e-ISSN: 2321 - 595X
p-ISSN: 2321 - 6379

International Journal of Scientific Study

www.ijss-sn.com

June 2014 • Volume 2 • Issue 3

www.ijss-sn.com

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June 2014 • Volume 2 • Issue 3

IJSS

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Publisher Name: Smile Nation - Lets Smile Together

Registered Office: International Journal of Scientific Study, 9/2, Satyalok Building, Gadital, Hadapsar, Pune, Maharashtra, India – 411028.

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REVIEW ARTICLES

CASE REPORTS

CASE PICTORIAL

Screen and Treat Approach for Cervical Cancer - A Feasible Technique for Developing Setups like India

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Cervical cancer is one of the leading cancers among women worldwide (World Health Organization 2009). The estimated annual incidence cases and deaths in the moderate to low income countries is more than 4,50,000 and 2,40,000, respectively accounting for more than 88% of deaths are estimated to occur in these countries and this percentage is predicted to climb to at least 91.5% by 2030.

In 2008 in India, the annual incidence and mortality from cervical cancer was 134,420 cases (age-standardized rate (ASR): 27/100,000) and 72,825 deaths (ASR: 15.2/100,000), respectively. Cervical cancer was the most common cancer in Indian women, accounting for nearly 25.9 % of new cancer cases and 23.3% of all cancer-related deaths in the country.[1] In 99.7% of cases, cervical cancer results from a persistent infection by a high-risk subset of Human Papillomavirus (HPV).[2]

Cervical intraepithelial neoplasia (CIN) occurs along a spectrum of grades as defined by World Health Organization ranging from low (CIN-1), moderate (CIN-2) to severe (CIN-3). The process from low-grade CIN to cervical cancer takes from 10 to 20 years, during which time screening for pre-cancerous lesions and early treatment is highly effective in preventing the onset of the disease especially in developing setup like India. This is the rationale for cervical cancer screening and treatment.[3]

There are several screening tests to identify pre-cancerous lesions, that include Pap test (cytology), visual inspection with acetic acid (VIA), with Lugol's iodine (VILI), and the HPV-DNA test. Pap-based screening programs are effective in Developed countries or High Income Countries (HIC), but health systems in developing countries are ill-equipped to effectively provide Pap screening to all women insofar as they are hindered by the challenges of reaching target populations, carrying out appropriate testing, following up and treating women.

Highly effective alternative low-cost screening approaches like VIA, VILI and HPV- DNA tests offer new options for screening and have replace Pap Test in Low Income countries.[4] These can be immediately followed by cryotherapy, a highly effective and low-cost approach for early treatment. These new combination allow for combined screening and treatment in one sitting, known as the screen-and-treat approach.[5]

Based on recent studies and analyses the recent cost effective and culturally adoptable gold standard approach for management of Cervical Cancer is "The Screen-and-treat Approach". Screening by VIA, eliminates the huge cost of cytology and the reduces the budget by eliminating high yield laboratories for interpretation of results, and screening could be done in Tertiary Health Care by dais and mid-wives.[6]

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Original Article

Health Impact to Different Concentrations of Fluoride in Drinking Water of South India

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Abstract

Background: India lies within the geographical fluoride belt that extends from Turkey to China. Nearly 12 million of the 85 million tons of fluoride deposits on earth's crust is found in India. Excessive fluoride in drinking water causes dental fluorosis, skeletal fluorosis and general health problems. About 20 states of India are identified as endemic for fluorosis. The highest rate of endemicity has been reported from Andhra Pradesh, Haryana, Karnataka, Punjab, and Tamilnadu. Till today no data is available on the health impact of fluoride (F) in Nelakondapally Mandal of Khammam district, Andhra Pradesh (A.P). Hence this area was considered as an ideal location for conducting this survey.

Objective: To determine fluoride level in ground water and correlate its impact on public health.

Methods: Water samples from 38 villages of Nelakondapally Mandal were subjected to fluoride analysis using Orion 720A ion-specific electrometer, to confirm the fluoride levels in the drinking water before commencement of clinical examinations**.** 240 individuals aged 6-54 years from Nelakondapally Mandal of Khammam district (A.P) were examined for manifestations of dental, skeletal and non-skeletal manifestations of fluorosis.

Results: There was significant positive correlation between water fluoride levels to various form of fluorosis. Among the study population, prevalence of dental fluorosis was 47.9%, skeletal fluorosis 13.7% and non skeletal manifestations 3.7% respectively.

Conclusion: The survey revealed higher incidence and severity of dental, skeletal and non-skeletal fluorosis among the study population. Skeletal manifestations were high in males and with increasing age, the severity became more evident restricting physical movements.

Keywords: Dental fluorosis, Fluoride (F), Nelakondapally Mandal, Skeletal fluorosis

INTRODUCTION

Water is our body's principle chemical component and makes up about 60 percent of body weight. It is essential to good health and lot of functions like regulating body temperature, carrying nutrients to cells, flushes toxins out of vital organs and so on. It is life for all living beings. But nowadays, pure drinking water is available to very few people and others take more or less contaminated water. The contamination may be caused either by natural forces or by industrial effluents, and one such contamination is fluoride (F).[1,2]

F is the most highly reactive element of the halogen family. It exists in water mainly as F ion.[3] F has dual significance, if F content in water is less it may cause caries, and if it is in excess it may causes fluorosis. The requirement of F content changes and it mainly depends on the geographical condition and age of the human beings. Among the F concentration in ground water, resources have become one of the most important toxicological and geo-environmental issues in India. Fluorosis is a major public health problem in 20 states in India. Human intake of is chiefly determined by F content in water, food as well as air. The population areas with high F content in drinking water are exposed to the risk of endemic fluorosis.[4]

Fluorosis disease can occur in three forms: Dental fluorosis, skeletal fluorosis, and non-skeletal fluorosis. Dental fluorosis results in hypo-mineralization of tooth enamel due to the continuous ingestion of excessive amount of F during tooth development. This results in a

variety of pathological changes in the structure of teeth and if not prevented during childhood can hamper dental esthetics and psychological well-being.[5] It is regarded as an unfortunate side effect to its caries protective benefits. Skeletal fluorosis[6] affects the bones and major joints of the body. The bone gets hardened and less elastic, resulting in an increased frequency of fractures. Non-skeletal fluorosis affects invariably all the soft tissues, organs and systems of the body. Excessive F results disturbances in soft tissues due to chronic intoxication. Till today no data is available on the health impact to the different water F levels at this Mandal and this makes Nelakondapally Mandal an ideal place for the present descriptive epidemiological study, and the correlation between these interrelated afflictions.

MATERIALS AND METHODS

According to the survey conducted by Rajiv Gandhi National Drinking Water Mission[7] fluorosis was prevalent in all districts of A.P including Nelakondapally Mandal of Khammam District.

Nelakondapally Mandal experiences hot and dry summer throughout the year, expect during the south west monsoon season that extends from June to September. The mean annual temperature is about 45°C. The main staple food in this region is rice. General living conditions and socio-economic status were comparatively similar in all villages. 70% population is involved in agriculture. This Mandal had drinking water supply from tanks and wells. Water from primary sources such as wells is pumped into storage tank and the supply remains constant.

Collection and Analysis of Water Samples

Collection of water samples was done based on the methodology followed in National Oral Health survey and F Mapping 2002-2003.[8] The water samples were sent to the laboratory of 'Rural Water Supply, Nalgonda to confirm the F levels in the water before commencement of clinical examination. Water F analysis was done using Orion 720A fluoride meter, coupled with ion specific electrode. The entire geographical area of Nelakondapally Mandal was divided into 3 strata, based on the concentrations of naturally occurring F in drinking water (Table 1). After taking informed consent and explaining the purpose of the study selected population were interviewed with a pre-designed questionnaire and clinically examined for identification of signs and symptoms of suspected dental, skeletal and non-skeletal fluorosis along with their food habits, addictions and use of fluoride containing tooth paste.

Clinical Examination

Type-III clinical examination,[9] as recommended by American Dental Association (ADA) was followed throughout the study for intra oral examinations. Emphasis was laid on importance of routine, simple preventive measures and periodic dental visits. Dental fluorosis, skeletal fluorosis and non-skeletal fluorosis were assessed by diagnostic criteria developed by fluorosis research and rural development foundation, New Delhi.[8]

Inclusion Criteria

Study population who satisfied the following criteria were included in the study.[10]

1) Individuals aged between 6-54 years irrespective of sex, race, and socio-economic status who were residents of that particular region and who were using the same source of drinking water.
2) Individuals who were willing and cooperative for the study.

Exclusion Criteria

1) Individuals who had migrated from some other place or who were not the permanent residents of that particular area.
2) Severe extrinsic stains on their teeth in which assessing fluorosis is not possible.
3) Individuals suffering with any communicable or systemic diseases and fractured anterior teeth.

The single examiner concept was followed as it maintains consistency and eliminates inter examiner bias. To ensure continuous consistency in recordings, 10% of study population was randomly re-recorded, compared each day and constant check was maintained throughout the study. Data collected was analyzed.

RESULTS

Out of 240 study population aged between 6-54yrs, 156 (65%) were males and 84 (35%) were females. Out of total study population 157 (65.4%) were affected by either dental, skeletal fluorosis or non-skeletal manifestations. All the individuals who were affected with fluorosis have resided in the respective villages since birth. The disease incidence was more in males (42.5%) than in females (22.9%) (Table 2). Dental fluorosis afflicted 66% of males and 33.9% of females. Table 3 shows prevalence of different grades dental fluorosis. 46% with grade 2, 25.2% grade 1, 18.2% grade 3, 7.8% grade 4, 2.6% grade 5

Table 1: Three strata with different F levels in drinking water

Strata	F content in ppm
Strata 1	<0.7 ppm
Strata 2	0.7-1.2 ppm
Strata 3	>1.2 ppm

fluorosis. The earliest evidence of dental fluorosis was observed among children around 6-10 yrs of age and of skeletal fluorosis around 11-20 years of life. Distribution of degree of skeletal fluorosis was high in males (63.6%) compared to females (36.4%). Among the different clinical signs and symptoms of skeletal fluorosis, 8.7% had joint pains, 15.1% had difficulty in walking, 12.1% had knock-knees, 0.8% had back pain and stiffness, and 3% had loss of sense and perception (Table 4). As the age advances, the manifestations of skeletal fluorosis became more evident, restricting physical movements and causing difficulty in walking. The incidence of mild form of skeletal fluorosis like joint pains, back pains was more prevalent in males, whereas knock-knees are equally prevalent among males and females. Disease manifestations of non-skeletal fluorosis was slightly higher in males (55.6%) compared to females (44.4%). 3.3 % had pain in stomach and loss of appetite, 3.7 % had muscle weakness, 2.9 % had fatigue and depression, 2.5% has polyurea and polydispia (Table 5).

DISCUSSION

From the present study, the overall prevalence of dental fluorosis was found to be 47.9 %. Many studies in the past have proved the direct link between the degree of dental fluorosis and the amount of F in drinking water in the respective communities and countries. Baskarados[11] reported in Tamilnadu overall prevalence of dental fluorosis to be 15.8%, Choubisa[12] (45.7%), Bharthi *et al*[13] (35%), Acharya[14] (16-100%), Nanda[15] (0.15%) in India, Kumar[16] (7-10% in fluoridated areas and 5-9% in non fluoridated areas) in Newburgh, Shourie[17] (36.5%) in India, Vacher[18] (51.57%) in Amritsar, Thaper[19] (59.10%) in Moga, Ramchandran[20] (66.2%) in Tamilnadu, Tewari and Chawla[21] (81.60%) in urban areas of India, Subba Reddy VV[22] (24-31%) in Punjab.

Prevalence of manifestations for skeletal fluorosis was found to be 13.7%. Earlier studies like Majumdar[23] (23.8-34.1%), Bharthi *et al* (17%), Choubisa (22%), showed various degree of skeletal fluorosis The incidence of mild and severe form of skeletal fluorosis was almost equally predominating in males and females. Earlier studies have indicated that the incidence and severity of chronic fluoride intoxication was greatly influenced by socio-economic, climatic and nutritional status, being higher in poorer segments of the population with signs of nutritional deficiency. Prevalence of non skeletal manifestations among the present study population was about 3.7%.

Table 2: Gender distribution of fluorosis

Group	Total number surveyed	Affected with fluorosis (%)	Dental fluorosis	Skeletal fluorosis	Non skeletal fluorosis
Males	156	102 (63.3)	76 (48.7)	21 (13.5)	5 (3.2)
Females	84	55 (65.4)	39 (46.4)	12 (4.2)	4 (4.7)
Total	240	157 (65.4)	115 (47.9)	33 (13.7)	9 (3.7)

Table 3: Distribution of degree of dental fluorosis

Group	Affected with dental fluorosis	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)	Grade 4(%)	Grade 5 (%)
Males	76	21 (27.6)	36 (47.3)	11 (14.4)	6 (7.8)	2 (2.6)
Females	39	8 (20.5)	17 (43.5)	10 (25.6)	3 (7.6)	1 (2.5)
Total	115	29 (25.2)	53 (46)	21 (18.2)	9 (7.8)	3 (2.6)

Table 4: Distribution of degree of skeletal fluorosis

Group	Total number surveyed	Joint pains	Back pain & stiffness of back	Difficulty in walking	Knock-knees	Loss of sensation perception
Males	21	13 (5.4)	2 (0.8)	3 (1.2)	2 (0.8)	1 (0.4)
Females	12	8 (3.3)	0 (0)	2 (0.8)	2 (0.8)	0 (0)
Total	33 (13.7)	21 (8.7)	2 (0.8)	5 (15.1)	4 (12.1)	1 (3)

Table 5: Distribution of non skeletal fluorosis

Group	Total number surveyed (%)	Pain in stomach	Loss of appetite	Muscle weakness	Polyurea\polydispia	Fatigue depression
Males	5	5 (100)	5 (100)	5 (100)	4 (80)	3 (60)
Females	4	3 (75)	3 (75)	4 (100)	2 (50)	4 (100)
Total	9 (3.7)	8 (3.3)	8 (3.3)	9 (3.7)	6 (2.5)	7 (2.9)

CONCLUSION

It is said that there is an urgent need for basic health care in the study area. Community and domestic water de-fluoridation measures need to be monitored on urgent basis. Awareness regarding the sources and ill effects of fluoride has to be spreaded in the population through health education. These measures could avoid possibly fluorosis as much as possible in these rural areas.

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How to cite this article: M. Shanthi, B V Thimma Reddy, Shivani Kohli. "Health Impact to Different Concentrations of Fluoride in Drinking Water of South India". Int J Sci Stud. 2014;2(3):2-5.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Cheilectomy, Drilling, Curettage and TFL Muscle Pedicle Bone Grafting in Post Traumatic Osteonecrosis of The Femoral Head

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Abstract

Background: Osteonecrosis of the femoral head is a common entity in developing countries. It is generally progressive inspite of treatment, resulting in collapse of the femoral head and painful secondary osteoarthritis of the hip joint.

Aims and objectives: This is a retrospective and prospective study to evaluate the treatment by cheilectomy, drilling, curettage and TFL muscle pedicle bone grafting in post traumatic osteonecrosis of the femoral head.

Material and method: The study was conducted at IPGME&R & SSKM Hospital, Kolkata from January 2005 to March 2009 on 20 subjects between the age of 25 yrs to 60 yrs with good range of movement in at least one direction particularly flexion of 90° in Ficat Arlet stages II and III of posttraumatic osteonecrosis of the femoral head.

Results: Results were analysed on the basis of reduction in pain and increase in the range of movement, status of preservation of the contour and congruity of the articular surface and reduction in the rate of progressive collapse of the femoral head and degeneration and effectiveness in postponing a head sacrificing surgery in pre and post collapse stages respectively. Final evaluation was done clinically by modified Harris Hip Score and Baksi's radiological criterion. Overall clinical improvement having excellent and good results were obtained in 9 out of 10 stage II (90%), 8 of 10 stage III (80%) patients wheras radiological improvement was noted in 8 (80%) patients of stage II and 6 (60%) patients of stage III disease. Chi Squre =χ^2 = 1.25 for clinical evaluation and is significant at 0.05 level of significance.

Conclusion: In patients especially young with a predegenerative and early degenerative stage of osteonecrosis of the femoral head this can be the treatment protocol.

Keywords: Femoral head, Muscle pedicle bone grafting, Osteonecrosis, TFL

INTRODUCTION

Osteonecrosis of the femoral head is associated with trauma and other etiologies like corticosteroids intake, alcoholism, hemoglobinopathy (sickle cell disease and coagulopathies), hepatorenal and skin disorders and commonly affects young patients around the age of 20-40 years. Idiopathic osteonecrosis is also a common entity in developing countries like ours. It is generally progressive inspite of treatment, resulting in subchondral fracture, collapse and painful secondary osteoarthrosis of the hip joint. Early diagnosis and management may prevent the subsequent collapse of the femoral head and development of a painful and stiff hip joint.

Untreated osteonecrosis of the femoral head ultimately leads to collapse and disintegration of hip joint. The predegenerative stages of osteonecrosis especially when seen in young adults, should be treated by a femoral head preservation operation with the objective to delay and possibly to avert the above consequences. Previously head preserving surgeries were not in vogue so total hip replacement was the only viable option.

Femoral head preservation operation produce good result in the early stages of osteonecrosis but most of their results were inconsistent and have deteriorated markedly in longer follow up, as seen in following different

osteotomies,[1-5] core decompression[6-8] and non vascular strut grafting with the tibia or fibula.[9] Cancellous bone grafting after the curettage of the necrotic bones fails to relieve pain or prevent progressive collapse of the femoral head.[10,11]

Recently, different vascularised bone grafts like free vascularised fibular graft with free iliac chip graft[12-15] and vascular pedicle iliac crest grafting,[16-18] provided encouraging results, especially in early stages of necrosis. The use of quadratus femoris muscle pedicle bone grafting combined with free cancellous graft provide good results in early stages of osteonecrosis but poor results in advanced stages.[19] However even in advanced stages of osteonecrosis, subcutaneous adductor tenotomy, cheilectomy, drilling and muscle pedical bone grafting provided symptomatic relief irrespective of femoral head deformity.[20]

The results of the use of different MPBGs alone using of Q-F, Sartorius, Gluteus medius or the tensor fascia lata (TFL) in the different stages of osteonecrosis of the femoral head was reported by Baksi.[20,21]

AIMS AND OBJECTIVES

This study was undertaken in a retrospective and prospective basis to analyse the results of cheilectomy, drilling, curettage and TFL muscle pedicle bone grafting in post traumatic osteonecrosis of the femoral head. Initially the study was intended to include cheilectomy in all cases but due to the paucity of cases in the advanced stages the same was done in cases where applicable. The aims and objectives of the study were –

a. In the pre collapse stage:-
   1. To analyse whether the procedure reduces pain.
   2. To analyse whether the contour and congruity of the articular surface is preserved.
   3. To analyse whether the procedure reduces the rate of natural progression of the disease into collapse of the femoral head and subsequent degeneration.

b. In the post collapse stage:-
   1. To analyse whether the procedure relieves pain, increases the range of movement and daily functional activities.
   2. To analyse whether the method is an effective salvage procedure for the already deformed head and whether it postpones a head sacrificing surgery.

Null Hypothesis: There is no improvement in the clinical condition of the patient after the surgery (Both Grade- II & grade III) cases on the modified Harris hip scoring.

MATERIALS AND METHODS

This study was conducted in the Department of Orthopaedics, I.P.G.M.E & R and S.S.K.M Hospital, Kolkata-20, in a retrospective and prospective basis from January 2005 to March 2009.

In this study 20 patients were taken into consideration after taking proper written consent and explaining the nature and possible complications of the procedures. 13 were men and 7 were females. 8 of the male patients were manual labourers. 4 males and 1 female were government office employees. 4 were housewives and 2 young females were unemployed. 1 male patient was a driver.

Osteonecrosis was diagnosed by clinical and radiological studies in all cases. Magnetic resonance imaging (MRI) and computerised tomography (CT) scanning were done in selected cases. The diagnosis was confirmed by histopathological examination of the subarticular bone obtained from the femoral head during the operation in all cases. Clinical evaluation pre and postoperatively was done using the Harris hip score (modified).

Preoperative radiological staging of osteonecrosis was done according to Ficat and Arlet. Accordingly, among the 20 cases 10 were in stage II and 10 were in stage III necrosis. However, badly damaged femoral heads with a collapse of 5 mm or more were not included here. Postoperative radiological assessment of the cases was carried out on the basis of radiological criteria of healing. 14 (70%) osteonecrotic femoral heads were due to united post fracture femoral necks and 6 (30%) were due to traumatic hip dislocations. 12 had right hip and 8 had left hip involvement.

Inclusion criteria

Age - 25-60 years.

Post traumatic osteonecrosis of femoral head without any other etiologies of osteonecrosis were taken into consideration, eg: Cases after cannulated hip screw fixation for fracture femoral neck which have united, traumatic dislocation of the hip joint etc.

Osteonecrosis Ficat Arlet stages II and III.

Good range of movement at least in one direction particularly flexion of 90^0.

Collapse of femoral head of 1-2 mm; maximum upto 5 mm.

Exclusion Criteria

Age: Less than 25 yrs, more than 60 yrs.

Osteonecrosis Ficat Arlet stage I, IV disease.

Gross restriction of movements especially flexion less than 90^0.

Collapse of femoral head more than 5 mm.

Other etiologies like longterm corticosteroids consumption, alcohol abuse, hemoglobinopathy (sickle cell disease and coagulopathies), certain renal, hepatic, skin disorders, gout, hip dysplasias were not taken into consideration.

Associated comorbid conditions like uncontrolled diabetes, psychiatric illness and anaesthetically unfit patients were not included.

Previous history of two or more surgeries of the hip joint.

Uncooperative patients who are not willing to follow strict postoperative regime including three months non-ambulation.

Preliminary Management

On admission to the ward a detailed history of the case was taken and age, sex, occupation, socioeconomic status, mode of injury, any concurrent medical illness, relevant past illness and previous surgery were recorded.

A detailed and thorough clinical examination of major systems and affected part was done.

The patient was counselled and encouraged to start hip and knee exercises.

Routine preoperative investigations were done and standard surgical protocols were followed in all cases.

Methods

Majority of the cases with posttraumatic osteonecrosis of femoral head in Ficat & Arlet stages II and III were treated with cheilectomy, drilling, curettage and TFL muscle pedicle bone grafting. The indication of surgery was pain and discomfort around the hip during walking, sitting cross-legged, and even at rest and limitation of movement of the hip. The presence of a good range of movement at least in one direction, particularly flexion of at least 90^o was considered important for this head preserving operation.

Technique of tensor fascia lata muscle-pedicle bone graft (Figures 1-3)[20,21]

With the patient in the supine position and a small sandbag behind the buttock of the affected side, an incision is made from a point about 7.5 cm behind the anterior superior iliac spine, along the outer lip of the iliac crest. It curves downwards, with its concavity directed posteriorly, to the level of the base of the greater trochanter.

The groove between sartorius and TFL is identified and the deep fascia overlying TFL is raised. An incision is then made in the muscle fibres of the TFL, in their direction, 2.5 cm behind the anterior edge of the muscle. The isolated anterior fibres of TFL are elevated and its deeper fibres, found intermingled with those of the underlying gluteus minimus, are sectioned. A segment of the iliac crest 2.5 cm long and 2.5 cm broad is osteotomised and retracted down, keeping its attachment to the anterior fibres of the TFL intact The muscle-pedicle bone graft so prepared gets its blood supply from the superior gluteal artery and the ascending branch of the lateral circumflex femoral artery. Bleeding from the raw surface of the muscle pedicle bone graft is observed.

The exposed gluteus minimus muscle is erased from the outer surface of the ilium and retracted down, and the straight and reflected heads of rectus femoris are sectioned. Next, the anterior capsule of the hip is opened, using an inverted T-shaped incision. Marginal osteophytes are trimmed from the femoral head and, in advanced stages of necrosis, cheilectomy of the femoral head in it's superior, anterior & anterio inferior part is performed medial to the limit of the acetabular margin. This improves the range of abduction and rotation of the hip.

The articular surface of the femoral head is examined for alteration of its colour and contour, for erosion and for softening. A pit with undermined edges is made in the anterosuperior subarticular surface of the femoral head close to the neck. Through this pit multiple drilled holes into the femoral head are made. Usually the necrotic area is sclerotic but in some it is friable. A small notch is cut at the margin of the pit to accommodate the muscle belly of the pedicle and to prevent it being stripped off the graft during impaction. Splitting the inferiorly retracted gluteus minimus muscle belly facilitates easy placement of the TFL graft into the necrotic bed without tension. The bony portion of the MPBG is shaved according to the contour of the slot. One drill hole is made on either side of the slot over the femoral head and also along the axial length of the MPBG for the passage of one Vicryl thread or one 4 mm cannulated screw as and when necessary. The MPBG is impacted inside the slot and anchored with the overlying fascial sleeve.

The cut margins of the capsule and the gluteus minimus muscle are then repaired to secure the graft. The wound is closed in layers over a suction drain (Figure 6). If needed, subcutaneous adductor tenotomy is done at the end of the operation. The foot is fitted with a well padded boot with an anti-rotation bar.

Aftercare[20,21]

Assisted hip movements are encouraged early in the postoperative period. Vigorous hip movements are started at four weeks with the patient still in bed. Crutch walking, non-weight-bearing on the affected leg, is allowed from five to six weeks. Full weight-bearing does not begin before four to five months after the operation. The cases with significant pre operative limitation of movement of the hip in advanced stages are treated with 7.5 lbs to 10 lbs skin traction of the operated limb for 2-3 weeks accompanied by intermittent hip motion. Postoperative check x-ray of pelvis including both hip joints in anteroposterior view and lateral view of the affected hip is done in every cases before discharge.

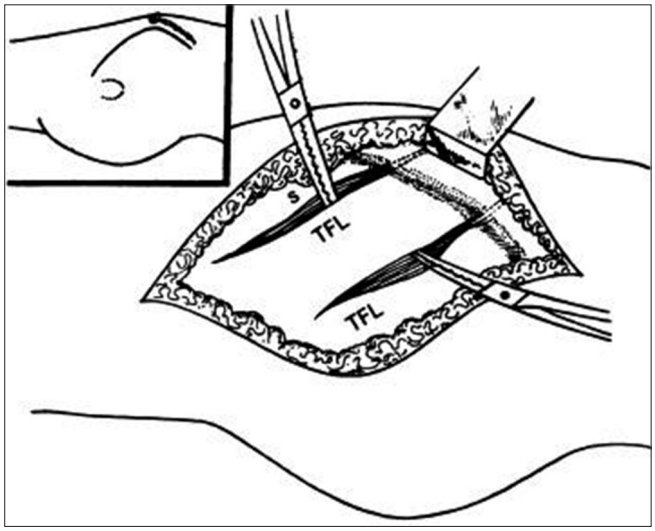

Figure 1: Skin incision (inset) and method of isolation of the tensor fascia lata (TFL) muscle fibres

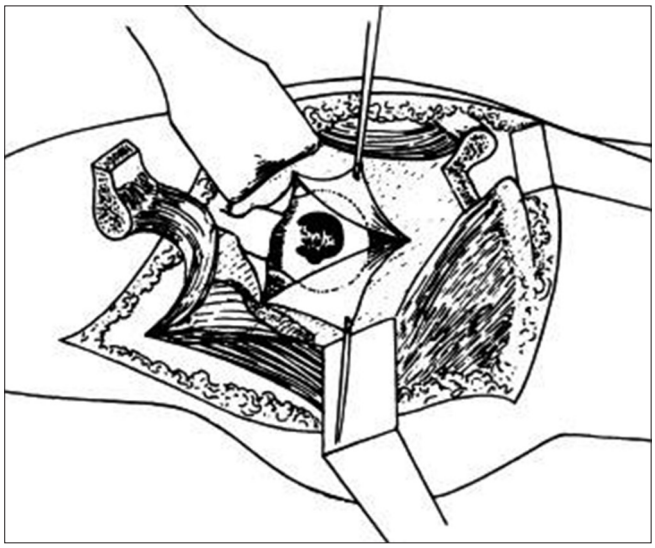

Figure 2: Diagram to show the prepared TFL muscle pedicle bone graft and a pit cut in the antero superior surface of the femoral head and neck. Multiple drill holes are made into the femoral head through the pit

Evaluation

Evaluation of operation was based on functional results, radiological findings and complications. There is no universally acceptable hip score for every society. So different authors have used different hip scales of scoring for their society. In this study Harris Hip Evaluation system (modified) was used to assess the functional out come of cheilectomy, drilling, curettage and TFL muscle pedicle bone grafting in posttraumatic osteonecrosis of femoral head.

Final clinical evaluation was done by modified Harris Hip Score and patients' satisfaction was graded by the following way:-

- Excellent: Hip score: 91-100, Patient is very satisfied.
- Good: Hip score: 81-90, Patient is satisfied.
- Fair: Hip score: 71-80, Patient is satisfied, but not up to the mark.
- Poor: Hip score is less than 70, patient is not satisfied.

The results were analysised by the Chi square test and tested for significance at 0.05.

Radiological criteria of improvement (Baksi's)[20,21]

- The diminution of density of the necrotic portion of the femoral head.
- Return to normal density of the preoperative rarefied areas, restoration of the normal trabecular pattern.
- Disappearance of the crescent sign.
- Healing of the cystic areas and of the fracture line

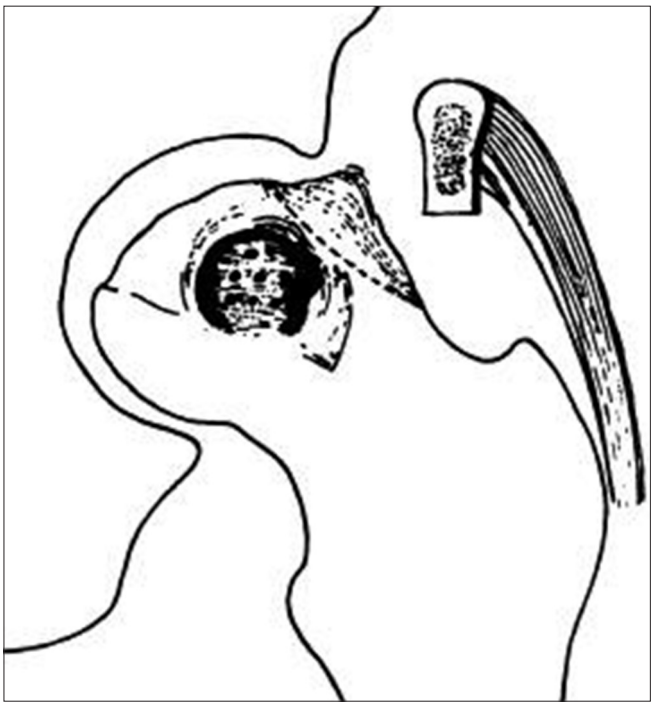

Figure 3: Diagram to show the line of cheilectomy on a deformed femoral head and the pit prepared for grafting

within the necrotic area or between it and the healthy bone.

- Improvement in the contour of the femoral head, particularly after cheilectomy and improvement of the radiological joint space.

The results were analysised by the Chi square test and tested for significance at 0.05.

RESULTS AND ANALYSIS

Clinical improvement was considered according to modified Harris hip score and radiological improvement was judged by Baksi's radiolological criteria of healing. The duration of follow-up was of a minimum of six months and maximum of four years and eight months (average 31 months) The average operative time in our study was 1.5 hours.

Overall clinical improvement having excellent and good results were obtained in 9 out of 10 stage II (90%), 8 of 10 stage III (80%) wheras radiological improvement was noted in 8 (80%) patients of stage II and 6 (60%) patients of stage III disease (Figures 4 and 5). There was no case of death. No cases were lost to follow up and all cases were followed up at regular intervals.

The average age in our study was 43 years, ranging from 29 years to 57 years. Among them, 13 cases were males and 7 cases were females. 12 cases had right hip and 8 cases had left hip involvement.

Harris Hip Score

Preoperative Harris hip score was evaluated in all the cases. The average score was 50.

Harris Hip Score

HHS 21-30	0
HHS 31-40	2
HHS 41-50	9
HHS 51-60	8
HHS 61-70	1

Harris Hip Score – at 3 months post operative

HHS 0-40	0
HHS 41-50	3
HHS 51-60	6
HHS 61-70	9
HHS 71-80	2
HHS 81-90	0
HHS 91-100	0

*The average was 65

Harris Hip Score – at 6 months post operative

HHS 0-40	0
HHS 41-50	1
HHS 51-60	1
HHS 61-70	4
HHS 71-80	5
HHS 81-90	8
HHS 91-100	1

*The average was 86

Harris Hip Score – at 12 months post operative

HHS 0-40	0
HHS 41-50	0
HHS 51-60	1
HHS 61-70	1
HHS 71-80	3
HHS 81-90	6
HHS 91-100	9

*The average was 95

Statistical Analysis

Chi-Squre test on the effectiveness of the surgery based on Clinical Evaluation done by Modified Harris Hip score.

Results of clinical examination

Result of test → / Type of test ↓	Satisfactory	Dissatisfactory	Total
Grade II	9	1	10
Grade III	7	3	10
Total	16	4	20

Calculation of expected frequencies (f_e):-

Row 1:- $\frac{(16\times10)}{20} = 8, \frac{(4\times10)}{20} = 2$

Row 2:- $\frac{(16\times10)}{20} = 8, \frac{(4\times10)}{20} = 2$

$\therefore$ Chi Squre $=\chi^2 = \Sigma\left[\frac{(fo-fe)^2}{fe}\right]$ Where f_o = Observed frequencies & f_e = Expected frequencies

$$= \frac{(9-8)^2}{8} + \frac{(1-2)^2}{2} + \frac{(7-8)^2}{8} + \frac{(3-2)^2}{2} =$$

$$\frac{(1)^2}{8} + \frac{(-1)^2}{2} + \frac{(-1)^2}{8} + \frac{(1)^2}{2}$$

$= 0.125+0.5+0.125+0.5 = 1.25$

$\therefore \chi^2 = 1.25$

Degree of Freedom = df = (r-1)(c-1) = (2-1)(2-1)= 1×1 = 1.

$\therefore$ Chi Squre = χ^2 = 1.25, Degree of Freedom = df = 1.

The χ^2 critical value for 1 df is 0.455 at 0.05 level of significance and the obtained value is 1.25, greater than the table value. This indicates that there is a positive relationship in between the type of tests and the results of clinical evaluation.

Thus the Null Hypothesis that there is no improvement in the clinical condition of the patient after the surgery (Both Grade-II & grade III) based on the modified Harris hip scoring is rejected and the alternative hypothesis that there is a significant improvement after the surgery (Both Grade-II & grade III) is accepted at 0.05 level of significance.

Chi-Squre Test on the Effectiveness of Radiological Examination

Results of radiological examination

Result of test → / Type of test ↓	Satisfactory	Unsatisfactory	Total
Grade II	7	3	10
Grade III	6	4	10
Total	13	7	20

Calculation of expected frequencies (f_e):-

Row 1:- $\frac{(13\times10)}{20} = 6.5$, $\frac{(7\times10)}{20} = 3.5$

Row 2:- $\frac{(13\times10)}{20} = 6.5$, $\frac{(7\times10)}{20} = 3.5$

$\therefore$ Chi Squre = $\chi^2 = \Sigma\left[\frac{(fo-fe)^2}{fe}\right]$ Where f_o = Observed frequencies & f_e = Expected frequencies

$$= \frac{(7-6.5)^2}{6.5} + \frac{(3-3.5)^2}{3.5} + \frac{(6-6.5)^2}{6.5} + \frac{(4-3.5)^2}{3.5} =$$

$$\frac{(0.5)^2}{6.5} + \frac{(-0.5)^2}{3.5} + \frac{(-0.5)^2}{6.5} + \frac{(0.5)^2}{3.5}$$

= 0.384+0.071+0.038+0.071 = 0.218

$\therefore$ χ^2 = 0.218

Degree of Freedom = df = (r-1)(c-1) = (2-1)(2-1) = 1×1 = 1.

$\therefore$ Chi Squre = χ^2 = 0.218, Degree of Freedom = df = 1.

There is no significant relationship in between the type of test and the results of radiological examination. Thus the radiological examination shows no significant improvement after the surgery (Both Grade-II & grade III) at 0.05 level of signicance.

Hence, after the statistical analysis it can be concluded that the Clinical Examination shows comparatively more significant results than the Radiological Examination after surgery (Both Grade-II & grade III).

COMPLICATIONS

There was no case of any neurovascular compromise, haemorrhage, heterotopic ossification, thromboembolism, periprosthetic fractures or deep infection in our study. Only 2 cases of superficial wound infection were found in our series. Both were treated with a change of antibiotic, according to the wound swab culture and sensitivity report. Only 2 cases had a terminal restriction of hip movements with persistence of pain less limp in another 3 cases. Slippage of the graft occurred in 1 case which was fixed with Vicryl suture. This prompted us to use a 4 mm cannulated cancellous screw to fix the MPBG in the latter part of our series.

ILLUSTRATING PHOTOGRAPHS

Pre Operative Skiagrams

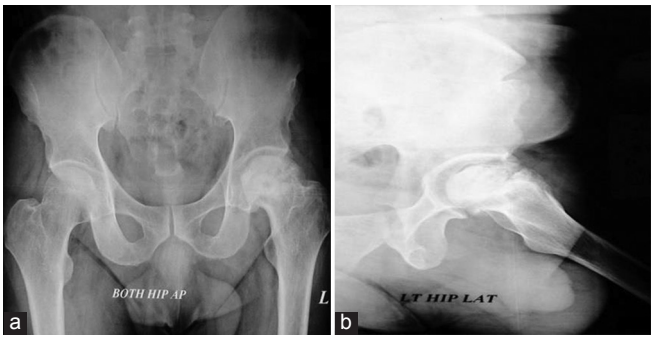

Figure 4: Ficat Arlet stage III osteonecrosis of the left femoral head

Post Operative Skiagrams

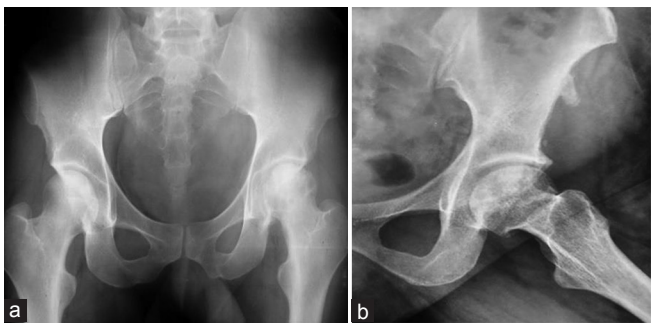

Figure 5: Ficat Arlet stage III osteonecrosis of the left femoral head in the above case without any radiological improvement

Per Operative Photographs

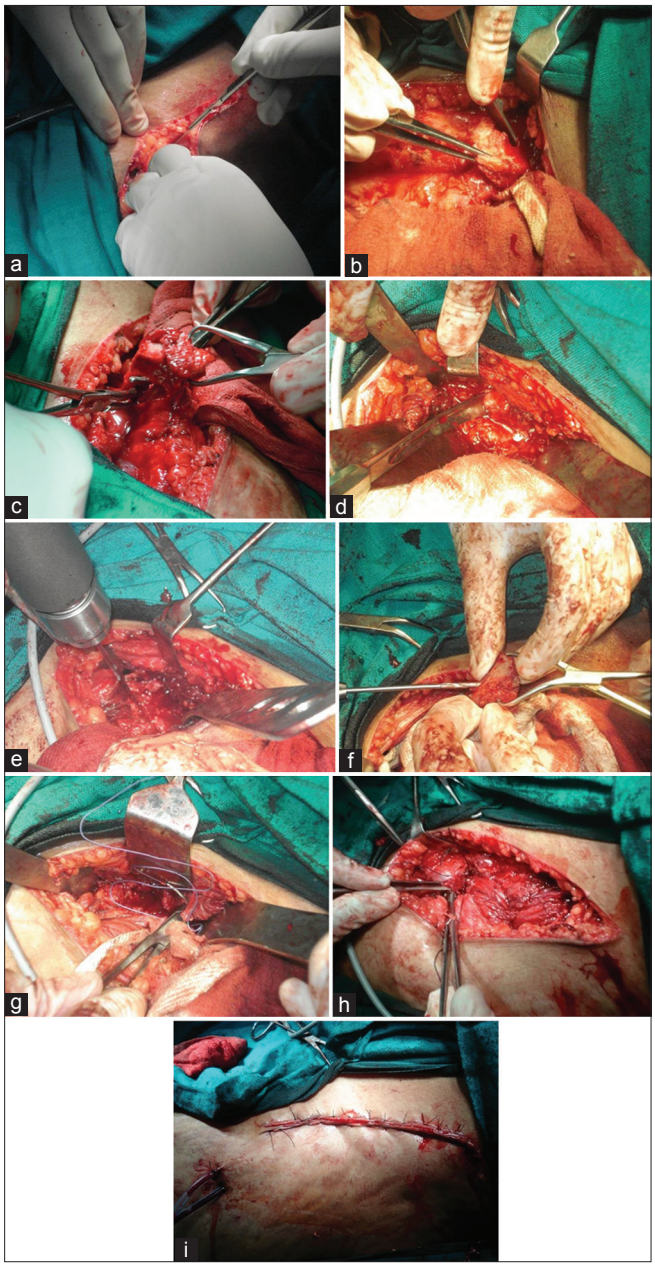

Figure 6: (a) Incision, (b) Separation of TFL MPBG, (c) TFL MPBG Secured, (d) Cheilectomy, (e) Decompression, (f) Slot Made in the Graft for Fixation, (g) Fixation of the graft, (h) Closure in layers, (i) Wound closed

DISCUSSION

Majority of femoral head retaining operations are extraarticular which does not address the intracapsular pathology and hence do not provide satisfactory long term functional outcome. Our study with cheilectomy, drilling, curettage and TFL MPBG addresses the pathology with a single treatment modality unlike others like only decompression or decompression with cheilectomy.

