrhage, rupture and adrenal insufficiency, thus early surgical treatment is advocated to prolong disease-free interval. However, if surgery is not possible, suitable chemotherapy and/or radiotherapy is given.

CASE REPORT

A 56-year-old woman presented with recent onset of diffuse low-grade abdominal pain, heaviness and dragging sensation mainly around both hypochondrium and lumbar regions, and also noticed abdominal discomfort on compression over lumbar regions. She had a chronic history of dry cough become productive on winter season and was bidi smoker for last 20 years with a frequency of 15-20 bidis/week. On clinical examination, all vital signs are normal and unremarkable with visible mild fullness of lumbar regions marked in the left side. Reduced resonance on percussion and breath sound on auscultation noted in the left upper lobe region of the thorax and mild tenderness over both lumbar region, but no palpable lump felt on abdominal examination.

Her laboratory examination was unremarkable except anemia hemoglobin (Hb = 8.1 g/dl). Patient was referred to the radiology department for further imaging evaluation like chest X-ray and abdominal sonography. Chest X-ray revealed a homogeneous opacity in left upper lobe from hilum to lateral thoracic wall. Ultrasonography of the abdomen showed (Figure 1) well encapsulated heterogeneous bulky mass in relation to the upper pole of the kidney on both sides. The mass lesion having areas of cystic changes. In view of opacity in the left lung, these mass reported as bilateral moderate to large adrenal metastasis from lung mass. A complimentary computed tomography (CT) scan of thorax and abdomen was done on 16 slice multidetector scanner without contrast and with contrast. CT scan showed moderate size enhancing soft tissue mass in the upper lobe of left lung (Figure 2a and b), encasing the neck vessels at the root of neck, infiltrating the fat plane of arch of aorta, main pulmonary trunk, left pulmonary branch insinuating into aorto-pulmonary window and left hilum associated with chest wall infiltration. Few enlarged precarinal lymphnodes also seen. While abdominal scans (Figure 3a-c) revealed bulky bilateral adrenal masses. The left one measuring 80 mm × 62 mm and the right one 61 mm × 40 mm with central cystic changes. The adrenal masses are compressing the renal capsule and encasing the renal vascular pedicles. No evidence of any recent hemorrhage into the adrenal tumoral mass. Fine-needle aspiration cytology was done from lung mass and adrenal mass as well which confirmed the adenocarcinoma of the lung mass and similar cellularity of the adrenal mass. Whole body bone scan showed no abnormal tracer uptake. Final diagnosis was NSCLC with isolated large bilateral adrenal metastases (T3N1M1). The treatment plan was advised as an early surgical adrenalectomy and palliative chemotherapy for lung mass. However, because of bilaterality of the adrenal lesion, the poor Hb status and lack of such surgical facility, she was finally kept on chemotherapy. Patient was given 6 cycles of chemotherapy containing folic acid based pemetrexed and platinum based carboplatin. She was followed-up regularly and found that she tolerated the drugs well having only complaint of mild nausea, vomiting, and occasional diarrhea. No worsening of her symptoms or any evidence of symptoms/signs correlate with acute hemorrhage, adrenal insufficiency or rupture of mass during chemotherapy. After 12 months of follow-up, she was revaluated by abdominal sonography and CT scan of thorax and abdomen. There was evidence of the increase in size of the lung mass and few more appearance of para-tracheal lymphnodes, but no change in adrenal mass size or its any complications like hemorrhage or rupture noted. Thus labeled as progressive lung lesion and treated for another 4 cycles of chemotherapy with changing the drugs, i.e. gemcitabine and docetaxel and advised coming after 1 month. However unfortunately she was lost to follow-up thereafter probably she became symptom-free or treatment is costly for her.

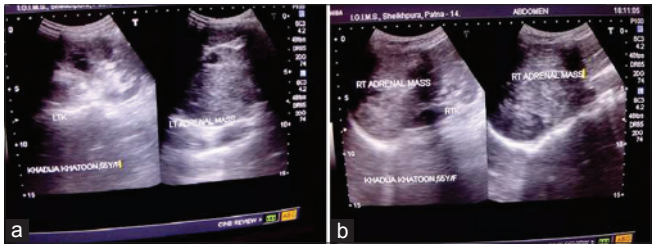

Figure 1: (a) Upper and (b) lower. Ultrasonography images of the abdomen showing large bilateral adrenal masses (metastases) mainly solid with few cystic spaces

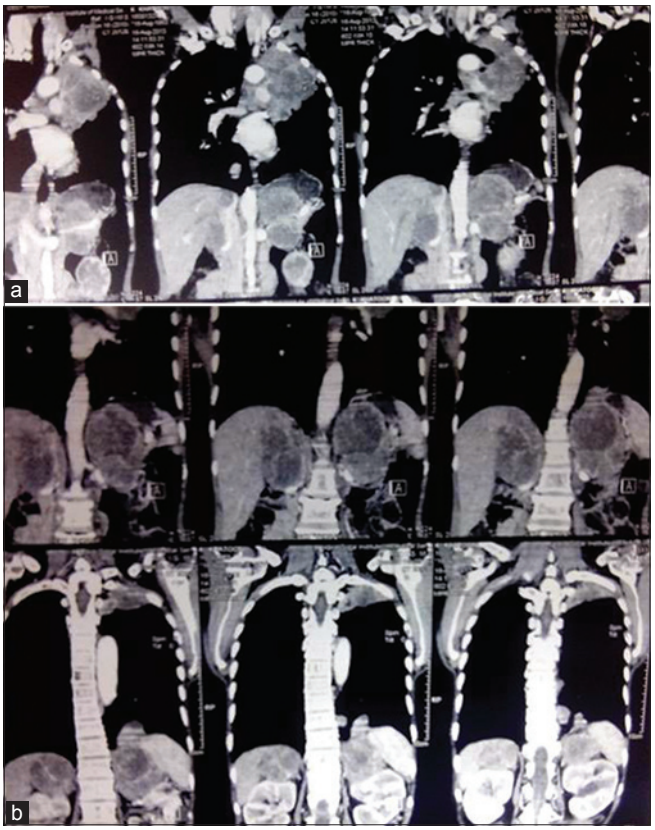

Figure 2: Coronal reconstructed contrast computed tomography scan of the thorax including the upper abdomen (a and b) showing a large left upper lobe mass that has infiltrated the fat planes of arch of the aorta, pulmonary trunk, left pulmonary artery branch, thoracic wall and insinuated the left hilum and associated with pre-carinal nodes. Large isolated bilateral adrenal masses also visualized

DISCUSSION

Although adrenal glands are a common site of metastasis for NSCLC, others also include breast, kidney, gastro-intestinal tract, melanoma, and lymphoma.[4] Adrenal metastasis constitute <10% (1.6-3.5%) in a patient

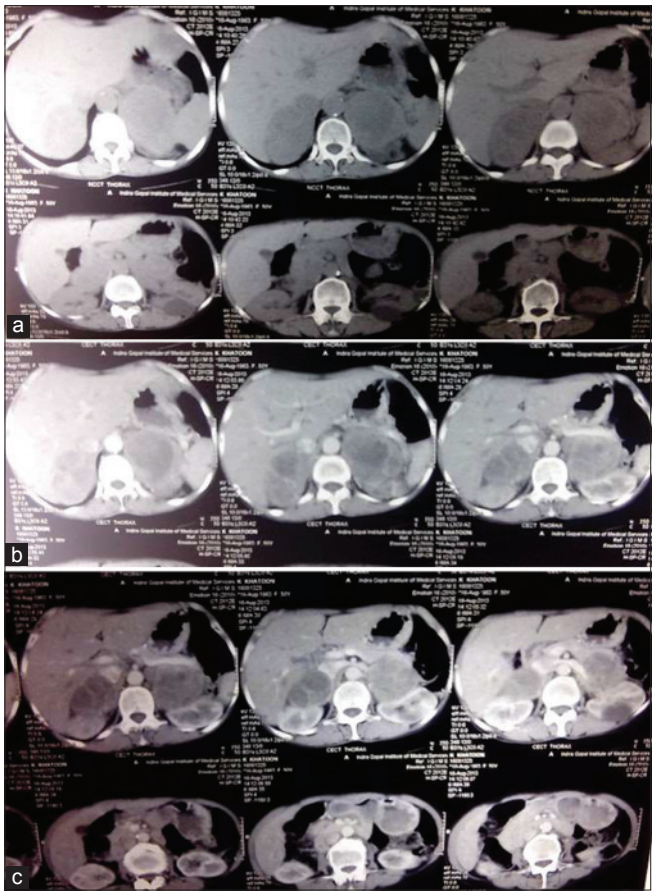

Figure 3: Axile noncontract (a) computed tomography (CT) scan showing large bilateral adrenal masses with no evidence of calcification, fat or intratumoral hemorrhage, while contrast images (b) showing heterogeneous enhancement of adrenal masses with displacement of adjacent vessels and indentation over renal capsule. (c) Axile contrast CT scan showing large bilateral adrenal masse with multiple cystic necrotic areas and compression of the renal capsule with encasement of renal vascular pedicle on respective sides

presenting with NSCLC. Isolated metastatic involvement alone is very rare and bilateral is even more rare.[5] Metastases means wide spread systemic dissemination and caries poor prognosis leading to patient loss even after treatment.

Most adrenal metastasis are incidentally diagnosed by abdominal imaging either patient was symptomatic by abdominal discomfort or during the staging evaluation.[5]

The sensitivity of CT scan in the evaluation was low, but its specificity was high, in a study involving 53 adrenal glands with a proven metastasis from lung cancer.[5] Magnetic resonance imaging (MRI) is best to differentiate between adrenal metastases and adrenal adenoma, where adenoma appears hypointense (due to fat) and metastases is hyperintense (due to cystic change).[3] Any isolated adrenal mass >3 cm should be investigated thoroughly in diagnosed NSCLC and CT guided biopsy is advised.[6]

In metastatic NSCLC, palliative chemotherapy is generally the common method of treatment. Most studies and reports demonstrated that patient survival can be prolonged by surgical resection of isolated metastasis such as brain, and it is also useful and safe for adrenal in a selected patient where primary lung cancer is in early stage.[7]

According to the hypothesis, the cause of isolated adrenal metastasis in lung cancer is direct lymphatic spread from the primary tumor via retroperitoneal channels representing a loco-regional spread in contrast to systemic spread. An isolated adrenal metastasis is defined as synchronous if it is diagnosed within 6 months of initial diagnosis of primary lung cancer and metachronous metastasis when diagnosed after 6 months. The surgical approach for synchronous adrenal metastasis in a patient with operable NSCLC was safe and increases patient survival.[7] Adrenalectomy for solitary metachronous adrenal metastasis also lead to long survival of the patient in completely resected primary mass.[8] Where adrenalectomy is not feasible palliative chemotherapy and/or radiation therapy is used as like other metastatic disease.[3,9] The independent predictor of poor survival in a patient with adrenalectomy is loco-regional lymphnode metastasis noted at surgery for primary NSCLC.[10]

Laparoscopic adrenalectomy is also a safe procedure in a patient for resected primary lung mass, but not implicated if the size of metastasis is >5 cm as it increases the risk of dissemination and tumor recurrence.[3,11]

Adrenal hemorrhage and insufficiency are rare but serious complication, and the risk is high when metastatic mass is large. In such cases, the early adrenal resection is strongly suggested.[3]

According to Porte *et al.* the median survival of patients underwent adrenalectomy was 11 months in a multicentric study and no significant difference noted in survival between synchronous and metachronous presentation.[12] However, according to Tanvetyanon retrospective study on survival of adrenalectomy in NSCLC patients, median survival was shorter for synchronous adrenal metastasis than metachronous adrenal metastasis. The cause for this is intrinsic biology of tumor where synchronous lesion grows faster or more aggressive in nature. According to Soffen *et al.* median survival was 6 months for palliative radiotherapy for isolated adrenal metastasis done on nine patient with lung cancer.

All patients must be thoroughly investigated with a positron emission tomography scan, MRI brain, whole body bone scan and mediastinoscopy to rule out any possibility of more advanced stage of disease, if they presented with early stage of NSCLC with isolated adrenal metastasis.

CONCLUSION

Solitary adrenal metastases is very common in NSCLC but isolated large bilateral adrenal metastases is exceedingly rare. The possible cause for isolated metastases is lymphatic spread through retroperitoneal lymphatic channels. Although rare, large adrenal metastasis has risk of complication like hemorrhage thus early surgical measures are recommended. If surgery is not possible palliative chemotherapy and/or radiotherapy can be given to improve the patient survival.

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Case Report

Stoppas Revisited: A Case Report of a Recurrent Bilateral Inguinal Hernia

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Abstract

Amongst the vast majority of hernias present, inguinal hernias form the major bulk of cases. They can be benign if left untreated but always have a potential risk of complications like obstruction and strangulation. Many types of hernia repair surgeries have been described in the past, and all of them are generally safe and effective. Complications include infection, seroma, hematoma, chronic pain, and recurrence. Subsequent surgical treatments after a recurrence have a much higher failure rate. This article discusses a 61-year-old male patient who presented with recurrent bilateral inguinal hernia and was operated on using Stoppas groin hernia repair.