Posttraumatic osteonecrosis of the femoral head is on the rise in developing countries like India due to the high incidence of road traffic accidents. This modality of treatment is especially beneficial in the younger population with modern lifestyle in whom the results of total hip replacement (THR) are unpredictable with high failure and revision rates. Pain relief in osteonecrosis were mainly due to decrease in subarticular venous pressure and intracystic pressure achieved due to decompression and cheilectomy where applicable.

Revascularisation occurs due to the ingrowth of granulation tissue from MPBG and better clinical outcome were evident with preoperative collapse of femoral head of 2-3 mm. In precollapse stage TFL MPBG gives better strut effects than Q-F[19] or gluteus medius[21] MPBG which contain spongy bones.[20] The gluteus medius MPBG is alsocomparatively short to reach the anterosuperior necrotic part of femoral head.

Our study showed favourable results also in most cases with limited preoperative collapse but some had persistent pain with restricted range of motion due to ongoing necrosis and secondary osteoarthritis which can be taken care of by future total hip replacement.

The vascularised fibular bone grafting combined with free iliac bone chip provided 86% survivorship compared to 30% using non-vascular fibular grafting in seven years follow up only in the early stages of necrosis[13] whereas they showed only 69.6% survivorship in five years when performed among combined early and stage III necrosis.[15] The vascular pedicle iliac crest grafting provided 40%[18] to 52%[17] good results for stage II and early stage III necrosis during four to fourteen years follow-up and provided a survival rate of 85% in five years and 61% in 10 years, mostly amongst stage II cases.[16] The procedures showed over 80% survivorship in all of the predegenerative stages of necrosis at 15 years follow up. The confidence band is also narrow indicating that the estimates have variability.

Vascularised grafts needs technical expertise and also has the chances of losing viability as it is based on a single vascular pedicle which may undergo torsion as compared to TFL MPBG which is technically simpler and the multiple vascular channels are well protected in the muscular bed.

Since this method gives satisfactory outcome even in predegenerative stages and significant functional outcome with better congruity of the femoral head, this

treatment protocol can be given in young patients with a predegenerative stage of osteonecrosis of the femoral head. In the context of it's long term failure, total hip replacement can always be carried out in later period of life.[20-22]

CONCLUSION

Osteonecrosis has become a subject of interest amongst orthopaedic surgeons predominantly during the last four to five decades. Etiologies include idiopathic, traumatic, steroid intake, alcoholism, smoking, Caissons disease, Gauchers disease, gout, haemoglobinopathies among others with different pathogenesis in each cases.

Diagnosis of osteonecrosis of femoral head is done clinically by pain in the groin, gradual restriction of motions, radiographic criteria and staging of Ficat and Arlet and ARCO. Radionuclide Scintigraphy (99 mTc Di-phosphonate) can be done especially for diagnosis in the early stages of osteonecrosis without any signicant radiological changes. CT also can detect the early bone changes. MRI shows very early marrow necrosis not detectable by CT and this has significantly improved the outlook of outcome with the advent of stem cell therapy. Tests for haemodynamic functions (intramedullary pressure measurements and venography) for vascular stasis also helps in early diagnosis.

Pain in hip in early stages is due to subarticular increased intravenous pressure, marrow oedema, necrosis and also due to increased intracystic pressure associated with secondary degenerative changes of hip in advanced stages of necrosis. In advanced stages, there may be collapse of femoral head, cheilus formation, adhesions around the periphery of femoral head and associated capsular contracture causing pain due to its stretching effect over the peripheral cheilus. These may produce mechanical limitation of hip motions.

Conservative management has no role in the final outcome of osteonecrosis and collapse occurs in 75% - 100% cases. Treatment depends on age of the patient, stage of the disease, etiology, lifestyle and associated morbidity among others. In our country where squatting and sitting crossslegged is customary every effort should be made to preserve a biological femoral head as long as possible.

Post traumatic osteonecrosis of femoral head treated in our study by curettage of the necrotic area in the anterosuperior aspect of the femoral head followed by multiple drilling and TFL MPBG helped in revascularisation of the necrotic bone by absorption of the dead bone and ingrowth of vascular granulation tissue. Advanced cases were treated in addition with cheilectomy and adductor tenotomy. Results produced pain relief, improvement in range of motion, prevention of collapse and improvement in articular incongruity especially in early stages.

The clinical results did not always correlate with this radiological alterations of the femoral head, since some patients achieved satisfactory clinical scoring even in long term follow up despite the lack of radiological improvement. Clinical improvement was considered according to modified Harris hip score and radiological improvement was judged by Baksi's[20,21] radiolological criteria of healing. The duration of follow-up was of a minimum of six months and maximum of four years and eight months.

Overall clinical improvement having excellent and good results were obtained in 9 of 10 (90%) stage II, 8 of 10 (80%) stage III disease wheras radiological improvement was noted in 8 (80%) patients of stage II and 6 (60%) patients of stage III disease. Only 2 cases had a terminal restriction of hip movements with persistence of pain less limp in another 3 cases.

While THR is the treatment of choice for older patients and with advanced degenerative changes; younger patients undergoing femoral head preserving surgery showed good results both immediate post surgery and also on long term follow up. Hence when the compression is less than 5 mm or the femoral head is not badly compromised beyond repair, decompression of femoral head and TFL muscle pedicle bone grafting is preferred in early and also in some advanced stages of the disease especially as the Indian population in general requires to squat. TFL muscle pedicle bone grafting is a relatively simpler procedure technically than other vascular bone grafting procedures for treatment of osteonecrosis which is commonly encountered in India.[22]

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How to cite this article: Tanmay Datta, N D Chatterjee, Ananda Kisor Pal, Sunil Kumar Das. "Cheilectomy, Drilling, Curettage and TFL Muscle Pedicle Bone Grafting in Post Traumatic Osteonecrosis of The Femoral Head". Int J Sci Stud. 2014;2(3):6-14.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Knowledge and Attitude of Female Medical Students of Crimea State Medical University, Ukraine to Cervical Cancer and Examination

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Abstract

Background: There were no data on the knowledge and attitude of female undergraduate students in Ukraine about this cancer even though In Ukraine, about 21.22 million women are at a risk of having cervical cancer. Cervical cancer ranks as the 6th cause of female cancer deaths in Ukraine, and is the 2nd leading cause of cancer deaths among women aged 15-44 years.

Aim & Objectives: To assess the knowledge and attitude towards cervical cancer and its examination among female medical students of Crimea State Medical University, Ukraine.

Materials & Methods: Data collection was done using a self-administered questionnaire developed to capture the aim of this study. The questionnaire was translated into Russian language and then translated back to English by a different person to assess validity. We measured knowledge about cervical cancer: (risk factors, eligibility for screening and screening techniques), attitudes towards cervical cancer screening and government intervention. 268 questionnaires were administered, 217 were filled and returned, 31 questionnaires were not returned while 20 questionnaires were incorrectly filled (response rate: 81%).

Results: Response rate was 81% (217) with nationalities from Nigeria (41.0%), India (15.2%), Ukraine (13.8%), Russia (9.2%), Crimean Tatar (8.3%), Namibia (3.2%), Uzbekistan (2.8%), Sri Lanka (1.8%),Tanzania (1.4%), Liberia and Turkey (0.9%) each while Armenia, Azerbaijan, Cameroon, Germany and Nepal (0.5%) each. 38% of the respondents were not sure if they had received the HPV Vaccine while 16% did not know what is the HPV Vaccine. 80% of the respondents had heard of cervical cancer but only 58% had heard about cervical cancer screening. Of the screening tests, 17% of respondents knew about the HPV test while only 3% knew about the VIA testing. Even though 82% respondents thought that cervical cancer is a major concern, only 32% had ever done a pap smear.

Conclusion: More than half of the respondents knew about cervical cancer screening (58%), although only 32% of these had ever done a pap smear. This indicates a low level of utilization of Pap smear, probably due to low level of knowledge of the benefits of the test and prevention of cervical cancer. This shows that the females in our institution need to be more effectively educated and informed about cervical cancer and the authorities need to make an effort to put in place screening services that could help in early detection and prevention of the cancer and treatment at pre-malignant stage.

Keywords: Cervical cancer, Cervical cancer screening, HPV, Pap smear, Ukraine, VIA

INTRODUCTION

Cervical cancer is a malignant neoplasm arising from cells originating in the cervix uteri. Vaginal bleeding is a common symptom of cervical cancer, but in some cases it may remain asymptomatic until the cancer is in an advanced stage.[1]

According to the World Health Organization, It is the 3rd most common cancer among women worldwide with approximately 83,195 new cases annually, and 35,673 deaths in 2012.[2] In Ukraine, about 21.22 million women are at a risk of having cervical cancer. Every year, 5,230 women are diagnosed with cervical cancer, and 2,271 women (almost 50%) actually die of this illness. Cervical cancer

ranks as the 6th cause of female cancer deaths in Ukraine, and is the 2nd leading cause of cancer deaths among women aged 15-44 years.[3]

Infection with some kind of Human Papillomavirus is known to cause cervical cancer (more commonly HPV type 16 and 18). It is estimated that about 50% of all sexually active women will contract this virus at least once in their lives, making HPV the most commonly sexually transmitted disease. Smoking and HIV infection are also known to be leading risk factors for this disease. Others include: Early onset of sexual activities, prolonged use of oral contraceptives, multiple sexual partners, history of STDs, and immunosuppresses, in most cases, cells infected with the Human Papilloma Virus heal on their own. However, in some cases, the virus continues to spread and become an invasive cancer.

Cervical cancer screening is typically recommended starting at age 21.[4] How often a pap smear should be done varies from once a year to once every five years depending on the result of the smear. Well screened women with no abnormal smears can stop screening about 60-70 years old, although the guidelines on how long to continue screening vary.[5] Pap-smear screening, every 2-5 years, with appropriate follow-up has been proven to reduce the incidence of cervical cancer by up to 80%.[6] Also, vaccination against HPV has also proved to reduce the risk of cervical cancer by up to 90%. The cost of the vaccine is the major reason why not so many people have received it. Some governments are making plans towards funding the HPV vaccination. If these plans work, they will also go a long way in reducing the incidence of cervical cancer.

Until very recently, the only ways to cure cervical cancer was either surgically, or through radiation therapy (because cervical cancers are radiosensitive). The choice of treatment depended on the stage of the cervical cancer. A new drug has been discovered in Kenya, 'Cervarix'; Lopinavir which was originally used for HIV treatment. But to cure cervical cancer, it is required in high dosage, hence it is used topically by directly inserting it into the birth canal and it is known to destroy the Human Papillomavirus (HPV).[7]

Currently, there are two vaccines used against the HPV; Gardasil and Cervarix to reduce the risk of cancerous and pre-cancerous changes in the epithelium of the cervix and perineum by 93%,[8] although it is only effective if administered before infection occurs. It is typically given to women between the ages 9 to 26, and the effect lasts up to 4-6 years. The high cost of these vaccines has been a major source of concern for ages. Some countries are considering setting up programs to fund this vaccination while some other countries; e.g. South Africa, have developed policies and schemes for screening of cervical cancer,[9] to reduce the incidence of this disease, and improve the health of the women in the nation.

According to various research, the number of women who have this illness without being aware of it is very high. Apart from the fact that it is asymptomatic in the early stages, many of them are not enlightened about it. Lack of knowledge about the HPV infection and lack of preventive measures are also leading causes of cervical cancer. According to various studies, many women have never had a pap smear in their lives, and many more have not heard of cervical cancer screening. More attention and efforts should be paid to enlighten women about this illness as this will also go a long way in reducing the number of cases and deaths recorded annually.

In Ukraine, there is no scheme set aside for vaccination against the HPV or for cervical screening. If a female has any symptoms, she will have to consult with her doctor who will then direct her to the Oncology department. A lot of ladies admitted to feeling embarrassed, scared, or uncomfortable having to discuss their symptoms with the doctors. Some said they won't be able to make time to see the doctor while some others just would not be bothered.

MATERIALS & METHODS

Inclusion and Exclusion Criteria

The study population was comprised of female medical students of the Crimean State Medical University, Ukraine within the age range of 16-60 years. All female students who neither are medical students nor within the age range were excluded from the study.

Study Design and Data Collection Instrument

Data collection was done using a 37-item self-administered questionnaire developed to capture the aim of this study between January and March, 2014. The questionnaire was translated to Russian language and then translated back to English language by a different person to assess validity. We measured knowledge about cervical cancer, attitudes towards cervical cancer screening and government's role in reducing cervical cancer incidence. 268 questionnaires were administered, 217 were filled and returned, 31 questionnaires were not returned while 20 questionnaires were incorrectly filled (response rate: 81%). Respondents were given a free hand in their responses to questions and were only guided when they voluntarily called

for assistance. They were also assured that the information provided would be kept confidential.

Data Analysis

Data was entered and analyzed using Statistical Package for Social Sciences 11.5 (SPSS 11.5). Descriptive statistics of socio-demographic information, knowledge, attitudes and practices of participants regarding cervical cancer were determined and reported in the forms of mean, standard deviation, proportions and percentages.

RESULT

Demography

Response rate was 81% (217) with nationalities from Nigeria (41.0%), India (15.2%), Ukraine (13.8%), Russia (9.2%), Crimean Tatar (8.3%), Namibia (3.2%), Uzbekistan (2.8%), Sri Lanka (1.8%), Tanzania (1.4%), Liberia and Turkey (0.9%) each while Armenia, Azerbaijan, Cameroon, Germany and Nepal (0.5%) each. Of the remaining 51 questionnaires, 31 questionnaires were not returned while 20 questionnaires were incorrectly filled. Majority of the respondents were in the age range of 16-25, 33% of the respondents were in the 3rd year of medical education and 93% were single (Figures 1-3, Table 1). Even though 80% of respondents had heard of cervical cancer (Figure 6), only 13% had received the HPV vaccine (Figure 5) while 9% had a family history of cancer (Figure 4).

Knowledge of Cervical Cancer and Risk Factors

16% of respondents indicated that they knew a lot about cervical cancer while 55% indicated they knew not so much about the cancer (Figure 8). Majority of the respondents (46%) wrongly believed that blood test is used for cervical cancer screening while only 3% knew of the VIA method of screening (Figure 7). The main source of information

Table 1: Age range

Socio-demographic variable	Frequency	Percentage (%)
Age range		
16-25	188	87
26-40	28	13
Above 40	1	0

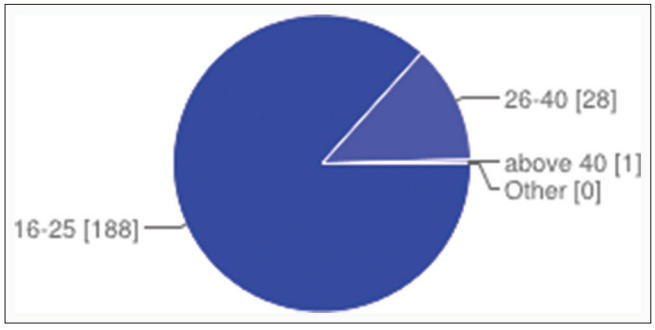

Figure 1: Age range

1st	36	17%
2nd	26	12%
3rd	71	33%
4th	50	23%
5th	15	7%
6th	15	7%

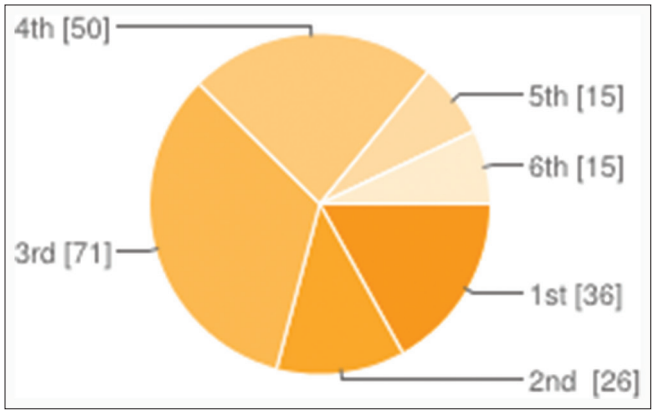

Figure 2: Course (Student)

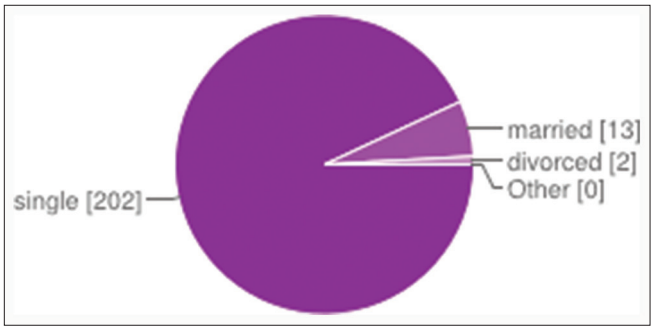

Figure 3: Marital status

Single	202	93%
Married	13	6%
Divorced	2	1%
Other	0	0%

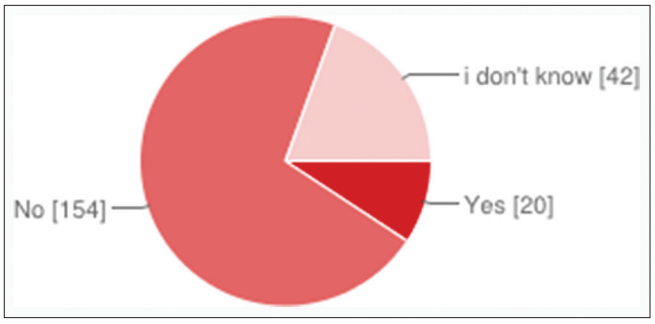

Figure 4: Family history of cancer

Yes	20	9%
No	154	71%
I don't know	42	19%

indicated by the respondents was the internet (37%) while only 2% had read about it in a medical textbook (Figure 9). 4% had relatives who had cervical cancer (Table 3), 25% did not know if it is preventable and 5% thought it can't be treated (Figures 15 and 16). Unusual vaginal discharge (27%) was the most common symptom indicated while 4% and 6% wrongfully thought that rash and swelling in the pubic area respectively were symptoms of cervical cancer (Table 2, Figure 14). Even though HPV is the main risk factor for cervical cancer, only 9% of respondents had indicated it. Only 2% of respondents knew that social status plays a role in cervical cancer, as poor women do

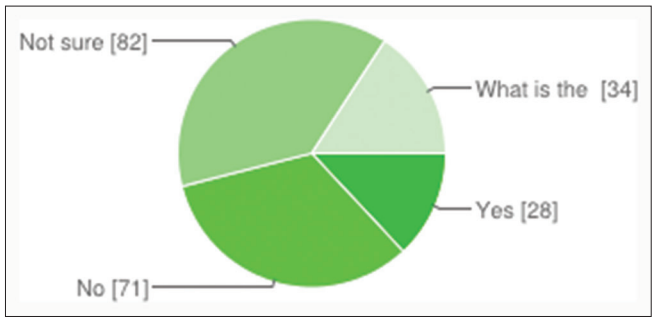

Figure 5: Did you receive the HPV vaccine

Yes	28	13%
No	71	33%
Not sure	82	38%
What is the HPV vaccine	34	16%

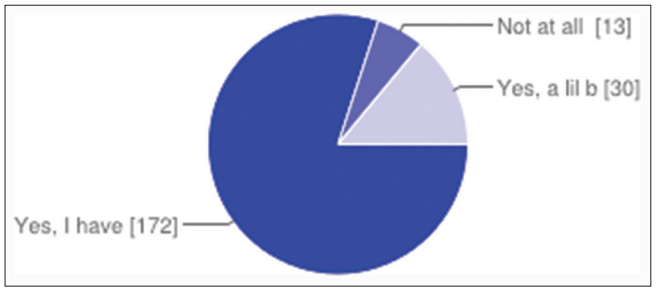

Figure 6: Have you heard of cervical cancer?

Yes, I have	172	80%
Not at all	13	6%
Yes, a lil bit	30	14%

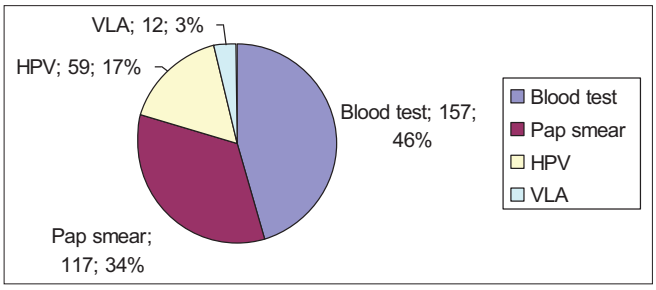

Figure 7: Types of screening tests you know

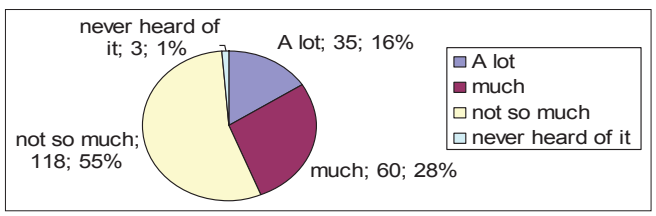

Figure 8: How much do you know about cancer

Table 2: Symptoms of cervical cancer

Variable	Frequency	Percentage (%)
Symptoms of cervical cancer		
Vaginal bleeding between periods	123	26
Bleeding after intercourse	75	16
Pain during intercourse	99	21
Unusual vaginal discharge	127	27
Rash in supra-pubic region	18	4
Swelling in supra-pubic region	28	6

Table 3: Have you, your family or close friends ever had cervical cancer

Variable	Frequency	Percentage (%)
Have you, your family or close friend ever had cervical cancer		
Me	3	1
Close family member	5	2
Other relative	9	4
Close friend	4	2
Other	1	0
Neither me, family nor close friend	183	89

Table 4: Risk factors

Variable	Frequency	Percentage (%)
Genetics	145	19%
Alcohol	45	6%
Smoking	71	9%
Multiple partners	95	12%
Unprotected sex	70	9%
contraceptives	57	7%
IUDs	30	4%
Multiple pregnancies	40	5%
Social status	15	2%
Young age at first pregnancy	29	4%
HPV	67	9%
vulvular warts	42	5%
Diet	12	2%
Other types of cancer	60	8%

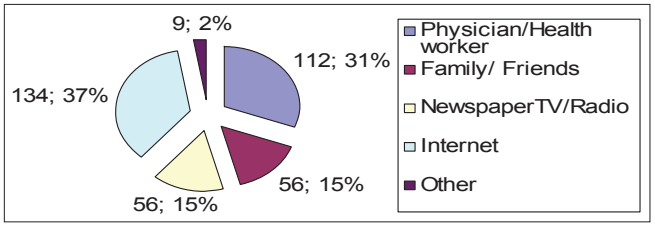

Figure 9: Source of information about cervical cancer

not access to adequate health care services including pap tests (Table 4).

Cervical Cancer Screening

58% of respondents had heard about cervical cancer screening mainly through the internet (Figure 18). 67% had not done cervical cancer screening (Figure 20) and when asked why they had not been screened, 46% said they were healthy while 38% said the doctor did not request (Table 8, Figure 26). When asked for a reason why they would not visit the doctor even if they had a symptom related to cervical cancer, 29% said they would be worried what the doctor might find while 10% said they would feel uncomfortable talking about their symptoms with their

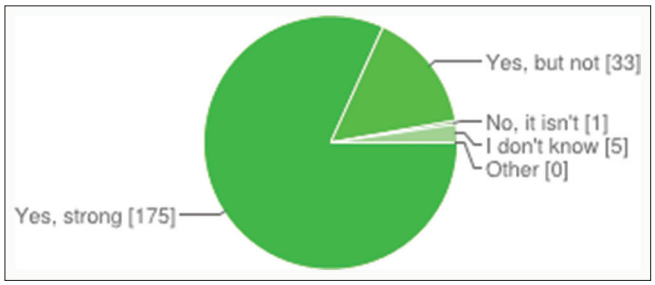

Figure 10: Do you think it is a major concern

Yes, strongly	175	82%
Yes, but not that really serious	33	15%
No, it isn't	1	0%
I don't know	5	2%
Other	0	0%

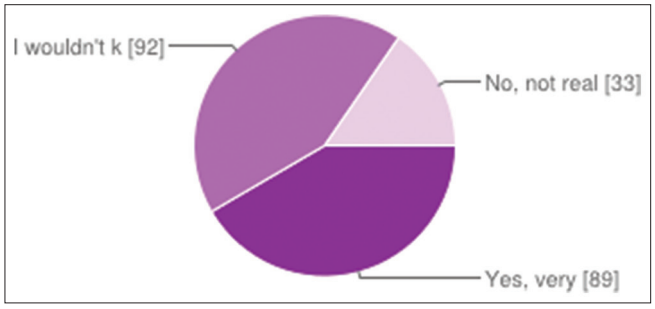

Figure 11: Is it widespread

Yes, very	89	42%
I wouldn't know	92	43%
No, not really	33	15%

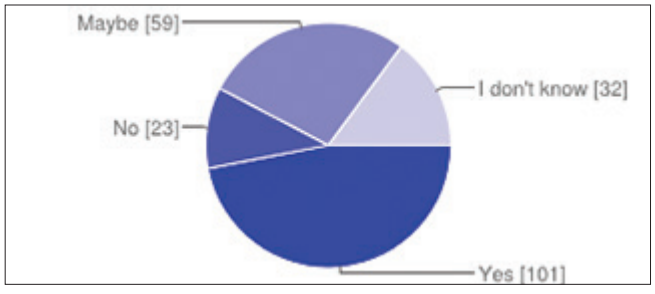

Figure 12: Can it be caught in early stages

Yes	101	47%
No	23	11%
Maybe	59	27%
I don't know	32	15%

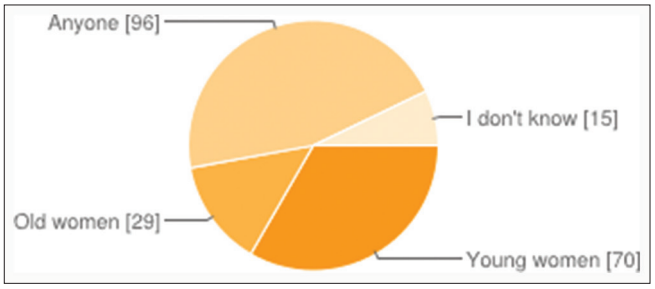

Figure 13: Who is at more risk

Young women	70	33%
Old women	29	14%
Anyone	96	46%
I don't know	15	7%

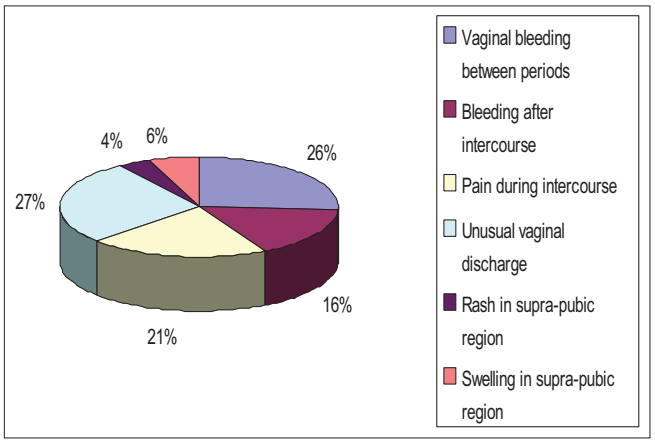

Figure 14: Symptoms of cervical cancer

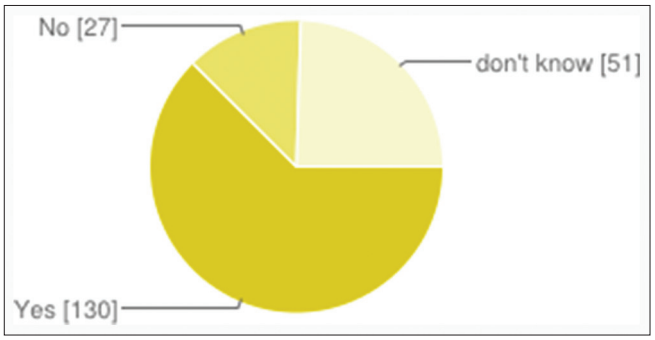

Figure 15: Can cervical cancer be prevented

Yes	130	63%
No	27	13%
Don't know	51	25%

doctor (Table 7). 28% of respondents did not know at what age the first screening should be done while 9% thought that smoking 24 hours before the screening will affect the test result (Table 9, Figure 22).

Government Intervention

29% of respondents knew of at least a government programme set at curbing cervical cancer while 45% were not sure they knew any (Figure 30). Majority of respondents thought that the government placed a 40-59% priority on health care (Figure 32) and that most people can not afford the cost of the diagnostic tests (Figure 33). However, majority of the respondents (65%) agreed that

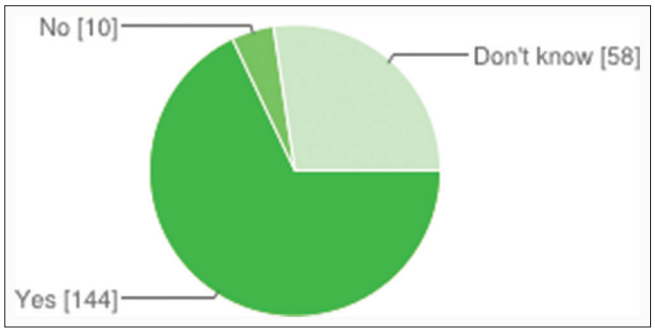

Figure 16: Can cervical cancer be treated

Yes	144	68%
No	10	5%
Don't know	58	27%

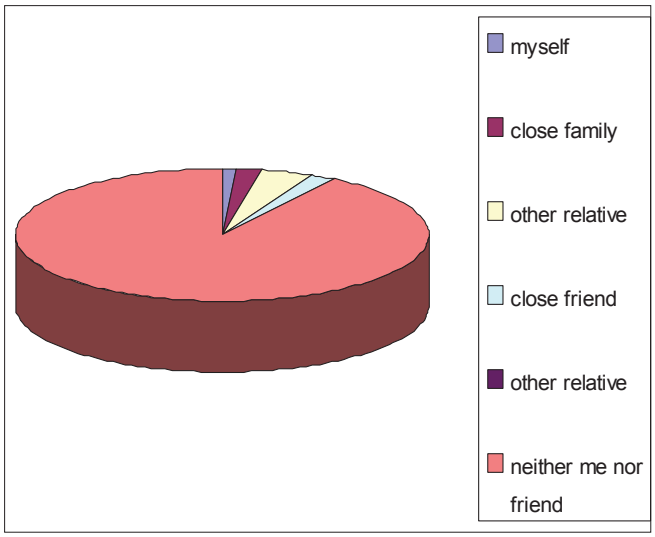

Figure 17: Have you, your family or close friends ever had cervical cancer?

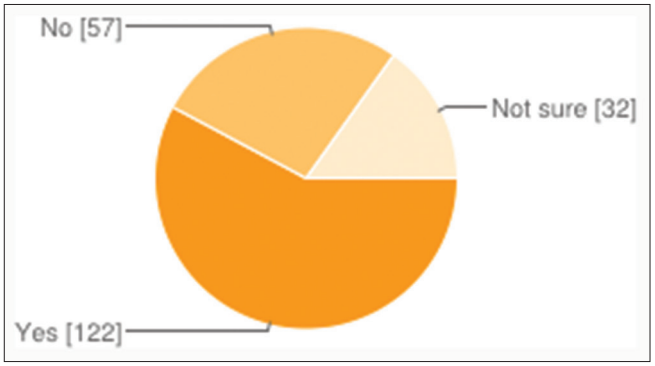

Figure 18: Have you heard of cervical cancer screening

Yes	122	58%
No	57	27%
Not sure	32	15%

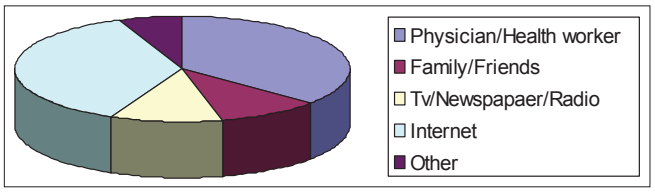

Figure 19: Source of information for Cervical Cancer Screening

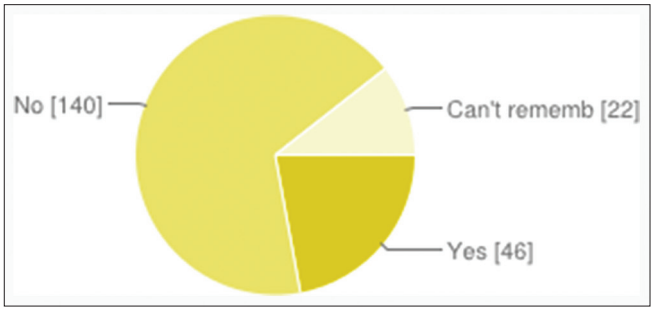

Figure 20: Had cervical cancer screening

Yes	46	22%
No	140	67%
Can't remember	22	11%

Table 5: Source of information for cervical cancer screening

Variable	Frequency	Percentage (%)
Source of information		
Physician/health worker	95	36
Family/friends	26	10
Tv/newspapaer/radio	30	11
Internet	99	37
Other	17	6

Table 6: Reasons for uptake of cervical screening test

Variable	Frequency	Percentage (%)
Reasons for uptake of cervical cancer screening		
Doctor's request	36	33
Free / Subsidized	16	15
Self-conviction	28	26
Part of a general screening program	29	27

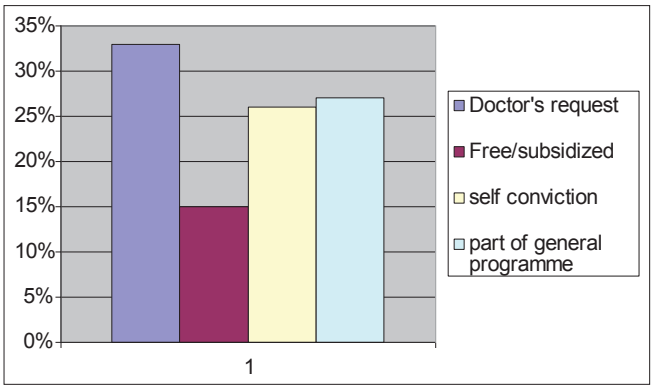

Figure 21: Reasons for uptake of cervical screening test

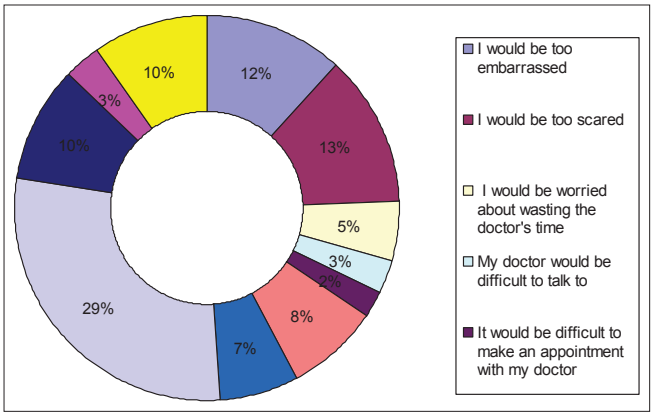

Figure 22: Could you say if this reason might put you off going to the doctor if you had a symptom that you thought might be a sign of cervical cancer?

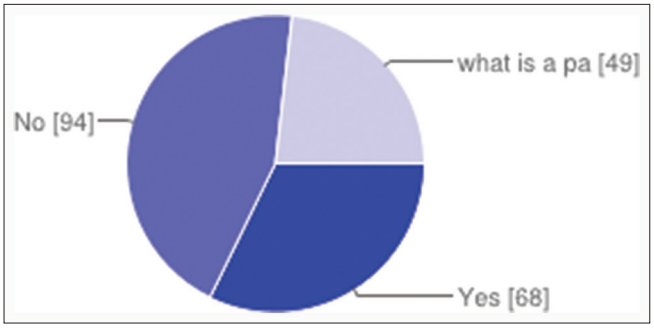

Figure 23: Have you ever had a Pap smear

Yes	68	32%
No	94	45%
What is a pap smear	49	23%

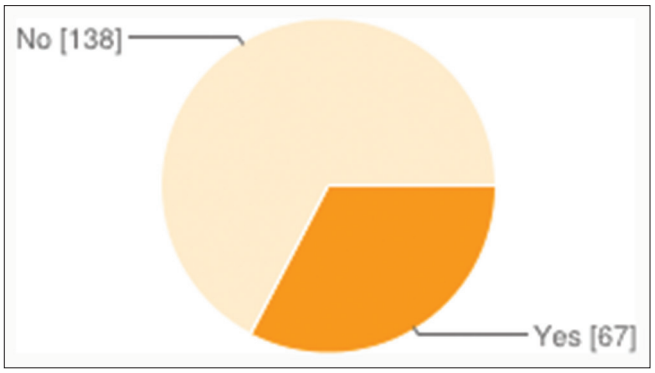

Figure 24: Have you done a pap smear in the last 3 years

Yes	67	33%
No	138	67%

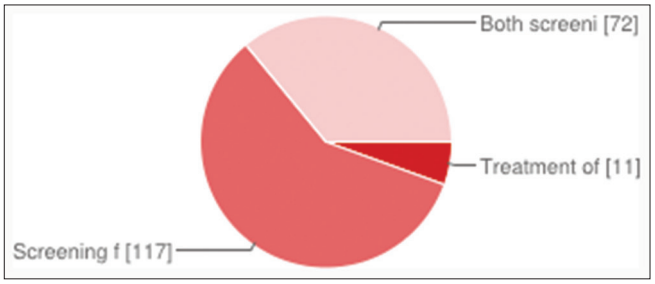

Figure 25: Cervical cancer screening is used for

Treatment of cancer	11	6%
Screening for cancer or pre-cancer	117	59%
Both screening and treatment	72	36%

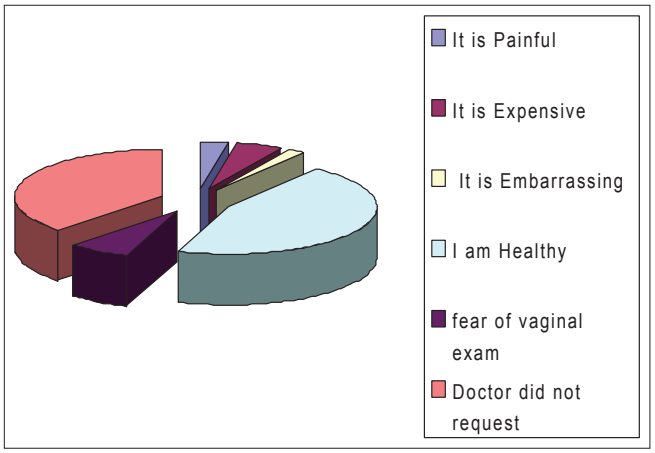

Figure 26: Reasons for non-uptake of cervical screening test

the government has an important role to play in reducing the spread of the cancer (Figure 34).

DISCUSSION

The study was restricted to female undergraduate students in Crimea state medical university. Cervical cancer will remain one of the commonest female genital cancer in Ukraine for decades to come if concerted and sustained efforts are not geared towards preventive measures. In this study, we sought to establish the level of knowledge about cervical cancer and its screening, risk factors and government intervention. Most of the respondents were aware of cervical cancer (80% of students) (Figure 6), although this is low when compared

with a similar study done at the Faculty of Medicine, University of Porto where all the respondents had heard about cervical cancer.[10] We found out that students in 5th and 6th years of study knew more about cervical cancer than students in the 1st and 2nd year, this may however be a be a sign of their education level rather than solely their experience.