Keywords: Bilateral, Hernia, Recurrent, Stoppa

INTRODUCTION

"A hernia is defined as a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of it's containing cavity."[1] Bilateral inguinal hernias occur in 6-8% of groin hernias.[2] The recurrence rates of inguinal hernias are anywhere between 0.2% and 10%.[3] Inguinal hernias are problematic in that the risk of recurrence increases with every subsequent surgery for a hernia. A study indicated 3rd time recurrences have failure rates as high as 50%.[4] They also bring along with it the usual problems of any surgery such as infection, pain, cost and quality of life.

Multiple surgeries have been described for hernia repair. There are two methods to achieve this, tissue or tension repair technique and tension-free repair technique. Tension-free repair today is most popularly used for hernia repairs which involves the use of prosthetics for reinforcing and rebuilding the posterior inguinal wall. This procedure has replaced tension repair in which adjacent muscles are cut and sutured so as to cover the inguinal defect through which the hernia is protruding. For recurrent bilateral inguinal hernias the popular methods are Lichtenstein's repair, Stoppas repair, Wantz and Nyhus. Laparoscopic repair for inguinal hernias are being increasingly used. Two techniques used are transabdominal preperitoneal hernioplasty, which uses the same principles as Stoppas repair, but carried out laparoscopically and total extraperitoneal repair. Although there is no clear superior approach, laparoscopic hernia repair has been shown to have a mildly increased risk of recurrence compared to open hernia repair.[5] With that in mind and factoring the increased cost of the surgery it was decided to proceed with an open hernia repair.

CASE REPORT

The patient was a 61-year-old-male, a driver by profession who presented with bilateral inguinal swellings, with the left side greater in dimensions than the right. He also complained of mild pain on the left inguinal swelling.

He had no history of fever, nausea, vomiting or constipation. He denied any changes in his bowel or bladder habits. The patient reported a past history of inguinal hernias. He was operated for bilateral inguinal hernia at the age of 17 years

and had a recurrence of the left inguinal hernia when he was 54 years of age for which he was operated with meshplasty. He reported both surgeries went off well and showed no evidence of post-operative infection at incision sites. He also had a history of hemorroidectomy. The patient had no history of diabetes mellitus, hypertension, pulmonary complications or difficulty urinating.

On examination, the patient was in no acute distress. On local examination, the swellings were non tender and showed no warmth or erythema bilaterally. The swellings were reducible, positive for cough impulse, negative for transillumination test. On per rectal examination, Grade 1 prostatic hypertrophy was present. A provisional diagnosis of recurrent direct bilateral inguinal hernia was made.

The patient was sent for an ultrasonography which confirmed a bilateral inguinal hernia with contents of the sac identified to be bowel. On routine blood investigation, the patient was diagnosed with high blood sugar and was posted for surgery after it was brought under control.

Surgical Technique

Stoppa's approach was first published in 1975 by Rene Stoppa, in which he described fitting an unsutured Dacron patch between the peritoneum and the muscular layers of the abdominal wall via a median lower abdominal incision.[6]

Stoppas groin hernia repair also called as giant prosthetic reinforcement of the visceral sac. The principle of the surgery is that the implanted mesh acts as a fascia preventing the herniation of the visceral sac through the myopectineal orifice.

The patient was taken under spinal anesthesia. A midline infraumbilical incision was taken extending 2 cm below the umbilicus and 1 cm above pubis symphysis. With blunt dissection, the preperitoneal space was entered. Dissection was done through the retropubic space of retzius and borgos and continued laterally up to the retroinguinal space, remaining posterior to the rectus abdominis. The hernia was identified and then reduced. The same was done on the opposite side. Tension free repair was achieved by dissecting the spermatic cord and gonadal vessels from their peritoneal attachment and placing a mesh. The polyester mesh was placed in the space between the peritoneum and the transversalis fascia without the need for fixation as the intraabdominal pressure holds it flat (in this case, the patient was fitted with a mesh of 15 cm × 15 cm). The size of the mesh is measured on the patient with the width equaling the distance between the anterior superior iliac spines and height equaling the distance between the umbilicus and the symphysis pubis plus 6 cm.[4] The abdomen was closed without placing a suction drain.

The patient was given clear liquids 8 h later and progressed to a soft diet after 12 h. Patient was doing well post-operatively and discharged on post-operative day 3. Patient was advised to avoid lifting weights heavier than 20 lbs. for the first 2 weeks after which he was advised to resume a normal lifestyle without any restrictions. The patient has been followed up post-operatively and is doing remarkably well.

DISCUSSION

There is considerable debate about the best technique used to repair inguinal hernias. The main factor to take into consideration when comparing various surgical techniques in recurrent hernia cases is the rates of recurrence and anatomic basis of the hernia. There is a general consensus that one must try to avoid using the same technique on a patient that has failed before. Other factors to look at are post-operative complications like infection and chronic pain, length of hospital stay, cost of the procedure, length of the training period, complexity of surgery and operating time so as to minimize the duration of anesthesia.

A study comparing Stoppas technique to Lichtenstein technique showed that patients operated on by Stoppas had shorter operative time, smaller incision length, shorter mean hospital stay, lower scores on the pain score scale and of most vital importance no recurrences compared to Lichtenstein's technique. The Figures reported were that Stoppas repair had operative time of 52 ± 20.7 min compared to 75 ± 16 min using Lichtenstein technique. The length of the incision using Stoppas was 10.6 ± 2.7 cm compared to the sum of bilateral incisions of 15.5 ± 3.6 cm using Lichtenstein. Mean hospital stay was 2.6 ± 1.8 days in patients treated with Stoppas technique compared to 4.9 ± 1.3 days in patients treated with Lichtenstein technique. There were no recurrences in patients treated with Stoppas while recurrences were present in 13.3% of the patients treated with Lichtenstein technique.[7] Another study comparing quality of life outcomes showed that following Stoppas operation long-term quality of life was superior compared to bilateral Lichtenstein technique in bilateral inguinal hernias.[2]

Another study comparing rives technique with that of Stoppas showed that rives technique had a 5.7% recurrence

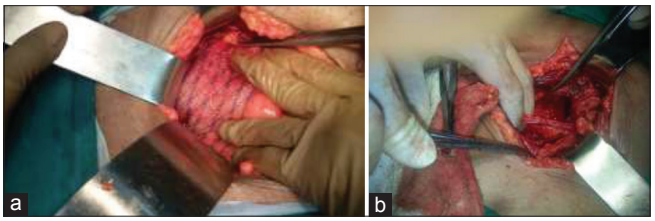

Figure 1: (a) placement of mesh in the preperitoneal plane (b)triangle of doom

rate while patients treated with Stoppas repair had a complete absence of recurrences.[8]

CONCLUSION

Stoppas procedure is safe and reliable. Theoretically, it is not possible to get recurrences after the procedure, although they do occur occasionally, mostly attributed to errors in size of the mesh and placement of the mesh.[9] It has improved quality of life outcomes, with lower post-operative pain, early return to normal activities and dramatically reducing recurrence rates. It should be offered to all patients with complex, recurrent bilateral hernia.

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Case Report

A Rare Case of Cysticercosis of the Abdominal Wall

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Abstract

Cysticercosis is a parasitic disease caused by *Taenia solium*. In the developing world, it is a major health concern. Intestinal infection is known as Tiniasis, and it is quite asymptomatic, in severe conditions it can cause intestinal irritation, anemia, loss of appetite and emaciation. Tissue infection is called cysticercosis, isolated soft tissue cysticercosis of the trunk is uncommon and may be difficult to diagnose. Here we report an unusual case who presented with abdominal wall swelling without central nervous system and ophthalmic involvement.

Keywords: Cysticercosis, *Taenia solium*, Tapeworm

INTRODUCTION

Cysticercosis is a tissue infection by the *Taenia solium*. Infection is acquired through ingestion of raw or under cooked meat/pork containing the cysticercus, that's why it is also known as pork tapeworm. Man is an intermediate and pig is a definitive host.[1] Cysticerci can be found anywhere in the body. Diagnosis is made by the biopsy of the lesion. Patients may usually asymptomatic for years, develop approximately one to two centimeter painless lump in the skin and muscles, or have neurological symptoms if the brain is affected. When cysts are found in the brain, it is known as neurocysticercosis. In the developing countries like India, this is one of the most common causes of seizures.[1]

The disease is usually spread by eating foods that contains the tapeworm's eggs, especially in non-vegetarian people.[2] In vegetarian people it can be caused by uncooked vegetables. Diagnosis is made by computed tomography (CT), magnetic resonance imaging serological investigations, histopathology.[3-5] In routine investigations, eosinophil counts usually raised. In our patient eosinophilia was present. In Indian scenario, this case needs documentation in the medical literature so that clinicians can have a differential diagnosis of an asymptomatic lump in the skin.

CASE REPORT

A 6-year-old boy presented with a painless swelling on the right side of the abdominal wall at the level of umbilicus, noticed by mother while bathing the child 8 days back. He was a non-vegetarian residing in a rural locality. On examination there was an ovoid, freely mobile non tender swelling measuring 2 cm × 1 cm in size. Routine examination of the patient revealed eosinophilia, eosinophil counts were markedly raised. Other routine investigations were with in normal limit. There was no history of trauma. He underwent excisional biopsy. Histopathology confirmed cysticercus cellulose shown in Figure 1. He did not have any neurological symptom, seizure or visual disturbance. CT scan head and ophthalmic examination were unremarkable. Patient discharged with course of prednisolone 20 mg OD followed by albendazole 400 mg OD for 21 days. Routine blood investigations were normal. In regular follow-up patient is having no clinical complaints (Figure 2).

DISCUSSION

Cysticercosis is a parasitic infection caused by cysticercus cellulosae, the larva form of *Taenia solium*. Whereas the infestation of the human intestine with an adult tapeworm

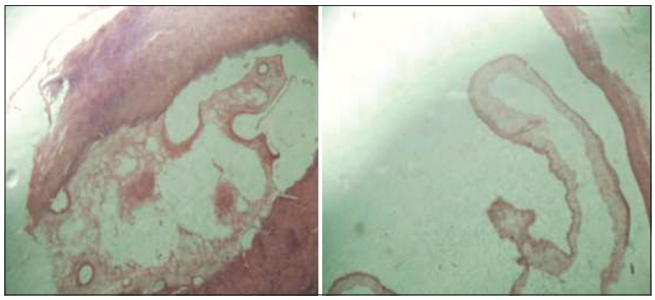

Figure 1: Histopathologic photographs showing scolex

Figure 2: Post-operative photo of patient showing scar of surgery

is known as Taeniasis. Human are the only definite host while human and pig can act as intermediate hosts. The mode of transmission is feco-oral. The most common being the consumption of raw or under cooked beef or pork, water or vegetables contaminated by Taenia eggs.[1]

Humans become the dead end host of the *T. solium* larvae when they drink contaminated water or eat raw or poorly cooked vegetables or pork infested with larvae.[2]

The most common site of occurrence of cysticercosis of soft tissue cysticercosis is skeletal muscle of the upper extremities.[3] Abdominal and chest wall lesions are seen less often.[4,5]

Isolated soft tissue cysticercosis is often used as a marker of neurocysticercosis and an evaluation for coexisting central nervous system (CNS), and ocular involvement is recommended.[4] This was done post-operatively in our patient. High-resolution sonography can clench the diagnosis by demonstrating the presence of a scolex within the cyst. Sonographic features are surrounding edema or abscess formation and rice grain appearance.[6]

Fine needle aspiration cytology is also useful for pre-operative diagnosis of soft tissue cysticercosis. The aspirate is usually blood stained. Sometimes it may be clear fluid or pearly white. It may show the presence of tiny parasitic fragments.[7]

Surgical excision of the isolated soft tissue cysticercosis usually suffice if concurrent involvement of the CNS and ocular disease have been ruled out, if soft tissue cysticercosis is diagnosed accurately. Particularly in an endemic area it can be treated medically eliminating need for surgery, if there is evidence of abscess formation. Medical therapy includes high dose anthelminthic therapy, i.e., albendazole 10-15 mg/kg/day for 8 days.[3,8]

CONCLUSION

Most important aspect of our case report is to give a message of preventing the infection involves: Cooking pork well, boiled vegetables, proper sanitation and improved access to clean water in urban, as well as rural part of India. Conservative management of neurocystercercosis may be with the medications praziquantel or albendazole. Medication required long period of time. Role of steroids is also there to decrease inflammation during treatment. Anti-seizure medication is also needed for neuro-cysticercosis. Surgical management is the main stay when conservative management is fail to relieve the symptoms.