More than half of the respondents knew about cervical cancer screening (58%) (Figure 18), although only 32% of these had ever done a pap smear (Figure 20). This indicates a low level of utilization of Pap smear, probably due to low level of knowledge of the benefits of the test and

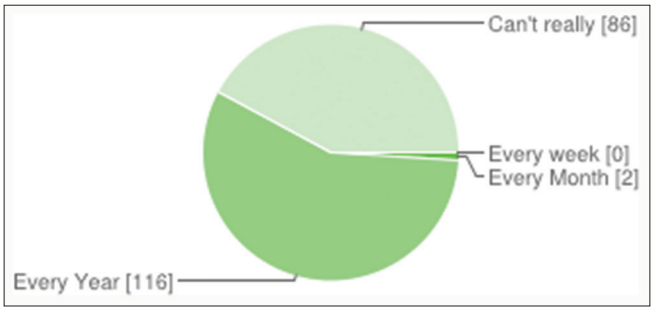

Figure 27: How frequently do you go for check-up

Every week	0	0%
Every Month	2	1%
Every Year	116	57%
Can't really say	86	42

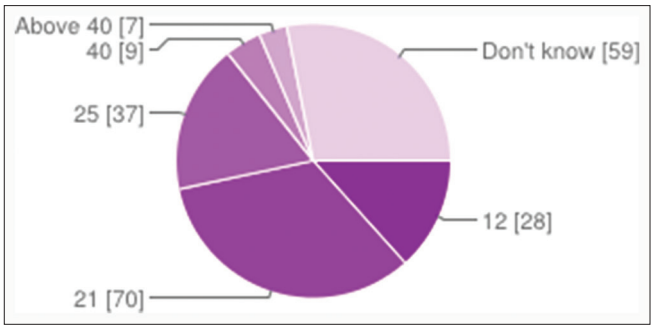

Figure 28: At what age should cervical screening start

12	28	13
21	70	33%
25	37	18%
40	9	4
Above 40	7	3
Don't know	59	28

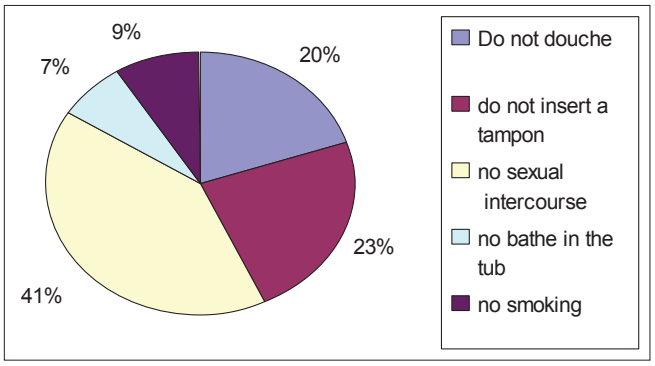

Figure 29: What not to do 24 hours prior to screening

Table 7: Could you say if this reason might put you off going to the doctor if you had a symptom that you thought might be a sign of cervical cancer

Variable	Frequency	Percentage (%)
Could you say if this reason might put you off going to the doctor if you had a symptom that you thought might be a sign of cervical cancer?		
I would be too embarrassed	24	12
I would be too scared	26	13
I would be worried about wasting the doctor's time	10	5
My doctor would be difficult to talk to	6	3
It would be difficult to make an appointment with my doctor	4	2
I would be too busy to make time to go to the doctor	15	8
I have too many other things to worry about	13	7
I would be worried about what the doctor might find	57	29
I would not feel comfortable talking about my symptoms with the doctor	20	10
I might not be able to see a female doctor	5	3
I would worry about not being taken seriously	20	10

Table 8: Reasons for non- uptake of cervical screening test

Variable	Frequency	Percentage (%)
Reasons for non-uptake of cervical cancer screening		
It is painful	5	3
It is expensive	9	5
It is embarrassing	3	2
I am healthy	88	46
Fear of vaginal exam	14	7
Doctor did not request	74	38

Table 9: What not to do 24 hours prior to screening

Variable	Frequency	Percentage (%)
What not to do 24 hours before screening		
Do not douche	63	20
Do not insert a tampon	75	23
No sexual intercourse	131	41
No bathe in the tub	22	7
No smoking	20	9

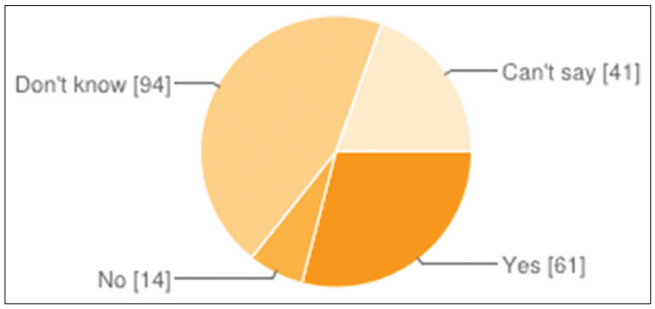

Figure 30: Are there any programs set at curbing cervical cancer

Yes	61	29%
No	14	7%
Don't know	94	45%
Can't say	41	20

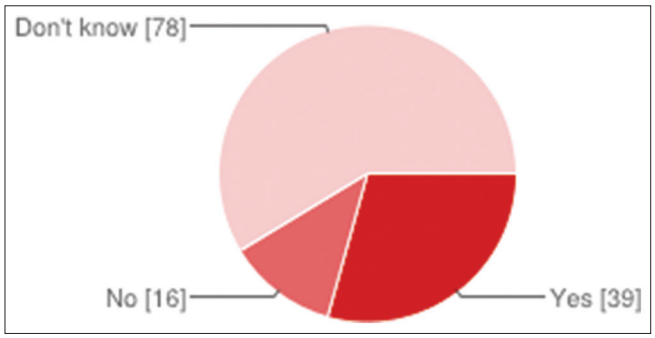

Figure 31: If yes, are they effective

Yes	39	29%
No	16	12%
Don't know	78	59%

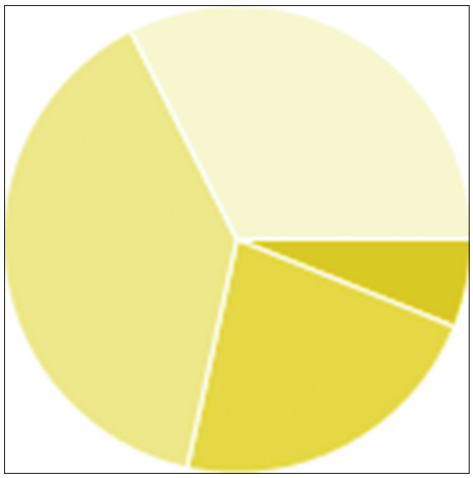

Figure 32: How much priority does government place on health care

100-90%	12	6%
89-60%	44	22%
59-40%	77	39%
<39%	64	32

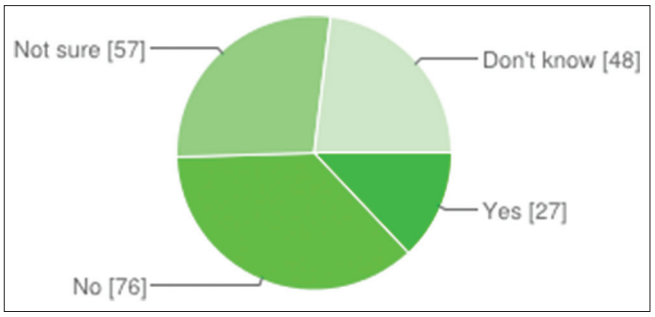

Figure 33: Can most people afford the cost of diagnostic tests

Yes	27	13%
No	76	37%
Not sure	57	27%
Don't know	48	23%

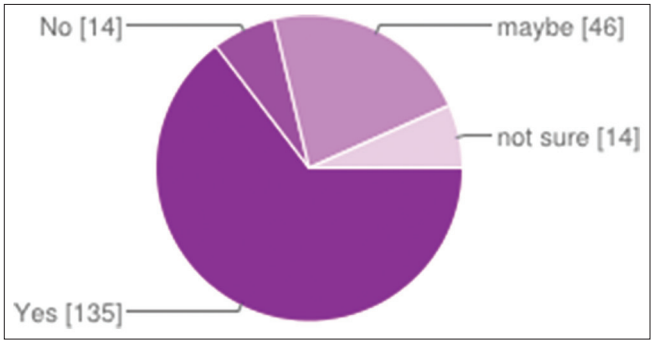

Figure 34: Do you think the government could have an important role to play in reducing the spread of cervical cancer?

Yes	135	65%
No	14	7%
May be	46	22%
Not sure	14	7%

prevention of cervical cancer. Majority of the respondents indicated the media as their source of information (Table 5, Figure 19), further supporting the view that the role of media campaigns should be considered as these are known to work best in promoting knowledge about cervical cancer and screening when multiple media are used. There should be provisions made available for female students when attending health clinics at the university for any condition. Health care workers at the clinic can educate female students during the annual medical check-up, and motivate them to have a Pap smear performed, targeting the risk population on risk factors for cervical cancer. This can improve the university community's knowledge of cervical cancer and practices on the Pap smear test when they seek medical care. The success of the screening programme in reaching its aim is dependent on achieving adequate coverage and thus could reduce morbidity and mortality from cervical cancer (Table 6).

LIMITATIONS OF THE STUDY

Prior to administering the questionnaire, it is possible that some students had studied cervical cancer as a portion of their course by reading recommended materials and had thus acquired a greater knowledge of the subject prior to questioning. Some homogenization of answers could have occurred through comparing answers in class. A restricted time period was given for filling in the questionnaire, this was designed to avoid this. This may also have introduced another limitation because the short time given may have led the students to provide fast, poorly considered responses.

CONCLUSION

The study shows that the level of awareness among female students is fairly low, and most ladies don't know so much about cervical cancer. There is a good knowledge about cancer screening, but practice of cervical cancer screening is low and majority of the respondents wrongly believed that blood test is used for cervical cancer screening and very few know about the VIA method of screening. There is a fair knowledge of the risk factors but knowledge about the associated signs and symptoms is moderately low. This shows that the females in our institution need to be more effectively educated and informed about cervical cancer and the authorities need to make an effort to put in place screening services that could help in early detection and prevention of the cancer and treatment at pre-malignant stage.

AKNOWLEDGEMENT

The authors are grateful to Efunnuga Henrietta, student of International Medical Faculty, Crimea State Medical University, Ukraine for her valued contributions. The authors are also grateful to all the participants who took part in the study.

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How to cite this article: Ogunfowora Olumide Taiwo, Victory I. Wilcox, Olajumoke Alice Ogunji. "Knowledge and Attitude of Female Medical Students of Crimea State Medical University, Ukraine to Cervical Cancer and Examination". Int J Sci Stud. 2014;2(3):15-24.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

A Study of Atherosclerosis in Systemic Vasculitis

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Abstract

Introduction: Vasculitides are diseases characterised by inflammation of blood vessels. Systemic Vasculitis exhibits an enhanced cardiovascular morbidity and mortality akin to Rheumatoid arthritis and Systemic lupus erythematosus. In many systemic vasculitides, accelerated atherosclerosis has become a leading cause of death.

Aim & Objectives: To study the correlation of atherosclerosis in patients with different forms of Vasculitis.

Material & Methods: 13 consecutive patients attending the Dept of Medicine were studied along with 10 age and sex matched controls. Information regarding traditional risk factors was obtained. Disease Activity was assessed by BVAS and organ damage by VDI. Plasma lipid concentrations, C reactive protein (CRP) and ANCA were measured and IMT, a marker of early atherosclerosis, was measured by B-mode ultrasound of extra cranial part of common carotid artery.

Results: Out of the 13 cases studied, 3 had Polyarteritis nodosa, 3 Takayasu arteritis, 2 Churg strauss syndrome, 3 Wegener's granulomatosis,1 Microscopic Polyangiitis, and 1 Hypocomplementic urtecarial vasculitis. Baseline characteristics of patients and controls were similar. Mean disease duration was 3.59±2.45 yrs. Active disease was present in 7 patients with a cumulative BVAS of 78±8.83 whereas VDI was 2.2±1.48 (10 patients having damage). IMT was increased (0.93±0.96 mm) in 10 of 13 (76.92%) patients and 3 of 10 (0.76 ± 0.26 mm) (33.33%) controls. Mean CRP level in patients of Vasculitis was 9±3.46 as against a level <6 in the controls. 4 patients were positive for ANCA (C-ANCA: 2, P-ANCA:1, P+C ANCA: 1). Comparison of patients with and without increased IMT and controls revealed a longer duration of illness (3.77±2.63 Vs 3±1.73), more cumulative BVAS (76±8.72 Vs 13±3.6), more damage (14±3.74 Vs 8±2.83), and increased CRP level (12 ±3.46 Vs 6±2.45) in those having increased IMT without any difference in traditional/nontraditional risk factors including lipid levels amongst the groups.

Conclusion: In our study increased IMT, a sign of accelerated development of atherosclerosis in patients with Systemic Vasculitis is present as compared to controls. This cannot be explained by an increased prevalence of traditional risk factors. Whether the rise of CRP values resulted from atherosclerosis or indicated ongoing activity needs to be further analyzed in prospective studies.

Keywords: Atherosclerosis, Intima media thickness, Vasculitis

INTRODUCTION

Vasculitides are diseases characterised by inflammation of blood vessels. Its clinical manifestations are dependent on the localisation and size of the involved vessels as well as on the nature of the inflammatory process. In many systemic vasculitides, accelerated atherosclerosis has become a leading cause of death.

Systemic rheumatic diseases are complicated by excess cardiovascular mortality, suggesting an accelerated atheromatous process, which relates to the vascular inflammation common in such diseases. Atherosclerosis is a complex and progressive disease of the arterial vasculature consisting of fibro-fatty and fibrous lesions preceded and accompanied by inflammation.[1] Patients with different forms of systemic vasculitis experience long-term morbidity and mortality caused by cardiovascular disease due to premature atherosclerosis.

Systemic vasculitis is a clinicopathologic process characterized by inflammation and necrosis of blood vessels.[2] Patients with systemic vasculitis have a higher risk to develop atherosclerosis than healthy controls[3,4] and this view was also supported by animal models.[5] Oxidized low-density lipoproteins are believed to play important role in the progression of the atherosclerosis. Production of oxygen species plays a pivotal role in the pathophysiology

of vasculitis,[6] which would in turn cause increased oxidation of LDL (low density lipoprotein) leading to atherosclerosis.[7]

Autoimmune diseases like RA (Rheumatoid Arthritis) and SLE (Systemic lupus erythematosus) are complicated by excess cardiovascular morbidity and mortality, which cannot be explained by traditional risk factors.[8,9]

Premature and accelerated atherosclerosis, with enhanced cardiovascular morbidity and mortality, occurs in the course of systemic inflammatory diseases such as RA, SLE and vasculitis.[10]

The systemic vasculitides are a heterogeneous group of diseases, with different patterns of organ involvement, size and type of vascular target, and varying pathological mechanisms, such as ANCA associated damage.

Neutrophil-derived myeloperoxidase and its oxidants, T cells and autoantibodies such as antineutrophil cytoplasmic antibodies (ANCA), anti-endothelial cell antibodies and anticardiolipin antibodies play an important pathophysiological role in the acceleration of atherosclerosis in vasculitis.

Several studies have now shown that, during long-term follow-up, cardiovascular disease is a major cause of mortality in patients with ANCA-associated vasculitis.[11] Zaenker *et al.* reported that patients with Wegener's granulomatosis had a higher frequency of cardiovascular diseases compared with healthy controls [odds ratio (OR)6·7].[12] In line with these findings, patients with ANCA-associated vasculitis more often had stroke and/or myocardial infarction (OR 3-4).[13]

The atherosclerotic process is further enhanced due to the presence of co-existent diabetes, hypertension, dyslipidaemia, abdominal obesity (metabolic syndrome), impaired renal function, persistent proteinuria and increased production of C-reactive protein.

This current study is aimed at determining if atherosclerosis could be found in vascular beds unaffected by the primary vasculitic process, and whether vasculitis subgroup or ANCA association influenced this. Multisystem disease such as systemic vasculitis is often complicated by secondary problems which are also associated with atherosclerosis, such as uraemia and hypertension.

Systemic Vasculitis exhibits an enhanced cardiovascular morbidity comparable with that seen in SLE and RA. Increased Intima Media thickness (IMT), a tool for atherosclerosis imaging and event prediction[14] was found increased in Wegener's Granulomatosis (WG) patient's, which could not be explained by traditional risk factors.[15]

Diagnosis of Vasculitis carries an independent possibility of cardiovascular risk and has potential implications regarding their treatment and surveillance.[16]

AIM & OBJECTIVES

To study the correlation of atherosclerosis in patients with different forms of systemic vasculitis.

MATERIALS & METHODS

Ethical approval was given by the Local Research Ethics Committee for the study and informed consent was obtained from each patient.

Thirteen consecutive patients attending the Medicine Department of NSCB Medical College Jabalpur, fulfilling the American College of Rheumatology and Chappell Hill Consensus Criteria for different Vasculitides were included in the study. Secondary Vasculitis was excluded from the study. Ten age and sex matched volunteers were recruited as controls.

Information was obtained from all subjects with respect to the traditional risk factors for cardiovascular diseases including blood pressure; lipid levels, smoking status, diabetes and family history of cardiovascular diseases.

Vasculitis Disease Activity[17] was assessed by the Birmingham Vasculitis Activity Score (BVAS) and active disease was defined as BVAS of >1 and organ damage was assessed by Vasculitis Damage Index (VDI).[18] Clinical remission was defined as the absence of significant disease activity for at least one month (BVAS=0-1), active disease was defined as BVAS>1.

Blood Analyses

Cholesterol, Low density lipoprotein (LDL), Very Low density lipoprotein (VLDL), High density lipoprotein (HDL), triglycerides and C-reactive protein (CRP) were measured by routine techniques and MPO and PR-3 ANCA was measured by ELISA and IF (Iimmunoflorecence).

Measurement of Intima-Media thickness (IMT)

IMT was measured by B-mode ultrasound of extra cranial part of common carotid artery and mean IMT was calculated. Adequate data of all 13 patients and 10 controls were available for analysis.

IMT was considered to be increased when it exceeded 0.8 mm at the age of 50 and 0.9 mm when age was over 50.[19]

Statistical Analysis

Comparison between patients and controls were made by Mann-Whitney U tests and chi-square test. A p value of <0.05 was considered significant.

RESULTS

Out of the 13 cases studied, 3 had Polyarteritis nodosa (PAN), 3 TKA (Takayasu Arteritis), 2 Churg-Strauss Syndrome (CSS), 3 Wegener's Granulomatosis (WG), 1 Hypocomplementemic urticarial Vasculitis (HUS) and 1 Microscopic Polyangiitis (MPA) (Figure 1).

Characteristics of Patients and Controls

Baseline characteristics of patients and controls are given as under. The patients and controls were similar with respect to age, sex, blood pressure, smoking habits, body mass index, prevalence of diabetes and a positive family history of cardiovascular disease (Table 1).

DISEASE RELATED FACTORS

Characteristics of Patients with Vasculitis

Table 2 shows the different characteristics of patients related to duration of disease, age, disease activity (BVAS), damage (VDI) and steroid intake.

Intima-media Thickness

IMT was increased in 10 of 13 patients of Vasculitis (76.92%) and 3 in controls (33.33%).

Intima-media thickness of patients and controls

Patients (N=13)	Controls (N=10)	P value
0.93±0.96	0.76±0.26	0.004

Mean disease duration of patients having increased IMT was 6.91 ± 2.63 yrs (2 wks to 29 yrs). 3 out of these 10 patients were a known hypertensive previous to the onset of the disease

Blood Analysis

4 patients were positive for ANCA (C-ANCA: Two, P-ANCA: One, P+C ANCA: one) all of whom had increased IMT. However one among them had preexisting hypertension for 10 yrs.

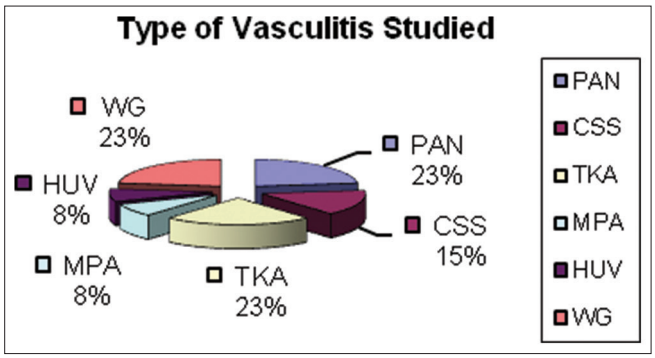

Figure 1: Different Types of Vasculitis Studied.

Mean CRP (C-reactive protein) level in patients of Vasculitis was 9±3.46 as against a level <6 in the controls.

Comparison of Risk Factors for Cardiovascular Disease in Vasculitics Patients with and without Increased IMT

By dividing the patient group in those with (n = 10) and without (n=3) increased IMT, the factors more prevalent in those with increased IMT were evaluated (Table 3).

The patients with increased IMT had a longer duration of illness, higher cumulative BVAS, higher VDI meaning more damage, and increased CRP level as compared to those having normal IMT. The vasculitic patients with increased IMT were also compared with the controls but no difference was found in the traditional risk factors. (Figures 2-4).

DISCUSSION

In this study, it was seen that increased IMT was a sign of accelerated development of atherosclerosis in patients of Vasculitis, assessed during active and inactive disease, compared with controls. This difference could not be explained by traditional risk factors, suggesting that the disease itself contributes to the development of atherosclerosis.

Previous studies have shown premature atherosclerosis in autoimmune diseases such as SLE and RA. Roman *et al* found an association of atherosclerosis with a longer duration of

Table 1: Characteristics of patients and controls

Characteristic	Patients (n=13)	Controls (10)	p value
(yrs)	42.9±6.37	38.7±6.22	NS
Male sex	7 (53.84%)	6 (60%)	NS
Body mass index	25.6±3.3	24.8±2.8	NS
Blood pressure			NS
Systolic	115 (± 17)	116 (± 17)	
Diastolic	69 (± 12)	72(± 8)	
Smoking (n)	1	1	NS
Diabetes	1	0	NS
Family h/o CVD	3	2	NS
Total cholesterol	167.46±12.94	165.1±12.85	NS
LDL	102.69±10.13	102.9±10.14	
VLDL	27±5.20	21.4±4.62	
HDL	48.3±6.95	39.5±6.28	
Triglycerides	119.69±10.94	124.8±11.17	

Table 2: Characteristics of patients with Vasculitis

Characteristics	All (n=13)
Disease duration	3.59±2.45 (1yr to 8yrs)
Active disease (BVAS>1)	7
Cumulative BVAS	78±8.83
Pt's having damage	10
Cumulative VDI	2.2±1.48
Cumulative prednisolone dose (g)	43.7±6.61

disease, a higher damage index score, and less aggressive immunosuppressive treatment, arguing strongly for chronic inflammation as an atherogenic factor in patient's with SLE.[9]

Endothelial dysfunction, which may lead to atherosclerosis has been demonstrated in systemic Vasculitis.[16] A recent study conducted by Leeuw K de *et al* demonstrated accelerated atherosclerosis in patients with Wegener's Granulomatosis.[12] The present study shows an increased prevalence of atherosclerosis in patient's with all types of Vasculitis.

To measure the extent of atherosclerosis we used ultrasound of the common carotid artery, as the previous study revealed high reproducibility, showing less variability than other segments, and reveal the presence of early atherosclerosis.

In patients with systemic vasculitis, HDL cholesterol levels are decreased, whereas LDL cholesterol levels are not elevated but elevated LDL cholesterol levels occur when moderate to severe proteinuria is present.[20]

To determine predisposing factors for atherosclerosis in our patient group, traditional and non-traditional risk factors were investigated. Although the prevalence of traditional risk factors including lipid profile did not differ significantly between patients and controls, patients tended to be slightly older and tended to have a higher body mass index and were more likely to be male and to have a family history of cardiovascular disease. However, because of the limited number of patient's in our study, no definite opinion could be made.

Atherosclerosis is considered to be a chronic inflammatory disorder, and CRP is a marker of systemic inflammation is described as an independent prognostic marker for cardiovascular disease.[21] In our patient's, plasma concentration of CRP was increased. Several studies have suggested that CRP may contribute directly to the development of atherosclerosis, as it induces the expression of adhesion molecules on the endothelial surface and promotes the adherence of leucocytes.[22] Thus CRP could be a direct link between autoimmune disease, characterized by systemic inflammation, and an increased

Table 3: Characteristics of patients with and without increased IMT and controls

Characteristics	Normal IMT (N=3)	Increased IMT (N=10)	Controls (N=10)
Age (yr)	37.67±6.13	44.5±6.26	38.7±6.22
Male sex n (%)	1 (33%)	6 (60%)	6 (60%)
BMI (Kg/m^2)	24.6(±4.95)	26.2(±5.12)	24.8(±4.98)
Blood pressure			
Systolic	110(±15)	118(±18)	116(±17)
Diastolic	66(±7)	71(±14)	72(±8)
Smoking	0	1	1
Diabetes	0	1	0
Total cholesterol	131±11.44	178.4±13.36	165.1±12.85
LDL	87.67±9.36	107.2±10.35	102.9±10.14
VLDL	20±4.47	29.1±5.39	21.4±4.62
HDL	53.67±7.32	46.7±6.83	39.5±6.28
Triglycerides	106.67±10.33	123.6±11.11	124.8±11.17
Family history of CVD	1	2	2
Duration (yrs)	3±1.73	3.77±2.63	
Patient's with active disease	4 (30%)	6 (46%)	
Cumulative BVAS	13±3.6	76±8.72	
Cumulative BVAS/ Duration (yrs)	4.33±2.08	20.15±3.32	
Patient's with damage	3	7	
Cumulative VDI	8±2.83	14±3.74	
Cumulative prednisolone dose (g)	20±0.1	21.42±0.14	
Pt's with ANCA positive Vasculitis	0	4	
CRP Level	6±2.45	12±3.46	<6

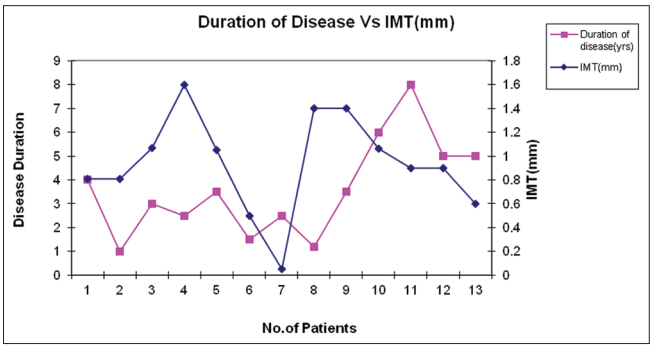

Figure 2: Correlation of the disease duration with the Intima media thickness

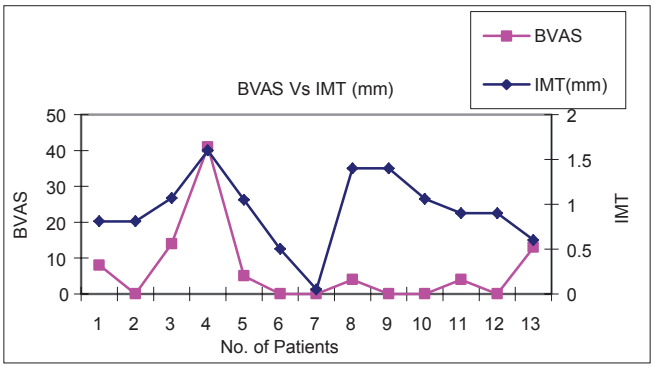

Figure 3: Correlation of the Vasculitis disease activity (BVAS) with the Intima Media thickness

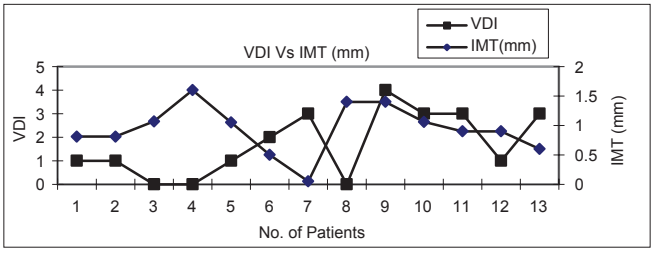

Figure 4: Correlation of the the organ damage (VDI) with the Intima Media thickness

risk for cardiovascular disease. But the question remains as to whether this is a reflection of the greater prevalence of atherosclerotic changes in the vessel wall or of active disease in these patient's resulting in endothelial activation and eventually, in atherosclerosis.

When we divided our patient group on the basis of the presence or absence of increased IMT, it was found that patient's having increased IMT had longer duration of disease, more disease activity, more damage and increased CRP levels. (Figure 5)

No difference was found between age, sex, body mass index (BMI), blood pressure, smoking habits, diabetes, or family history of cardiovascular disease (CVD). Leeuw K de et al neither found any difference in traditional or non-traditional risk factors nor a history of more severe active disease/long duration in patients with increased IMT.

In the present study no difference was found in the cumulative dose of prednisolone between patients with or without increased IMT.

CONCLUSION

In our study increased IMT, a sign of accelerated development of atherosclerosis in patients with Systemic Vasculitis is present as compared to controls. This cannot be explained by an increased prevalence of traditional risk factors.

Whether the rise of CRP values resulted from atherosclerosis or indicated ongoing activity needs to be further analyzed in prospective studies.

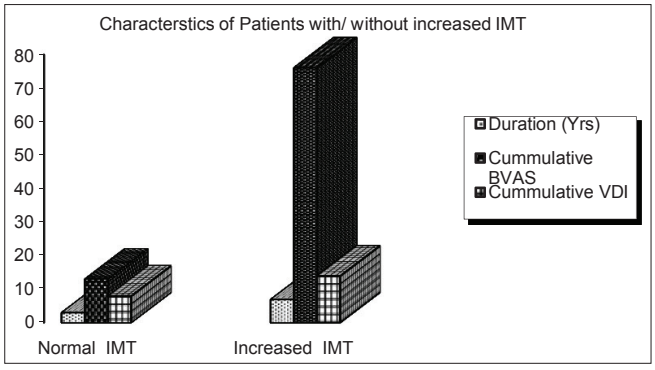

Figure 5: Characteristics of Patients with or without increased IMT

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How to cite this article: Silas Supragya Nelson, Sonjjay Pande, Avadhesh Pratap Singh Kushwah. "A Study of Atherosclerosis in Systemic Vasculitis". Int J Sci Stud. 2014;2(3):25-29.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Study of Factors Influencing Pneumatic Reduction of Intussusception in Children in Tumkur, South India

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Abstract

Background: Pneumatic reduction of intussusception, a non-operative treatment is better than saline or barium reduction.

Aims & Objectives: To study the factors affecting pneumatic reduction of ileo-colic intussusception in children.

Materials and Methods: A cross sectional study was done with 53 children aged <2 years with ileo-colic intussusception between January 2010 to December 2013.

Results: 38 (76%) early cases were pneumatically reduced and failed in 12 (24%) late cases. We studied 10 factors responsible for irreducibility seen.

Conclusion: Success of Pneumatic reduction is multifactorial, depending on clinical, radiological and sonological factors. It can be safely performed in selected patients and avoids operation and anesthesia in small children. Also predictors of irreduciility can avoid unnecessary pneumatic reduction in late cases and early operation can be done.

Keywords: Intussusception, Pneumatic Reduction

INTRODUCTION

Ileo-colic Intussusception (ICI) in children is a common surgical emergency.[1] Majority of ICI (Primary/idiopathic) in children aged <2 years are non-specific (infective) Viral Gastro-enteritis induced ileal hyperplastic Payer's patches acting as lead points (LP) requiring urgent Laparotomy and Reduction. In 2-8% cases (Secondary), in children aged >2 years there are specific (non-infective) LP viz., Meckel's diverticulum, polyp, enterogenous cyst, hemangioma or adenoma[2,3] requiring Laparotomy and Resection. The intussusceptum drags its mesentry leading to lympho-venous congestion and ischemia. Delayed diagnosis and treatment leads to gangrene and perforation[4] mandating operation. Ultrasonography (USG) the imaging of choice[2] is 100% accurate[5] identifying 66% of LP[6] Non-operative treatment methods are Saline, Barium and Pneumatic reduction (PR)[1,2] with the latter having more success and less chances of perforation.[1,2,4] Non-operative reduction is not done for secondary ICI, as they have specific LP requiring Laparotomy and Resection. Compared to ICI, small bowel (ileo-ileal, jejuno-ileal, or jejunojejunal) intussusception is less likely to be reducible by non-operative reduction.[7,8]

MATERIALS & METHODS

Cross sectional study was carried out between January 2010 and Dec 2013. All children aged <2 year with clinically suspected ICI were confirmed sonlogically and included. Children in shock and peritonitis were excluded. A proforma including age, gender, clinical features, Leukocyte count, radiological and sonological findings were recorded. Plain X-ray abdomen ruled out bowel obstruction, ascites and pneumoperitoneum. USG findings i.e., location of the intussusceptum, colonic wall thickness, entrapped fluid, color flow, small bowel obstruction, enlarged mesentric nodes, and ascites were recorded.

Procedure

Child was made to lie on the Fluroscopic table without any anesthesia. A tri-way 14F Foley's catheter was introduced per-rectally, bulb inflated, and buttocks were strapped. Second side tube of Foley's catheter was connected to sphygmo-manometer and third to an inflating bulb. Air was gradually inflated under fluroscopic guidance and controlled pressure not exceeding >120 mm Hg. Initial location of intussusceptum was noted. PR was considered complete when air was observed intering the ileum (cecal reflux) upto 10 cm or more. A "nil cecal reflux" was considered as irreducible (IR) or failure and was operated. All the successful PR cases were reconfirmed by USG, admitted, maintained on IV fluids, observed for 24 hours, feedings were resumed the next day and later discharged. Parents were advised to report immediately if symptoms recurred.

RESULTS

Of the total 59, 6 cases >2 years age were eliminated. In the remaining 53 aged <2 years, 5 were excluded (shock 4, perforation-2). Of the 47 included, 3 had recurrence making it 50 attempts. PR was successful in 38 (76%) early cases, and failed (IR) in 12 (24%) late cases who were operated. In PR group the children were referred early and easily reduced. Whereas 12 cases presented late were irreducible. The features of late presentation were dehydration/hypovolemia, illness/lethargy, abdominal lump, duration of symtoms for >24 hours, rectal bleed, bilious vomiting, fever, leukocytosis, sonological features suggesting tight intussusception and radiological features of bowel obstruction (Table 1).

DISCUSSION

Majority were male (3:2)[1-3] with mean age of 11 months, successfull PR in 76% cases (other studies 74%,[1] 51% - 95%[9]) and peak incidence during summer as in other studies.[10] We had 10 predicting factors of IR viz., Non-hydration/hypovolemia, ill look/lethargy, Lump abdomen, Colicky abdomen/Crying child for >24 hours, Rectal bleed, Emesis of bile, Fever, Leukocytosis, USG and X-ray finding. During PR, cecal reflux into ileum suggests complete reduction. A "nil cecal reflux" suggests IR whose predictors can be remembered by the mnemonic "NIL C REFLUX", also letters LCR stands for Lump, Colic and Rectal bleed which form the clinical triad of ICI (Table 1).

Nonhydration/Hypovolemia due to previous diarrhoea, vomiting, anorexia and third space loss due to ascites was seen all the 12 IR cases. Ill look/lethargy, a late sign was seen 8 of IR group, of which 3 were uncoscious and 1 had covulsions due to dyselectrolytemia. In PR group all were active. Lump abdomen is an important sign, but its absence does not rule out ICI. The ileum intussuscepts into the right colon, then into the transverse colon forming a sausage shaped lump making an empty right iliac fossa. Lump is unfelt in early cases and difficult to feel in crying child. It has to be felt when the child relaxes between the colics. In PR group only in 10 and in IR group lump was felt in all the 12. Symptoms for >24 hours duration, abdomen colic in older children and incessant or unconsolable cry in preverbal children is the most consistent factor as in other studies.[1] In our study, duration of symptoms was <24 hours in 35 cases and >24 hours (late presentation) in 15 cases. All among the 35 early cases and 3 among the late 15 had successful PR. Among the late 12 had symptoms for >36 hours were IR and operated with 3 gangrenous bowel requiring resection. Rectal bleed due to venous congestion of the intussusceptum, mixes with the excessively produced mucus resembling red currant jelly[2] predicting irreducibility. In the PR group with 8, but in IR group all had rectal bleed. 5 cases in IR group were referred late, as diarrhoea with blood and mucus which was confused to be desentry resulting in gangrene in 3. Also the rectal bleed is a sign of bowel ischemia, hence PR to be done meticulously as the bowel at risk for perforation. Emesis of bile, a late feature due to bowel obstruction was 2 in PR group 10 in IR group. Non-bilious vomiting is comman in early cases which is reflex and non-specific,[2] was seen in 24 cases in PR group. Fever and Leukocytosis signs of early sepsis and IR predictor. Of the IR 8 had fever and 3 has lekocytosis. However after PR fever is noted due to release of endotoxins or bacterial translocation. USG is 100% accurate in diagnosing intussusception[1,2,5,11] with findings viz, location of intussusceptum, colonic wall thickness (intusscepiens) >10 mm, entrapped fluid, free fluid, reduced color flow, bowel obstruction are predictors of IR. Mirilas et al. achieved 100% succesfull hydrostatic reduction when colonic wall is <7.2 mm.[12] In our study 14 had IR findings on USG. Of which 2 had PR with difficulty and repeated attempts and 1 got perforated during the procedure requiring operation indicating failed PR. 11 were irreducible. Location of intussusceptum is important as Proximal (ascending and transverse colon) intussusception (30) are easy for PR. 20 were distal (descending and sigmoid colon) are difficult (8) and most of them (12) are IR (Table 2). X-ray abdomen rules out pneumoperitoneum and intestinal obstruction which are predictors of IR. 3 cases with pneumperitoneum were excluded and 9 with bowel obstruction were irreducible, due to tightness between the intussusceptum and intussuscepiens. Also the dilated bowel loops will interfere with visualisation of PR.

Operation was done for 12 IR cases, 7 were very tight intussusceptions with serosal splits requiring very meticulous manual reductions. Gangrenous bowel in 4 and perforation in 1, requring resection and anastamosis.

Table 1: Irreducibility factors in PR and IR group

Sl. no.	Irreducibility predictors (NIL C REFLUX)	No. of cases	PR group (n=38)	IR group (n=12)
1	Non-hydrated/hypovolemia	12	Nil	12
2	Ill look	8	Nil	8
3	Lump abdomen	22	10	12
4	Colicky abdomen/Cry >24 hr	15	3	12
5	Rectal bleed	20	8	12
6	Emesis of bile	2	10	12
7	Fever	8	Nil	8
8	Leukocytosis	8	Nil	8
9	USG features of IR	14	2	12
10	X-ray features of bowel obstruction	9	Nil	9

Table 2: Location of intussusception in PR and IR group

Location of intussusceptum	No.	PR group	IR group
Proximal colon	30	28	2
Distal colon	20	10	10

Recurrence was seen in 3 cases within a month in PR group, who again underwent successful PR. It is believed that recurrent ICI are loose and easy to reduce and operation is indicated only when PR fails.[1]

CONCLUSION

Pneumatic reduction of ileocecal intussusception should be done in all children less than 2 years unless contraindicated (peritonitis, shock, sepsis). Our 10 factors (NIL C REFLUX) are not exclusion criterias, but are predictors of irreducibility. Even with these irreducible factors pneumatic reduction can be definitely attempted provided surgical team is ready for operation in case of irreduciblity or perforation. Pneumatic reduction has the advantage of avoiding an operation, anesthesia, and morbidity. It also reduces the hospital stay, recovery time and cost.[13] Also the surgeon should not unnecessarily delay the operation by doing pneumatic reduction in a child already presenting with multiple preditors of irreducibility.

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How to cite this article: Kiran Kumar KM, Shiva Kumar T, Naveen kumar M, Pavan BM, Ashok C, Kottur S. "Study of Factors Influencing Pneumatic Reduction of Intussusception in Children in Tumkur, South India". Int J Sci Stud. 2014;2(3):30-32.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

A Comparative Study of Blood Pressure in Normal and Pregnancy Induced Hypertensive Cases for Early Diagnosis of Hypertensive Disorders in A Tertiary Care Hospital

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Abstract

Introduction: Hypertension is one of the commonest complications of pregnancy and is a common cause of fetal and maternal mortality and morbidity. Hypertensive diseases complicate roughly 5-10% of pregnancy after mid gestation (Daftarg 1992). Pregnancy induced hypertension is a multi organ disease. Depending on the end organ effects it can be preeclampsia when renal involvement leads to proteinuria and eclampsia when central nervous system involvement leads to seizures. Despite its major negative implications, its origin remains obscure and the disease process is ultimately reversed only by delivery.

Materials & Methods: In the present study four hundred pregnant women with an age group between 18 to 40 years were selected. This study was done for a period of 2 years. Blood pressure was measured using a sphygmomanometer. All subjects were clinically examined and detailed history was taken.

Results: In the present study blood pressure changes in 400 pregnant women were studied throughout their pregnancy in different trimesters. Among 400 pregnant women under study, 352 women remained normotensive throughout their pregnancy and 48 women developed hypertension during pregnancy. A significant difference in blood pressure between women with hypertension in pregnancy and normotensive pregnant women can be observed since the first trimester, much before the actual clinical diagnosis of hypertension in pregnancy.

Conclusion: Preeclampsia and eclampsia is a very common problem in obstetrics. This study shows the pregnancy associated predictable variation in the blood pressure. On account of variations in blood pressure throughout pregnancy seen in this study, it can be concluded that these variations in blood pressure between healthy and complicated pregnancies may lead to early identification of hypertensivecomplications in pregnancy as well as to the establishmentof prophylactic intervention and reduce the maternal and fetal mortality rate.

Keywords: Eclampsia, Hypertension, Preeclampsia, Pregnancy, Trimesters

INTRODUCTION

Pregnancy is the physiological state. Human pregnancy is the most studied of all the mammalian pregnancies. Childbirth usually takes about 38 weeks after conception, which is approximately 40 weeks from the last menstrual period. The WHO defined normal term for delivery as between 37 weeks and 42 weeks.

A woman's reproductive period is roughly from 15 to 45 years – a period of 30 years.