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Case Report

Malignant Melanoma of Esophagus and its Prognosis: A Case Report and Review of Literature

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Abstract

Primary malignant melanoma of the esophagus (PMME) is a rare entity, representing only 0.1-0.2% of all esophageal malignancies. The most common location of melanoma in esophagus is in the middle to lower thoracic part. Dysphagia or retro sternal discomfort or pain is the most common initial presentation. It commonly metastasizes via hematogenic and lymphatic pathways. Esophagectomy and lymph node dissection is the treatment of choice in localized cases. Survival of the patients is poor and usually <1 year after diagnosis. The purpose of this study was to describe a case of 60-year-old man with a history of progressive dysphagia since 12 months, the investigation of which led to a diagnosis of PMME. The patient was treated by radical resection, and now survived with no evidence of disease since 12 months after surgery.

Keywords: Diagnosis, Esophagus, Malignant melanoma, Prognosis

INTRODUCTION

Malignant melanoma is more frequently found in sun exposed areas; however, it can occur in other sites including the mucosal surfaces. The primary malignant melanoma of esophagus (PMME) is a rare entity and accounts for 0.1-0.2% of all malignant tumors in this organ, with a total of 337 reported cases up to the year 2011.[1] It occurs mostly in the elderly age group with an average age at diagnosis of 60.5 years, and a male to female prevalence ratio of 2:1, as in the present case.[2] Small amount of melanocytes are present in the normal squamous epithelium or basal membrane of the esophagus. These melanocytes can act as precursors of melanocytosis and primary malignant melanoma. Most of the cases are diagnosed in the advanced stages and with poor prognosis. Prognosis is not related to the tumor thickness.[3] Mean survival period is 10 months after diagnosis. The present case is the esophageal melanoma, which underwent radical resection and survived till 22 months of the initial appearance of symptoms.

CASE REPORT

A 65-year-old male patient was presented with dysphagia since 12 months. Upper gastrointestinal (GI) endoscopy showed a friable pedunculated polyp on the posterior aspect of esophagus 30 cm from the incisor, which bleeds on touch (Figure 1). Biopsy from the growth was taken, and histopathological examination revealed melanin containing malignant epithelial cells in large sheets and also in small clusters along with adjacent areas of normal looking stratified squamous epithelial cells (Figure 2). Individual tumor cells are round to polygonal in shape having abundant amount of cytoplasm containing melanin, large round to oval nucleus and single central prominent macro-nucleoli (Figure 3). A contrast-enhanced computed tomography thorax revealed a pedunculated well defined enhancing lobulated lesion (of size 30 mm × 24 mm × 20 mm) in the lumen of mid esophagus at the level of D6-7 disc and is attached to the posterior wall of esophagus by a narrow peduncle of size 5 mm × 6 mm. Total esophagectomy and lymph node dissection

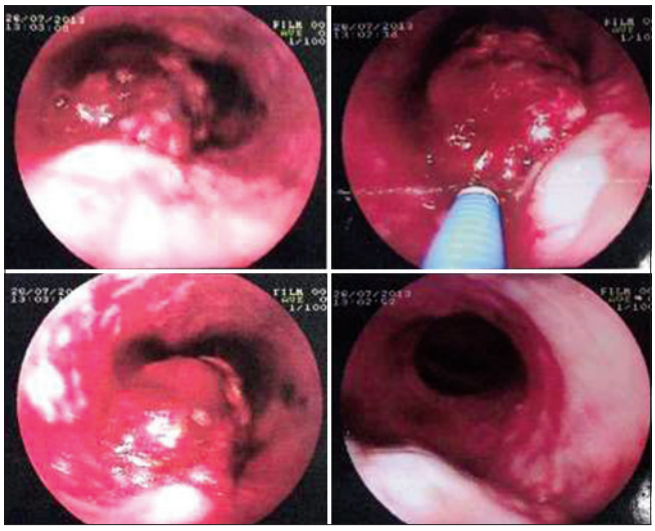

Figure 1: Upper gastrointestinal endoscopy showed a friable pedunculated polyp on posterior aspect of esophagus

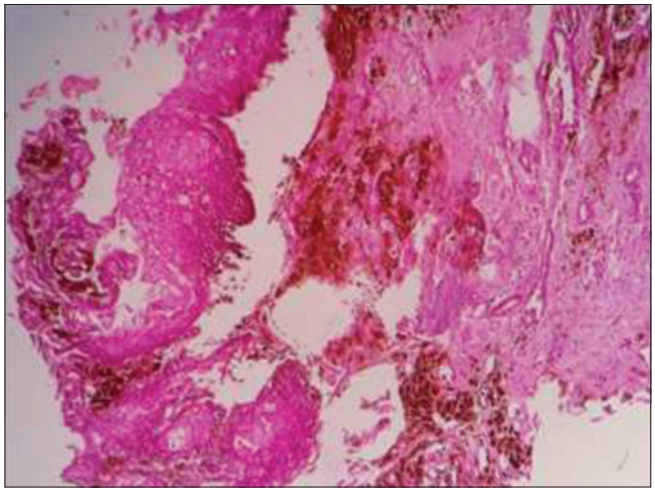

Figure 2: Presence of stratified squamous epithelial lining along with melanin containing malignant epithelial cells in sheets and small clusters (H and E, ×100)

done and a polypoidal fleshy blackish growth found in the mid esophagus of size 3.5 cm × 3 cm × 2.5 cm with multiple mucosal dark intransit lesions, the growth is 7 cm away from proximal resection margin and 9 cm away from distal resection margin. Microscopic examination revealed malignant melanoma of esophagus invading up to submucosa, all cut margins free and all lymph nodes examined free of tumor. Immunohistochemistry showed positive for human melanoma black-45 (HMB-45). After 6 months of surgery, the patient developed a stricture at anastomotic site. Repeated dilatation done, but stricture persists, for which endoscopic retrograde cholangiopancreatography and stenting done. Now, patient is survived since 12 months after surgery without any recurrence of the disease.

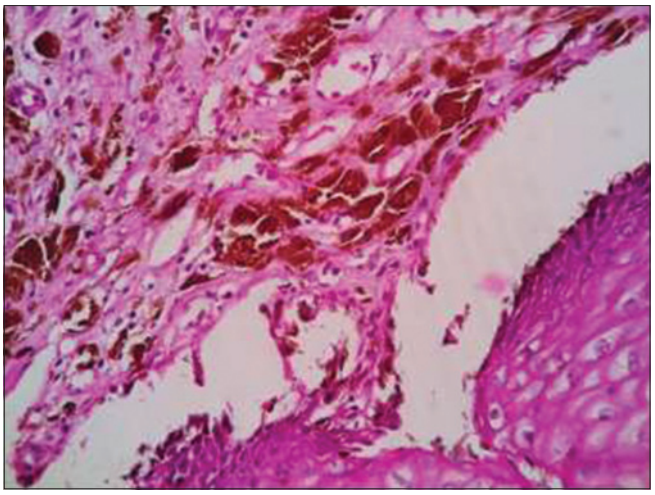

Figure 3: Presence of stratified squamous epithelial lining along with melanin containing malignant epithelial cells in sheets and small clusters. Individual cells are large having abundant amount of melanin containing cytoplasm, large round to oval nucleus and single prominent macro-nucleoli (H and E, ×400)

DISCUSSION

Skin is the most common site for primary malignant melanoma. However, it can occurs in other sites like in the GI tract and eyes. Among the GI tract, anorectal area is the most common.[4] It is rare in the esophagus. PMME has a worse prognosis than cutaneous melanoma. The mean survival rate is reported to be <5% at 5 years and a mean survival rate of 10 months with a disease related mortality of 85%.[5] It occurs most frequently in the middle and lower esophagus, as reported in more than 90% of cases in some series. This is due to a greater concentration of melanocytes in this location.[6] PMME mostly have seen in solitary form. According to the literature, multiple lesions are seen in 12% of cases.[7] Most of the cases are seen in pigmented form (85%). Only few cases of amelanotic melanoma have been reported. PMME grows in a lentiginous radial manner and involves mucosal and submucosal layers in most of the cases. Involvement of lymphovascular space invasion is common.

Dysphagia is the most common symptom in malignant melanoma similar to esophageal carcinoma, as in our case. The occurrence of hematemesis or melena is unusual. It may easily be missed by small biopsy of an esophageal growth. The diagnosis of malignant melanoma can only be established by upper gastroinstinal endoscopy with biopsy and immunohistochemical studies.[8] Endoscopic findings usually show a pedunculated friable polypoidal masses, and pigmented tumor, covered by normal mucosa and rarely accompanied by ulcers.[2] Its color varies depending on the amount of melanin, which can be absent. Most often it

is non-pigmented, and histological examination showed the presence of epithelioid, spindled and anaplastic cells. In some cases, melanin granules are not detected in the cytoplasm. In these situations, immunohistochemical positive study of S-100 protein, HMB-45, neuron-specific enolase and negative for cytokeratin and carcinoembryonic antigen confirm the diagnosis of melanoma and exclude carcinoma. Distinguishing primary from metastatic melanoma is difficult, but absence of history of malignant melanoma elsewhere, presence of radial growth phase, and epithelioid and spindle cell histology are in favor of primary esophageal melanoma.[9]

In most cases, it is diagnosed at advance stage like aggressive local invasion, and lymphatic or distant metastases; survival is no more than a few months, despite multimodality treatments.[10,11] The most common sites of metastasis are adjacent lymph nodes, liver, adrenal glands and lung.[10] The PMME is prognostically poor due to aggressive behavior, late diagnosis, and advanced stage at presentation.[12] Recently, the prognosis seems to be improved due to early detection of the tumor. The primary treatment of esophageal melanoma is surgical excision with lymph node dissection inoperable cases. Total near-total esophagectomy offers the best survival outcome (about 5 years, vs. 9 months for local resection).[5] A combination of esophagectomy and 3-field lymph node dissection as periesophageal, mediastinal and celiac trunk is the treatment of choice in PMME.[1] Due to the presence of frequent satellite lesion, broader surgical margins should be taken in comparison to other esophageal melanoma. In this procedure, it is difficult to determine cost benefit due to high post-operative morbidity and mortality and most patients die from disease recurrence in a short period of time.[12] In case of obstructive unrespectable tumors radiation therapy can be used as palliative treatment, and endoscopic metallic stents can also be used. The efficacy of treatment with radiotherapy, chemotherapy and immunotherapy are controversial.

CONCLUSION

PMME is a rare entity with aggressive behavior. Small biopsy may miss the diagnosis; so larger biopsy or multiple sites of biopsy should be taken. A better survival rate can be achieved if the diagnosis is made early. The treatment of choice is surgical resection, even in cases of recurrent or metastatic disease. After radical treatment close, surveillance is necessary to detect local and distant recurrence.

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Case Report

Spontaneous Perinephric Urinoma in a Postpartum Woman: Case Report and Review

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Abstract

Urinoma develops secondary to extravasation of urine from urogenital system that is, the kidneys, ureter, urinary bladder or urethra. This extravasated urine dissolved the retroperitoneal fat and later on encapsulated by body immune system and closely mimics loculated ascites. Spontaneous perinephric urinoma is less common and caused by obstructive uropathies include pregnancy, ureteral calculus, pelvic masses, posterior urethral valves, congenital anomalies, and chronically distended bladder. Non-obstructive causes primarily include trauma to the urogenital tract causing perforation of collecting system. Spontaneous perinephric urinoma in pregnancy is extremely rare and cause is 2-fold one is physiological (hormonal) and second is mechanical obstruction of ureter at pelvic brim.

Keywords: Mechanical obstruction, Postpartum period, Spontaneous perinephric urinoma

INTRODUCTION

Spontaneous perinephric urinoma during pregnancy is extremely rare obstructive uropathi other causes include pelvic mass, stone disease, posterior urethral valves, ureteropelvic junction (UPJ) obstruction, congenital anomalies, chronically distended bladder etc. Non-obstructive causes include primarily trauma to the urogenital system from kidneys to pelvis and gynecological, retroperitoneal or genitourinary surgery. Encapsulated collection of the extravasated urine can be subcapsular, perinephric, peripelvic or diffuse in retroperitoneum, and it may be unilateral or bilateral. The most possible pathophysiology of spontaneous urinoma is pyelosinus backflow of urine rising intrapelvic pressure >35 cm of H_2O with subsequent multiple rupture or porosities at calyceal fornices and extravasation of urine through sinus and renal capsule. Hydronephroureterosis is very common during pregnancy and seen up to 80% of cases and is primarily a physiologic phenomenon caused by hormonal changes and mechanical obstruction by gravid uterus and completely resolved during postpartum period.[1,2] In the rare instance this changed into perinephric urinoma when condition is severe and prolonged. We reported a case of bilateral asymmetrical spontaneous perinephric extravasation of urine (urinoma) diagnosed during postpartum period in which left side is very large. This was diagnosed by imaging methods and successfully managed by percutaneous drainage.