Pregnancy can be complicated by many involved factors like haemorrhage, infection, preterm labour, cervical insufficiency, hypertension, gestational diabetes etc.

Hypertension is one of the commonest complications of pregnancy and is a common cause of fetal and maternal

morbidity as well as mortality. Hypertension complications are involved in roughly 5-10% of pregnancy cases after mid gestation[1] and 10-15% of all maternal deaths are associated with it.

Despite its major negative implications, its origin remains obscure and the disease process is ultimately reversed only by delivery. However, evidence accumulated in the past 20 years indicate that in a large number of these women abnormal placentation is one of the initial events.

Preeclampsia is a syndrome complex characterized by development of hypertension to the extent of 140/90 mmHg or more with edema or proteinuria or both induced by pregnancy after 20 weeks of gestation. Eclampsia is a preeclamptic state in pregnancy complicated with convulsion.

Pregnancy induced hypertension is a complication involving multiple organs cumulatively. Depending on the end organ effects, it can be preeclampsia when renal involvement leads to proteinuria and eclampsia when central nervous system involvement leads to seizures. The HELLP syndrome can occur as a complication of preeclampsia which is characterized by hemolytic anemia, elevated liver enzymes and low platelet count.

According to Working Group of National High Blood Pressure Education Program (NHBPEP) 2000, the hypertensive disorders can be classified into four types:[2]

1) Gestational hypertension
2) Preeclampsia and Eclamptic syndrome
3) Preeclampsia syndrome superimposed on chronic hypertension
4) Chronic hypertension.

Preeclampsia and Eclampsia

Preeclampsia is multisystem disorder characterised by development of hypertension to the extent of 140/90 mmHg or more with oedema or proteinuria or both after 20 weeks of gestation. Preeclampsia often affects young and nulliparous women.

If there is onset of convulsion in women with preeclampsia and this cannot be attributed to other cause, then it is termed eclampsia. The seizures are generalized and may appear before, during or after labour.

Preeclampsia superimposed on chronic hypertension, predispose to development of superimposed preeclampsia and eclampsia.

The incidence of preeclampsia in primigravidae is about 10% and in multigravidae 5%.[3] There is increased association of preeclampsia with elderly and young primigravidae.

Zhang and associates (2002) reported that the incidence of preeclampsia was doubled in women whose daily intake of ascorbic acid was less than 85 mg.[4]

Villar and associates (2006) showed that calcium supplementation in population with low dietary calcium intake had a small effect to lower perinatal mortality rates, but no effect on the incidence of preeclampsia.[5]

Preeclampsia is principally a syndrome of signs and when symptoms appear, it is usually late.

Hypertension is the most important sign of preeclampsia because it reflects the severity of the disease.

Proteinuria is a sign of preeclampsia which is defined as more than or equal to 300 mg of protein in a 24-hour urine collection. Proteinuria is also valuable as a sign of severity and a value of more than or equal to 5 g in 24 hours is one of the criteria to classify preeclampsia as severe.

Increase in weight and edema are no longer considered signs of preeclampsia. Headaches are usually present in severe forms of preeclampsia. Epigastric pain is also common in patients with severe forms of the disease, particularly HELLP syndrome.

Blurring or diminish of vision or sometimes complete blindness can occur. It usually regains within 4-6 weeks following delivery.

The only possible known treatments for eclampsia or advancing preeclampsia are abortion or delivery either by labour induction or caesarean section.

However, post-partum pre-eclampsia may occur up to 6 weeks following delivery even if symptoms were not present during the pregnancy. Post-partum pre-eclampsia might be dangerous to the health of the mother since she may ignore or dismiss symptoms as simple post delivery headache and edema.

Hypertension can sometimes be controlled with taking anti hypertensive drugs.

Women with underlying inflammatory disorders such as chronic hypertension or autoimmune diseases would likely benefit from aggressive treatment of those conditions prior to conception, tamping down the overactive immune system.

Risk factors associated with preeclampsia include obesity, multi fetal gestation, maternal age older than 35 years and African-American ethnicity.[6]

Conde-Agudelo et al (1993) suggested that mean arterial pressure in the second trimester is a better predictor of gestational hypertension than of preeclampsia.[7]

Andreas et al (2006) reported that abnormal uterine perfusion, independently of the pregnancy outcome, has a significant impact on maternal cardiovascular control. Measures of blood pressure variability, baroreflex sensitivity and heart rate variability might be used for improved risk stratification.[8]

Buchbinder et al. (2002) reported that women with severe gestational hypertension have a higher incidence of preterm birth and small-for-gestational-age newborns than in those with normal pregnancy and with mild preeclampsia.[9]

Ramon C. et al (2001) reported that during the first half of pregnancy, systolic but not diastolic BP is slightly elevated in women who developed gestational hypertension.[10]

Monique et al (2008) suggested that high blood pressure before and during early pregnancy is associated with an increased risk of gestational diabetes mellitus.[11]

Ananth and Basso (2009) reported that the risk for stillbirths was more likely in hypertensive multiparas compared with nulliparas.[12]

There is approximately 30% probability of preeclampsia to recur in future pregnancy. Women who develop preeclampsia are also at high risk for chronic hypertension later in life.

If preeclampsia is detected early, with prompt and effective treatment the preeclamptic features subsides completely and the prognosis is not unfavourable, both for the mother and the baby.

In the present study the pattern of blood pressure changes in pregnant women were studied. This was done throughout their pregnancy in different trimesters, so that the blood pressure changes could be used as a marker in the early diagnosis of hypertension in pregnancy.

MATERIALS & METHODS

In the present study 400 pregnant women of age group 18 to 40 years were selected. Blood pressure was recorded throughout their pregnancy in all the three trimesters. This study was done over a period of 2 years at Patna Medical College and Hospital.

Exclusion Criteria of Subjects

1. Women with diabetes, cardiovascular or renal diseases were excluded
2. None of the women had a history of hypertensive disorders in previous pregnancy
3. Drugs with cardiovascular effects were not given to any women.

All subjects were examined and blood pressure was recorded in the OPD of the obstetrics and gynaecology department between 9 to 11 am to avoid any influence on blood pressure due to diurnal variation.

All subjects were clinically examined and detailed history was taken with reference to duration of pregnancy and previous child birth. Subject's details of obstetrics and gynaecological history along with drug history was recorded

In all the subjects' blood pressure was recorded using sphygmomanometer.

The subjects were made to rest in supine position on the couch comfortably for 10 minutes before blood pressure was taken. They were mentally and physically relaxed and free from excitation and anticipation.

The blood pressure was measured in left arm. The arm with the cuff wrapped around it, was kept at the level of the heart to avoid the influence of gravity. In all the subjects blood pressure was first recorded by palpatory method to get the systolic pressure. Then both the systolic and diastolic pressure was recorded by auscultatory method of blood pressure recording. Three readings were taken at an interval of 2 minutes. The average of those readings were taken as final reading of systolic and diastolic blood pressure.

RESULTS

In the present study blood pressure changes in 400 pregnant women were studied throughout their pregnancy in different trimesters.

Among 400 pregnant women under study, 352 women remained normotensive throughout their pregnancy and 48 women developed hypertension during pregnancy.

Table 1 shows that the mean systolic blood pressure was 114.06 among normotensive women and 123.06 among women with final diagnosis of hypertension in pregnancy in the Ist trimester. The mean diastolic pressure was 66.02 among normotensive women and 74.50 among women with final diagnosis of hypertension in pregnancy in the Ist trimester.

So, Table 1 shows statistically significant (P<0.001) difference of systolic and diastolic blood pressure of normotensive women and women with final diagnosis of hypertension in pregnancy in the Ist trimester.

Table 2 shows that the mean systolic blood pressure was 116.75 mmHg among normotensive women and 130.08 mmHg among women with final diagnosis of hypertension in pregnancy in the IInd trimester. The mean diastolic pressure was 68.82 mmHg among normotensive women and 80.83 mmHg among women with final diagnosis of hypertension in pregnancy in the IInd trimester.

So, this table shows statistically significant (P < 0.001) difference of systolic and diastolic blood pressure of normotensive women and women with final diagnosis of hypertension in pregnancy in the IInd trimester.

Table 3 shows that the mean systolic blood pressure was 117.23 mmHg among normotensive women and 146 mmHg among women with final diagnosis of hypertension in pregnancy in the IIIrd trimester. The mean diastolic pressure was 69.32 mmHg among normotensive women and 94.83 mmHg among women with final diagnosis of hypertension in pregnancy in the IIIrd trimester.

So, this table shows statistically significant (P < 0.001) difference of systolic and diastolic blood pressure of normotensive women and women with final diagnosis of hypertension in pregnancy in IIIrd trimester.

DISCUSSION

The present study was undertaken to study the pattern of blood pressure changes in pregnancy, which was done throughout the pregnancy in different trimesters.

In the present study 400 pregnant women within age group of 18 to 40 years were selected.

In our study we found that among 400 pregnant women, 48 women developed hypertension in pregnancy and 352 women were normotensive throughout the gestational period.

In the present study the blood pressure of the women with final diagnosis of hypertension in pregnancy in the first trimester of gestation was significantly higher than the women who remained normotensive throughout the pregnancy (Table 1).

Ramon C et al (2000) reported that there is a highly statistically significant difference in the circadian variability of systolic and diastolic blood pressure between normotensive and pregnancy induced hypertensive women during the first fourteen weeks of gestation.[13]

Table 1: Pattern of blood pressure of normotensive women and women with final diagnosis of hypertension in pregnancy in the Ist trimester of gestation

Subject	Blood pressure (mmHg)	
	Systolic	Diastolic
Normotensive N=352	114.06±2.87	66.02±2.79
Hypertensive (final diagnosis) N=48	123.06±2.34	74.50±1.51
't'	20.91	20.71
'p'	<0.001	<0.001

Data are expressed as mean±standard deviation, N=Number of cases

Table 2: Pattern of blood pressure of normotensive women and women with final diagnosis of hypertension in pregnancy in the IInd trimester of gestation

Subject	Blood Pressure (mmHg)	
	Systolic	Diastolic
Normotensive N=352	116.75±2.49	68.82±2.55
Hypertensive (final diagnosis) N=48	130.08±2.56	80.83±2.24
't'	43.09	32.06
'p'	<0.001	<0.001

Data are expressed as mean±standard deviation, N=Number of cases

Table 3: Pattern of blood pressure of normotensive women and women with final diagnosis of hypertension in pregnancy in the IIIrd trimester of gestation

Subject	Blood pressure (mmHg)	
	Systolic	Diastolic
Normotensive N=352	117.23±2.53	69.32±2.48
Hypertensive (final diagnosis) N=48	146.00±2.70	94.83±3.13
't'	73.53	64.80
'p'	<0.001	<0.001

Data are expressed mean±standard deviation, N=Number of cases

Ramon C et al (2001) who studied the ambulatory blood pressure, reported that by 14 weeks of gestation, the predictable trend of blood pressure for women with gestational hypertension and preeclampsia reaches 115/67 mm Hg, for systolic and diastolic blood pressure, whereas the healthy normotensive women have a mean blood pressure at 103/60 mm Hg at the end of first trimester of pregnancy.[10]

In our study in the first trimester the mean systolic and diastolic blood pressure of women with final diagnosis of hypertension in pregnancy was 123.06/74.50. The mean systolic/diastolic blood pressure of normotensive woman was 114.06/66.02 (Table 1).

Therefore, a significant difference in blood pressure between women with hypertension in pregnancy and normotensive pregnant women can be observed since the first trimester, much before the actual clinical diagnosis of hypertension in pregnancy.

In our study we found that blood pressure further increases in second trimester of pregnancy in women with pregnancy induced hypertension. The range of blood pressure for diagnosis of preeclampsia was seen in the third trimester of pregnancy (Tables 2 and 3).

In our study although the blood pressure was higher in the hypertensive than in the normotensive women from the first and the second trimester but it was within normal range. The blood pressure at or above 140/90 mm Hg was seen in the third trimester (Table 1-3).

Ramon C et al (2001) also reported that blood pressure increases linearly during the second half of gestation in pregnancy induced hypertension, the average blood pressure values for women who developed gestational hypertension and preeclampsia, are well within the normal ranges of blood pressure variability until the very late stages of pregnancy.[10]

Ramon C. et al (2000) reported that the differences in blood pressure between healthy and complicatedpregnancies can be observed as early as in the first trimesterof pregnancy. Those highly significant differences are foundwhen both systolic and diastolic blood pressure for women witha later diagnosis of gestational hypertension or preeclampsiaare well within the accepted normal.[13]

Diana E Ayala et al (1997) reported that the evaluation of predictable variability in bloodpressure by the use of ambulatory devices, and the proper processingof the time series thus obtained, can be useful for the earlyassessment of hypertensive complications in pregnancy.[14]

CONCLUSION

The present study revealed that women who had the final diagnosis of hypertension during pregnancy had their blood pressure significantly raised in the first, second, third trimester of gestation as compared to women who had normal blood pressure throughout the gestation.

Hypertension and its related complications of pregnancy (preeclampsia, eclampsia) are very common problem in obstetrics. If left untreated preeclampsia may lead to eclampsia which is a fatal condition.

This study shows the pregnancy associated predictable variation in the blood pressure. On account of variations in blood pressure throughout pregnancy seen in this study, it can be concluded that these variations in blood pressure among healthy and complicated pregnancies may lead to an early identification of hypertensivecomplications in pregnancy as well as to the establishmentof prophylactic intervention and reduce the maternal and fetal mortality rate.

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How to cite this article: Pallavi kumari, S N Sharma, Sumit Kumar, Mayur Kumar. "A Comparative Study of Blood Pressure in Normal and Pregnancy Induced Hypertensive Cases for Early Diagnosis of Hypertensive Disorders in A Tertiary Care Hospital". Int J Sci Stud. 2014;2(3):33-37.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Multi Drug Resistant Uropathogens in HIV: Are They A Threat to Community?

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Abstract

Introduction: Untreated Urinary tract infections accounts for 7-60% of opportunistic infections in immunocompromised hosts. Asymptomatic bacteriuria is one among the important causes of opportunistic infections in HIV seropositive. Urinary tract infections became quite alarming as isolated uropathogens exhibits high percentage resistance to almost all antibiotics. Limited data is available from India on the frequency of asymptomatic bacteriuria in HIV seropositive.

Aims & Objectives: The present study was taken up to know the prevalence of asymptomatic urinary tract infections among HIV patients.

Materials & Methods: 200 HIV seropositive patients without any complaints of urinary symptoms were included in the study. Patients with urinary tract abnormalities, diabetes mellitus, pregnancy etc. were excluded from the study. Patient's history of antibiotics & anti retroviral treatment intake was noted. Urine samples were processed by standard protocols. Antibiotic susceptibility testing was performed using Kirby-Bauer's disk diffusion method. CD4 counts were done using FACS Calibur.

Results: Among 200 HIV patients in the study, 100 patients were on antiretroviral treatment. Out of 200 urine samples, 60 (30%) samples showed significant growth. 40 patients with significant bacteriuria were on antiretroviral treatment. Out of 60 samples, 48 (80%) isolates were bacteria & 12 (20%) were identified as Candida species.Commonest bacterial isolates were Staphylococcus aureus 34 (56.66%), Enterococcus species 09 (15%), Escherichia coli 03 (5%). Isolates showing resistance to three or more than three categories of antibiotics were considered as multi drug resistant bacteria. 28 bacterial isolates were showing multi drug resistance.15 (44.11%) of Staphylococcus aureus were methicillin resistant.

Discussion: Higher prevalence of resistant uropathogens in HIV patients is a definitive threat. The early identification of multi drug resistant uropathogens in these patients and their proper treatment will help in patient betterment & also avoids the spread of these bacteria to the community.

Conclusion: Routine urine screening of HIV seropositive might help in the early detection of multi drug resistant uropathogens.

Keywords: Asymptomatic bacteriuria, HIV, Multidrug resistant uropathogens

INTRODUCTION

The Acquired Immunodeficiency Syndrome (AIDS) caused by Human Immunodeficiency Virus (HIV) is the most important public health problem. Though HIV infections made delayed into India, its spread has been very rapid and at present, India has the distinction of having the largest number of people living with HIV in the world.[1] Urinary tract infection (UTIs) is one of the significant illnesses that cause burden on national exchequer. It is not only common nosocomial infection but an important source of morbidity in community as well.[2] Urinary infections are one of the most common bacterial infections and the cause of morbidity and hospitalization in HIV positive individuals.[3] HIV disease is associated with a variety of renal syndromes. In patients with low CD4 counts, bladderareflexia and hyporeflexia are common neurologic complications, which lead to urinary stasis and ultimately infection.[4,5]

However, prevalence of data on the frequency of UTIs in HIV infected patients is limited & is not updated. Urinary tract infections accounts for a significant proportion of patient's daily hospital visits in HIV patients.[6] Asymptomatic bacteriuria (ASB) is isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or signs referable to urinary infection.[7,8] Untreated UTI accounting for 7-60% of opportunistic infections could be a source for ascending urinary tract infection and septicemia in immunocompromised hosts.[4]

UTI accounts for a large proportion of anti-bacterial drug consumption.[3] Resistance to commonly prescribed antibiotics for UTI is an expanding global problem both in developed as well as developing countries.[8] Due to widespread and injudicious use of antibiotics at community level, we are encountered with more resistance patterns to common antibiotics.[2] UTI became quite alarming as isolated uropathogens exhibits high percentage resistance to almost all antibiotics.[9] These multidrug resistant (MDR) pathogens are relentlessly multiplying in HIV patients & thus become an important circulating source of infection in the community.

Most of the times for treating UTI, empirical therapy is used till culture and susceptibility patterns are available.[8] It is necessary to have a good knowledge of the etiological agents, their epidemiological characteristics and antibacterial susceptibility profiles.[3] Unfortunately nearly all available current data on uropathogens are derived mostly from female patients. Uropathogens causing UTI in different age groups of male patients and their antibiotic susceptibility are scarcely available one.[9]

As limited data is available from India on the frequency of ASB/UTIs in HIV seropositive and comparison of these infections between pre-antiretroviral treatment (ART) and ART patients, the present study aimed to assess its occurrence by screening and culture methods. However there is paucity of literature on the role of the virus in predisposition to infections of the urinary tract.[4] By its nature, the HIV predisposes to multi system/organ infection. It can thus be hypothesized that the incidence of UTI in individuals with HIV/AIDS would be increased in comparison to non-infected individuals.[10] Early diagnosis and apt treatment are the identified imperative factors for their elimination and there by avoid associated urosepsis plus renal scarring risk.[9]

So this study was taken up to know the prevalence of urinary tract infections and their antibiotic susceptibility pattern in asymptomatic individuals of HIV/AIDS patients.

MATERIALS & METHODS

This prospective study was carried out at the department of Microbiology, Mysore Medical College & Research institute, Mysore from July 2013 to December 2013.

200 HIV seropositive patients attending integrated counseling and testing centre (ICTC) antiretroviral treatment (ART) Centre were included in the study. 100 patients who were taking ART & 100 patients who were not on ART (non-ART) without any urinary symptoms were taken for the study. Patients with urinary tract abnormalities, diabetes mellitus, pregnancy etc. were excluded from the study.

Urine samples were collected from patients after counseling. Detailed history of antibiotics intake and history of ART drugs was taken. CD4 counts of these patients were done using BD-FACS Calibur.

Midstream urine samples were collected from the patients in sterile containers. Samples were processed with in 30 min of collection. Microscopy and culture were done as per the standard protocols. Isolates grown were identified using standard biochemical reactions.[11] Antibiotic susceptibility testing was performed using Kirby-Bauer's disk diffusion test as per CLSI guidelines. Antibiotics used for the isolates were Ampicillin-30 μg, Cotrimaxazole-1.25/23.75 μg, Erythromycin-15 μg, Clindamyci-2 μg, Nitrofurantoin-300 μg, Ciprofloxacin-5 μg, Norfloxacin-10 μg, Cefoxitin-30 μg, Linezolid-30 μg, Vancomycin-30 μg, Gentamycin-10 μg, Imipenem-10 μg, Ceftazidime-30 μg, Cefotaxime-30 μg, Amoxyclavulinic acid-30 μg.[12] Isolates showing resistance to three or more than three categories of antibiotics were considered as MDR bacteria.[13]

RESULTS

A total of 200 urine samples were collected from 200 HIV seropositive patients. The age of the population studied ranged between 8-70 years. The mean age was 33 years 33 (55%) patients with asymptomatic bacteriuria were females & 27 (45%) were males (Table 1). Out of 200 urine samples, 60 (30%) samples showed significant growth. Among them 48 isolates were bacteria and 12 were identified as Candida species. 20 (58.82%) of Staphylococcus aureus were showing multidrug resistance (Table 2).

Out of 60 infected patients, 23 of them had CD4 counts <350, 23 had HIV-TB co-infection and 15 of them were on ATT (Table 3).

Table 1: Distribution of cases of asymptomatic bacteriuria among non-ART/ART patients

Gender	No of cases with ASB	Pre ART	On ART
Male	27	12	15
Female	33	08	25
Total	60	20	40

Table 2: Percentage of multidrug resistant bacteria (MDR) among different bacterial isolates

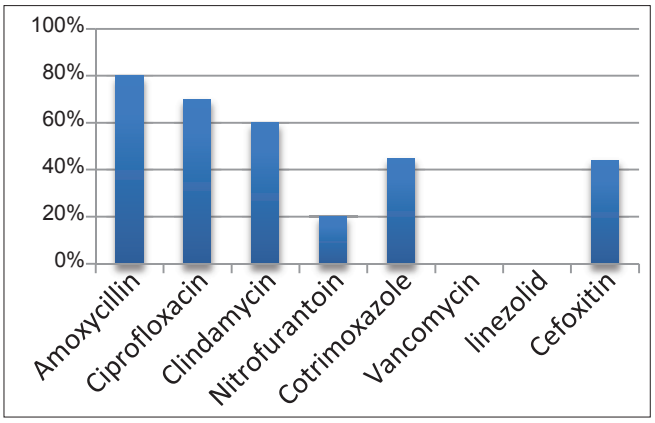
Type of Isolate	No of cases	MDR cases
S. aureus	34	20
Enterococcus spp	09	05
Escherichia coli	03	02
CONS	01	00
Acinetobacterspp	01	01
Candida spp	12	00
Total cases	60	28

CONS-Coagulase negative Staphylococcus, S. aureus-Staphylococcus aureus

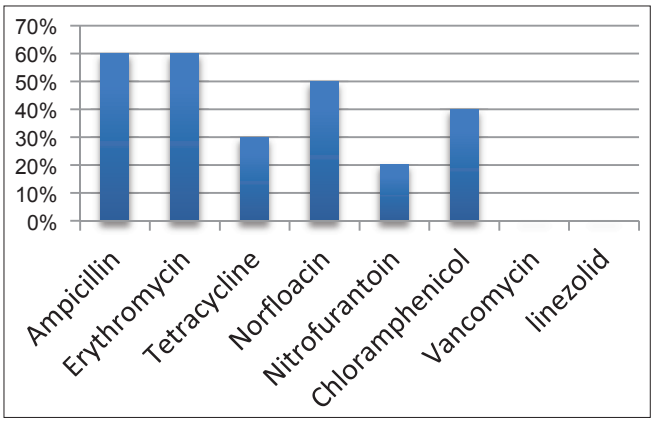
Table 3: Asymptomatic bacteriuria patients in relation with CD4 count

CD4 count	No of cases examined	Noof cases with ASB
<50	10	03
50 to 200	27	15
201-350	30	05
>350	133	25
Total	200	48

Fifteen (44.11%) isolates of Staphylococcus were MRSA. Graphs 1 and 2 showing antibiotic resistance of Staphylococcus aureus & Enterococcus species.



Graph 1: Percentage of antibiotic resistance of Staphylococcus aureus isolates



Graph 2: Percentage of antibiotic resistance of Enterococcus Species

DISCUSSION

More than 40 million people are living with HIV and to this pool additional 14,000 people are estimated to be added everyday.[6] Opportunistic infections are the cause of high morbidity and mortality in HIV/AIDS patients. Prompt and accurate diagnosis and management of opportunistic infections will not only prolong the life of an HIV infected individual but also improve the quality of life.[4] There has been concern about the prevalence of UTIs amongst HIV infected patients in recent times, thus we investigated the occurrence and antibiogram of uropathogens among pre-ART & ART HIV seropositive individuals.

In our study out of 200 HIV positive cases, 48 (24%) showed significant bacteriuria that correlates with the other studies.[14,15]

More than 90 % of UTIs are due to enteric Gram positive and Gram negative bacteria including Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Proteus mirabilis and Klebsiella pneumoniae.[6] In our study most of the infections were caused by Staphylococcus aureus 34/60 (56.66%), Enterococcus 09/60 (15%), Escherichia coli 03/60 (5%) cases (Table 2). Candiduria was seen in 12/60 (20%) cases. This observation correlates to the results of another study where Staphylococcus was the most common uropathogen.[14] These are in contrast to the observations of various studies that have reported E. coli, Klebsiella, Pseudomonas and Enterococcus as the most common urinary isolates.[16-18] Another study from Bangalore has reported E. coli 5/12 (41.7%) followed by Staphylococcus aureus 3/12 (25%), Pseudomonas aeruginosa 2/12(16.7%), Klebsiella pneumoniae 1/12 (8.3%), Coagulase negative Staphylococcus 1/12 (8.3%).[7] The changing pattern of etiology in various geographical regions & susceptibility pattern should be taken into consideration before initiating treatment for UTI in AIDS patients.

Candida is a much known successful opportunistic pathogen in HIV people. If at all, candida is the cause for UTIs, there is a definitive chance for it to establish systemic infection.

People living with HIV are likely to be more predisposed to UTI due to the suppression of their immunity and women in this category tend to get UTI more often due to the nature of their anatomy.[19] The bateriuria was significantly more in females than males i.e. 33/60 (55%) cases in our study (Table 1). This follows the trend in normal healthy individuals where females are at higher risk of being infected with UTI. However this finding is in contrast with the studies that have reported a lower prevalence rate in female.[14,20] Whether anatomical considerations affect the incidence of UTIs in HIV patients or multiple factors operate like sexually active age, behavioral abnormalities and prevalence of HIV in both sexes or exclusion of pregnant females in our study.

In our study among 48 patients with asymptomatic bacteriuria, 34 were on ART and 14 were non-ART (Table 1). Asymptomatic bacteriuria was more among the patients who were on ART than non-ART, probably that lower CD4 counts in ART patients predicts the lower immune status with higher chances of opportunistic infections like asymptomatic bacteriuria.

Among 48 isolates, 28 were shown to be MDR of which 16 were found to be resistant to Co-trimoxazole (Table 2). Fifteen (44.11%) isolates of Staphylococcus aureus were MRSA (Graph 1). The emergence of antibiotic resistance in the management of urinary tract infections is a serious public health problem particularly in the developing world where apart from high level of poverty, ignorance and poor hygiene practices, there is also a high prevalence of fake and spurious drugs of questionable quality in circulation.[19] Out of 48 infected patients, 23 of them had CD4 counts <350 (Table 3), 23 had HIV-TB co-infection and 15 of them were on ATT at the time of urine examination, which again adds to the burden of antimicrobial resistance. It is observed that the patients with immunosuppression have a very high chance of developing bacteriuria. The patients who are on Cotrimoxazoleprophylaxis with asymptomatic bacteriuria or UTI should not receive Cotrimoxazole, as they are most likely to be resistant. Co-trimoxazole prophylaxis did not have significant effect in prevention of ASB. Also it becomes necessary that antibiotic resistance pattern should be known before any treatment, which avoids unnecessary antibiotics.

An immunocompromised status like HIV is a hotspot for MDR pathogens to multiply relentlessly and become source of infection to other healthy population.

UTI in HIV-positive patients tends to recur, requiring longer treatment and it is suggested that treatment should be culture-specific.[21] Diverse studies across the globe have reported the incidence of asymptomatic bacteriuria in HIV patients as 3.1%-to the maximum of 26% compared to an average prevalence of 0.04% in healthy population.[4] It would have been useful to investigate more aggressively with better history taking and physical examination of HIV patients.We have considered significant bacteruria (10^5 Cfu/ml) for our study. With the immunocompromised status of HIV patients, a lower colony counts cannot be ignored. So the actual prevalence of infection will be definitely more and has to be considered.

HIV positive patients are liable to acquire opportunistic infections. But with the advent of highly active antiretroviral therapy (HAART) which has shown to have an indirect immune restoration but long lasting preventive effect.[19] Early initiation of ART helps in immune reconstitution and possible reduction of viral load. This has improved considerably the health and life expectancy of people who are HIV seropositive. An attempt to diagnose UTI/ASB early will surely help the patient to avoid complications.

CONCLUSION

Routine urine examination for UTI could be considered for HIV patients on ART. The present study suggested that the early initiation of ART might help the patient to maintain the immune status which inturn help in preventing the opportunistic infections. The identification of MDR pathogens in these patients and their proper treatment will help in patient betterment & also avoids the spread of these MDR bacteria to the community.

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How to cite this article: K. Murugesh, S. Deepa, C. Ravindranath, D. Venkatesha. "Multi Drug Resistant Uropathogens in HIV: Are They a Threat to Community?". Int J Sci Stud. 2014;2(3):38-42.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Comparing The Effect of Local Prostaglandin-E_2 Gel and Intravenous Oxytocin in Induction of Labor: A Randomised Study

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Abstract

Introduction: A healthy mother and a healthy baby are the ultimate desire of the patient and the treating doctor. Induction of labor leads to stress to the mother and the fetus. Research is on to find out an ideal inducing agent that does not affect the outcome adversely. The present study was undertaken with a view to compare the prostaglandin gel with oxytocin for induction of labour.

Objectives: To compare the efficacy and safety profile of prostaglandin-E_2 gel versus intravenous oxytocin in induction of labour.

Study Design: Prospective study, conducted at Teerthanker Mahaveer Medical College and research centre. 120 patients requiring induction of labor for various indications beyond 36 weeks of gestation were included in the study. 60 patients were included in group A (PGE_2 GEL group) and 60 patients were included in group B (oxytocin group).

Results: The mean induction delivery interval was 11.2 hours ± 5.2 hours in group A and in group B it was 12.6 ± 4.6 hours. Successful induction was achieved in a total of 90% of patients which includes 93.3% in group A and 86.6% in group B. Most common side effects with group A was gastrointestinal complaints and fetal distress was common in group B. Neonatal outcome was similar in both the groups.

Conclusions: In patients with high risk factors and where elective induction for safe confinement is required, PGE_2 gel was found to be more safe and effective without adversely affecting the maternal and fetal outcome.

Keywords: Induction of labour, Oxytocin, Prostaglandin gel

INTRODUCTION

Induction of labor remains one of the major challenges in obstetrics.[1] Induction of labor is resorted in the condition where the continuation of pregnancy may be hazardous to the fetus or mother.[2] In this era of modern obstetrics with low risk practice the spectrum of indications for induction of labor has greatly increased to obtain an optimum pregnancy outcome in the interest of mother and fetus e.g.- Premature rupture of membranes (PROM), postdated pregnancy, Pregnancy induced hypertension (PIH) etc.

Intravenous oxytocin has been used as a major drug for induction of labor and has stood the test of time. Introduction of prostaglandin in the field of induction opened a new chapter. PGE_2 gel has greatly revolutionized the method of induction of labor.[3,4]

MATERIALS & METHODS

The study was carried out in the Department of Obstetrics and Gynecology of Teerthanker Mahaveer Medical College and Research Centre, Moradabad, India, between April 2013 to March 2014.

A total of 120 cases were included in the study and were divided into two groups each of 60 cases.

Patients of singleton pregnancy irrespective of parity with gestational age more than 37 weeks duration with vertex presentation and intact membranes without cephalopelvic disproportion were included in the study.

Patients having previous uterine surgery, vaginal bleeding of uncertain origin, hypersensitivity to prostaglandins, fetal distress, and previous caesarean section were excluded from the study. Medical conditions such as heart disease, asthma, and glaucoma were also ruled out.

Informed consent was taken from all patients.

Detailed history, general and obstetric examination was carried out. All routine investigations such as hemogram with ESR, bleeding and clotting time etc. including sonography were carried out.

Patients were randomly assigned to either of the two groups. All patients of group A received Prostaglandin E2 gel (PGE2 GEL) whereas patients of group B received intravenous Oxytocin for induction of labour.

Group A – The patients were placed in lithotomy position. A lubricated speculum was introduced and the cervix exposed. The PGE_2 gel was introduced into the posterior fornix. The woman was kept in head low position for about half an hour. The fetal heart rate (FHR) and uterine contractions were monitored periodically for about 6 hours. After 6 hours a per vaginal examination was done to assess the Bishop's score. If the score did not exceed 6, a second instillation of PGE_2 gel was done. If cervix was ripe and Bishop's score was more than 6, amniotomy was performed and later augmentation of labour with intravenous oxytocin was done, if required.

Group B – An oxytocin drip with 5 International Units (IU) of Oxytocin was started in 5% dextrose. Escalation of the initial dose of 5 units was done at 30 minutes interval until an optimum response of 4 sustained contractions/10 minutes was achieved. The dose was titrated according to the uterine contractions and at 3-4 cms of cervical dilatation, amniotomy was performed and oxytocin infusion was continued.The induction - onset of labor, induction-delivery interval, length of labour, maternal & neonatal side effects were noted & compared.

RESULTS

120 women were included in the study of which 60 were in group A and 60 were in group B. The indications for induction of labor were almost similar & are as shown in Table 1.

The mean duration of induction to onset of labor in group A patients was 4.5 ± 2.5 hours & group B was 4.4 ± 2.3 hours, as shown in Table 2.

The mean induction- delivery interval was 11.2 ± 5.2 hours in group A and 12.6 ± 4.6 hours in group B.

The labor pattern was more or less similar in both the groups. The time interval between medications to start of contractions was 4.5 ± 2.5 hours with PGE_2 gel whereas it was 4.4 ± 2.3 hours with Oxytocin. The induction to delivery interval was shorter with PGE_2 as compared to oxytocin group as shown in Table 2.

The outcome of labor has been outlined in Table 3. In group A overall success rate was 93.33% while in group B it was 86.6%. 80% patients in group A had normal vaginal delivery, 13.33% had instrumental or forceps delivery and 6.6% had caesarean section. While in group B, 83.33%

Table 1: Indication for induction of labor

Indication	Group A	Group B
PIH	16	18
Post dated pregnancy	24	20
PROM	8	10
IUGR	12	12

Table 2: Relationship between bishop score & labor pattern in successful cases

Labor (hours)	PGE_2 (hours)	Oxytocin (hours)
Medications to contractions	1.15±0.3	0.46±0.3
Medications to established labor	4.5±2.5	4.4±2.3
Latent phase	4.4±1.1	4.23±1
Active phase	3.5±1.2	3.8±0.4
2nd phase	32.18±18.6 (in min)	32.4±14 (in min)
Induction to delivery	11.2±5.2	12.6±4.6

Table 3: Outcome of labor

Successful outcome	Patients in Group A		Patients in Group B	
	No.	%	No.	%
Total deliveries	56	93.33	52	86.66
1st application or 1st induction	32	53.33	16	26.66
2nd application or 2nd induction	8	13.33	36	60
Normal vaginal delivery	48	80	50	83.33
Oxytocin augmention	16	26.66	-	-
Forceps	8	13.33	2	3.33
Caesarean section	4	6.66	8	13.33

had normal vaginal delivery, only 3.33% had instrumental delivery and 13.33% landed up into caesarean section.

Indications for caesarean section have been outlined in Table 4. The incidence of caesarean section was high in group B i.e., 13.3% as compare to 3.33% in group A.

Neonatal outcome was similar in both the groups

Mean neonatal weight in group A was 2.75 kg & in group B it was 2.8 kg.

Mean Apgar score in group A was 8 & in group B it was 8.4 (Table 5).

Gastrointestinal side effects were more common in prostaglandin group than oxytocin group i.e. 13% in group A while 3% in group B. while fetal distress & uterine hyper stimulation was seen more commonly in group A patients.

DISCUSSION

Induction of labor includes pharmacological and mechanical methods like. foley's catheterization, oxytocin induction & prostaglandin. Elective induction is still practiced in many centers especially for the convenience of the patients.[5]

In our study the most common indication of induction was PIH, followed by postdated pregnancy. Agarwal observed PIH & PROM as the commonest cause.[6]

The induction to delivery interval in PGE_2 group was 11.2 hours in primipara & 8.7 hours in multipara. In the oxytocin group it was 12.6 hours in primipara & 10.33 hours in multipararespectively. These results are comparable to studies conducted by Raybum[7] Al – Tanni et al found that induction to delivery interval was shorter in multiparas in comparison to primipara patients.

The overall success rate in group A was 93.39% & in group B was 86.69% in our study. Keirse have failed to show any advantage for either PGE_2 or placebo over the others as induction agents and overall reduction in induction failure was noted and reduction in caesarean section rate. In our study both agents were almost equally efficacious in inducing labor. And the incidence of LSCS was 3.33% in group A & 13.33% in group B. Parikh et al[2] observed a caesarean section rate of 6.69% with PGE_2 gel & 13.3 % in oxytocin group. They recommended PGE_2 gel as a successful inducing agent with less failure rate.

In our study the incidence of maternal & foetal side effects were much lower with the PGE_2 gel. The incidence of fetal distress & uterine hypersensitivity was high in oxytocin group. Similar results have been reported by studies Buccellato CA et al,[5] Al-Taani MI[8] & Keirse MJNC.[9] GI side effects like nausea & vomiting were more common with group A. Paul and Singh et al[10] have also observed a higher incidence of uterine stimulation and fetal heart variations on the oxytocin group.

There was no difference in the Apgar scores and neonatal outcome in two groups. This is comparable to other studies.[6,10]

Table 4: Indication for caesarean section

	Group A	Group B
Non progress of labor	-	-
Foetal distress	2	2
Incoordinate uterine action	-	4
Failed induction	2	2

Table 5: Outlines the side effect of both the drugs

Side-effects	Group A patients	Group B patients
Incordinated uterine action	-	4
Rigors	2	2
Uterine hyperstimulation	0	4
Foetal distress	2	2
PPH	-	-
Vomitings	8	2

CONCLUSION

Modern obstetrics has enormously improved the outcome of pregnancy. Labor is induced in conditions where continuation of pregnancy may be hazardous to the mother or the fetus. With the introduction of prostaglandins induction of labor witnessed a major breakthrough. It is evident from the study that vaginal PGE_2 gel offers an advantage over the routine use of i.v oxytocin. Not only the induction to delivery interval is shorter but there is a low incidence of fetal distress and caesarean section. The only limitation in its use may be the cost of the gel.

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How to cite this article: Rehana Najam, Sarika Gupta. "Comparing The Effect of Local Prostaglandin-E_2 Gel and Intravenous Oxytocin in Induction of Labor: A Randomised Study". Int J Sci Stud. 2014;2(3):43-46.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Study of Various Causative Factors of Diarrhoeal Diseases with Special Reference to Bacteriological Profile among 0 to 5 Years Age Group

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Abstract

Introduction: Diarrhoea is leading cause of death in the population of 0-5 years age of the children in developing countries. the purpose of the study was to find out the pattern and bacteriological profile in diarrhoea case.

Materials & Methods: Cross section study of 200 cases of age ranging from 0 - 5 years having diarrhoea without history of taking any antimicrobial drug therapy outside. Detail history, Clinical examination, systemic examination and lab investigation was done.

Results: The maximum number of cases in the study group were upto 1 years (35%), followed by upto 2 years (29%) and upto 3 years (18%). So, the maximum number of cases came under the age of 3 years (82%). In the study group male were 59.5% and female 40.5%. According to socio-economic status, The maximum number of cases i.e. 74.5% were from low socio-economic status. Upto age of 1 year the patients on mixed diet, had maximum i.e. 24% incidence of diarrhoea followed by tin milk (8.5%) and animal milk (cow's milk, buffalo's milk and she goat's milk) 7%. The lowest incidence of diarrhoea was in the babies on mother's milk i.e. 5.5%; upto 2 years of age the maximum cases of diarrhoea observed were in patients on mixed diet i.e. 21%. As the age advances, food habit does not keep any significant value in diarrhoea. Various pathogenic organisms found in study group were bacteria other than M. tuberculosis (74%), Helminths (22.5%), Protozoa (22%) and other miscellaneous cause (7.5%). Two or more pathogens were found in some individuals. Pathogenic organisms were found in 88.5% cases, out of which 63.5% cases had single pathogen and 25% cases mixed pathogens. Among the Helminths, Round Worm was found in maximum number of cases (15.5%) followed by Hookworm (5.5%). 74% (148/200 cases) shown positive stool culture and 26% cases showed no growth. In the study group E.coli were found in maximum number of cases i.e. 39% followed by Shigella (7.5%). Upto age of 1 year, E.coli was the most offending agent isolated (26%). Maximum number of Shigella isolation (3%) was observed in children above 1 year and upto the age of 2 years. Maximum number of Salmonella isolation (4.5%) was observed in children above 2 years and upto 5 years of age. Other organisms more or less equally distributed in all the age groups.

Conclusion: In the present study, maximum numbers of cases were upto age 1 year. Low Socio-economic status and mixed diet had greater impact over incidence of diarrhoea up to age of 2 years. Pathogenic organism were found in 88.5% cases. Among the Helminths, round worm found in maximum cases. Upto age of 1 year, E. coli was the most offending agent isolated. 74% case shown positive stool culture. So author concluded that each and every patient of diarrhoea must be subjected to routine examination of stool and stool culture, it facility prevails and treated accordingly.