CASE REPORT

A 25-year-old postpartum woman (underwent vaginal delivery with prolonged labor) presented with persistent abdominal swelling on the left side even after 5 weeks of her delivery. She complained of vague abdominal pain more on the left flank. There was no complaints of dysuria. No past history of abdominal trauma or no documented evidence of stone disease or urinary tract infection during pregnancy. Clinical examination revealed fullness of abdomen and mild tenderness in the left flank and also soft large abdominal mass from left hypochondrium to upper pelvis was palpated. The laboratory tests were normal like serum creatinine (0.6 mg/dl) including urine culture.

Patient was referred for ultrasonography for a diagnostic approach. Abdominal sonography revealed a large fluid

containing cyst like mass around the left kidney and the same pattern in the right side but relatively very small. This was provisionally reported as bilateral, but asymmetrical perinephric collection with close differential of loculated ascites. There was no evidence of hydronephrosis or calculus. A complementary non-contrast computed tomography (NCCT) and contrast-enhanced computer tomography (CECT) scans were done with iodinated contrast. NCCT showed thin walled unilocular fluid attenuating perinephric collection large in the left side displacing kidney superomedially toward midline while in the right side it is relatively small. CECT showed a normal pattern of the renal enhancement without any extravasation of contrast into perinephric collection. This perinephric collection had significant pressure effect on renal capsule. There was no evidence of hydroureteronephrosis or calculus. Thus, imaging findings confirmed bilateral asymmetrical encapsulated perinephric collection (urinoma) (Figures 1 and 2).

Since left side was enormous in size and causing symptoms, an elective percutaneous drainage was performed.

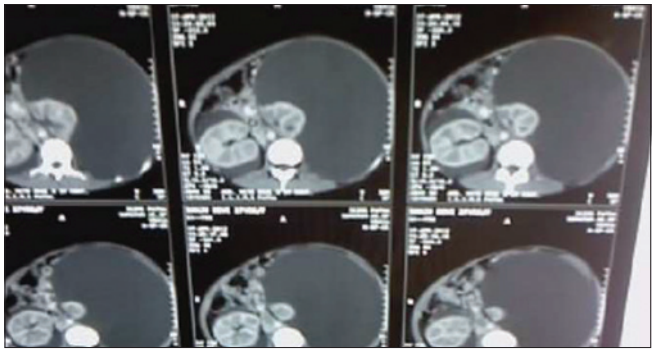

Figure 1: Abdominal computed tomographic axile views showing bilateral asymmetrical perirenal/perinephric urinomas. The left side perirenal urinoma is relatively very large displacing the ipsilateral kidney toward midline and compressing the renal parenchyma. No evidence of hydronephrosis or renal calculus

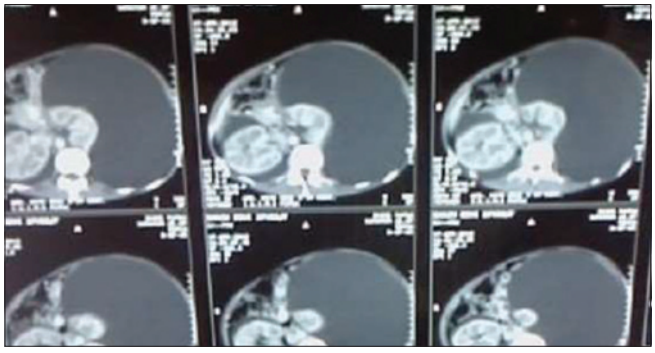

Figure 2: Computed tomography of abdomen (at 70-80 s) showing large left side and relatively small right side perirenal urinomas without evidence of contrast extravasation, rules out any traumatic renal cause

Approximately 4000 ml of amber colored uriniferous fluid was drained. After 7 days, repeat sonography was done showing complete resolution. The drainage catheter was removed when no drain into urobag. Right side was left as such, because of small size, for spontaneous resolution. The patient was asymptomatic at the 6 weeks follow-up.

DISCUSSION

Urinoma (pararenal or perirenal pseudocyst) results from extravasation of urine in the retroperitoneal space which later on encapsulated[3] by chronic immune response. It is mainly caused by external trauma to the urogenital tract or endosurgical procedure[4] and also by obstructive uropathies like pregnancy, pelvic mass, UPJ obstruction, congenital urethral disease, enlarged prostate causing chronic bladder retention of urine. Reports of bilateral perinephric urinoma in connection with pregnancy are very rare in literature. Spontaneous perinephric urinoma in pregnancy is caused by obstruction at pelvis aided by hormonal influence. Obstruction leads to increase in intrapelvic pressure, pyelosinus backflow and subsequent rupture (increased porosities) of calyceal fornices which results in extravasation of urine.[5-8] This extravasation is mainly in the subcapsular space or in the perirenal space bound by Gerota's fascia. If condition is severe, urine may cross the midline travel diffusely below the inguinal ligament to involve pelvis, thigh, buttock, scrotum and also the peritoneum.

In pregnancy urinary ductal system dilatation or hydronephrosis is common occurrence and seen approximately 80% of cases, mostly in right side. This is completely resolved in the postpartum period.[1,2] However, in our patient no evidence of hydronephrosis noted probably it is time gap between development and presentation where hydronephrosis changed into huge perinephric extravasation in postpartum period.

Initial investigation for a suspected case of urinoma is abdominal ultrasonography complemented by abdominal computer tomography (CT) scan with or without contrast. The CT scan is better, especially contrast and delayed films, to demonstrate the relationship between the urinomas and the urogenital tract and the fascial planes.[9]

If urinoma is left untreated can lead to serious complications like perinephric abscess, urinary granuloma, retroperitoneal fibrosis, paralytic ileus, systemic sepsis and electrolyte imbalance. Thus, when diagnosed early management has to be considered until complete resolution is achieved. Management depends upon the size of urinoma and associated complaints. If it is small manage conservatively.

If large and symptomatic and does not decreased with time, intervention with percutaneous catheter drainage under sonographic or CT guidance is done in the most dependent position. If output is decreased catheter is removed and follow-up done with ultrasound to ensure complete resolution. In the case not resolved additional nephrostomy tube with or without a ureteral stent will be considered.[10]

CONCLUSION

Spontaneous perinephric urinoma in developed during pregnancy and detected in the postpartum period is extremely rare and caused by persistent mechanical obstruction of ureters at narrow pelvic brim by enlarged gravid uterus aided by physiologic hormonal dilatation of the urinary system. Accepted mechanism is basically due to raised intrapelvic pressure and pyelosinus backflow causing calyceal fornices rupture and extravasation of urine. So a woman presenting as persistent abdominal swelling and flank pain in the postpartum period, large urinoma should be a consideration. Quick and prompt diagnosis is mandatory to prevent serious complication and to preserve renal function as well.

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Case Report

Sacrococcygeal Teratoma in an Adolescent: A Rare Case Report

Aditya Pratap Singh[1], Pradeep Gupta[1], Javed Salam Ansari[1], Arun Gupta[2], Mahendra Jangid[1], D P Morya[1], Rajlaxmi Pardeshi[3]

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Abstract

Sacrococcygeal teratoma (SCT) is a common congenital neoplasm, common in infants, but rare in adults. It is arise from Hensen node and located at sacrococcygeal area. Tumor contain derivatives of more than three embryonic germ cell layers e.g. Ectoderm, mesoderm and endoderm. These are usually arise as mass in sacrococcygeal region. Here we report a case of huge sacrococcygeal mass in a 14-year-old-male child which is very rare which was exiced completely via perineal approach without operative or post-operative morbidity. Histopathology was in favor of SCT. Prognosis depends on complete excision of the tumor. Hence, have reported the case with clinical manifestations, imaging aspects along with histological findings of this case.

Keywords: Cysticercosis, Taenia solium, Tiniasis

INTRODUCTION

Sacrococcygeal teratoma (SCT) is derived from embryonic germ cell layers. It is one of the commonest tumors in infants.[1] It is rare in adults, however, most being located in the intrapelvic spaces,[2] and 1-12% were reported to undergo malignant transformation.[3] Radiological imaging is helpful in diagnosis and extent of this disease with surrounding structures. A mature SCT is potentially curable by complete surgical resection.[2]

CASE REPORT

A 14-year-old male child was admitted to our department with a large swelling in the sacrococcygeal region since birth. On local examination, mass was present over sacrococccygeal region. It was painless and slowly growing in nature. Dimension was of 12 cm × 16 cm. The mass was irregular in shape and size. Overlying skin was free. No other significant finding detected. Per abdomen mass was not palpable. Per rectal examination revealed, the mass was palpable posterior to the rectum. Total leucocyte count and differential leucocyte count was in normal limit. Renal function test, liver function test and tumor markers (alpha feto protein and beta human chorionic gonadotropin [HCG]) were within normal range [Figures1 and 2].

Ultrasonography revealed a large mass of mixed echogenicity with calcification and cystic lesion seen in the sacrococcygeal region with a small pre sacral component with pushing bladder anterior and coccyx posterior. Horse shoe shaped kidney was also present. Finding was suggestive of Type 1 SCT.

Contrast-enhanced computed tomography (CT) scan of pelvis suggestive of a large heterogeneously enhancing mixed density soft tissue lesion of size approximately 124 mm × 161 mm × 174 mm seen at sacrococcygeal region with both extra and intra pelvic component. Fat planes not spared, compressing over adjacent abdominal viscera. Showing multiple cystic area, fat density, calcify foci suggestive of SCT with horse shoe shaped kidney.

The patient operated under general anesthesia through perineal approach. The teratoma was removed completely.

Macroscopic feature revealed that the cyst was filled with a thick fluid which was white in color, pus and tissues of different germ layers e.g. hair was present. Coccyx also removed with mass [Figure 3].

Perineal incision closed in layers keeping drain in situ. Post-operative period was uneventful. The patient discharged 12 post-operative days and advised for regular monthly follow-up. Histopathology report was in favor of SCT.

DISCUSSION

SCT is the most common neoplasm in newborn with an incidence of 1/40,000 live birth. SCT varies considerably in size and is composed of 2 or 3 germ cell layers and multiple tissue type. SCT is more common in females with a male, female ratio of 1:3-4.[4] SCT is a neoplasm arising in the sacrococcygeal region and contain tissue derived from more than one primitive germ cell layers, it is cause remain unknown.[5] Some believe that it is originated from multi potential cells in Hansen's node, which migrate caudally to coccyx. It is one of the commonest fetal neoplasm, but it is rare in adult.[6] Most adult SCT is intrapelvic, whereas most are external in infants. In infant malignant transformation is much higher.

SCT has a malignant potential which is parallels the age of the patient at presentation. Complete resection of the tumor soon after birth provides an excellent prognosis. The incidence of malignancy at the neonatal period is approximately 10% against almost 100% at the age of 3 years. About 67% of SCT are diagnosed by the age of 1 year. Females are 4 times more likely to be affected than male. In childhood they normally occur as extragonadal mass, located along the midline. About 40-50% occurs in the sacrococcygeal region. Early detection and management are important. These tumors may be present with varying symptoms like bowel and bladder incontinence, backache, weakness of limb or fistula of the urogenital or gastrointestinal tract. Other congenital anomalies like defect in the cloacal and hind gut are associated in 10-24% of cases.[7]

50% SCT exhibit calcification and ossification which is seen in CT scan, so CT scan is more sensitive modality of investigation. Magnetic resonance imaging is superior for evaluating the anatomical relationship to adjacent organs. Biochemical markers including alpha-feto-protein, carcinoembryonic antigen and HCG[8] are helpful in malignant SCT while not in benign. Also be used to detect recurrence after surgery.

In the case of late presentation, it is due to lack of awareness and lack of proper diagnostic facilities. Surgical excision is the treatment of choice. Mostly excised by posterior para sacrococcygeal approach and which extends in the pelvic cavity are by the combined abdominoperineal approach. In a patient with teratoma coccyx often contain nests of

Figure 1: Pre-operative posterior view of Sacrococcygeal mass

Figure 2: Pre-operative lateral view of Sacrococcygeal mass

Figure 3: Specimen

totipotent cells and therefore it should be removed *en bloc* with the tumor. Excision of the tumor without coccyx results in recurrence in over 30% of cases.[6] For mature and immature teratoma the prognosis is good after surgical excision alone but malignant teratoma have a tendency to recur and metastasis so teratoma should be removed meticulously if not than regular follow-up required detecting early recurrence. Recurrence after resection varies from 2% to 35%. This may result from incomplete surgical excision, with the presence of microscopic residues, non-resection of entire coccyx and/or tumor spillage. Complete excision including the coccyx and sparing the sacral nerves leads to low recurrence. The recurrence is high in the first 3 years after surgery and therefore needs regular follow-up.[9] Those tumors with malignant changes need further chemotherapy. Usually platinum based chemotherapy used as neoadjuvent or adjuvant.

CONCLUSION

A prenatal diagnosis of SCT is essential to avoid early mortality. Early diagnosis, early complete enbloc resection of the tumor along with the coccyx and the avoidance of intraoperative spillage of the tumor are prognostic factor. Delayed presentation and the presence of malignant changes continued to be poor prognostic factors. Close follow-up of these patients is necessary to deal with the postoperative sequelae of surgery.

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