Keywords: Bacterial infection, Children, Diarrhoea, Epidemiology, Infant, Stool culture

INTRODUCTION

Diarrhoea is made up of two Greek words 'dia' and 'rhein' meaning 'through' and 'to flow' respectively. Hippocrates (460-370 B.C.) gave his clinical and epidemiological description of the entity of diarrhea.[1] He observed that children from 05-10 years of age were more vulnerable to diarrhoea with a high mortality rate. Diarrhoea may be studied according to age, sex, diet, infection (enternal and parenteral) Bacterial, Viral, Fungal, Protozoal and

Helminthic etc, other various factors like food allergy, bad sanitation, endocrinal, metabolic or psychosomatic[2] etc.

Diarrhoea is the leading cause of death in children younger than 5 years of age; persistent diarrhoea accounts for 30 to 50 percent of those deaths in developing countries. Malnutrition, immunosuppression, young age, and an increase in the preceding diarrhea burdens are risk factors for the development of persistent diarrhoea. Although many viruses, bacteria, and parasites can produce persistent diarrhoea, enteropathogenic Escherichia coli, enteroaggregative E. coli, Giardia, Cryptosporidium, and Cyclospora are the most important of these agents.

O' Ryam M et. al.[3] observed more than one billion diarrhoea episodes occur every year among children younger than 5 years of age in socio-economically developing countries causing 2 to 2.5 million deaths. More than twenty viral, bacterial, and parasitic enteropathogens are currently associated with acute diarrhoea. Rotavirus and diarrhoeagenic Escherichia coli are the most common pathogens responsible for acute diarrhoea episodes in children; Shigella spp., Salmonella spp, Campylobacter jejuni/coli, Vibrio cholerae, Aeromonas spp, and Plesiomonas spp. occur more commonly in poorer areas and infections caused by protozoa and helminthes occur mainly in areas where environmental sanitation is significantly deteriorated. The various bacteria causing diarrhoea are E.coli, Shigella, Salmonella, Vibrio cholerae, Compylobacter jejuni, Bacillus cereus, Staphylococcus faecalis etc.[2] Bacteriological pattern of diarrhoea vary considerably not only from region to region but also in the same region from time to time. This creates necessity for periodic assessment of bacteriological pattern of diarrhoea.

This study was carried because, Diarrhoea still carries high morbidity and mortality due to its high incidence and prevalence, affecting the most vulnerable and valuable group of population 0-5 age group of children, gross environmental insanitation prevalent in the community and the mismanagement of the diarrhoea as such by parents, community elders, quacks and local health administration. The purpose is to study the various causative factors of diarrhoeal diseases with special reference to bacteriological profile among 0-5 years age group of children.

MATERIALS AND METHODS

This was a cross sectional study done in the duration of 2 years (Jan 2008-June 2009). The point of study was R.T.H.C. Kalyanpur, Bihar. This work was carried out on the patient attending R.T.H.C. Kalyanpur. 200 cases ranging from 0-5 years age group of children having diarrhoea without history of taking drug outside were studied. Their parents/guardians were given informed consent.

Exclusion Criteria

1. They should not have any history of treatment with any antidiarrhoeal chemotherapeutic agent
2. They should not have any concurrent serious illness such as HIV, TB, Pneumonia, Kala-azar, Malaria, Cardiac, Renal or hepatic diseases etc.

In all the cases detail history, clinical examination (general examination and systemic examination) and investigation were done. The case sheet was recorded. Macroscopic or Naked eye Examination of Stool, routine examination of stool and stool culture was done.

RESULT

Distribution of diarrhoeal case according to the age was shown in Table 1, it was observed that maximum (70 case or 35%) diarrhoea case of age group 0-1 year followed by 58 case (29%) of age group 1-2 years. In the age group 2-3 years cases were 36 (18%) while 9.5% (19 cases) and 8.5% (17 cases) in the age group of 3-4 year and 4-5 year respectively. From the Table 2 it was also observed that male cases were 59.5% (119 cases) and females were 40.5% (81 Cases).

From the study of Table 3, author found that maximum cases were from low socio-economic status i.e. 74.5% (149 cases) followed by 21.5% (43 cases) from middle socio-economic status and least from high socio-economic status 4% (08 cases). Table 4 showing various types of food habit according to the age of child in study group. It was concluded

Table 1: Distribution of diarrhoea cases according to age

Age group in years	Cases	
	No.	Percentage
0-1	70	35
1-2	58	29
2-3	36	18
3-4	19	9.5
4-5	17	8.5
Total	200	100

Table 2: Distribution of cases according to sex

Sex	Cases	
	No. of cases	Percentage
Male	119	59.5
Female	81	40.5
Total	200	100

that maximum cases of all age group were on mixed diet i.e. 121 case (60.5%) followed by 38 cases (19%) on animal milk and least with breast milk (7.5%).

It was observed from Table 5 that Bacterial other than M.tuberculosis having the maximum (74%) incidence in the cases, Helminthic infestation and Protozoal infestation were near equal 22.5% and 22% while 7.5% were miscellaneous cause. Apart of this from Table 6, author found 75% cases (150 cases) from single pathogen and remaining 25% (50 case) due to mixed pathogen. Authors observed Helminthic etiology from Table 7 and found that H. nana, T. trichiura and F. buski had single etiology and had only 1 case (0.5%) for each. On other hand Round worm and Hook worm had mixed etiology and had 15.5% (31 cases) & 5.5%incidence(11 cases). From Table 8, the protozoal etiology (total 44 cases) was observed and found that mixed etiology of E. histolytica and Giardia lamblia was 19.5% (39 cases) and total cases having E.histolytica were 35 (17.5%) & 09 cases (4.5%) for Giardia lamblia. while studying the mixed etiology in 50 cases, we found that E. coli + E.H. + Round worm were having the maximum incidence i.e. 6.5% (13 cases) from Table 9. In Table 10, observed that maximum cases (104 cases) 52% had only bactrial infection, 22% (44 cases) had Bacterial mixed with other pathogens while 52 cases (26%) shown negative culture. after observing the bacteriological profile according to age from Table 11, observed that E.coli had maximum incidence in age group 0-1 year age i.e. 52 cases (26%) and in age group 1-2 year age i.e. 15 cases (7.5%). Over all maximum incidence 78case (39%) of E.coli followed by 15 case (7.5%) of Shigella infection. Salmonella, Proteus, Klebsiella, Psedomas, Staph. aureus and Strept. Faecalis were having 13 cases (7.5%), 11 cases (5.5%), 09 cases (4.5%), 07 cases (3.5%), 04 cases (2%) and 03 cases (1.5%) respectively.

Table 3: Cases of diarrhoea according to socio-economic status

Socio-economic status	No. of cases	Percentage
Low	149	74.5
Middle	43	21.5
High	08	4.0
Total	200	100

Table 4: Types of food habit according to the age of child

Age in years	Type of Feed								Total	
	Breast milk		Tin milk		Animal milk (cow's, buffalo's & she goat's)		Mixed diet			
	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%
0-1	11	5.5	17	8.5	16	8.0	26	13	70	35
1-2	02	1.0	04	2.0	07	3.5	45	22.5	58	29
2-3	01	0.5	03	1.5	07	3.5	25	12.5	36	18
3-4	01	0.5	02	1.0	05	2.5	11	5.5	19	9.5
4-5	-	-	-	-	03	1.5	14	7.0	17	8.5
Total	15	7.5	26	13	38	19	121	60.5	200	100

Table 5: Various pathogens in study group

Pathogenic organism	No. of positive cases	Percentage
Bacterial other than M.tuberculosis	148/200	74
Helminthic infestation	45/200	22.5
Protozoal infestation	44/200	22.0
Miscellaneous cause	15/200	7.5

DISCUSSION

In the study group the highest incidence of diarrhoea was observed in infants upto 1 year of age (35%) followed by 29% upto 2 years and 18% upto 3 years of age, 9.5% upto 4 years of age and 8.5% upto 5 years of age. Evidently the incidence of diarrhoea was on declining trend with advancing age. Similar observation were made by various researchers like Raizada N et. al,[4] Aidara A et. al.,[5] Ansari S et. al.[6] Contrary to authors observation, Sharma[7] and Huilan S et. al.[8] observed very high incidence of diarrhea

Table 6: Single and mixed pathogens

	Etiology		Total
	Single pathogen	Mixed pathogen	
No. of cases	150	50	200
Percentage	75.0	25.0	100.0

Table 7: Helminthic etiology

Etiology	As single etiology		As mixed etiology		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Round worm	-	-	31	15.5	31	15.5
Hook worm	-	-	11	5.5	11	5.5
H. nana	1	0.5	-	-	1	0.5
T. trichiura	1	0.5	-	-	1	0.5
F. buski	1	0.5	-	-	1	0.5
Total	3	1.5	42	21.0	45	22.5

Table 8: Protozoal etiology

Etiology	As single etiology		As mixed etiology		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
E.histolytica	03	1.5	32	16	35	17.5
Giardia lamblia	02	1.0	07	3.5	09	4.5
Total	05	2.5	39	19.5	44	22.0

Table 9: Various mixed pathogens

	Etiology agents						Total
	E. coli+E.H.+ G.lamblia	E. coli+E.H.+ Hook worm	Shigella+ E.H.	E. coli+ Round worm	Round worm+ Hook worm	E. coli+E.H.+ Round worm	
No. of cases	07	05	07	12	06	13	50
Percentage	3.5	2.5	3.5	6.0	3.0	6.5	25.0

Table 10: Bacterial etiology as single and mixed with other pathogens

Etiology	No. of cases	Percentage
Only bacterial	104	52
Bacterial mixed with other pathogens	44	22
Negative culture	52	26
Total	200	100

in children below 1 year of age. The difference is because of localizing their studies in children below 3 years of age, while author has taken the work in the wide age range.

While studying the sex distribution in the present series of work, male comprised 59.5% and female 40.5%. So male: female ratio was 1.5:1. Sex incidence was almost proportionate in different age groups, which is also statistically highly significant. Similar observations were made by Huilan S et. al.[8] and Raizada N et. al.[4] Majority of cases (68%) were below 2 year of age.

In the present study, highest incidence of diarrhoea was observed in low socio-economic group (74.5%) followed by in middle socio-economic group (21.5%) and least number in high socio-economic group (4%). Similar observations were made by Joshi CK et. al.[9] The author likes to conclude that high incidence of diarrhoea in low socio-economic group are due to malnutrition, living in substandard environment and poor knowledge about hygiene.

While discussing the role of diet in cases of diarrhea in study group, maximum incidence was observed on mixed diet (60.5%) subsequently on Animal milk (19%), Thin milk (13%) and minimum in babies who were on exclusively breast feeding (7.5%). Similar observations were made by Aidara A et. al.[5]

Out of 200 cases in the study group, 63.5% showed single etiology and 25% mixed etiology. Similar observations were made by Mayo SJ et. al.[10] as they found 20.7% cases of mixed infection at Dar es salaam. Out of 200 cases in the study group, helminthic infestation was observed in 22.5% cases. Various helminthes observed were Round worm (15.5%); Hook worm (5.5%); H. nana (0.5%), T. trichuria (0.5%) and F. buski (0.5%). More or less similar observations were made by Ansari S et. al[6] as they found only 1.3% helminthic infestation. This variation might be due to variation in the place.

Out of 200 cases, author observed protozoal infestation in 22% cases. Various protozoa observed were E.histolytica (17.5%) and G.lamblia (4.5%). More or less similar observations were made by Mayo SJ et. al.,[10] Radvin JI et. al.,[11] Nelson WE et. al.[12] and Hasan KZ et. al.[13] Contrary to authors observation Huilan S et. al.[8] and Jarousha AM et. al.[14] observed low incidence of E.histolytica infestation. The low incidence of E.histolytica in their series might be due to geographical variation.

In the present series of work, G. lamblia infestation was observed in 4.5% cases. Similar observations were made by Huilan S et. al.[8] Contrary to author's observation Mirdehghan MM et. al.[15] reported very high incidence of G. lamblia infestation in children in Iran. The variation is again self-explanatory that work has been done in Iran.

In the study group, author observed 74% cases as bacterial etiology other than M. tuberculosis. Similar observations were made by Huilan S et. al.[8] Contrary to author's observation, Aidara A et. al.[5] observed 32% and 20.9% bacterial isolation respectively. The variation in different series might be due to the variation in place, time and season, pattern of feeding and socio-economic status of the cases.

In the study group, various bacteria isolated were E.coli, Shigella, Salmonella, Proteus, Klebsiella, Pseudomonas, Staphylococcus aureus and Streptococcus faecalis. In the present series of work, author observed E.coli in 39% cases. More or less similar observations were made by Bhan MK, Raj P, Levine MM[16] and Craviato A.[17] Contrary to author's observation, a higher as well as lower incidence of E.coli diarrhoea was observed by some authors. Higher incidence was observed by Biswas NK[18] and lower incidence as observed by Aidara A et. al.[5] These variations again seems to be multifactorial.

In the present series of work, author observed Shiegella in 7.5% cases. Similar observations were made by Huilan S.[8] Contrary to these observations, a higher incidence of Shigella infection was observed by Joshi CK, Bhardwaj AK, Vyas BL.[19] These variations can be because of the time and improvement in general sanitation in the general population.

In the present study, author observed Salmonella infection in 6.5% cases. Similar observations were made by

Table 11: Bacteriological profile according to age

Age in years	Bacterial Isolated																		Total	
	E. coli		Shigella		Salmonella		Proteus		Klebsiella		Mixed growth		Psedomas		Staph. aureus		Strept. Faecalis			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-1	52	26	01	0.5	01	0.5	-	-	02	1.0	-	-	01	0.5	-	-	-	-	57	28.5
1-2	15	7.5	08	4.0	02	1.0	03	1.5	04	2.0	05	2.5	04	2.0	01	0.5	01	0.5	43	21.5
2-3	05	2.5	02	1.0	05	2.5	03	1.5	02	1.0	02	1.0	02	1.0	01	0.5	01	0.5	23	11.5
3-4	03	1.5	02	1.0	02	1.0	03	1.5	01	0.5	01	0.5	-	-	01	0.5	-	-	13	6.5
4-5	03	1.5	02	1.0	03	1.5	02	1.0	-	-	-	-	-	-	01	0.5	01	0.5	12	6.0
Total	78	39	15	7.5	13	6.5	11	5.5	09	4.5	08	4.0	07	3.5	04	2.0	03	1.5	148	74

Huilan S et. al.[8] and Raizada N et. al.[4] Contrary to author's observation, a high incidence of Salmonella infection was observed by Joshi et. al.[9] Food factors might be responsible for higher incidence of Salmonella infection and gradual improvement in general sanitation in the society showing declination in incidence.

In the present series of work, author observed Proteus group of organisms in 5.5% cases and Klebsiella in 4.5% cases. More or less similar observations were made by Joshi et al[9] and Raizada N et. al.[4]

CONCLUSION

In the present work author has taken 200 cases in the study group. The age was ranging from 0-5 years of age. The maximum number of cases were upto 1 years (35%), followed by upto 2 years (29%), upto 3 years (18%), upto 4 years (9.5%), upto 5 years (8.5%). So, the maximum number of cases came under the age of 3 years (82%). In the study group male were 59.5% and female 40.5%. According to socio-economic status, cases were studied as low, middle and high. The maximum number of cases i.e. 74.5% was from low socio-economic status and least number i.e. 4% from high socio-economic status. The cases were studied according to type of food habits. Upto age of 1 year the patients on mixed diet, incidence of diarrhoea was maximum i.e. 24% followed by tin milk (8.5%) and animal milk (cow's milk, buffalo's milk and she goat's milk) 7%. The lowest incidence of diarrhoea was in the babies on mother's milk i.e. 5.5% upto 2 years of age the maximum cases of diarrhoea observed were in patients on mixed diet i.e. 21%, and rest of feeds incidence was more or less negligible. As the age advances, food habit does not keep any significant value in diarrhoea. Various pathogenic organisms found in study group were bacteria other than M. tuberculosis (74%), Helminths (22.5%), Protozoa (22%) and other miscellaneous cause (7.5%). Two or more pathogens were found in some individuals.

Pathogenic organisms were found in 88.5% cases, out of which 63.5% cases had single pathogen and 25% cases mixed pathogens. Among the Helminths, Round Worm was found in maximum number of cases (15.5%) followed by Hookworm (5.5%), H. nana, T.trichiura and F.buski each in 0.5%. Among the Protozoa, E.histolytica and G. lamblia were found in 17.5% and 4.5% cases respectively. All the cases in the study group were subjected to stool culture. Out of which 74% cases showed positive culture and 26% cases showed no growth. In the study group E. coli were found in maximum number of cases i.e. 39% followed by Shigella (7.5%), Salmonella (6.5%), Proteus (5.5%), Klebsiella (4.5%), Mixed bacterial growth (4%), Pseudomonas (3.5%), Staphylococcus aureus (2%) and Streptococcus faecalis (1.5%). Upto age of 1 year, E. coli was the most offending agent isolated (26%). Maximum number of Shigella isolation (3%) was observed in children above 1 year and upto the age of 2 years. Maximum number of Salmonella isolation (4.5%) was observed in children above 2 years and upto 5 years of age. Other organisms more or less equally distributed in all the age groups.

Although some of the authorities recommend withholding of antibacterial therapy because of the self-limited nature of the infection, the cost of drugs and the risk of emergence of resistant organisms, there is persuasive logic in favour of empirical treatment with antibiotics to all children in whom bacterial diarrhoea is suspected. Even if not fatal, the untreated illness may cause the child to be quite ill leading to chronic or recurrent diarrhea. There is a risk of development of malnutrition or worsening of the condition during prolonged illness, particularly in children of developing countries. The risk of continued excretion of bacteria leads to social hazard and may cause epidemic of diarrhoea further argue against the strategy of withholding antibiotics in acute diarrhoea. Since other than bacterial cause there is quite a good number of Helminthic, Protozoal and other miscellaneous causes of diarrhoea, the author concludes that each and every patient of diarrhoea must be subjected to routine examination of stool and stool culture, it facility prevails and treated accordingly.

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How to cite this article: Manoj Kumar, Manisha Ramakrishna Koram, Lalit Kumar. "Study of Various Causative Factors of Diarrhoeal Diseases with Special Reference to Bacteriological Profile among 0 to 5 Years Age Group". Int J Sci Stud. 2014;2(3):47-52.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

A Comparative Study of Two Different Doses of Dexmedetomidine as Adjunct to Lignocaine in Intravenous Regional Anaesthesia of Upper Limb Surgeries

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Abstract

Introduction: Intravenous regional anaesthesia is a simple and cost effective technique for surgery involving the distal arm. Dexmetomidine which is about eight times more potent than clonidine has been used in bier's block and was shown to improve the quality of anaesthesia, torniquet pain and postoperative analgesic requirement. The aim of present study is to compare two different doses of dexmedetomidine (0.5 µgm/kg and 1 µgm/kg) as adjunct to Lignocaine in intravenous regional anaesthesia for upper limb surgeries. Also to evaluate dose related responses of dexmedetomidine on onset and quality of block, tourniquet pain and post operative analgesia.

Material and Methods: This study included 60 patients of ASA class I and II of either sex aged between 17-70 years scheduled for various upper limb surgeries. Patients were randomly divided into two groups 30 each. They received 40 ml 0.5% lignocaine and either dexmedetomidine 0.5 µgm/kg (group A) or dexmedetomidine 1 µgm/kg (group B). None of the patient in 2 groups was premedicated sensory and motor block onset were noted. Postoperative pain score was recorded by using Visual analogue scale (VAS). Diclofenac was given I.M as rescue analgesia when VAS values reached ≥4. Duration of postoperative analgesia was noted from deflation of torniquet to VAS score of 4. Assessment of sedation was done using Ramsay sedation score at 30 minute, 60 minute and 90 minute intervals following torniquet deflation.

Results: The onset of sensory and motor block in group B was significantly shorter than group A. Both the groups showed comparable low level of sedation. VAS score of group B was statistically lower than VAS score of group A. Quality of blockade among both groups was excellent.

Conclusion: We concluded that addition of 1 µgm/kg dexmedetomidine to lignocaine for IVRA improves quality of anaesthesia and postoperative analgesia in comparison to 0.5 µgm/kg dexmedetomidine.

Keywords: Biers block, Dexmedetomidine, Intravenous regional anaesthesia, Lignocaine, Regional anaesthesia

INTRODUCTION

The Taxonomy committee of International Association for Study of Pain (IASP) defines pain as "An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."[1]

Pain being subjective phenomenon is perceived only by sufferer. Due to differences in the neuro endocrine mechanism of pain relief, men require more analgesics then women. Postoperative pain is due to surgical trauma with an inflammatory reaction & initiation of an afferent neuronal damage. Severe postoperative pain starts a cascade of endocrine-metabolic and inflammatory events which later on leads to organ dysfunction, morbidity, increased hospital stay and mortality. There are chances of deep venous thrombosis, pulmonary atelectasis, muscle wasting and urinary retention in postoperative period, due to pain related immobility of patient.[2] Besides this restlessness caused by severe pain may contribute to postoperative hypoxemia.[3]

The peripheral neural activation together with central neuroplastic changes associated with postoperative pain may in some patients continue into a chronic pain state.[4,5]

Assessing postoperative pain is very important. The aim of assessment is to determine the intensity, quality and duration of pain, to help decide on the choice of therapy and to evaluate the relative effectiveness of different therapies.

Approaches to the measurement and assessment of pain include verbal and numerical rating scales, visual analogue scale (VAS), behavioural observation scales and psychological responses. Of these the VAS is the most frequently used self rating score. The most common VAS consists of a 10 cm horizontal or vertical line with the two end points labelled 'No pain" and 'Worst pain ever'. Patients are required to place a mark on the 10 cm line at a point that corresponds to the level of pain intensity they presently feel. The distance in centimetre from the low end of VAS to the patient's mark is used as a numerical index of the severity of pain. Advantages include ease and brevity of administration and scoring, its minimal intrusiveness, its greater sensitivity to detect intervention-based changes in pain and its conceptual simplicity.[6]

MANAGEMENT OF POST-OPERATIVE PAIN

1. Pharmacological measures*:* Include administration of drugs like opioids as well as non-opioids by various routes including oral, intra-muscular, intra-venous, per-rectal, epidural, intrathecal, sublingual, intra-articular, subcutaneous, etc.[7]
2. Non-pharmacological modalities: Transcutaneous electrical nerve stimulation (TENS) applied with a relevant strong sub noxious intensity and adequate frequency in the wound area may reduce analgesic consumption in the postoperative period.[8] Acupuncture is another non-pharmacological means which is proven to be of value in acute pain management especially in the postoperative period.[9]

The beginning of regional anaesthesia can be traced back to 1884 when Karl kollar reported efficacy of cocaine as local anaesthetic.

In 1908 August Karl Gustav Bier, Professor of Surgery at Berlin, described an unusual method of producing analgesia of a limb and named this technique VENOUS ANAESTHESIA i.e., use of vascular bed to bring anaesthetic agent to the nerve endings. He used an Esmarch bandage to exsanguinate the arm and injected procaine between two tourniquets to quickly produce anaesthetic and analgesic effects at the site.[10]

Though it proved effective, IVRA remained relatively unpopular until C McK Holmes reintroduced it in 1963. Today the technique is common due to its economy, rapid recovery, reliability, and simplicity.[11]

This technique begins by exsanguinating the limb as Bier did with an elastic bandage, squeezing blood proximally toward the heart. Pneumatic tourniquets are then applied to the limb and inflated to occlude all blood vessels. The local anaesthetic, typically lignocaine or prilocaine, is slowly injected as distally as possible into the exsanguinated limb. The anaesthetic sets in after approximately 20 minutes, at which point the tourniquets can be deflated and the surgery may begin. The wait time is important for avoiding toxic levels of anaesthetics in the systemic bloodstream. Alternatively, the tourniquets may remain inflated to maintain a bloodless field.[12,13]

The disadvantages of this type of block which includes less effective blockage, tourniquet pain and insufficient postoperative pain relief can be mitigated using drugs to potentiate local anaesthetics such as tramadol,[14] α2-agonists,[15] neostigmine,[16] or nonsteroidal anti-inflammatory drugs (NSAIDs).[17]

α2-Adrenergic receptor (adrenoceptor) agonists have been the focus of interest for their sedative, analgesic and perioperative sympatholytic and cardiovascular stabilizing effects with reduced anaesthetic requirements. Dexmedetomidine, a potent α-2 adrenoceptor agonist, is approximately 8 times more selective toward the α2- adrenoceptors than clonidine. Dexmedetomidine has been shown to decrease anesthetic requirements by up to 90% and to induce analgesia in rats, volunteers, and patients.[18-22]

The addition of clonidine to lignocaine during bier's block had shown to improve tourniquet pain tolerance but did not influence the speed and quality of bier's block. It's effect on prolonging post-operative analgesia is controversial. Reported side effects were post deflation sedation and hypotension.[15,23]

Dexemedetomidine which is about 8 times more potent than clonidine has been used in bier's block and was shown to improve the quality of anesthesia, torniquet pain and post-operative analgesic requirement. It's effect on speed of onset is controversial. This shows that dexemedetomodine is better adjuvent to lignocaine in bier's block than clonidine.

The aim of present study is to compare two different doses of dexemedetomidine (5 μg/kg and 1 μg/kg) as adjunct to lignocaine in intravenous regional anaesthesia for upper limb surgeries. To evaluate dose related responses of

dexemedetomidine on onset & quality of block, tourniquet pain and post-operative analgesia.

MATERIAL AND METHODS

The present study was undertaken in 60 patients attending to Surgery and Orthopaedics Department of N.S.C.B. Medical College and Hospital, Jabalpur during routine and emergency hours for various minor and major surgical procedures involving upper extremities.

Selection of Cases

An informed written consent was taken from all the patients in both groups after the approval of Institutional and Ethics Committee in patients of ASA class I and II of either sex aged between 17-70 years scheduled for various minor and major procedures involving upper extremities.

A detailed history, thorough physical examination, routine investigation and any special investigation if required was done for the study.

Criteria for Exclusion

1. Patient with known hypersensitivity to local anaesthetic.
2. Patient with Severe peripheral vascular disease and neurological disease.
3. Where use of tourniquet was either not possible or contraindicated.
4. Patient with Hemolytic diathesis specially sickle cell anemia, epilepsy, diabities mellitus, hypertension, cardiovascular disease like myocardial infarction, cardiac arrhythmias, heart block, altered mentation were not included and procedures lasting for more than 90 min were also not considered.
5. Patient with allergy to study medication.
6. Therapy with adrenergic receptor antagonist, calcium channel blocker and ACE inhibitors.

Design of Study

Patients were randomly divided into two groups (30 patients each).

Gr. A - received 40 ml,0.5% lignocaine (preservative free) with dexmedetomidine 0.5 μg/kg (original strength 100 μg/ml) in 1.0 ml to make final volume to 41ml.

Gr. B - received 40 ml, 0.5% lignocaine (preservative free) with dexmedetomidine 1 μg/kg (original strength 100 μg/ml) in 1.0 ml to make final volume to 41.0 ml.

Technique

Premedication: None of the patients in two groups were premedicated. Premedication with sedatives and narcotics was deliberately omitted so as to avoid any interference in the assessment of sensory and motor blockade.

Monitoring: The patients were asked frequently and monitored continuously for any discomfort during the surgery. Throughout the procedure tourniquet pressure was monitored and maintained. The pulse rate, BP, RR, were recorded every 10 min throughout the procedure.

Before starting the procedure it was ensured to keep resuscitation equipments and emergency drug to deal with any untoward effect. The patients were again assessed preoperatively. Pulse, BP and RR were noted. Intravenous line was secured in contralateral arm to assure an IV route.

A padded double cuff tourniquet was tested and positioned around the arm. A 22G butterfly needle was placed for injecting drug in a peripheral vein distal to the operative site, preferably over the dorsum of the hand and secured in position. Now the limb was elevated for exsanguination to 90 degrees for 3 min along with application of sterile bandage followed by inflation of proximal tourniquet cuff to 250 mmHg. This criterion was fixed for all cases of the study. Then a dose of 40 ml .5% lignocaine injected slowly either with dexmedetomidine .5 μg/kg or 1 μg/kg (in 1.0 ml)depending upon the group as mentioned earlier.

Assessment of Sensory Blockade

After injecting drug (considered as time 0), the time of onset of sensory blockade is determined by pinprick using fine hypodermic needle. Sites used for sensory assessment included the thenar eminence (median nerve), hypothenar eminence (ulnar nerve)and first web space (radial nerve). Loss of pinprick sensation in all three skin areas was considered as complete sensory blockade.

Assessment of Motor Blockade

Patients were asked to make finger movements. Inability to do so was taken as motor blockade.

After 30 minutes to drug injection, distal cuff inflated to 250 mmHg which is followed by deflation of proximal cuff, to avoid any tourniquet discomfort in every case. Throughout the procedure tourniquet pressure was monitored and maintained at 250 mmhg. Following completion of surgery, tourniquet cuff is deflated with repeated deflation re-inflation technique. For this cuff is deflated for 10 sec and then reinflated again for 1 min. This sequence is repeated 3 times with great care taken not to deflate the cuff within 30 min of local anaesthetic injection in any case to avoid local anaesthetic toxicity. Even if the surgical procedure is over within 30 min, the tourniquet

was not deflated before 30 min. This was strictly observed throughout the study.

Torniquet Time: Time from the inflation of distal cuff to deflation of cuff was designated as the total tourniquet time and it was recorded in every case. All the patients were observed for at least 30 min postoperatively in recovery for signs of any untoward reaction.

Assessment of Quality of Block

The quality of overall block was assessed according to the grading described by Ware R.J.(1979) as follows-

1. Excellent - complete anaesthesia (lack of any sensation to pin prick and no movements of wrist and fingers)
2. Good - complete anaesthesia (touch sensation may be preserved but no pain to pin prick and minor movements of fingers)
3. Fair - adequate anaesthesia (slight discomfort but tolerable without any supplementation
4. Poor - inadequate anaesthesia (requiring supplementation with either sedative systemic analgesics or general anaesthesia).

Assessment of Post Operative Pain

Postoperatively, the pain score was recorded by using visual analogue pain scale (VAS), between 0 to 10 (0-no pain, 10-most severe pain). Diclofenac was given I.M. as rescue analgesia when VAS values reached more ≥4. Duration of post operative analgesia was noted from deflation of tourniquet to VAS score of 4.

Assessment of Sedation

Ramsay sedation scale

Score	Response
1	Anxious or restless or both
2	Cooperative, orientated and tranquil
3	Responding to commands
4	Brisk response to stimulus
5	Sluggish response to stimulus
6	No response to stimulus

Statistical Analysis

The data of the present study were recorded into the computer and after its proper validation, check for error, coding & decoding were compiled and analysed using the software SPSS 18 for windows. Appropriate univariate and bivariate analysis were carried out using the Student *t* test for the continuous variable (Age, SBP, DBP,HR etc) and two-tailed Fisher exact test or chi-square (χ^2) test for Categorical variables. All means are expressed as mean ± standard deviation. The critical levels of significance of the results were considered at 0.05 levels i.e., $P < 0.05$ was considered significant.

RESULTS

Patients of ASA class I and II of either sexes, between 17-70 years of age were included in the study.

Patients were randomly divided into two groups (30 patients each).

Gr. A - received 40 ml, 0.5% lignocaine (preservative free) with Dexmedetomidine 0.5 μg/kg (original strength 100 μg/ml) in 1.0 ml to make final volume to 41 ml.

Gr. B - received 40 ml, 0.5% lignocaine (xylocard) with Dexmedetomidine 1 μg/kg (original strength 100 μg/ml) in 1.0 ml to make final volume to 41.0 ml.

Table 1: Age wise distribution of patients

Age in years	Group A	Group B	Total
15-19	4	6	10
	13.3%	20.0%	16.7%
20-29	11	13	24
	36.7%	43.3%	40.0%
30-39	7	4	11
	23.3%	13.3%	18.3%
40-49	4	5	9
	13.3%	16.7%	15.0%
50-59	4	0	4
	13.3%	0.0%	6.7%
60+	0	2	2
	0.0%	6.7%	3.3%
Total	30	30	60
Mean±SD	31.93±11.399	30.37±13.353	31.15±12.334

P>0.05

Table 1 describes the trend of age among studied groups. The mean ages among both groups were comparable.

Table 2: Sex wise distribution of patients

	Group A	Group B	Total
Male	26	25	51
	86.7%	83.3%	85.0%
Female	4	5	9
	13.3%	16.7%	15.0%
Total	30	30	60

P>0.05

The majority of patients were males in both the groups. Out of 60 patients studied, 85% were males as compared to 15% females [Table 2].

Table 3: Weight wise distribution of patients

Wt. (kg)	Group A	Group B	Total
45-49	0	2	2
	0.0%	6.7%	3.3%
50-54	5	6	11
	16.7%	20.0%	18.3%
55-59	8	13	21
	26.7%	43.3%	35.0%
60-64	9	7	16
	30.0%	23.3%	26.7%
65-69	4	1	5
	13.3%	3.3%	8.3%
>70	4	1	5
	13.3%	3.3%	8.3%
Total	30	30	60
Mean±SD	60.30±6.154	56.80±5.301	58.55±5.962

P>0.05

Table 3 describes the trend of weight among studied groups. The mean weights among both groups were comparable.

Table 4 shows various surgeries performed in both group.

Table 5 show the variation in mean pulse rate in both the groups. Initially there was a rise in mean pulse rate in Group B which was statistically insignificant, later on after switching tourniquet there was a fall in mean pulse rate in both the group and finally pulse rate observed to fall back to near base line values which was also statistically insignificant.

Table 6 show the variation in mean systolic blood pressure in both the groups. There was an initial rise in mean systolic blood pressure which was followed by a gradual fall. The values than returned back to baseline gradually. None of the patients in either group developed hypotention.

Table 7 show the variation in mean diastolic blood pressure in both the groups. The changes in diastolic blood pressure were not significant in either of the groups.

Table 8 show the changes in mean respiratory rate in both the groups. There was no significant change in respiratory rate in either of the groups.

Table 9 show the mean onset of sensory block in studied groups. The mean onset of sensory block in Group B was significantly shorter than Group A.

Table 10 show the mean onset of motor block in studied groups. The onset of motor block in Group B was significantly shorter than Group A.

Table 4: Type of surgery

	A	B	Total
3RD metacarpal amputation	1	0	1
	3.3%	0.0%	1.7%
Alli's plate fixation	1	0	1
	3.3%	0.0%	1.7%
AV malformation	1	0	1
	3.3%	0.0%	1.7%
Bone biopsy	0	1	1
	0.0%	3.3%	1.7%
Contracture release	1	3	4
	3.3%	10.0%	6.7%
Curettage of RT ULNA	0	1	1
	0.0%	3.3%	1.7%
Debridement	2	2	4
	6.7%	6.7%	6.7%
Delta frame	1	1	2
	3.3%	3.3%	3.3%
Ganglion excision	2	0	2
	6.7%	0.0%	3.3%
Ganglion removal	0	2	2
	0.0%	6.7%	3.3%
Implant removal	2	3	5
	6.7%	10.0%	8.3%
Jess distractor	2	1	3
	6.7%	3.3%	5.0%
K wire fixation	0	4	4
	0.0%	13.3%	6.7%
K-wire fixation	7	0	7
	23.3%	0.0%	11.7%
Nailing	0	1	1
	0.0%	3.3%	1.7%
Orif	2	3	5
	6.7%	10.0%	8.3%
Radial head excision	0	1	1
	0.0%	3.3%	1.7%
Radial plating	1	0	1
	3.3%	0.0%	1.7%
SSG	2	2	4
	6.7%	6.7%	6.7%
Tendon repair	4	2	6
	13.3%	6.7%	10.0%
Thumb amputation	0	1	1
	0.0%	3.3%	1.7%
Ulnar plating	1	1	2
	3.3%	3.3%	3.3%
Venous flap of ring fingure	0	1	1
	0.0%	3.3%	1.7%
Total	30	30	60

Table 11 show mean duration of tourniquet time. The tourniquet time in both the groups was comparable.

Table 12 show median sedation scores of both the groups at 30, 60 and 90 minute intervals following tourniquet deflation. Both the group showed comparable low level of sedation as depicted by Ramsay Sedation Scale.

Table 5: Change in mean pulse rate±SD

Group	Preop	5 min. after initiation of surgery	Before switch over of tourniquet	After tourniquet deflation		
				5 min	10 min	15 min
A	78.80±7.327	78.53±7.181	78.80±7.058	77.40±6.729	77.13±6.761	78.27±7.158
B	79.13±6.922	80.53±6.146	80.67±6.712	78.00±6.787	78.73±6.247	79.47±6.078
Total	78.97±7.069	79.53±6.703	79.73±6.894	77.70±6.708	77.93±6.504	78.87±6.611

Table 6: Change in mean systolic blood pressure (mmhg)±SD

Group	Preop	5 min. after initiation of surgery	Before switch over of tourniquet	After tourniquet deflation		
				5 min	10 min	15 min
A	125.73±7.679	127.13±7.533	127.07±7.139	124.40±7.209	125.07±6.843	125.87±7.500
B	123.27±10.312	124.27±9.214	125.27±8.812	122.27±9.303	123.77±8.565	125.20±8.181
Total	124.50±9.099	125.70±8.468	126.17±8.002	123.33±8.321	124.42±7.714	125.53±7.788

Table 7: Change in mean diastolic blood pressure (mmhg)±SD

Group	Preop	5 min. after initiation of surgery	Before switch over of tourniquet	After tourniquet deflation		
				5 min	10 min	15 min
A	79.53±6.296	81.13±5.818	80.87±5.244	78.33±6.348	79.00±6.187	80.87±5.865
B	79.33±7.265	80.33±6.870	81.00±6.029	78.00±6.303	77.87±5.380	78.20±4.965
Total	79.43±6.741	80.73±6.324	80.93±5.602	78.17±6.274	78.43±5.777	79.53±5.552

Table 8: Changes in mean respiratory rate±SD

Group	Preop	5 min. after initiation of surgery	Before switch over of tourniquet	After tourniquet deflation		
				5 min	10 min	15 min
A	16.57±0.898	17.87±0.900	17.40±0.932	16.67±0.959	16.83±0.986	17.87±0.900
B	17.27±1.230	17.47±1.167	17.27±1.112	16.93±1.015	17.07±1.015	17.20±0.997
Total	16.92±1.124	17.67±1.052	17.33±1.020	16.80±0.988	16.95±0.999	17.53±0.999

Table 9: Mean onset of sensory block (minutes±SD)

Group	A	B
Onset (minutes±SD)	3.89±0.914	1.05±0.346
Total	30	30

P<0.0001

Table 10: Mean onset of motor block (minutes±SD)

Group	A	B
Onset (minutes±SD)	10.62±2.185	5.30±1.149
Total	30	30

P<0.0001

Table 11: Mean duration of tourniquet time (minutes±SD)

Group	A	B
Duration (minutes±SD)	51.60±5.157	53.80±4.773
Total	30	30

P>0.05

Table 12: Median sedation score (maximum-minimum)

Group	Sedation score (after tourniquet deflation)		
	30 min	60 min	90 min
A	2 (1-3)	1 (1-2)	1 (1-2)
B	2 (1-3)	2 (1-2)	1 (1-2)

P>0.05

Table 13: Median vas score (maximum-minimum)

Duration	Group A	Group B
1st Hour	1 (0-2)	0 (0-1)
2nd Hour	2 (1-4)	1 (0-2)
3rd Hour	4 (1-4)	1 (1-2)
4th Hour	3 (2-4)	2 (1-4)
5th Hour	4 (3-4)	3 (1-4)
6th Hour	4 (4-4)	4 (2-4)
7th Hour	-	3.5 (2-4)
8th Hour	-	4 (4-4)

Ramsay sedation scale

Score	Response
1.	Anxious or restless or both
2.	Cooperative, orientated and tranquil
3.	Responding to commands
4.	Brisk response to stimulus
5.	Sluggish response to stimulus
6.	No response to stimulus

Table 14: Mean duration of post-operative analgesia (minutes±SD)

Group	A	B
Duration of analgesia±SD	174.20±67.076	331.53±78.267
Total	30	30

t=–8.360; P<0.0001

Table 13 show median VAS scores of both the groups at hourly interval. At each hourly interval, median VAS score of Group B was statistically lower than median VAS score of Group A except at 6th hour.The study for Group A ended at 6th hour while the study of VAS for Group B was continued upto 8th hour in accordance to the end point of achievement of median VAS≥4.

Table 14 show the mean duration of post-operative analgesia in both groups. Mean duration of analgesia was significantly longer in Group B.

Table 15: Quality of block

Grading of quality of blockade	Group A	Group B	Total
Excellent	25	27	52
	83.3%	90.0%	86.7%
Good	4	3	7
	13.3%	10.0%	11.7%
Fair	1	0	1
	3.3%	0.0%	1.7%
Poor	0	0	0
	0.0%	0.0%	0.0%
Total	30	30	60

p>0.05

Table 15 shows the grading of quality of blockade among both groups. In majority of the cases it was excellent.

Table 16 show complication rates noted post-operatively in studied groups. Majority showed no complication attributed either to the drug or to technique.

DISCUSSION

Intravenous regional anaesthesia (IVRA) is a simple and reliable method of providing anaesthesia for extremity surgery. This technique begins with exsanguinating the limb with an elastic bandage and squeezing blood proximally toward the heart. Then Pneumatic tourniquets are applied to the limb and inflated to occlude the blood vessels. The local anaesthetic, typically lignocaine or prilocaine, is slowly injected as distally as possible into the exsanguinated limb. The administration of IVRA requires only the skill to perform a venipuncture. Limitation of IVRA has been tourniquet pain and the inability to provide postoperative analgesia as compared with peripheral nerve blocks.

Table 16: Complications

	Group A	Group B	Total
Dry mouth	1	2	3
	3.3%	6.7%	5.0%
Bradycardia	0	1	1
	0.00%	3.3%	3.3%
Tinnitus	0	1	1
	0.00%	3.3%	3.3%
Perioral numbness	0	1	1
	0.00%	3.3%	3.3%
Nil	29	25	54
	96.7%	83.3%	90%
Total	30	30	60

As mentioned above IVRA occasionally does not provide effective anaesthesia and postoperative analgesia. To improve the quality of IVRA as well as to prolong the duration of postoperative analgesia, the addition of various drugs to local anaesthetics found with controversial results such as tramadol,[14] clonidine,[15] neostigmine,[16] nonsteroidal anti-inflammatory drugs (NSAIDs).[17]

The use of an α2- agonist as an adjunct in pain management is attractive because of the potentiating that occurs through their action at the central and peripheral sites.[28] Two drugs belonging to the α2 adrenoceptor agonist namely clonidine and dexmedetomidine have been the focus of adjuncts in IVRA in recent clinical studies.

Gentili M et al (1999)[15] showed that clonidine 150 µg produced a significant increase in tourniquet tolerance in patients undergoing IVRA.

Lurie SD et al (2000)[27] reported the efficacy of 1 µg/kg clonidine added to IVRA lignocaine in decreasing the onset of severe tourniquet pain and found that it delayed the sensory onset time.

Reuben et al (1999)reported that the addition of 1 µg/kg clonidine to lignocaine, 0.5%, for IVRA in patients undergoing ambulatory hand surgery improves postoperative analgesia without causing significant side effects during the first postoperative day.

Kleinschmidt S et al (1997)[23] conducted a study to investigatethe effect of the addition of clonidine 2 μg/kg to prilocaine 0.5% for intravenous regional anaesthesia (IVRA) in the arm. There were no significant differences between the groups concerning the onset and recovery characteristics of sensory and motor blockade, post-operative pain or side effects.

Dexmedetomidine is a potent α2-adrenoceptor agonist with eight time's higher affinity for the receptors than clonidine. Dexmedetomidine produces sedation, analgesia and anxiolysis. Dexmedetomidine compared to Clonidine is a more selective α2-adrenoceptor agonist, which might permit its application in relatively high doses for sedation and analgesia without the unwanted vascular effects from activation of α1-receptors. In addition, dexmedetomidine is shorter-acting drug than clonidine and has a reversal drug for its sedative effect, Atipamezole. These properties make dexmedetomidine suitable for sedation and analgesia during the peri-operative period: As premedication, as an anesthetic adjunct for general and regional anesthesia, and as postoperative sedative and analgesic.

Study by Dilek Memis et al (2004)[24] found that the addition of dexmedetomidine 0.5 μg/kg to lignocaine for IVRA leads to significant decreases in sensory and motor block onset time compared with a control group. Later, AEsmaoglu et al (2005)[25] found that addition of 1 μg/kg dexmedetomidine to lignocaine for intravenous regional anesthesia leads to improved quality of anaesthesia and decreased analgesic requirements, but had no effect on the sensory and motor block onset and regression times.

Kol, Iclal O et al (2009)[26] conducted study on addition of dexmedetomidine or lornoxicam to prilocaine in intravenous regional anaesthesia for hand or forearm surgery: A randomized controlled study. They suggested that addition of dexmedetomidine had a more potent effect, shortening sensory block onset time and prolonging sensory block recovery time more than lornoxicam.

No previous study has shown comparison between two different doses of dexmedetomidine in IVRA technique. The purpose of the present study is to compare two different doses. 5 μg/kg & 1 μg/kg of dexmedetomidine when added to lignocaine 0.5% in terms of onset of sensory & motor block, duration of post-operative analgesia & quality of block. So, as to come up with an optimal dose having favorable outcome with least side effects.

With this aim, we conducted 'A comparative study of two different doses of dexmedetomidine as adjunct to lignocaine in intravenous regional anesthesia for upper limb surgery' in 60 Patients of ASA class I and II of either sexes, between 17-70 years of age at N.S.C.B. Medical College and Hospital, Jabalpur.

Patients were randomly divided into two groups (30 patients each).

Gr. A - received 40 ml, 0.5% lignocaine (preservative free) with dexmedetomidine 0.5 μg/kg (original strength 100 μg/ml) in 1.0ml to make final volume to 41 ml.

Gr. B - received 40 ml, 0.5% lignocaine (preservative free) with dexmedetomidine 1 μg/kg (original strength 100 μg/ml) in 1.0 ml to make final volume to 41.0 ml.

The data of the present study were recorded into the computer and after its proper validation, check for error, coding & decoding were compiled and analysed using the software SPSS 18 for windows. Appropriate univariate and bivariate analysis were carried out using the Student *t* test for the continuous variable (Age, SBP, DBP,HR etc) and two-tailed Fisher exact test or chi-square (c2)test for Categorical variables. All means are expressed as mean ± standard deviation. The critical levels of significance of the results were considered at 0.05 levels i.e. $P < 0.05$ was considered significant.

The demographic data of this study show that all patients are within range of 17-70 years of age. The mean age of Group A subjects was 31.93 (±11.399)years and Group B cases was 30.37 (±13.353) years. They were comparable.

The mean body weight of Group A subjects was observed 60.30±6.154 kgs and Group B cases it was 56.80±5.301 kgs. They were comparable.

The majority of patients were males in both the groups. Out of 60 patients studied, 85% were males as compared to 15% females.

The type of surgery between both studied groups was comparable.

Mean duration of tourniquet was 51.60±5.157 min in Group A & 53.80±4.773 min in Group B which was also comparable.

Since all the groups were demographically similar ($p>0.05$ in all the comparisons), it can be presumed that the groups are comparable for the purpose of the study. No premedication was used in study population it can therefore be presumed that recording of parameters pertaining to sensory analgesia were consistently accurate. Thus, the patients of both the groups in study were comparable in regards to age, weight and sex distribution.

In this study, it was observed that initially there was a rise in mean pulse rate in Group B which was statistically insignificant, later on after switching tourniquet there was a fall in mean pulse rate in both the group and finally pulse rate observed to fall back to near base line values which was also statistically insignificant.

It was also seen that there was a initial rise in mean systolic blood pressure followed by gradual fall and then back to near base line values. None of the patients in either group developed hypotention. The changes in diastolic blood pressure were not significant in either of the groups.

The changes in respiratory rate were also not significant in either of the groups.

The mean onset of sensory and motor blockade in Group B was 1.05±.346 & 5.30±1.149 minutes while it was 3.89±.914 & 10.62±2.185 minutes in Group A. Difference in mean onset of sensory & motor block between Group A & B was statistically highly significant (P<0.0001). Dilek Memis et al (2004)[24] in his study also found that the addition of dexmedetomidine 0.5 µg/kg to lignocaine for IVRA leads to significant decreases in sensory and motor blocks onset time compared with a control group. Later, AEsmaoglu et al (2005)[25] found that addition of 1 µg/kg dexmedetomidine to lignocaine had no effect on the sensory and motor blocks onset times which is not in agreement with our study.

Median sedation score of Group A at 30, 60 and 90 minute (in terms of median with minimum and maximum values)were 2(1-3), 1(1-2), 1(1-2) and that of Group B were 2(1-3), 2(1-2), 1(1-2). Results showed low level of sedation as per Ramsay Sedation Scale with intergroup insignificance. Dilek Memis et al (2004)[24] in their study also foundno statistical difference between groups for sedation values at any intra-operative and post-operative period when compareddexmedetomidine. 5 µg/kg with control group. AEsmaoglu et al (2005)[25] in their study found higher sedation score levels post-operatively in dexmedetomidine 1 µg/kg group than their control group and it was in accordance to the sedation level of group B (1 µgm/kg) of present study.

Median VAS score at each hourly interval of Group B was statistically lower than median VAS score of Group A except at 6th hour at which the values were equal in both groups. The study for Group A ended at 6th hour while the study of VAS for Group B was continued up to 8th hour in accordance to the end point of achievement of median VAS≥4. The median VAS score was below 4 in the first two hours in Group A while it was below 4 for up till 6th hour in Group B. Dilek Memis et al (2004)[24] in their study using 0.5 µgm/kg dexmedetomidine as adjuvant also observed VAS below 4 in the first two hours.Which in accordance to the observation of our Group A (0.5 µgm/kg dexmedetomidine). A Esmaoglu et al (2005)[25] in their study using 1.0 µgm/kg dexmedetomidine as adjuvant observed VAS score of 0 during their two hours of observational postoperative period.

The mean duration of post-operative analgesia was 174.20±67.076 minutes in Group A and 331.53±78.267 minutes in Group B. Duration of analgesia was significantly longer in Group B than Group A which was statistically highly significant (P<0.0001). This result correlate well with the study conducted by Dilek Memis et al (2004)[24] & AEsmaoglu et al (2005),[25] they found significantly prolonged duration of analgesia with dexmedetomidine group when compared with control group.

Quality of blockade was excellent in 83.3% cases in Group A and 90% of cases in Group B. It was good in 13.3% of cases in Group A & 10% of cases in Group B. The quality of block was not found to be poor in any cases in either group. Dilek Memis et al (2004)[24] & AEsmaoglu et al (2005)[25] also found quality of blockade statistically better in dexmedetomidine group.

There were only few incidence of side effects encountered in our study like, dryness of mouth which was observed in 1(3.3%) case in Group A and 2(6.7%) cases in Group B, bradycardia, tinnitus & peri-oral numbness were noted in 3.3% cases only in Group B. All the results were statistically non significant (P>0.05%) among the groups and easily ameliorated by drugs or by mere observation which was in disagreement with the study of AEsmaoglu et al (2005)[25] who at a dose of 1 µg/kg dexmedetomidine did not observe any side-effect such as hypotension or bradycardia which required treatment.

To conclude, this study demonstrated that the addition of 1 µg/kg dexmedetomidine to lignocaine for IVRA showed significantly better improvement in the quality of anaesthesia and postoperative analgesia in comparison to. 5 µg/kg dexmedetomidine, without causing any significant side-effects. So, we prefer to use dexmedetomidine at a dose of 1 µg/kg as an adjunct to lignocaine in IVRA for upper limb surgeries.

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How to cite this article: Abhishek Gupta, Mamta Mahobia, Neeraj Narang, Rekha Mahendra. "A Comparative Study of Two Different Doses of Dexmedetomidine As Adjunct to Lignocaine in Intravenous Regional Anaesthesia of Upper Limb Surgeries". Int J Sci Stud. 2014;2(3):53-62.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Stress Hyperglycemia - An Observational Study

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Abstract

Introduction: There are many studies which imply that poorly controlled blood glucose levels are associated with a higher in-hospital morbidity and mortality, unfavorable post-discharge outcomes and significant excess health care costs. Myocardial infarction (MI) following stress hyperglycemia (post hip fracture) is of common occurrence now-a-days.

Materials & Methods: From February 2013 to Dec 2013, we carried out a prospective observational analysis of 126 consecutive patients with no history of diabetes who suffered hip fractures. Fasting blood glucose (FBG) and glycosylated hemoglobin tests as well as electrocardiography, ultrasonic cardiography, and chest X-ray examinations were performed after admission. All selected hip fracture patients were divided into stress hyperglycemia and non-hyperglycemia groups according to their FBG, and the incidence of AMI was monitored.

Results: Among the patients enrolled, the frequency of stress hyperglycemia was 47.89% (75/157) and that of AMI was 9.31% (15/157), and the occurrence of AMI in the stress hyperglycemia group was higher than in the non-hyperglycemia group (12.46 vs. 6.41%, P, 0.05). In the stress hyperglycemia patients, FBG reached maximum levels at 2-3 days after hip fractures and then decreased gradually. The AMI incidence (62.67%) of the stress hyperglycemia group was highest in the initial 3 days after hip fracture, significantly coinciding with the FBG peak time (P>0.05). In all patients with AMI, non–ST-segment elevation myocardial infarction occurred more often than ST-segment elevation myocardial infarction (62.39% vs 37.61%).

Conclusion: Stress-induced hyperglycemia after hip fracture increased the risk of AMI.

Keywords: Acute myocardial infarction, Hyperglycemia, Stress

INTRODUCTION

Advancement in medical science prolonged the life span all over the world, but on the other hand has also increased the incidence of age related degenerative diseases like hip fractures in elderly persons.[1]

Szulc in 2009 in his study has confirmed a strong association between cardiovascular events and osteoporosis.[2]

Release of stress hormones following any stress full event is a phenomenon mediated through neuroendocrine hypothalamo pituitary-adrenal (HPA) axis which in turn triggers stress hyperglycemia.[3,4]

The American Diabetes Association defined stress hyperglycemia as any blood glucose concentration > (140 mg/dl) without evidence of previous diabetes.

HbA1c has been recommended over oral glucose tolerance test as the preferred diagnostic testing in hospitalized patients with stress hyperglycemia.[5]

Stress hyperglycemia induces a sequence of events like generation of reaction oxygen species, Lipid peroxidation, raised cardiovascular inflammatory markers, which induces death of cardiac muscle.[6,7]

Literature is scanty for assessing the risk of acute myocardial infarction, following hip fractures.[8,9] We conducted a clinical observation of the relationship between stress-induced hyperglycemia and AMI in non-diabetic patients who were hospitalized with acute hip fractures in our hospital.

MATERIALS & METHODS

Patient Selection

We performed an observational study at the TMMC&RC, Moradabad. Consecutive hip fracture patients (n = 126) were selected for the analysis during a one year period. The study protocol was approved by the Hospital ethics committee, and informed consent of all patients was obtained.

Inclusion Criteria

S.N.	Factors included in inclusion criteria
1	Hip fracture at least a day before admission
2	Blood glucose normal
3	No occurrence of deep vein thrombosis
4	Bone density examination

Exclusion Criteria

S.N.	Factors included in exclusion criteria
1	Hip fracture less than 24 hrs
2	Type-1 or 2 DM
3	Occurrence of deep vein thrombosis
4	Thyroid and Liver diseases

All routine biochemical, haematological, pathological and radiological examinations were done as per study/research protocol. In special investigations Electrocardiography, Doppler cardiography, bone mineral density test were done. Appropriate orthopaedic treatment started in the department of orthopaedics and cardiac medications were also continued.

Patients who met our inclusion criteria were recorded fasting blood glucose and ECGs was monitored at fixed time. If any possibility of suggestive of AMI, additional blood samples were drawn to examine creatine kinase (CK), CK-MB. AMI diagnosis criteria met at least two of following: 1) the CK-MB concentration elevated. 2) Persistent ST-T segment changes. 3) precordial chest pain lasting for at least 30 min.

Statistical Analyses

Variables were expressed in mean with ±SD. P value <0.05 was considered statistically significant.

RESULTS

126 patients who full fill our inclusion criteria were included in the study. Mean age of patients was 70.02± 8.60 yrs and 72 were women. Co-morbidity in decreasing order was hypertension (56.02%), (CAD) (47.80%), dyslipidemia (46.17%); triglyceride, (36.13%), Obesity (34.63%), smoking (22.16%) & low levels of HDL cholesterol 19.26%.

S.N.	Co-morbid factors	Percentage of co-morbid factors
1	Hypertension	(56.02%),
2	(CAD)	(47.80%),
3	Dyslipidemia	(46.17%);
4	Triglyceride	(36.13%)
5	Obesity	(34.63%),
6	Smoking	(22.16%).
7	Low level of HDL cholesterol	19.26%.

Stress hyperglycemia was seen in 58 patients. In the stress hyperglycemia group, FBG values reached a maximum 3 days post hip fracture and then started declining. Repeated blood glucose values were significantly different ($P < 0.05$) in hyperglycemic patients exposed to stress, while it was not the case with non-hyperglycemia patients, they did not change ($P > 0.01$).

Acute myocardial infarction in stress hyperglycemia group was significantly higher 20.46% as compared to non-hyperglycemia group 8.88%.

A regression analysis using a conditional method revealed that stress hyperglycemia is an independent risk factor for the development of AMI (relative risk [RR] 2.130 [95% CI 1.431-3.172]. At the end of 3 months follow-up, there were no differences in mortality in patients with versus without stress-induced hyperglycemia.

DISCUSSION

In our study, we found that stress hyperglycemia was present in 58 persons and AMI was diagnosed in 11 in patients after hip fractures. The incidence of AMI in the stress hyperglycemia group was, 20.46%. Comparing these values to study conducted by (10), the incidence of AMI in patients after hip fractures appears higher.

Increased incidence of AMI after hip fracture may be related to osteoporosis.[2,10]

Conditions like osteoporosis and cardiovascular diseases are linked with common factors (a) poor general health status, (b) lifestyle, (c) nutrition, (d) hormone secretion, (e) vitamin D deficiency, (f) C-reactive protein, (g) interleukin-6 etc.[11-15]

We found that particularly stress hyperglycemia plays a vital role, because the incidence of AMI in the stress hyperglycemia group was approximately 12% higher than in the non-hyperglycemia group. In patients with hip fractures, stress hyperglycemia was the sole significant independent risk factor for the development of AMI (95% CI 1.431-3.172). Acute fractures induce "stress response," which in turn leads to insulin resistance, resulting in hyperglycemia and the associated risk factors.[16]

Hyperglycemia induces platelet aggregation and increases plasma adrenaline and nor-adrenaline, which leads to plaque formation, the disturbances in micro-vascular system, and thrombogenesis.[17-27] Our present work indicates that for patients without a history of diabetes, stress-induced hyperglycemia plays a key role in the risk of developing AMI. Our present analysis revealed that most (62.67%) AMIs occurred within the first 3 days after hip fractures, which is in accordance with the literature.[2] In the stress hyperglycemia group, blood glucose peaked at 2-3 days after hip fracture and then declined gradually, indicating a coincidence of AMI with the peak time of FBG. The cause of a more frequent STEMI occurrence in stress-induced hyperglycemia might be that raised glucose levels contribute to platelet activation and thereby enhanced platelet-mediated thrombogenesis[28] which develops into completely occlusive thrombi.

In addition, our study showed stress hyperglycemia ranges of 6.1-9.7 mmol/L after hip fractures for the first time, and we recommend that stress induced hyperglycemias after hip fracture should be identified early.

A limitation of our study was that we did not investigate an effect of inflammatory factors and/or stress hormones on FBG levels, which lead to increased AMI risk. In addition, we did not compare the results of this study with patients suffering from diabetes, and we did not find differences between the stress hyperglycemia and no hyperglycemia groups regarding comorbid disorders and/or drug administrations, e.g. statin against hypertension. Therefore we cannot completely rule out that other factors also contributed to the incidence of myocardial infarctions. Moreover, patients were not accurately diagnosed for diabetes in the longer term, and because blood glucose levels largely fluctuate, we did not specifically treat the hyperglycemias. Up until now, there has been no clear agreement on whether it is necessary to control glucose levels in these patients. In addition, we only show the significance of hyperglycemia on the incidence of AMI during admission; we did not show clinical outcome data at follow up. However, this study underlines the importance of understanding the indication for adopting appropriate methods to identify stress-induced hyperglycemia in correlation with AMI after hip fracture. We recommend that in patients, even without previous diabetes, FBGs and ECGs should be monitored for at least first 7 days after hip fractures. This might be helpful for the endocrinologist, cardiologist, and orthopedic surgeon to timely detect AMIs.

CONCLUSION

We conclude that stress-induced hyperglycemia increased the risk of AMI in patients with hip fractures. Stress induced hyperglycemias after hip fracture should be identified early.

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How to cite this article: V K Singh, J M Haria, S K Jain. "Stress Hyperglycemia - An Observational Study". Int J Sci Stud. 2014;2(3):63-66.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Visual Outcome of Traumatic Optic Neuropathy in Patients Treated with Intravenous Methypredisolone

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Abstract

Background: Optic nerve injuries occur in the setting of head injury which is often a consequence of road traffic accidents or falls. Traumatic optic neuropathy (TON) is an important cause of functional impairment of vision. Different treatment approaches like different dosages of steroids, surgical decompression and observation alone have been suggested but there has been no conclusive evidence to establish a standard approach to this devastating cause of visual loss.

Aim: To determine the effectiveness of intravenous (IV) methylprednisolone in the treatment of patients with traumatic optic neuropathy.

Materials and Methods: An observational clinical study. Nine patients, all male with a mean age of 39.1 (14 to 55 years) were enrolled. All patients received 1 g of IV methylprednisolone for 3 days followed by 1 mg/kg oral prednisolone in tapering dose over 2 weeks. Paired proportion test has been used to find out the significance of patients with >=2 line improvement of visual acuity from base line visual acuity after treatment.

Results: The data of 9 patients (12 eyes) were analysed.Ten out of twelve eyes had poor visual acuity (<=6/60). Visual acuity was ranging from 6/36 to 6/6 in 8 patients 1 month post treatment, of which those between 6/6-6/9 was seen to be statistically significant (p=0.061). Patients with initial visual acuity (pre-treatment) of counting fingers or better had > 2 line improvement in Snellen's chart 1 month post treatment which was statistically significant (p=0.045). Though 6 out of 7 patients with very poor vision (NLP, PL, HM) had >=2 line improvement, it was not statistically significant.

Conclusion: Patients with traumatic optic neuropathy who had vision better than counting fingers showed significant improvement after treatment with methylprednisolone but those with very poor vision did not show statistically significant improvement.

Keywords: Extra ocular muscle palsy, Methylprednisolone, Traumatic optic neuropathy, Vehicular accidents

INTRODUCTION

Traumatic loss of vision, along with deficits in visual field, colour perception and an afferent pupillary defect is called traumatic optic neuropathy (TON). TON which occurs mostly after blunt trauma is an important cause of visual loss.[1]

Indirect damage to the optic nerve is the most common form of TON occurring in about 0.5-5% of all cases of closed head trauma.[2] It is divided into direct injuries caused by sharp penetrating objects that enter the orbit and indirect injuries caused by concussive forces that are transmitted to the optic nerve as a result of orbital-facial or cranial trauma (1). This impact may create a shock wave which can lead to optic nerve avulsion or posterior indirect traumatic optic neuropathy.[3] While diagnosis of indirect TON is made through a careful history and clinical examination, its optimum management is yet to be elucidated. Different approaches includes different dosages of steroids (methylprednisolone and dexamethasone) in 60 mg to 7 g/day, surgical decompression of optic canal (via intracranial trans ethmoidal, endonasal, sub labial or other techniques)[4-8] and observation alone.[9] Comparison of these different approaches did not conclude either one being superior to other.[10] We report 9 cases of TON who

received intravenous methylprednisolone at Kempegowda Institute of Medical Sciences, Bangalore, Karnataka to find out the results of such treatment in these patients.

MATERIALS AND METHODS

The study design was prospective. We included patients with indirect optic injuries in otherwise healthy individuals. Cases with pre-existing ocular abnormalities that might affect assessment of visual function were excluded. All enrolled cases had a complete ocular examination including best corrected visual acuity (BCVA), IOP measurement, pupils assessed for relative afferent pupillary defect, ocular motility and fundus examination on admission, immediately post treatment and 1 month later and had CT scans (axial and coronal) of orbit and brain accordingly.

Visual acuity was the main outcome measure of the study, which was measured by Snellen chart on admission, immediately after treatment and 1 month later. Patients were examined within 3 hours to 3 days. A written informed consent was taken prior to starting of treatment. Intravenous Methylprednisolone 1 g was given (diluted in 100 ml Normal saline over 45 minutes) for 3 days. Base-line ECG and blood sugar level were done. Pulse and B.P recorded prior to infusion and monitored using pulse-oximetry. Then oral prednisolone 1 mg/kg in tapering dose was administered for 2 weeks. Patients were examined every day during hospitalisation and later at 1st week, 2nd week and 1 month. One patient had sphenoid fracture segment impinging optic nerve for which methylprednisolone was not administered.

Results on continuous measurements are presented as Mean +/- SD (Mi-Max) and results on categorical measurements are presented in Number (%). Significance was assessed from patients who had >=2 line improvement in visual acuity after treatment with intravenous methylprednisolone from baseline visual acuity. Paired proportion test has been used to find the significance.

RESULTS

The data of 9 patients (12 eyes) were analysed. Mean age of the patients were 39.1 (14 to 55 years) and all were male. Road traffic accidents were the main cause of trauma (77.8%). Ten out of twelve eyes had poor visual acuity (<=6/60) (Table 1). Associated extra ocular palsies and orbital fractures are shown in Tables 2 and 3 which did not have significant effect on visual outcome in the affected patients. Visual acuity was ranging from 6/36 to 6/6 in 8 patients 1 month post treatment, of which those between 6/6-6/9 was seen to be statistically significant (p=0.061) (Tables 4 and 5). Five patients had one to multiple orbital fractures, of which only one patient had displaced orbital wall fracture impinging the optic nerve. Patients with initial

Table 1: Demographic and clinical characteristics were noted (2)

Characteristic	Total (n=9 patients)
Age	39.1
Sex	
Male	9 (100%)
Eye	
Right	6 (66.7%)
Left	3 (33.3%)
Injury type	
Vehicle accident	7 (77.8%)
Fall	1 (11.1%)
Assault	1 (11.1%)
Base line visual acuity (n=12 eyes)	
NLP	1 (8.3%)
LP	4 (33.3%)
HM	2 (16.7%)
<20/200 to CF	3 (25.0%)
<20/40 to>=20/200	1 (8.3%)
>=20/40	1 (8.3%)

Abbreviations: NLP, no light perception; LP, light perception; HM, hand motion; CF, counting fingers

Table 2: Frequency of different paresis

Paresis	Number of eyes affected
Ptosis	5
Pupil palsy	3
3rd nerve palsy	4
6th nerve palsy	2
Total ophthalmoplegia	3

Table 3: Frequency of different orbital fractures

Type of fracture	Number of eyes affected
Orbit fx (total)	6
No fx	5
Optic canal fx	1
Ethmoidfx	2
Maxillary fx	3
Frontal fx	3
Zygomatic fx	4
Sphenoid fx	2
Temporal fx	2
Occipital fx	1

Abbreviations: fx, fracture

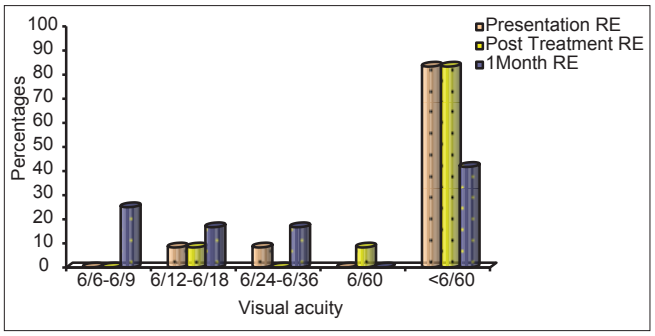
Table 4: Frequency of different visual acuities in assessment times

Visual acuity	Presentaion both eyes (n=12)	Post treatment both eyes (n=12)	1 month both eyes (n=12)	P value
6/6-6/9	0 (0%)	0 (0%)	3 (25%)	0.061+
6/12-6/18	1 (8.3%)	1 (8.3%)	2 (16.7%)	0.311
6/24-6/36	1 (8.3%)	0 (0%)	2 (16.7%)	0.311
6/60	0 (0%)	1 (8.3%)	0 (0%)	-
<6/60	10 (83.3%)	10 (83.3%)	5 (41.7%)	0.132

Table 5: % of patients with 2 line improvement in visual acuity according to baseline visual acuity

Baseline visual acuity	Immediately post-treatment (n=12)	After 1 month (n=12)	% change	P value
NPL, PL, HM	7 (58.3%)	7 (58.3%)	0.0	1.000
>=2 line improvement	4 (33.3%)	6 (50.0%)	+16.7%	0.266
CF or better	5 (41.7%)	5 (41.7%)	0.0	1.000
>=2 line improvement	1 (8.3%)	5 (41.7%)	+33.4%	0.045*

P values are obtained by using paired proportion test



Graph 1: Frequency of patients with visual acuities pre-treatment and post treatment

visual acuity (pre-treatment) of counting fingers or better had > 2 line improvement in Snellen's chart 1 month post treatment which was statistically significant (p=0.045). Though 6 out of 7 patients with very poor vision (NLP, PL, HM) had >=2 line improvement, it was not statistically significant (Table 4) (Graph 1).

DISCUSSION & CONCLUSION

The management of traumatic optic neuropathy should be guided by the Hippocratic adage to do no harm.[11] While there is little controversy on the macroscopic mechanism of trauma to the optic nerve, including the deceleration theory,[1] multiple hypotheses have been proposed at microscopic level of damage to the optic nerve, including contusion necrosis, nerve fibre tears and nerve infarction secondary to closed space edema, haemorrhage within the optic nerve sheath, thrombosis, vasospasm, impingement by bone spicules and shearing of dural vessels in the optic canal.[10]

Treatment of TON has been a topic of controversy. Even after 2 years, The International Optic Nerve Trauma Study (TIONTS) failed to recruit enough eligible patients to conduct a clinical trial to compare the results of steroid only arm with surgery plus megadose steroid arm.[10] Therefore it was transformed into an observational study and ultimately found no clear benefits for either corticosteroid or optic canal decompression approach. The idea of use of megadose steroid is extrapolated from traumatic spinal cord injury studies introduced by Anderson et al. Although the exact mechanism of its action is not clear yet, it seems that the main mechanism by which corticosteroids are thought to block neuronal death in the setting of trauma is inhibition of free radicals, decrease intra-neuronal or extra-neuronal oedema, reduce vasospasm limiting contusion necrosis of the nerve.[12-15]

Road traffic accident were the main cause of TON in our study, a finding similar to a report from Iran.[11] Similar to most reports,[10,16,17] our study indicated that patients with poor visual acuities have poorer visual prognosis. Although our study has limited number of patients, but 54.6% of them had atleast one orbital fracture (Table 3) with different degrees of extraocular nerve palsies (Table 2) but in contrast to the conclusion of some reports,[18] we failed to show significances of these findings and their effect on final visual results (Table 5).

Our study showed intravenous methylprednisolone as proposed by Optic Neuritis Treatment Trial (ONTT) for optic neuritis to be effective for treatment of traumatic optic neuropathy provided the visual acuity pre-treatment is not less than counting fingers. This thus reduces steroid induced side effects caused by megadose regimen.

One limitation in our study is small sample size, though it correlates with the incidence of TON in closed head trauma in our institution.

ACKNOWLEDGEMENT

The first author want to give a sincere thanks to his colleagues and post-graduate students, who have worked very hard to put this together. Special thanks to colleagues Dr. Niveditha H (Associate Professor) and Dr. Vinutha (Senior Resident) for their constant endeavour and support. He also would like to thank Dr. Nivedhitha Nikhil (Post–graduate) has been instrumental in co-ordinating our efforts and putting it together. He would also like to acknowledge the efforts of all the members of the Department of Ophthalmology for their support.

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How to cite this article: Sundeep, H Niveditha, Nivedhitha Nikhil, B V Vinutha. "Visual Outcome of Traumatic Optic Neuropathy in Patients Treated with Intravenous Methypredisolone". Int J Sci Stud. 2014;2(3):67-70.

Source of Support: Nil, **Conflict of Interest:** None declared.

Original Article

Vickers Hardness and Specific Wear Rate of Poly Propylene Reinforced PMMA

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Abstract

Background: Poly (methyl methacrylate) is one of the most widely accepted biomaterial in prosthetic dentistry due to its acceptable advantages. However the conventional PMMA used are far from being ideal because of their inferior mechanical properties. So the present study is to determine the Vickers Hardness and specific wear rate of the polypropylene reinforced PMMA.

Aim: Determination of Vickers Hardness number and specific wear rate of PMMA denture base by varying the weight percentage of polypropylene fiber and by varying the aspect ratio of polypropylene fiber.

Materials and Methods: To measure the Vickers hardness, specimens prepared, using a standard rectangular mold of 62 mm length, 10 mm breadth and 2.5 mm thickness. Vickers Hardness number measured using Vickers hardness test apparatus having square based diamond pyramid as indenter. For wear analysis, specimens prepared, using a standard cylindrical mold of 8 mm diameter and 25 mm length. Specific wear rate measured after measuring the weight loss in the pin on disc method by Wear and Friction Monitor TR-20ICL. Microstructure of the abraded surface observed through Trinocular inverted metallurgical microscope model Metji M1004. Detailed statistical analysis performed using One-way Analysis of Variance (ANOVA), Turkey-Kramer Multiple Comparisons Test.

Results: Polypropylene reinforced PMMA shown superior Vickers hardness number compare to control and the specific wear rate for the reinforced groups were less compare to control.

Keywords: Polypropylene fiber, PMMA, Specific wear, Vickers hardness

INTRODUCTION

Poly (methyl methacrylate) continued to be a preferred biomaterial of choice in prosthetic and craniofacial reconstructive dentistry due to its acceptable advantages. But the mechanical performance of these materials is inferior. Fiber reinforcement is a good method to improve mechanical characteristics and to prolong the service life of the PMMA based materials.[1] Poly propylene is a synthetic polymer and the fiber made out of it possesses superior mechanical properties, corrosion resistance, biocompatibility, etc.[2] So the current study utilized polypropylene fiber as a reinforcing agent. Polymer composites are made of matrix and dispersed phase. Poly (methyl methacrylate) is the primary matrix phase which is continuous and poly propylene fibers are the secondary dispersed phase which is discontinuous.[3] Measurement of Hardness and abrasion resistance is an effective tool in understanding the overall mechanical behavior of any material including the polymer composites.[4]

Aim

- To determine hardness and specific wear resistance of PMMA material by varying the weight percentage of polypropylene fiber (2.5 wt%, 5 wt%, 10 wt %).
- To determine hardness and specific wear resistance of PMMA material by varying the length/thickness ratio of polypropylene fiber (3 mm/220 μm, 6 mm/220 μm, 12 mm/220 μm).
- Comparison of the above and understand the optimum property of the PMMA material using the correct weight percentage and aspect ratio.

MATERIALS AND METHODS

Materials

Modeling wax, dental stone type III gypsum product, model plaster type II gypsum product, poly propylene fibers, heat polymerizing PMMA powder and monomer liquid, separating medium.

Methods

Preparation of Gypsum Moulds to Obtain The Acrylic Specimen for Hardness Test

Wax pattern (62 mm X 10 mm X 2.5 mm) is prepared, using modeling wax and invested in the dental flask in the conventional manner using dental stone and model plaster. After one hour, the invested flask kept for dewaxing, then any waxy residue removed by washing the mould by hot water and then cleaned using soap solution, allowed to dry, thin layer of separating medium is applied in the mould space, allowed to dry. The mould was then ready to be used for the preparation of acrylic specimen.

Preparation of Gypsum Moulds to Obtain the Acrylic Specimen for Wear Analysis

Wax pattern (8 mm diameter, 25 mm length) is prepared using modeling wax and invested in the dental flask in the conventional manner using dental stone and model plaster. After one hour the invested flask kept for dewaxing, then any waxy residue removed by washing the mould by hot water and then cleaned using soap solution, allowed to dry, thin layer of separating medium is applied in the mould space, allowed to dry. The mould was then ready to be used for the preparation of acrylic specimen.

Preparation of PMMA Resin Specimen

Control Group

Control group test specimen made with conventional heat polymerized PMMA resin (DPI heat cure) polymer and monomer (2.4 gm:1 ml) mixed and allowed to reach dough consistency. Dough is kneaded and then packed into the mould, flask is closed and a pressure of 1400 psi was given and bench cured for 30 minutes in a hydraulic press apparatus. Then the flask is clamped and transferred it into the water bath. Temperature of the water bath elevated slowly to 72°C, and maintained for 90 minutes. Then the temperature of the water bath elevated to 100°C and maintained for 60 minutes. After completion of polymerization cycle, the flask is allowed to cool in same water bath to room temperature, and the acrylic resin specimens are retrieved after deflasking. The specimen obtained were finished and polished in the conventional manner.[5]

Reinforced Groups

Poly propylene fibers of varying length and concentration is taken and impregnated in the measured monomer for 5 minutes, and then the polymer powder is weighed and mixed with monomer and polypropylene fiber and allowed to reach dough consistency. Then it is packed and a pressure of 1400 PSI is given and bench cured for 30 minutes in a hydraulic press apparatus. Then the flask is clamped and transferred it into the water bath. Temperature of the water bath elevated slowly to 72°C, and maintained for 90 minutes. Then the temperature of the water bath elevated to 100°C and maintained for 60 minutes. After completion of polymerization cycle, the flask is allowed to cool in the same water bath to room temperature, and the acrylic resin specimens are retrieved after deflasking. Specimens obtained were finished and polished in the conventional manner.

Hardness Testing

Hardness was measured using Vickers hardness test apparatus. It has a square based diamond pyramid as indenter. The value of the load (50 gm) and the time duration (10 seconds) that is to be applied was set. The test specimen was held firmly in position and lens were arranged to get the image clearly at its focal length, then the indentation made using set parameters. Indentations focused and the measuring lines were made to interact at two diagonally opposite corner. Readings were taken by pressing the read button. Similarly the lens was rotated and the measurement of diagonally opposite corner was measured.

Wear Analysis

Specific wear rate was measured using pin on disc method by Wear and Friction Monitor TR-20ICL. Weight of the specimen was measured and considered as initial weight W1. Specimen was inserted into the holder and made sure that the end surface of the specimen and disc surface was parallel to each other. Holder was adjusted to get the desirable wear track radius (D=60 mm). Load was given on the hang attached to the apparatus (300 gm). Specimen securely tightened to the holder. By using the controller attached to the device the speed of rotation (200 rpm) and the time duration for the rotation (10 minutes) were selected. Then the data recorded controller device was switched on. Once the rotation completed after set duration 10 minutes, the weight of the specimen measured W2. The procedure was repeated and the weight measured as W3. Weight loss W1-W2 and W2-W3 measured and average weight loss measured as ΔW. The experiment was repeated for 500 gm, 1000 gm load. The load was varied in order to understand the effect of load on the specific wear. Specific wear rate was obtained from the formula:

Specific Wear rate = ΔW/(load in Newton * sliding distance) gm/Nm

Where ΔW = average weight loss

Sliding distance S = *velocity m/sec * time sec*

Sliding velocity (V)= $\frac{¶DN}{60\times1000}$ m / sec

D= wear track diameter selected (60 mm)

¶ = 3.14

N = speed of the rotating disc (rpm) (200)

The surface after wear was observed through Trinocular inverted metallurgical microscope model Metji M1004.

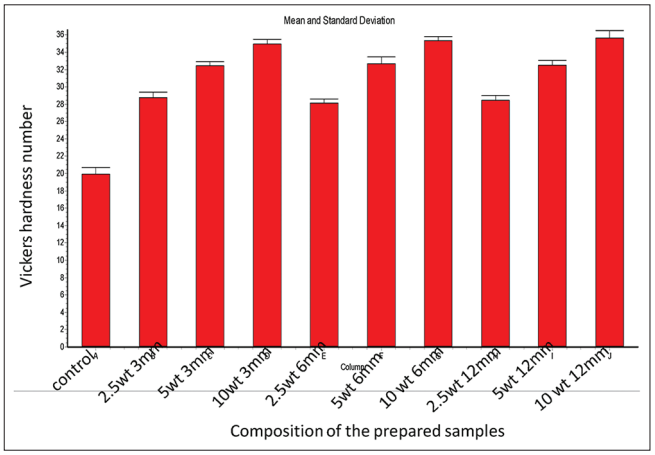
RESULTS

- All fiber reinforced groups shown higher Vickers hardness number compared to control group having no fiber.
- Comparing different fiber weight with same fiber length there was significant increase in the Vickers hardness number (Table 1 & Graph 1).
- Comparing different fiber length with same fiber weight percentage there was no significance in the Vickers Hardness number.
- Under all given loads, specific wear rate was more for the control group when compare with other polypropylene reinforced group (Table 2 & Graph 2).
- As the load increases from 300 gm to 1000 gm there was significant increase in the wear rate of the control group.
- As the fiber concentration increases, specific wear rate observed was less (Figures 1, 2 and Graph 2).

DISCUSSION

Polypropylene fiber has got superior mechanical property and chemical stability moreover poly propylene is used in variety forms in medicine as it is highly biocompatible.[6]

Hardness and wear resistance are related property and commonly examined mechanical properties in



Graph 1: Vickers hardness number of poly propylene fiber reinforced PMMA

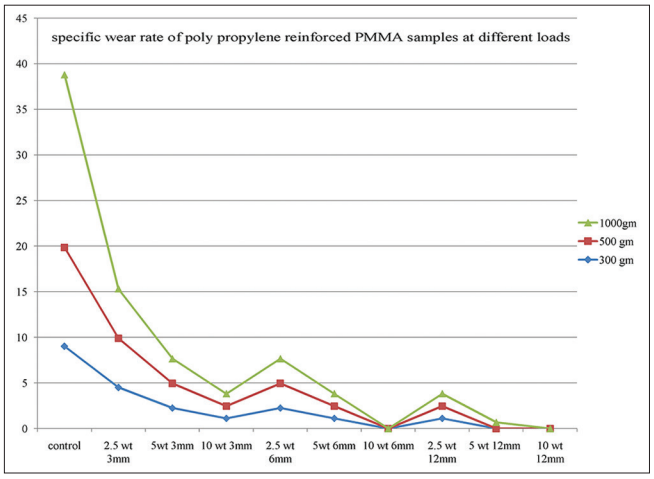
Table 1: Vickers hardness number of polypropylene reinforced PMMA

Serial no.	Control specimen	3 mm long ppf non treated			6 mm long ppf non treated			12 mm long ppf non treated		
		2.5 fiber wt%	5 fiber wt%	10 fiber wt%	2.5 fiber wt%	5 fiber wt%	10 fiber wt%	2.5 fiber wt%	5 fiber wt%	10 fiber wt%
1	20.4	29	32.6	34	27.8	33	36.1	29.2	33	36.1
2	19.4	29.6	33	35.1	28	33.4	35.7	28.6	33.1	36.7
3	19.4	28.9	31.8	35.5	29	32.9	35	27.8	32.6	36
4	21.2	27.8	32.4	34.8	27.9	32.7	34.9	29	31.8	35.8
5	20.1	28.3	32.8	35.3	28.2	31.2	35.2	27.9	32	35
6	18.9	29.1	32	34.9	28.1	32.9	35	28.1	32.5	34.4
Mean	19.9	28.783	32.433	34.933	28.166	32.683	35.316	28.433	32.5	35.66667
stdev	0.8342	0.6369	0.4633	0.5240	0.4320	0.7626	0.4792	0.5887	0.5215	0.828654

Table 2: Specific wear rate of the tested samples at different loads

	Control	2.5 wt 3 mm	5 wt 3 mm	10 wt 3 mm	2.5 wt 6 mm	5 wt 6 mm	10 wt 6 mm	2.5 wt 12 mm	5 wt 12 mm	10 wt 12 mm
Δw load 300 gm	0.001	0.0005	0.00025	0.000125	0.00025	0.000125	0	0.000125	0	0
Specific wear rate	9.02×10^{-7} g/NM	4.51×10^{-7} g/NM	2.26×10^{-7} g/NM	1.12×10^{-7} g/NM	2.26×10^{-7} g/NM	1.12×10^{-7} g/NM	0	1.12×10^{-7} g/NM	0	0
Δw load 500 gm	0.002	0.001	0.0005	0.00025	0.0005	0.00025	0	0.00025	0	0
Specific wear rate	10.83×10^{-7} g/NM	5.4×10^{-7} g/NM	2.7×10^{-7} g/NM	1.35×10^{-7} g/NM	2.7×10^{-7} g/NM	1.35×10^{-7} g/NM	0	1.35×10^{-7} g/NM	0	0
Δw load 1000 gm	0.007	0.002	0.001	0.0005	0.001	0.0005	0	0.0005	0.00025	0
Specific wear rate	18.93×10^{-7} g/NM	5.41×10^{-7} g/NM	2.7×10^{-7} g/NM	1.35×10^{-7} g/NM	2.7×10^{-7} g/NM	1.35×10^{-7} g/NM	0	1.35×10^{-7} g/NM	0.676×10^{-7} g/NM	0

Where Δw = average weight loss of specimen after wear test (w1-w2, w2-w3)



Graph 2: Specific wear rate of poly propylene reinforced PMMA samples at different loads

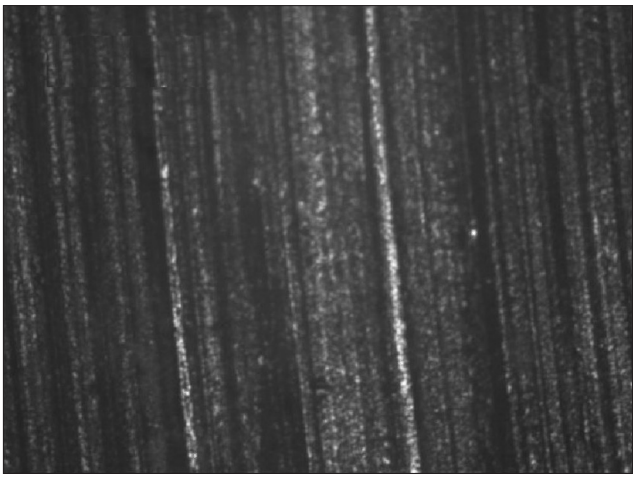


Figure 1: Abraded surface of the control specimen observed at 50× magnification

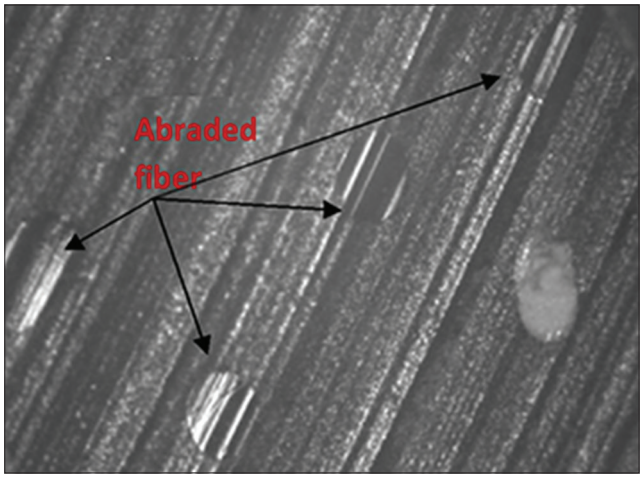


Figure 2: Abraded surface of the reinforced specimen observed at 50× maginfication

determining the longevity of the biomaterials inside the oral cavity.[7] In the oral cavity these materials are exposed to endogenous substances like proteins, enzymes, polysaccharides, bacteria etc and exogenous substances that coming through the food intake. These components establish a complex interaction, mechanical action on the artificial prosthesis and compromise its service life.[8] Presence of saliva can decrease the wear rate because in wet condition the abraded particles are removed from the surface otherwise these can act as additional abrasive and causes more wear.[9]

Vickers hardness test method is an accurate micro hardness test to measure the resistance offered by the polymer composite material when the load applied over the surface area of indentation. Vickers Pyramid number (HV) or Diamond Pyramid hardness (DPH) is the unit for measuring the Vickers hardness number.[10] In the present study, readings were taken on well polished samples immediately after the indentation made as it highly depends on the elastic recovery of the material and surface homogeneity.[11]

There are two different wear mechanisms such as cohesive and interfacial type of wear. Generally cohesive type of wear depends on the mechanical properties of the interacting material where as the interfacial wear depends on the chemistry of the surface involved in wearing. In polymer composite the cohesive two- body and three -body abrasions wear normally encountered and this is highly depend on the hardness of the materials in contact, applied load, sliding distance and geometry of the abrasive particle.[12] In the present study, the wear rate of the prepared polymer composite samples calculated under different loads and the results showed that the reinforced samples have better wear resistance than the control with no fiber and increase in the load applied increases wear, indicates that more energy required to cause the wear of fiber reinforced polymer. Hence hardness increased on increasing the fiber concentration as the wear and hardness are inversely related.[4]

CONCLUSION

- Poly propylene fiber is a good reinforcing material to poly methyl methacrylate as it enhances the hardness of the PMMA
- Fiber concentration affects the Vickers hardness number but aspect ratio did not play a significant role in the hardness number
- There is a significant change in the Specific wear rate of fiber reinforced specimens when compare to control specimen
- Load applied is one of the main factors which control the specific wear rate.

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How to cite this article: Merin Mathew, Kamalakanth Shenoy, KS Ravishankar. "Vickers Hardness and Specific Wear Rate of Poly Propylene Reinforced PMMA". Int J Sci Stud. 2014;2(3):71-75.

Source of Support: Nil, **Conflict of Interest:** None declared.

Review Article

Detrimental Effects of Smoking on Periodontium in Health and Disease

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Abstract

Cigarette smoking is a preeminent prospect for the cause of jillions of diseases. The cause of the development and progression of periodontitis has received pervasive attention, with significant progress over the past decade in clinical, microbiological, immunological, biochemical, and behavioural domains. The list of risk factors embodies smoking, diabetes, socio-economic status and behaviour and stress. This review covers ordered studies to examine the potential causal association between cigarette smoking and periodontitis. A number of epidemiologic studies have shown strong associations between smoking and the prevalence and severity of periodontitis, as well as bone loss. Whereas the periodontopathogens in smokers is of major concern, some data also suggests modification of the periodontitis micro-flora by smoking is mired in the development of periodontitis. Also there are data suggesting smoking effects on both acquired and innate responses in humans and animals. The prevalence and severity of periodontitis in former smokers is lesser as compared to current smokers, providing affirmation that smoking cessation is beneficial. Smoking markedly sways response to periodontal therapy. Statistical analysis of smokers has also connected smoking with a large proportion of periodontal cases and constitutes a major dental public health problem.

Keywords: Immune response, Microflora, Periodontitis, Periodontium, Smoking, Tobacco

INTRODUCTION

Periodontitis is an array of inflammatory diseases affecting the periodontium, i.e., tissues supporting and lining the radical portion of teeth.[1] It is a chronic inflammatory disease associated with gram-negative anaerobic bacteria present in the dental biofilm which leads to irrevocable impairment of periodontium.[2] Periodontitis results in a continuous release of bacterial and inflammatory cytokines into saliva and to a certain degree into blood.[3] These periodontal pathogens and inflammatory markers travel via saliva and blood from the affected tissues to distant sites thus affecting systemic health adversely.[4] Also it has been found in the women of pregnancy associated gingivitis,that periodontal therapy reduces the rate of preterm low birth weight.[5]

The concept concerning the etiology of active periodontal disease considers three factors: A susceptible host, the presence of pathogenic species, and the absence of so-called "beneficial bacteria".[6] The search for the pathogens of periodontal diseases has been underway for more than 100 years, and till date it is a motif of concern. In addition, varied risk factors have been pinpointed as potential risk factors for periodontitis including smoking, diabetes, socioeconomic status, behaviour and stress. Amongst these smoking is strongly implicated in the development of periodontal disease. There is accumulating evidence for a higher level of periodontal disease among smokers. Greater levels of clinical alveolar bone loss, tooth mobility, probing pocket depth and tooth loss have been proclaimed to be more austere in smokers than in non-smokers.[7]

Smoking and Gingivitis

Smoking and its clinical manifestations on periodontium is evident, but paradoxically, smokers show reduced clinical signs of inflammation in response to dental plaque than non-smokers, particularly the key diagnostic indices of gingival bleeding on probing and oedema. It has been suggested that this reflects an alterations of the caliber of the blood vessels perfusing the gingival tissues which can be attributed to the cotinine, a nicotin metabolic by-product, as it has a peripheral constrictive action on gingival vessels that reduces gingival clinical signs of bleeding, redness

and oedema.[8,9] In vitro studies have also advertised altered gingival crevicular fluid inflammatory cytokine profiles, immune cell function and altered proteolylic regulation in smokers. Lately Chang et al. have demonstrated altered Cox-2 mRNA expression in gingival fibroblasts in response to nicotine.[10]

Smoking & Periodontitis

The relationship between smoking and periodontal health was investigated as early as the middle of the nineteenth century. More recently a wealth of epidemiological, clinical and in vitro studies have emerged that have provided undeniable evidence that smoking adversely effects periodontal health and proposed mechanisms by which it may ensue.[11]

In 1999, Gelskey used methodology of Sir Bradford Hill's criteria for causation, as a framework to examine potential causal association between cigarette smoking and periodontitis. He stated that smoking meets most of the criteria for causation proposed by Hill (1965). This statement was based on the fulfilment of parameters between smoking and periodontal disease severity demonstrated by multiple cross-sectional as well as longitudinal studies. The parameters were consistency, strength of association, specificity, temporality, biological gradient, biological plausibility/coherence, analogy and experiment.[12]

Studies have indicated that smokers exhibit increased bleeding upon probing, higher calculus and plaque deposits, increased clinical attachment loss, gingival recession and tooth mobility which was independent of age, gender and systemic condition.[13] The results of a study reported that the relative risk of between 2.66 and 4.55 for light and heavy smokers respectively. A report from Calsina et al claimedthat there is a 2.7 times greater probability to have established periodontitis in a study of Spanish adults over 20 years old. These investigators also perceived a more significant effect in male patients and reported that the probability of having disease increased to 3.7 in those who had been smoking for 10 years or more. Linden and Mullally, although reported low prevalence but found that when furcation defects exclusively affected smokers. In a subsequent radiographic investigation of an older adult population of referrals to a specialist periodontal clinic it was reported that the prevalence of molar furcation defects among cigarette smokers were twice of the matched group of non-smokers.[14,15]

Schenkein et al. reported on the clinical status of subjects with varying degrees of periodontal destruction. They found a higher prevalence of smoking among patients diagnosed with generalized early-onset or aggressive periodontitis and adult periodontitis than in those with localized juvenile periodontitis or with good periodontal health. They reported 20% of subjects with localised aggressive periodontitis, 43% with generalised and 16% of healthy subjects were smokers. Significant effects were also seen in relation with periodontal attachment loss in smokers and generalized early-onset periodontitis. These patients had significantly more extensive periodontitis, more teeth with affected sites, and a greater mean loss of attachment than patients who did not smoke. Several authors have also reported high prevalence of smoking amid patients with aggressive periodontitis.[16]

Later Bergstrom and Baljoon in Saudi Arabia published report on water pipe smoking and its relation to periodontal health. They substantially compared the effects of cigarette smoking and water pipe smoking in periodontal vertical bone loss measured by full sets of radiographs. The impact of water pipe smoking (that had sharp rise in consumption due to its popularity in the recent years in men and women of Middle East countries) is of the same magnitude as that of cigarette smoking.[17] Krall et al.concluded that men who smoke cigars or pipes were at increased risk of experiencing tooth loss. Cigar smokers also were at increased risk of tolerating alveolar bone loss. These elevations in risk were similar in magnitude to those observed in cigarette smokers.[18]

Further talking about the region affected most, a number of other clinical investigations have revealed that cigarette smokers with aggressive or early onset periodontitis have more extensive periodontal destruction in the maxillary region. In a Brazillian study it was shown that group of smokers laid out that higher alveolar bone resorption as compared to non-smokers, especially in the incisors region, and confirmed that cigarette consumption affects maxillary region more as compared to the lower jaw and basically the anterior area.[19]

Smoking and Oral Microflora

Mechanisms by which smoking affects the development of periodontitis are notioned to be both direct and indirect. It has been suggested that modification of the periodontal microflora by smoking is involved in the development of periodontitis. It was shown that in vitro exposure of bacteria to cigarette smoking resulted in a marked decrease in the numbers of viable bacteria.[20] In a study on 798 subjects with different smoking histories, Zambon et al reported that smokers had significantly higher levels of, and were at greater risk of infection by B. forsythia. Furthermore, they showed that smokers were 2.3 times more likely to harbour this periodontal pathogen than former smokers or non-smokers.[21] Umeda et al. reported that current smokers displayed an increased risk (odds ratio,

4.6) for harbouring T. denticola in periodontal pockets, and that the presence of A. actinomycetemcomitans, P. gingivalis, P. intermedia, E. corrodens or F. nucleatum. Also, smoking increased the risk of having a mean pocket depth of ≥3.5 mm.[22]

From few other in vitro studies, it has been reported that bacteria are eclectically affected by cigarette smoke and that smokers present a decreased oxygen tension in periodontal pockets, which could favour anaerobic colonization. In contrast, clinical studies have shown minor differences between smokers and nonsmokers with respect to periodontal microflora.[23] Haffajee and Socransky investigated the relationship between cigarette smoking and subgingival microbiota using checkerboard DNA hybridization. They concluded that the major difference between smokers and non-smokers was in the prevalence of species i.e. periodontal pathogens colonized a larger proportion of sites, rather than counts or proportions. The increased colonization seen among smokers was particularly evident at the shallower pockets, i.e. those, less than 4 mm. In addition they reported that a higher percentage of sites were colonized by B. forsythus and P. nigrescens in maxillary than mandibular sites.[24]

Smoking and Systemic Manifestations

Smoking of tobacco leads to a number of systemic manifestations including diabetes, pulmonary destruction, renal pathologies and osteoporosis. Literature suggests that smokers are insulin resistant, they exhibit several aspects of the insulin resistance syndrome and they are at an increased risk for type 2 diabetes. Smoking even increases risk for diabetic nephropathy, retinopathy, neuropathy, macrovascular complications, and peripheral vascular disease. Nicotine, one of the components of tobacco has a direct effect on the beta cells of the pancreas and smoking has also been associated with larger upper body fat distribution which is a marker of insulin resistance, raised plasma glucose concentration and overt diabetes.[25-27]

Studies have suggested that smoking is the most widespread pulmonary inflammation and its cessation is probably the single most exigent preventive manoeuvre one can offer. In a spirometric test Neri et al chronic obstructive pulmonary disease (COPD) was observed to be affected five folds or greater in smoker irrespective of age and gender than in non-smokers. Hyman and Ried carried out a survey to analyse the relationship between smoking and its effect on the relationship between COPD and periodontal inflammation. The results suggested that it is a co-factor in the association of these two diseases and the extent of pathological involvement depended on the amount of tobacco smoke patient was exposed to.[28,29]

Studies have also included renal diseases as a consequence of tobacco smoking. Chapman et al observed that patients suffering from proteinuria had a heavier smoking history than the patients without proteinuria. Ward et al stated that smoking at the time of onset of nephritis is an independent risk factor for accelerated progression to end stage renal disease. It has been observed that smoking causes damage to endothelial cells, interfere with the coagulation/fibrinolysis systems and regeneration of oxygen radicals, these factors might be the cause of the nexus between the two.[30,31]

Another pathology that might associate smoking and its side-effects on periodontium is osteoporosis, myriad of studies have documented that smoking increases incidence of bone fractures. It has been associated with a variety of metabolic effects, several of which suggest plausible mechanisms for smoking-related changes in bone density, including altered level of calcitonin, androstenedione and serum steroid hormone. Cessation or reduction in smoking has been considered an important factor for primary and secondary prevention of osteoporosis and good prognosis following treatment.[32,33]

All the mentioned systemic diseases have been observed to either exaggerate or cause periodontitis. Like diabetics have been observed to have intensified response to bacterial attack by periodontopathic microorganism thus causing periodontal destruction. The association has been suggested to be through activated monocyte response observed in type 2 diabetes.[34] Pulmonary dysfunction is the other disease included in the list. Higher prevalence of periodontitis has been observed in COPD. A study have indicated that COPD increased prevalence of periodontitis up to six fold when measured to control group and up to threefold when compared to random Scandinavian population. A study even concluded that improved oral hygiene and frequent professional oral health care reduces the progression and even occurrence of respiratory diseases among high risk patients.[35,36]

End stage renal disease has been to observe to cause increased gingival inflammation and increased plaque and calculus formation. Yoshikara et al ordained a study to analyse the impact of renal function and periodontal disease in Japanese elderly. The study concluded that there was a significant association between clinical attachment loss and renal impairment which was independent of gender, oral hygiene habits and previous dental profile.[37,38]

Smoking and Host Immunity

Bacteria causing periodontal breakdown release a number virulence factors thus resulting in activation of host response. The release of these virulence factors in

the body causes tissue destruction.[39] Further smoking suppresses both the innate and immune host responses. Hemorrhagic response of the periodontal tissue has also been observed to decrease in smokers. Though studies state that smokers have increased number of neutrophils, the first line of defence against bacterial infection but smokers have decreased activity of neutrophils including chemotaxis, phagocytosis, adherence and its capacity to produce cytokines. Evidence even adumbrate that smoking influences lymphocyte count and production of antibody. It increases the level of CD3+ and CD4+ cells in a dose-dependent manner. Immunoglobulins particularly IgG2 which has been observed to be an important antibody against gram negative periodontal pathogens and these have been shown to be dwindled in smokers when compared to non-smokers.[40] Tobacco smoke exposure to unstimulated neutrophils elevates the oxidative burst causing tissue destruction by a direct toxic effect.[41] Smoking also affects a number of biomarkers which have observed to affect periodontal tissues, for example smokers have reduced levels of prostaglandin (PG) E2, lactoferrin, albumin, aspartate aminotransferase, lactate dehydrogenase and alkaline phosphatise.[39]

Smoking has a detrimental effect on cytokines as well, as it significantly reduces concentration of interleukin (IL)-1, IL-1β and IL-1ra in gingival crevicular fluid. Serum IL-1β in patients with untreated aggressive periodontitis showed a positive correlation with smoking. Smokers have lower amounts of IL-4 in GCF in patients suffering from early onset periodontitis and even in patients with healthy periodontium. The amounts of IL-10 in GCF has been observed to be low in smokers than in non-smokers whereas levels of IL-6 and IL-8 increase with smoking.[42,43] Cigarette smoke exposure may lead to decreased release of IL-6, decrease in production and release of IL-1 and increase in tumor necrosis factor-α (TNF-α) levels when compared between smokers and non-smokers.[41,44] IL-1, IL-6 and TNF-α cause stimulation of the expression of the receptor activator of nuclear factor-κβ ligand (RANKL) and inhibitor protein osteoprotegerin (OPG). These two are essential for bone resorption and remodelling. It has been observed that smoking leads to reduction in OPG concentration even disturbing the RANKL/OPG ratio; smokers have increased RANKL/OPG ratio. As earlier observed level of PGE 2 and alkaline phosphatase is also affected by smoking, this might also be reason for increased periodontal bone destruction.[45]

Smoking and Periodontal Therapy

Tobacco use has a major influence on periodontal therapy. A reduction in clinical benefits in smokers following non-surgical periodontal therapy has been a consistent finding across many studies. The suggested mechanisms for this finding include inflammatory, immunological, microbiological and wound-healing phenomena.

Preber and Bergstrom reported that smokers did not respond as much as non-smokers to non-surgical therapy.[46] Ah et al. and Kaldahl et al., who reported less probing depth reduction and attachment gain in smokers who had been treated by periodontal surgery, corroborated this finding that smokers were poor candidates for successful periodontal care.[47] Kamma and Baehni reported that smoking was found to have significant predictive value of future attachment loss in a five-year follow up of 25 young adults diagnosed with early-onset periodontitis who had been receiving regular periodontal maintenance care.[48] Mc Guire and Nunn found twice the risk of tooth loss in smokers undergoing maintenance periodontal care over a five-year period.[49]

It also been noted that the effect of smoking on implant survival appeared to be more pronounced in areas of loose trabecular bone. Type II diabetes mellitus may have an adverse effect on implant survival rates which again as mentioned above is linked to both smoking and periodontal destruction. A history of treated periodontitis does not appear to adversely affect implant survival rates but it may have a negative influence on implant success rates, particularly over longer periods.[50]

Few studies have been carried out to find the use of alternative therapies in smokers, for example, in one of the novel therapeutic approach, there was enhanced connective tissue breakdown which was due to inhibition of metalloproteinase activity as demonstrated for tetracyclines.[51] Well-evaluated markers of collagen turnover, such as the pyridinoline cross-linked carboxyterminal telopeptide of type I collagen (ICTP), have been used to investigate alterations in bone breakdown and bone turnover. ICTP was reduced in patients with periodontitis following administration of low-dose doxycycline and with no effect on non-treated subjects.[52]

Smoking Cessation and Periodontitis

Literature suggests smoking is linked to tooth loss, but there is little information on the effect of smoking cessation on tooth loss risk.

Analysis of Veterans Administration Dental Longitudinal Study (DLS) participants found that the rate of tooth loss among men who quit smoking was about 50% lower than the rate among current smokers but still significantly higher than the rate among non-smokers.[53] However, that analysis did not address how risk might change with increasing length of abstinence. In a 12-year follow-up study of 1031 Swedish women, prospective rates of tooth

loss were similar in never smokers and former smokers who had abstained from smoking an average of 10 years before entering the study.[54] These findings are consistent with the arrested progression of periodontal bone loss and attachment loss observed when individuals quit smoking.[55]

The results of few studies suggest that tooth loss risk does decline after smoking cessation but the risk remains elevated in relation to non-smokers for at least 9-10 years. The reason is the loss of alveolar bone which is not reversible, so one might expect the cumulative damage to the bone tissue by cigarettes to be permanent. Removing exposure to smoke reduces the likelihood that disease will become widespread and affect more number of teeth. It is assumed that as time elapses, these other risk factors become more important and begins to obscure the differences due to smoking history. Finally, there are other lifestyle changes which may occur when an individual decides to quit smoking and may become more established as the duration of abstinence increases. Smokers who quit appear to be more health conscious than those who continue to smoke, and they make physician visits and use health screening programs at rates comparable to those of non-smokers.[56]

CONCLUSION

It can be concluded from the literature written above that smoking is the most important risk factor. It increases the risk of periodontitis irrespective of the genotype. This risk is further aggravated in subjects bearing particular alleles of the polymorphically expressed genes studied. While the precise mechanisms whereby cigarette smoking can exert an effect on periodontal tissues are not completely understood, it is clear that it is still the most significant preventable risk factor for periodontitis. Its effects are related to the duration and number of cigarettes consumed.

ACKNOWLEDGEMENT

The authors would like to thank Mrs. Parul Jain.

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How to cite this article: Hansa Jain, Sanjyot Mulay. "Detrimental Effects of Smoking on Periodontium in Health and Disease". Int J Sci Stud. 2014;2(3):76-81.

Source of Support: Nil, **Conflict of Interest:** None declared.

Review Article

Review on Anti-nicotine Vaccine - The Smoker's Angel

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Abstract

Tobacco is the leading preventable cause of death in the world, estimated to cause nearly six million deaths a year. Addiction statistics indicates a shocking 1.2 billion smokers worldwide. Tobacco contributes to five million deaths every year. There are various nicotine replacements and non-nicotine replacement therapies (Medications). However overcoming nicotine-dependence is difficult and takes commitment, support and time. The development of a nicotine conjugate vaccine suggests that immunization may hold promise as a future therapeutic and preventive strategy for tobacco smoking. Using gene therapy, researchers were able to create a genetically-modified harmless virus which produces nicotine antibodies. After infecting the liver of mice with this virus, the nicotine antibodies were produced and were released into the blood-stream. The nicotine-antibody combo, which is constantly pumped out by the liver cells, get removed from the blood, then metabolized by the body and excreted. The design of the vaccine as a treatment for drug abuse and dependence is aimed at breaking the cycle of nicotine addiction and relapse. Allowing parents to immunize their children against smoking could be an infringement of children's right to an open future and is not ethically problematic.

Keywords: Anti-nicotine vaccine, Nicotine addiction, Nicotine-replacement therapy, Smoking cessation

INTRODUCTION

The World Health Organization estimates that there are 1.2 billion smokers worldwide[1] and five million tobacco related deaths annually by cardiovascular, respiratory and malignant diseases, accounting for ten percent of global mortality.[2] Much is known about the contents, mechanism of addiction, side effects of smoking nicotine. Tobacco dependence, being a chronic disease, necessitates effective long term treatment for both economy and public health. Besides conventional counseling and other medicinal therapy have low efficacy and high relapse rate.[3,4] Nicotine conjugated vaccines are a novel,immunologic approach in smoking cessation currently in pipeline,[5] (Figure 1, Tables 1 and 2).

MATERIALS AND METHODS

The electronic database chosen for developing this review was PubMed database. Following keywords were used for searching relevant papers: Anti-nicotine vaccine, nicotine replacements. Papers were selected if the combination of words appeared anywhere in the paper, were published over the time period of 25 years (1987-2012) and were written in English. The reference list of each paper was reviewed and any paper appearing in the reference list was added to the list of papers to be manually reviewed. A total of 57 papers were retrieved from the PubMed database, out of which only 24 papers were chosen which presented substantial information about anti-nicotine vaccine. The remaining papers listed in the reference list of this paper are regarding the various other nicotine replacements.

The main aim of this paper is to review the literature for various studies done on anti-nicotine vaccine as a replacement of nicotine addiction.

VACCINE DEVELOPMENT: RATIONALE & PRACTICAL ASPECTS

Working Mechanism of a Nicotine Vaccine

Nicotine itself is a small molecule that easily crosses the blood–brain barrier in less than one minute upon inhalation but does not induce an immune response from the body. Thus, nicotine must be chemically linked or conjugated to a carrier protein to elicit an immune response that forms anti-nicotine antibodies. Upon inhalation, nicotine from cigarette smoke is reversibly bound to these circulating antibodies, ensuing an immune complex that is too large to cross the blood–brain barrier. This reversible binding with nicotinic receptors causes a decreased release of dopamine and prevents activation of the reward pathway.[6] The term 'vaccination' (synonym: active immunization) refers to the administration of an immunogenic substrate that causes T and B cell activation, which leads to the formation of specific antibodies within the studied individual. By virtue of imprinting this response to the immunological memory, this approach yields longer lasting protection. However, therapeutic antibody levels are only established several weeks after the first vaccine injection. Passive immunization, in which preformed monoclonal or polyclonal high-affinity antibodies are injected in the body, offers immediate protection.

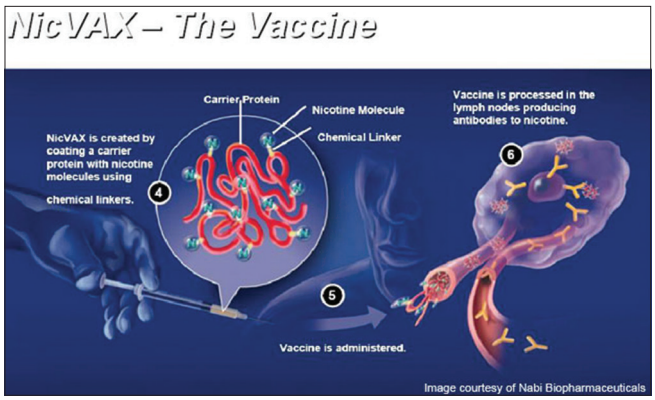

Figure 1: Working mechanism of anti-nicotine vaccine

IMMUNOLOGICAL METHODS

Active Versus Passive Immunization

Immunization against nicotine can be achieved by two methods. Active immunization (hereafter referred to as vaccination) involves repeated administration of an immunogen to the subjects being studied in order to stimulate the immune system to produce nicotine-specific antibodies. Passive immunization involves the production of antibodies in some other species (e.g., rabbits) or in vitro, which are then purified and administered to the subjects being studied.[7]

Table 1: Types of immunity

Active immunity	Passive immunity
1. Antigens are administered	1. Preformed antibodies are administered
2. Irreversible (with booster dose)	2. Reversible
3. Relatively inexpensive	3. Relatively expensive
4. Delay achieving antibody level in serum	4. Antibodies immediately enters serum
5. Booster dose needed after long interval	5. Frequent injections

VACCINES UNDER TRIAL

Table 2: Vaccines currently under trial[8-11]

Vaccine	Conjugate protein	Stage of trial
NicVAX	Pseudomonas aeruginosa Exoprotein-A	Phase III
CYT002-NicQb	Virus like particle Qb (host escherichia coli)	Phase II
TA-NIC	Inactivated cholera toxin	Phase II

STUDIES IN HUMANS

Immunogenicity

The results of phase I and II clinical trials have been reported for three nicotine vaccines: NicVAX, NicQb, and TA-NIC. The vaccination schedule in these clinical trials consisted of two to six doses of vaccine at an interval of two to four weeks, and a later booster dose was administered in two trials. As in animal studies, serum antibody levels were low after the first dose and increased significantly after each subsequent dose. Marked variability in antibody levels between subjects was observed. Antibody levels decreased by 50% over six to eight weeks after the last vaccine injection of the initial immunization period but increased again when a booster dose was administered. Thus, periodic booster doses would be needed to maintain antibody levels above some minimally acceptable value.[12]

CLINICAL ISSUES

Advantages of Immunologic Approaches

As discussed above, immunologic approaches to treating tobacco dependence have three key advantages. First, immunization appears to be safe because of its low cross-reactivity with compounds other than nicotine. Second, immunization only requires a brief series of monthly injections to produce effects that can endure for months.

The lack of major side effects and relatively minimal dosing requirements could be associated with improved patient compliance.[6] Third, its unique mechanism of action makes it well suited for combination with other pharmacotherapies. Despite best efforts to improve on immunologic methods in their own right, combining immunization with other medications may be necessary to maximize efficacy.[12]

Potential Concerns

The lack of control over antibody levels and large variability between subjects is the primary limitation of vaccination and achieving the highest antibody levels possible will be essential to maximizing the efficacy of vaccination. In addition, the slow development of antibody levels and onset of effect could discourage tobacco users who are eager to quit from trying vaccination, as treatment would need to be initiated months before the quit attempt. Passive immunization with a high affinity antibody could be combined with vaccination to provide any desired antibody level and an immediate onset of effect. However, passive immunization is much more expensive and requires more frequent dosing, and potential side effects could occur (e.g., allergic reactions). To the extent that nicotine plays a role in the adverse effects of maternal smoking on fetal outcomes, immunization against nicotine could play a role in protecting the fetus from some of these adverse effects.[12] Studies are needed to assess the safety of immunizing pregnant smokers and the efficacy of immunization in reducing fetal exposure to nicotine. Animal studies have shown that immunization reduces nicotine distribution to maternal brain in pregnant female rats to a similar extent as in male rats.[13,14] In addition, immunization reduces nicotine distribution to fetal brain by up to 63% after a single nicotine dose. Although nicotine distribution to whole fetus is not reduced, immunization reduces the concentration of unbound nicotine in fetal serum. There is concern that compensatory increase in smoking could occur to surmount the effects of immunization, possibly leading to increase in exposure to other harmful constituents in tobacco. However, there has been no evidence of compensation in either animals self-administering nicotine or smoking in humans. It is also possible that immunization could precipitate withdrawal. Although this has not been examined in animal models of nicotine withdrawal, one clinical trial found no evidence of vaccination precipitating withdrawal.[15]

CONCLUSION

Immunization against nicotine can extensively attenuate several behavioral effects of nicotine in animals which is considered relevant to tobacco dependence in humans. These findings suggest that immunologic interventions can be used in the treatment of tobacco dependence. Initial clinical trials have demonstrated that nicotine vaccines are safe and produce substantial serum levels of nicotine-specific antibody in humans. Although preliminary data from these small trials suggest that vaccination may facilitate abstinence from tobacco use,[1] more advance trials are needed to validate this finding. Taken together, the research to date suggests that immunological interventions could play an important role in future treatments for tobacco dependence.[16] The primary role of such interventions will likely be in preventing relapse in smokers who are motivated to quit. By preventing a lapse from producing positive subjective and reinforcing effects, vaccination might prevent progression to full relapse. Another potential role for immunologic interventions is in facilitating reduction of tobacco use in people who are unwilling or unable to quit. It is generally accepted that the most effective approach to treating tobacco dependence is concurrent use of medications and behavioral therapy. Despite the significant therapeutic potential of immunological interventions, they do not target the non-pharmacological factors that maintain tobacco dependence and will likely be maximally effective when combined with behavioral interventions that motivate abstinence from tobacco use.[12]

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How to cite this article: Lovekesh, Valsa Thomas, C Tinky Bose, R Asish. "Review on Anti-nicotine Vaccine - The Smoker's Angel". Int J Sci Stud. 2014;2(3):82-85.

Source of Support: Nil, **Conflict of Interest:** None declared.

Review Article

Reversal of Residual Soft-Tissue Anesthesia: A Review

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Abstract

Phentolamine mesylate, a nonselective α-adrenergic blocking drug, is the first therapeutic agent marketed for the reversal of soft-tissue anesthesia and the associated functional deficits resulting from an intraoral submucosal injection of a local anaesthetic containing a vasoconstrictor. In clinical trials, phentolamine injected in doses of 0.2 to 0.8 mg (0.5 to 2 cartridges), as determined by patients' age and volume of local anaesthetic administered, significantly hastened the return of normal soft-tissue sensation in adults and children 6 years of age and above, median lip recovery time reduced by 75 to 85 minutes, functional deficits, such as drooling and difficulty in drinking, smiling, or talking — and subjects' perception of altered function or appearance consistently resolved by the time sensation to touch returned to normal.

Keywords: Phentolamine mesylate, Reverse, Residual anesthesia

INTRODUCTION

Phentolamine is an old drug. It was first approved by the United States Food and Drug Administration (FDA) in 1952 under the trade name of Regitine and is currently indicated for the diagnosis and treatment of severe hypertension in patients with pheochromocytoma, a rare tumour of the adrenal medulla that secretes excessive epinephrine and/or norepinephrine, and the prevention or treatment of dermal necrosis following the intravenous administration or extravasation of norepinephrine. Phentolamine is a nonselective α-adrenergic receptor antagonist that competitively inhibits the ability of sympathomimetic amines like norepinephrine and epinephrine to cause vascular contraction. An injectable form of phentolamine mesylate has been developed to terminate the numbing action of local anesthesia when it is no longer desirable. The product contains 0.4 mg of phentolamine mesylate (0.235 mg/ml) packaged in a 1.7 ml dental cartridge (Table 1). On 12 May 2008, the United States Food & Drug Administration (FDA) granted approval of phentolamine mesylate for use in dentistry. It is marketed under the proprietary name of OraVerse™. It is available in 1.7 ml cartridges containing 0.4 mg phentolamine mesylate. It is not recommended for use in children less than 6 years of age or weighing less than 15 kg due to lack of clinical trials.[1]

Like other competitive antagonists, phentolamine shares a structural similarity (Figure 1) with the agonist epinephrine but includes bulky side chains that are presumed to permit receptor binding yet prevent receptor activation.[2]

The idea of using phentolamine as a local anesthesia "reversal" agent began when Dr. Eckard Weber, an inventor, specialist in creating companies pursuing innovative drug therapies, and a former professor of pharmacology at the University of California, visited a dentist and wondered why patients were constrained to remain numb for hours after each dental appointment. Although the notion of using phentolamine after local anesthesia to hasten the return of normal sensation had been contemplated at least twice previously, Weber was the first to take action. In 2000 he co-founded Novalar Pharmaceuticals with the expressed purpose of developing phentolamine for dental use.

Table 1: Dosing information of OraVerse™

Amount of local Anaesthetic administered	Dose of OraVerse™ (mg)	Dose of OraVerse™ (Cartridge (s))
½ Cartridge	0.2	1/2
1 Cartridge	0.4	1
2 Cartridge	0.8	2

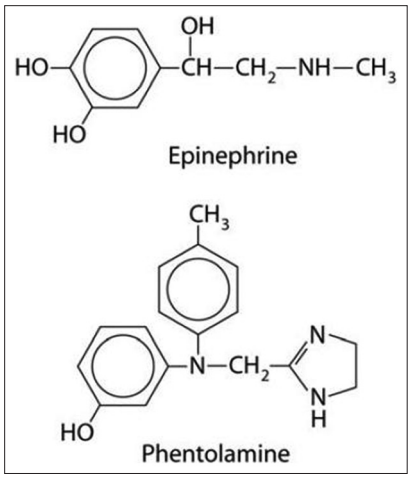

Figure 1: Structure of epinephrine and phentolamine[2]

MECHANISM OF ACTION

Phentolamine mesylate acts as a competitive inhibitor, blocking the effects of epinephrine, an active ingredient in some local anesthetics that causes vasoconstriction. Phentolamine blocks α-adrenergic receptors, causing smooth muscle relaxation. This relaxation will lead to greater blood flow, resulting in a more rapid systemic absorption of the local anesthetic. Thus, phentolamine mesylate is not an antagonist of the local anesthetic itself, but of the epinephrine added to prolong the effect of the local anesthetic. Therefore, phentolamine mesylate has not been tested for efficacy following use of local anesthetic without added vasoconstrictors.

The delivery method of phentolamine mesylate is similar to that of local anesthesia; it comes in a cartridge like that of regular local anesthetics. Each cartridge of 1.7ml Oraverse™ contains 0.4 mg of phentolamine mesylate. The amount of phentolamine mesylate delivered equals the amount of vasoconstrictor containing local anesthesia delivered during the appointment. In addition, the location for the delivery is the same as that used for the original local anesthesia. For example, delivery of three-fourths of a cartridge of lidocaine as an inferior alveolar block injection would require three-fourths of a cartridge of phentolamine mesylate to be delivered at the same inferior alveolar block injection site. The main challenge to the clinician using phentolamine mesylate is the timing of the injection. Since there is a delayed onset, the clinician needs to plan ahead to ensure that the client will regain sensation of soft tissue by the end of the dental appointment. Unlike local anesthesia, there are no known contraindications for phentolamine mesylate delivery.[3]

CLINICAL TRIALS

A phase 2 multicenter clinical trial, examined the reversal effect of phentolamine administered at the end of dental procedures in which local anesthesia was required intraoperatively but not postoperatively for pain relief. In addition to Lidocaine with epinephrine, vasoconstrictor containing formulations of articaine, mepivacaine, and prilocaine were tested. If a second cartridge of local anaesthetic was required to achieve adequate pain control, two doses of phentolamine (or placebo) were used as well. Table 2 displays the principal efficacy findings of this study with regard to lip sensation. This study demonstrated that phentolamine was effective in reversing soft-tissue anaesthesia caused by all tested local anaesthetic with vasoconstrictor formulations.[4]

Figure 2 illustrates the influence of phentolamine versus sham injection on recovery of lower lip sensation after mandibular injection of the same local anaesthetic formulations used in phase 2. Similar efficacies were observed for reversal of tongue anesthesia and, after maxillary injections tested in a separate phase 3 study, in the upper lip.[5]

A companion phase 2 trial extended the soft-tissue findings in children down to age 6. As shown in Figure 3, the reversal of lip anesthesia (in this case only Lidocaine with epinephrine was used) was more marked in the mandible than in adults, whereas the effect in the maxilla was less (not shown), yielding a combined median reduction of 75 minutes.[6]

Safety measures in all of these studies included the recording of vital signs at regular intervals, periodic assessments of pain at the injection and operative sites, the need for analgesic medications, visual assessments of the oral cavity, and reports of adverse events. No serious or severe adverse effects were noted during any of the studies nor were there any significant differences in vital signs, pain, or adverse events between phentolamine and sham-treated subjects.

Pharmacokinetic studies in adults and children support a low adverse potential of phentolamine used for reversal of local anesthesia.[7,8]

In recommended doses, the peak plasma concentrations of phentolamine are estimated to be about 100 times lower than those achieved in adults with medical doses of the drug infused intravenously. This difference explains the relative lack of cardiovascular effects with submucosal phentolamine.[9]

Table 2: Median times and treatment differences are in minutes (and percent difference)[4]

Location	Anaesthetic	Phentolamine		Placebo		Treatment difference
		n	Median	n	Median	
MAXILLA	Lidocaine/ epinephrine	7	35.0	8	150.0	115.0
	Articaine/ epinephrine	8	92.5	7	185.0	92.5.0
	Prilocaine/ epinephrine	7	35.0	6	113.0	78.0
	Mepivacaine/ levonordefrin	9	55.0	9	152.0	97.0
	All anesthetics*	31	50.0	30	155.0	105.5
Mandible	Lidocaine/ epinephrine	8	67.5	7	130.0	62.5
	Articaine/ epinephrine	7	135.0	8	160.0	25.0
	Prilocaine/ epinephrine	6	55.0	7	135.0	80.0
	Mepivacaine/ levonordefrin	9	120.0	9	190.0	70.0
	All anesthetics*	30	101.0	31	150.0	49.0
Combined	Treatment group total*	61	70.0	61	155.0	85.0

CLINICAL RELEVANCE

According to Rafique and colleagues 86% of patients receiving local anesthesia for dentistry report moderate dislike of postoperative numbness, and 14% report high dislike. In addition to the physical discomfort, some patients withdraw from public life while affected, refrain from eating (often appropriately) and drinking, or accidentally injure themselves by biting their lip or tongue. As a consequence, they may delay dental care or even refuse local anesthesia altogether.[10]

The only patient concern not addressed by the clinical development program for phentolamine was the drug's potential for According to a survey by College et al. lip biting after inferior alveolar nerve block occurs at the following rates in children: Under 4 years, 18%; 4 to 7 years, 16%; 8 to 11 years, 13%; and over 12 years, 7%. It is likely, but not certain, that these rates would fall in concert with the phentolamine-induced decrease in postprocedural numbness. Because the FDA has not approved the use of phentolamine reversal for children below 6 years of age, and safety data only extend down to children 4 years of age and 15 kg in weight, a study of young children is a pressing need to extend the benefit of phentolamine reversal to this important age group.[11]

Another issue of clinical relevance is the use of a 1:1 cartridge-dosing ratio. The notion that the volume of phentolamine injected should equal the amount of local anaesthetic administered was originally based on the

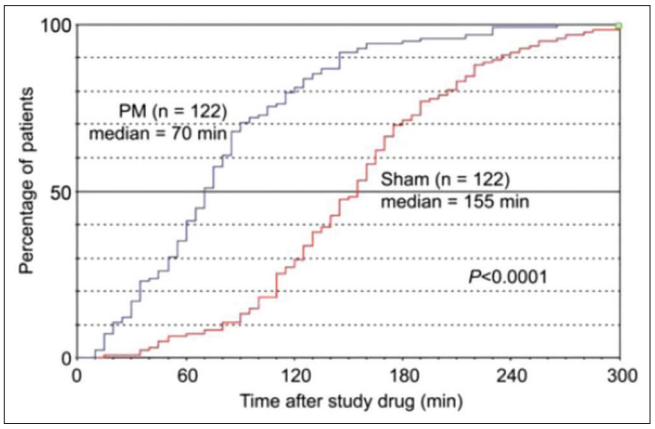

Figure 2: Percentage of adult and adolescent patients with normal lower lip sensation after phentolamine mesylate (PM) or sham injection[5]

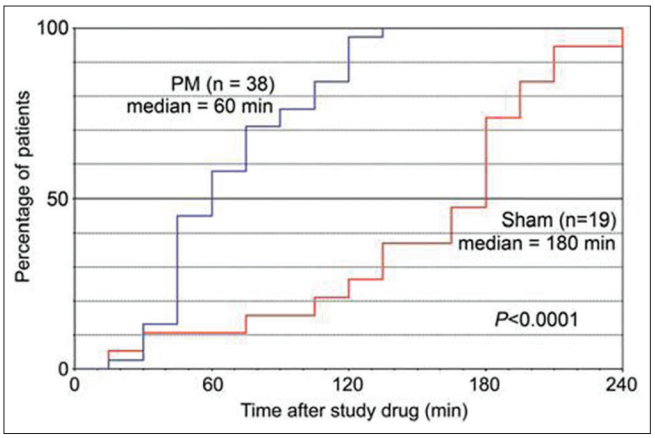

Figure 3: Percentage of children patients with normal lower lip sensation after phentolamine mesylate (PM) or sham injection[6]

assumption that phentolamine works by competitively blocking the injected vasoconstrictor. The actual mechanism probably derives more from the ability of phentolamine to block the actions of endogenously released norepinephrine and increase local blood flow.

This conclusion is based on (1) studies showing that submucosal epinephrine is absorbed quickly from oral tissues and would be mostly gone by the time phentolamine is injected, and (2) the pharmacokinetic indicating that phentolamine increases the systemic absorption of local anaesthetic remaining in tissues at the time of injection. If this mechanism is correct, there should be no need to give more than one dose of phentolamine per local anaesthetic injection site regardless of the number of local anaesthetic cartridges used there. Following this strategy would reduce the amount of phentolamine used and allow more local anaesthetic injections to be reversed without exceeding the maximum recommended dose of two cartridges. The proposed mechanism suggests that local anaesthetics without added vasoconstrictors can also be effectively reversed by phentolamine.[12,13]

CONCLUSION

The majority of dental treatments today are not so traumatic in nature as to require a patient to leave the dental surgery with residual soft-tissue anesthesia that commonly persists for many hours while gradually resolving. These include conservative dental restorations, crowns and periodontal maintenance procedures, such as scaling and root planing. In addition, paediatric patients, whether in the general dentistry or paediatric dentistry office, will benefit from the diminished soft-tissue duration associated with phentolamine mesylate administration. Patients with medical conditions requiring strict adherence to eating regimens, such as diabetics, will also benefit from the reversal of anesthesia.[14]

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How to cite this article: Goswami A, Bora A, Kundu GK, Ghosh S. "Reversal of Residual Soft-Tissue Anesthesia: A Review". Int J Sci Stud. 2014;2(3):86-89.

Source of Support: Nil, **Conflict of Interest:** None.

Case Report

Non-Odontogenic Toothache – A Clinical Dilemma

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Abstract

Toothache is a common complaint in the dental clinic. Generally toothaches have their origin in the pulpal tissues or periodontal structures. These cases of odontogenic pain are managed well and predictably by dental therapies. Nonodontogenic toothache is often difficult to identify and can challenge the diagnostic ability of the clinician. This case report highlights the importance of correct diagnosis and treatment planning.

Keywords: Diagnostic aids, Non odontogenic toothache, Orofacial pain, Trigeminal neuralgia

INTRODUCTION

Oral cavity is a reflection of our body. Diagnosis may be a grey area, even for the most experienced clinician. Pain in orofacial region is both complex and distressing, frequently overlapping various surgical and medical disciplines.[1] The diagnosis of oral pain is a constant challenge to dental practioner. However, diagnostic procedures are often limited to identifying a suspect tooth rather than considering a non-odontogenic source of pain. Toothache of nonodontogenic origin is not true dental pathology, rather it is the pain referred into the dentition from distant location.[2] A misdiagnosis will lead to unnecessary treatment for the patient and may also exacerbate the symptoms for which the patient sought treatment.[3]

Hence, this case report emphasizes on a multidisplinary approach, which highlights the importance of correct diagnosis and treatment planning.

CASE REPORT

A 35 year old man reported to the department of Conservative Dentistry and Endodontics, Dr. D.Y. Patil Dental College and Hospital, Pimpri with a chief complaint of pain in upper front region of the jaw since 2 yrs. On examination no obvious abnormality was detected in the anterior region. The pain was localized with respect to upper right lateral incisor. Dull continuous pain with exacerbation of sharp, shooting pain, lasting for few seconds. The patient gave a history of trauma in upper front region 2 yrs back. Medical history was non-contributory. Past dental history revealed root canal treatment and surgery in upper front region. He also gave a history of implant placement in lower right and left back region 2 years ago.

On Clinical examination, three unit ceramic bridge on 11, 21 and 22 was present. 12 was sensitive to percussion and palpation, periodontal probing depth ranged from 2-4 mm. Carious lesions with respect to 23, 38 and 47 were noted. Prosthesis with 36 and 46 was seen. Missing teeth were 17, 16, 15 and 21.

Various investigations were carried out - transillumination of 12 revealed enamel crack in incisal 1/3rd. pulp vitality test was performed with 13, 12, 11, 21, 22, and 23. all the examined tooth responded to thermal (cold) test and electric pulp test. With respect to 12 the vitality with cold thermal test revealed hyper response. Intraoral periapical radiograph with 12 showed widening of lamina dura (Figure 1). Orthopantomograph (Figure 2) revealed endodontic treatment with 11, 22, 25, 26, 27 and 37. Deep proximal radiolucent area was seen in 38 and 47. Implants in 36 and 46 were noted. Bridge in 11, 21, 22 region as well crowns with respect to 25, 26, 27 and 37 were seen. Provisional diagnosis was chronic irreversible pulpitis with 12.

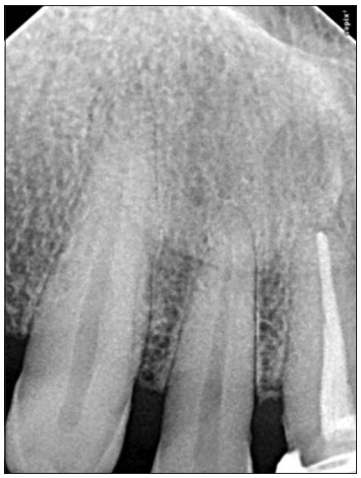

Figure 1: Peroperative IOPA with 12

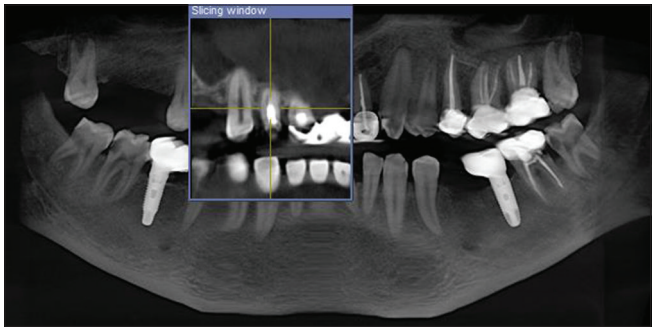

Figure 2: Orthopantomograph

Based on the clinical and radiographic findings treatment plan was drawn and carried out as follows:

- Anti-inflammatory and analgesic medication Tab Enzoflam TDS for 3 days.
- In the next visit after five days considering that right lateral was very sensitive to percussion and palpation root canal treatment was initiated with 12 and intacanal medication of calcium hydroxide with iodoform was given (Figure 3). Obturation was completed after 3 weeks (Figure 4).
- All the carious teeth were restored.
- Advanced investigation CBCT was adviced, but did not lead to any concrete/definitive diagnosis (Figure 5a-c).

However the pain was still not alleviated and the patient appeared to be in great stress and desperate to seek any relief from pain. The patient was examined further to determine if the pain was of non odontogenic in orgin.

Going back to the history of pain, initially the patient could not describe the pain but on asking lead questions and probing he stated "the pain was severe and occurred several times a day and lasted for few minutes". Palpation of periapical area near the lateral provoked severe pain which was described by the patient as electric shock like

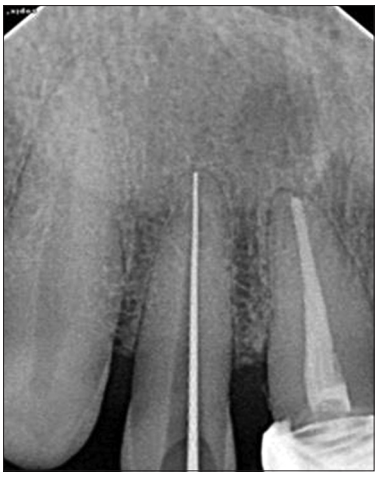

Figure 3: Working length of 12

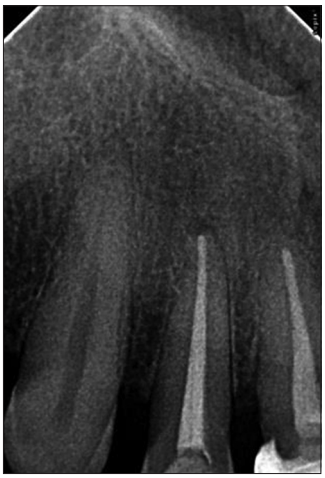

Figure 4: Obturation of 12

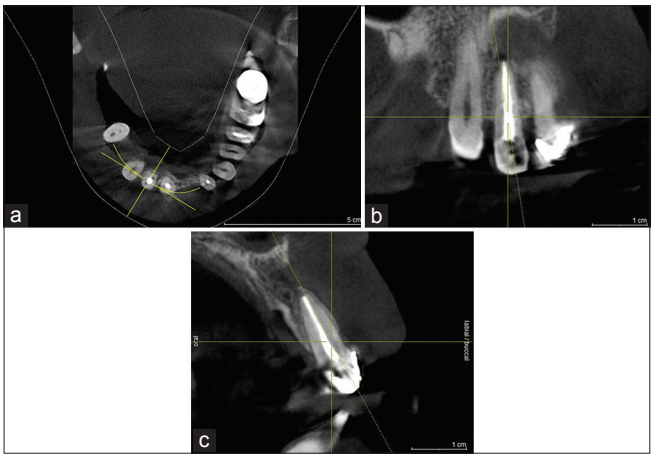

Figure 5: CBCT

pain radiating to the side of the nose near the ala region. The patient was further questioned as to whether the pain could be caused by any other means. He stated " sometimes whenever he strecthed or rubbed his upper lip with his fingers, especially during brushing, chewing or talking pain

occurred". Based on these findings, he was then reffered to OMDR dept. at Dr. D.Y.Patil College, for consultation regarding non-odontogenic pain. Diagnosis of trigeminal nueralgia was confirmed. The patient was then given tab Tegretol 500 mg in divided doses and he has been partly relieved of acute symptoms for more than 2 months. The patient has been maintained on this regimen, with the pain at a reduced level but not total, pain relief yet.

DISCUSSION

Tooth ache is the most common pain entity occurring in facial region. All pain entities presenting as tooth ache may not be of odontogenic origin. Pain in the orofacial region is a common affliction, affecting between 10-50% of the population. It is the primary responsibility of a dental practitioner to diagnose pathologic entities associated with oral cavity.[1] While much of endodontic diagnosis can be based on standard diagnostic procedures, an essential component of the diagnostic process is dependent on the patient's history of pain and the description or reaction to diagnostic tests. The patient's medical history, dental history, and psychological state may contribute to the diagnosis. Using various diagnostic aids like thermal testing, percussion, palpation, occlusal sensitivity, electric pulp testing, and radiographs the clinician can frequently isolate the origin of the patient's pain and arrive at a diagnosis. Pain must be considered in terms of quality, duration, temporal pattern, exacerbation, and relief. These characteristics and the perceived origin of the pain may be pathognomonic for specific sites. When patients present with diffuse pain and/or pain radiating to other areas, nonodontogenic sources should be given additional consideration.

Although the overwhelming majority of dental pain is odontogenic in origin, a significant percentage is non-odontogenic.[2] If pain were purely a sensory phenomenon, diagnosis would be fairly straight forward. However, pain has both sensory and emotional components. This complex nature of pain may make it difficult for patients to adequately describe the essential components for diagnosis (e.g. intensity, location, duration). An additional source of confusion is the fact that a practitioner must interpret and co-relate the patient's reaction to diagnostic tests and his/her description of the pain.

When a patient presents to an endodontist, usually the pain is of odontogenic origin. Diagnostic procedures may therefore be limited to identifying a suspect tooth rather than a nonodontogenic source of pain.[3] This case illustrates the complex task of the clinician in determining which factors are important to consider at each stage of the progression of a pain disorder.[4]

In this present case patient's pain condition seemed to be resistant to conservative dental treatment. The symptoms were quite severe which influenced the patient to consent to treatment, though the clinical findings were inconclusive and definitive diagnosis could not be made. Hence, the patient was referred to department of oral diagnosis, wherein the pain was suspected to be of non–odontogenic origin. Temporary Pain relief after therapy with carbamazepine for 3 months. Hence a definitive diagnosis of chronic orofacial pain was made.

"Chronic facial pain" is a more descriptive term than "atypical facial pain" and should be adopted for continuous, dull pain in the face, of greater than 6 months duration, with intermittent severe episodes. (International Association for the Study of Pain's).[5]

There remains an ill-defined and rare group of facial pain, which manifest themselves despite any discernible pathology. They are frequently termed as atypical, idiopathic or non-somatic. The disease can present in its atypical form due to the multitude of possible causes owing to anatomic complexity of the orofacial region. This was until at the end patient described pain to exposure to cold and touch, and the triggering of the attack by habitual oral activities (chewing, talking, tooth brushing). Only then diagnosis of trigeminal neuralgia was made. At the outset, the patient reported idiopathic onset and clinical characteristics with overlapping diagnostic possibilities (sharp pain episodes triggered by tooth stimulation; sharp pain episodes triggered by stimulation to the face), from which nociception sufficient to explain the complaint could be reasonably inferred.[4,6]

Trigeminal neuralgia is defined as "Severe, paroxysmal bursts of pain in one or more branches of the trigeminal nerve; often induced by touching trigger areas in or around the mouth".[7] The mandibular and maxillary divisions are most commonly involved.[5] Typically, the pain occurs as paroxysms of shocking, burning or lightning-like sharp stabs that last from a few seconds to a few minutes.[4,8] It occurs predominantly during middle and old age, and more frequently in women.[4,9] The pain can be provoked by sensory stimulations, such as touching and washing of the face, tooth brushing, shaving, chewing, talking, or by thermal change.[5] It usually is unilateral and remains in the anatomical distribution of the affected nerve regardless of intermission or remissions.[6]

Correct diagnosis and particularly early definitive diagnosis of neuropathic pain is crucial to avoid invasive and potentially more damaging forms of treatment. The overlap of symptom characteristics between some variants of neuropathic trigeminal pain and classic dental

Table 1: Differences between classic primary trigeminal neuralgia and atypical facial pain[11]

	Trigeminal neuralgia	Atypical facial pain
Location of pain	Along distribution of branches of the trigeminal nerve; unilateral	Usually will not follow automatic pathways; unilateral, less likely bilateral
Duration of pain	Brief : seconds, up to 1 to 2 minutes	Constant
Intensity of pain	Severe	Moderate to severe, may fluctuate
Sensory quality of pain	Sharp, stabbing, electric shock – like, lancinating, flashing, burning	Diffuse; burning, aching, dull
Affective quality of pain	Terrifying, blinding, torturing	Excruciating, vicious
Trigger	Non-painful physical stimulation of trigger points or trigger zones	Trigger very seldom present
Associated signs and symptoms	Signs: tic douloureux	Symptoms: allodynia, dysesthesia, paresthesia
Functional impairment	Considerable to extreme	Low
Response to treatment	Good	Limited
Treatment of choice	Carbamazepine	Tricyclic antidepressants
Sex distribution of patients	Women-men ~ 2:1 to 3:2	Predominantly women
Average age at (first) manifestation	Between 50 – 70 years	Around 40 years
Theories of causation	Impingement of trigeminal root; central nerval disease; vascular causation	Trauma: patho-psychology: vascular causation

disorders may be responsible for this confusion. Primary care physicians may also lack the training to establish a diagnosis of neuropathic trigeminal pain. More thorough examination of periodontal, alveolar, and gingival tissues for regions of allodynia, hyperpathia, and hyperalgesia will improve detection of less severe and more atypical cases of neuropathic trigeminal pain (Table 1).[10-12]

CONCLUSION

Severe pain may cause both the patient and the practitioner considerable distress that may complicate the diagnostic process and possibly lead to unnecessary and costly treatment. A multidisciplinary approach is therefore preferable and should be adopted for diagnostic and prognostic assessment.

ACKNOWLEDGEMENT

Authors would like to thank Dr. L. Beri, Prof. and Dr. R. Shetty, Prof & HOD for constant help and support; Dr. S. Gotecha,MS, McH Neurosurgery at D Y Patil Medical College for his guidance. Dr. Sarang gotecha, M.S., MCH Nuerosurgery at Dr. D.Y. Patil medical college for his constant support and guidance.

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How to cite this article: Khushbu Ajmera, Sanjyot Mulay. "Non-Odontogenic Toothache – A Clinical Dilemma". Int J Sci Stud. 2014;2(3):90-93.

Source of Support: Nil, **Conflict of Interest:** None.

Case Report

Single Coronary Artery from Single Sinus in Complete Transposition of Great Artery: An Exceptional Case

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Abstract

Complete Transposition of great arteries (D TGA) characterizes by Ventriculo-arterial discordance, along with AV concordance. In D-TGA, Aorta arises from morphologic right ventricle and Pulmonary artery arises from Left ventricle. In new born and infants this is a potentially lethal form of heart disease. The incidence of D-TGA is 1 in 2300 to 1 in approximately 5100 live birth. Ninety percent of d TGA are associated with dual sinus origin of coronaries, in this singular case,the baby had single sinus origin of coronary artery. In this exceptional study, a new born baby girl of 16 day age who could not maintain her oxygen saturation, found to have complete transposition of aorta, which was associated with single sinus origin of her coronary artery which indicates that both coronary arteries arise from one of the two but not both of the facing sinuses by a single ostium. Her left and right coronary and left circumflex artery arises from single coronary artery. She was taken for anatomic correction by arterial switch operation with re-implantation of coronary artery and she made excellent recovery. This case highlights that we have to be very careful to assess the coronaries thoroughly in all cases of d TGA as many cases of ischemia, infarct and LV failure have been documented in patients who were not treated appropriately with respect to coronary anatomy.

Keywords: Complete transposition of great arteries, Corrected transposition of great artery, D-TGA, Simple transposition

INTRODUCTION

Complete transposition or D-TGA is one the most fatal form of congenital cyanotic heart disease if remain untreated. Malformation consist of the origin of the Aorta from morphologic right ventricle and that of the pulmonary artery from the morphologic left ventricle.[1] Consequently, pulmonary and systemic circulation is connected in parallel rather than in series connection. In one circuit, the Systemic venous blood passes through the right atrium, right ventricle, and then to aorta. In the other, pulmonary venous blood passes through left atrium, left ventricle and to the pulmonary artery. This situation is incompatible with life unless mixing of the two circuits occurs.

The incidence of D-TGA is 1 in 2300 to 1 in approximately 5100 live birth.[2] The malformation represents 5-8 % of congenital cardiac malformations but accounts for 25 % of death from congenital heart disease in the first year of life.[3] Male outnumber females by a ratio of 4:1,[4] and seldom occurs in first born infants, but a twofold increase in incidence occur in mother who have had three or more pregnancy.

Associated congenital anomalies which are seen with D TGA are Patent foramen ovale, septum secundam atrial septal defect, ductus arteriouses, pulmonary stenosis, aortic arch anomalies such as hypoplasia, coarctation, interruption of aorta and aortic arch, or tricuspid and mitral valve abnormalities.

CASE REPORT

A baby girl of 16 day old,born through normal uncomplicated delivery, got admitted on 29 September 2013 with history of respiratory distress, chest infection

and bluish discoloration of lips, fingers and tongue since birth. Baby is third sibling of her parent. Baby was consulted by her parents with pediatrician during the past 15 day and was given antibiotics for the same.

Subsequently baby got admitted as there was no improvement in her respiratory distress and cyanosis.

On examination her heart rate was 142 per minute, oxygen saturation was 40%, blood pressure was 90/60 mmHg respiratory rate was 44/minute, her birth weight was 3.6 kg there was presence of central cyanosis, on CVS examination she had central cyanosis, with full volume bounding pulse. Precordial palpation was normal, loud palpable second heart sound at the left base is felt. Mid systolic murmur heard over aortic area, mid diastolic flow murmurs of mitral and tricuspid origin[5] were auscultated. Loud and single second heart sound of anterior place aorta was auscultated too.

Echocardiography reveals aorta arising from right ventricle, pulmonary artery arising from left ventricle with "sausage" appearance in short axis (Figures 1 and 2). The great arteries appear as double circles with aorta anterior and to the right of the main pulmonary artery. The anterior aortic root and posterior pulmonary trunk run parallel to each other and do not cross. There was small Patent ductus arteriouses which was about to close with left to right shunt and peak gradient of 13 mmHg.

There was single coronary artery arising from single sinus of left aortic sinus and gave rise to right coronary artery, left coronary artery and circumflex artery. Usually in more than 90% of DTGA, there is dual sinus origin of coronary artery (Figure 3).[6,7]

There was no evidence of associated other congenital anomaly.

Chest X ray showed narrow aortic knuckle, increased pulmonary vascularity, and fairly normal size cardiac silhouette.

MANAGEMENT

She was treated with oxygen supplementation 3 liter/hr, fluids and antibiotics, along with this baby was given Prostaglandin E1 to keep the duct patent so that baby could overcome the crises till she get her surgery done, subsequently she was taken for surgery. Although, Baloon atrial septostomy (BAS) was considered for the patient but in view of potential complications of BAS such as neurologic/embolic stroke[8,9] and poor exercise performance[10,11] after BAS in comparison to Arterial switch, the baby was taken for Arterial switch operation. Although there are reports of intra operative and post operative coronary artery kinking, ischaemia and lV dysfunction[12,13] but overall it gives the best possible result so the baby had undergone Arterial switch and made good recovery after the surgery and got discharged postoperatively (Figures 4-7).

DISCUSSION

Complete transposition of great arteries are one of the rare congenital heart disease of new born and in DTGA, chances of three coronary artery arising from single aortic sinus is less than 10%. To suspect complete transposition of great arteries in a new born, pediatric cardiologist or pediatrician should have vast knowledge to detect even minute details of the baby profile, gender, and clinical presentation. It should be aggressively confirmed with cardiac Doppler and Chest X-ray. The clinical recognition of D-TGA is based on following features (1) Male third or fourth child, (2) large birth weight (3) Cynosis in the neonatal period (4) Radiological feature of increased blood flow in presence of cyanosis and egg-shaped cardiac silhouette with a narrow vascular pedicle and absent thymic shadow (5) Echocardiographic identification of Aortic alignment with morphologic Right ventricle and Pulmonary alignment with morphologic left ventricle (Ventricular arterial discordance) and right atrial alignment with right ventricle and left atrium alignment with left ventricle (Atrioventricular concordance).

Some communication between the two circulations must exist after birth to sustain life; otherwise unoxygenated systemic venous blood is directed inappropriately to systemic circulation and oxygenated pulmonary venous blood is directed to the pulmonary circulation. Almost all patients have an interatrial communication such as Patentductusarteriouses, Ventricular septal defect or Atrial septa defect.

There could be various mode of coronary artery origin in DTGA, common amongst them are Dual sinus origin, in which left coronary artery arise from left aortic sinus which in turn give rise to left anterior descending artery and circumflex artery and right coronary from posterior aortic sinus. Dual sinus origin accounts for 90% of cases. Single sinus origin indicates that both coronary arteries arise from one of the two but not both of the facing sinuses by a single ostium or multiple ostia. In this exceptional study, there was single coronary artery from left aortic sinus which in turn gave rise to Left coronary, right coronary and circumflex arteries. The incidence of this among the DTGA is less than 10%.

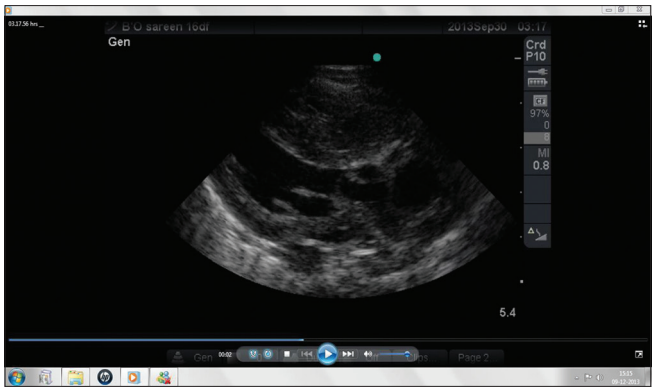

Figure 1: Echocardiography of transposition seen in long axis with great arteries side by side

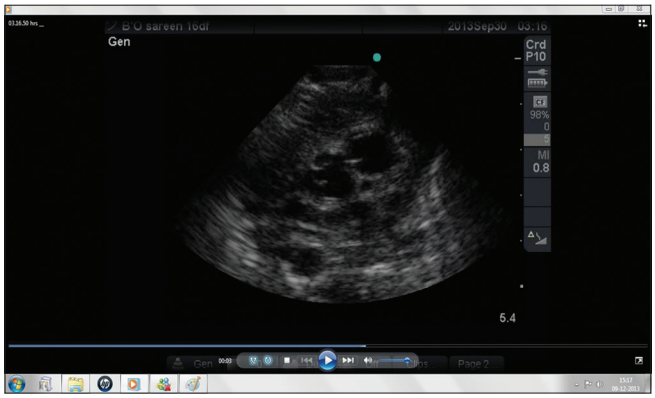

Figure 2: Echocardiography of great arteries in short axis view in DTGA with sausage appearance

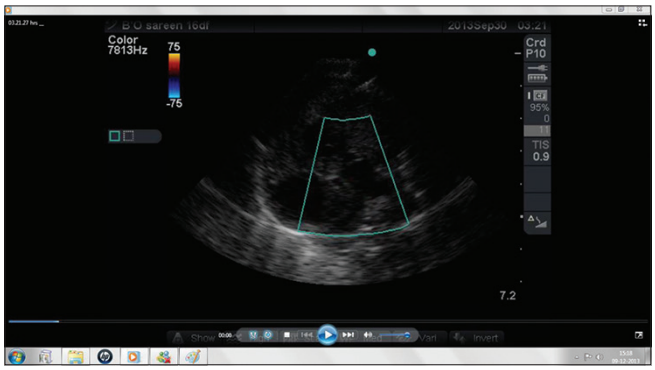

Figure 3: D-TGA in apical four chamber view with pulmonary artery arising from left ventricle and bifurcating into right and left pulmonary artery. Operative pictures of Arterial switch with single coronary artery and its branches {Left coronary artery-left main (LCA) , Right coronary artery (RCA) and left circumflex artery (Lcx)}

Management of D TGA could be done by Mustard and senning atrial switch procedures, but in view of increasing frequency of complications such as dysarrythmias, sudden cardiac death and right ventricular dysfunction has lead to go for anatomic correction with Arterial switch operation. Long term patency and growth of the coronary arteries are

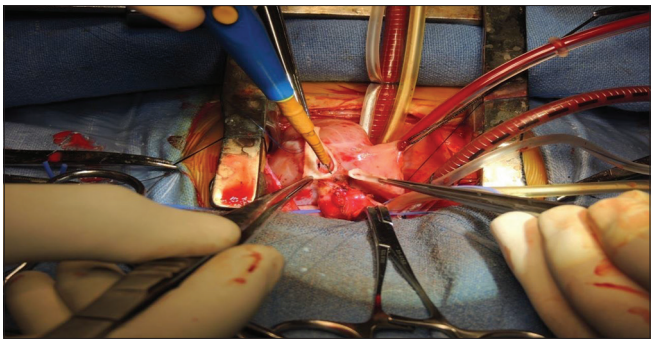

Figure 4: Transposition of great Artery (TGA)- great artery cut open

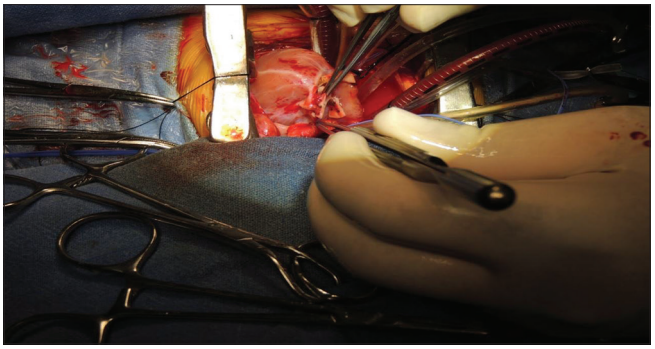

Figure 5: Single coronary artery arising from left aortic cusp with its branches- LCA, RCA, Lcx

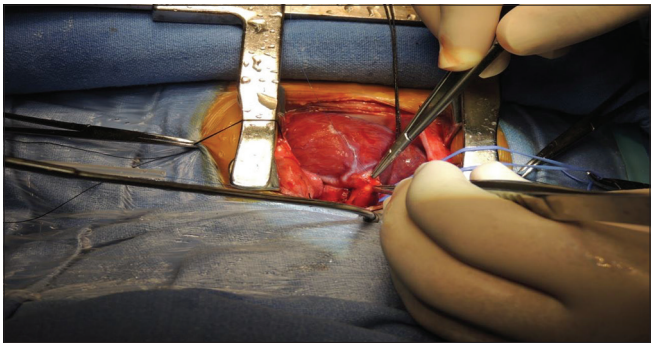

Figure 6: TGA with single coronary artery giving rise to LCA, RCA, Lcx

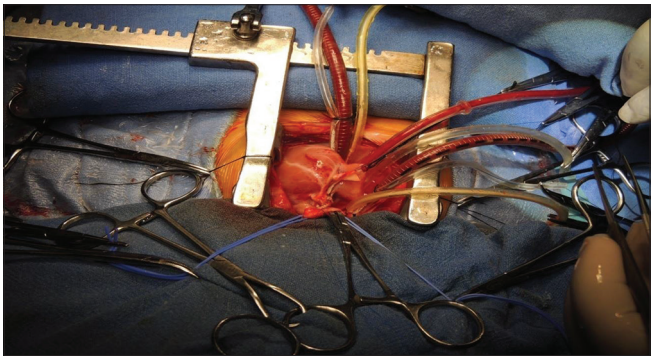

Figure 7: Post operative repair of TGA with coronary and its branches

crucial for the arterial switch operation to be considered the procedure of choice for the surgical management of TGA. Although intraoperative and post operative coronary artery kinking, occlusion can occur resulting in ischaemia and ventricular dysfunction.

CONCLUSION

Complete transposition of great arteries is one of the uncommon Cyanotic congenital heart diseases and single coronary sinus origin for all three coronary in DTGA is even exceptionally singular. Diagnosis of Complete transposition of great arteries should be suspected with the gender, para of pregnancy with its clinical presentation. It should be aggressively confirmed with echocardiography. Management has to be done aggressively with the idea to keep the shunt patent (Patent ductus arteriouses,Atrial septal defect or ventricular septal defect) with the help of Prostaglandin E1. Subsequently, whenever possible anatomical correction should be done with Arterial switch.

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How to cite this article: Sudeep Pathak, Rajeev Gupta, Altaf Masood. "Single Coronary Artery from Single Sinus in Complete Transposition of Great Artery: An Exceptional Case". Int J Sci Stud. 2014;2(3):94-97.

Source of Support: Nil, **Conflict of Interest:** None declared.

Case Report

A Case of Unusual Manifestation of Dengue Fever

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Abstract

Dengue retinopathy is a spectrum of ophthalmologic manifestations resulting from Dengue fever. The disease is considered to be one of the most important arthropod vector-borne diseases in the tropical and subtropical regions in terms of morbidity and mortality. Dengue virus can cause a wide spectrum of disease, ranging from mild febrile illness to life-threatening disease, such as Dengue hemorrhagic fever and Dengue shock syndrome. One of the complication in Dengue disease that is being observed more frequently in recent times is the Dengue retinopathy. However, only a few isolated case reports have been published. Here we report an isolated case of dengue retinopathy in a rural medical college.

Keywords: Aedes mosquito, Dengue retinopathy, Flavivirus

INTRODUCTION

Dengue fever is a mosquito borne disease that is commonly found in the tropics. Dengue virus belongs to the Flavivirus genus of the family Flaviviridae and its members include the four antigenically-related serotypes of dengue virus (DENV 1-4). It is transmitted to humans by the bite of an infected female Aedes mosquito, usually the Aedes aegyptimosquito. Dengue fever is the most prevalent form of flavivirus infection in humans. The highest incidence occurs in Southeast Asia, India and the American tropics.[1,2] Worldwide cases of illness exceed 100 million per year.[2] Dengue hemorrhagic fever (DHF) is a severe and potentially fatal form of the disease. Twenty-five thousand deaths are reported annually to the World Health Organization (WHO).

Ophthalmic complications associated with DF and DHF have not been classically described. This complication is being observed more frequently in recent times. However, only a few isolated case reports have been published. Here we report an unusual manifestation of dengue fever presenting bilaterally with extensive panretinal vasculitis and severe macular oedema.

CASE PRESENTATION

A male patient aged 23 years from South India presented with sudden bilateral loss of vision, one week back he was diagnosed to be suffering from Dengue fever, his Dengue NSI Ag was positive, which was confirmed by ELISA. His platelet count at the time of presentation was 24000/cmm, the visual acuity was right eye 6/36 and left eye was counting finger 3 m, on funduscopy there was retinochoroiditis with macular edema, neuroretinitis and flame shaped hemorrhages. He was transfused with 6 units of platelet and was also started on steroids and other supportive therapy. His platelet count gradually increased and at the time of discharge was 142000/cmm. By 3 weeks the macular edema had decreased and the visual acuity improved to 6/24 RE and 6/60 LE, although the patient was started on steroids by the end of 3 months the visual acuity remained at right eye 6/18 and 6/36 left eye, with no residual macular edema (Figures 1 and 2).

DISCUSSION

Dengue is the most common mosquito borne viral disease in humans. Globally, 2.5 billion people live in areas where dengue viruses can be transmitted.[1-3] Ophthalmic complications associated with DF and DHF have not been classically described, with only a few isolated case reports that have been published.Ocular involvement, usually bilateral, is common in patients with Dengue fever and symptoms may include sudden decrease in vision, central scotoma, floaters and subconjunctival hemorrhage (most commonly petechial in type). These findings are more common in patients with a platelet count of less than

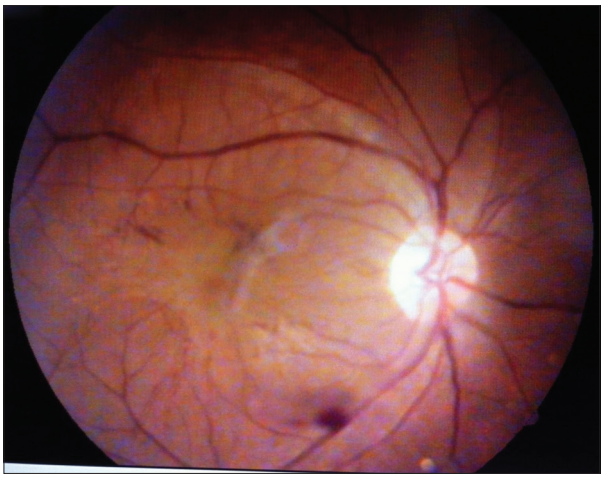

Figure 1: Neuroritinitis seen in dengue retinopathy

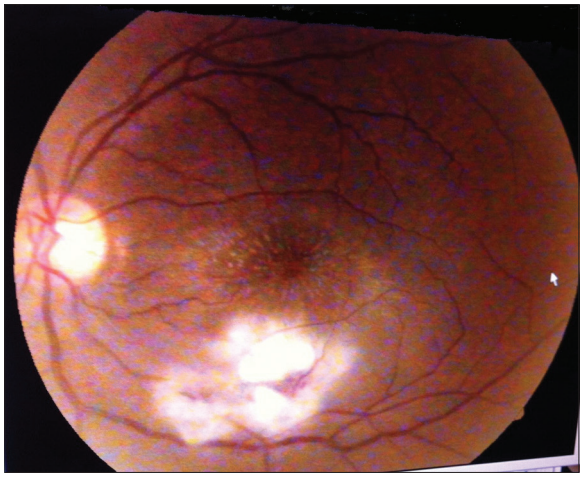

Figure 2: Retinochoroiditis seen in dengue retinopathy

50.000/µl. Other ocular findings may include anterior uveitis, vitritis, retinal hemorrhages, retinal vascular sheathing, yellow subretinal dots, RPE (retinal pigment epithelium)mottling, foveolitis, retinochoroiditis, choroidal effusion, optic disc swelling, optic neuritis, neuroretinitis, panophthalmitis and oculomotor nerve palsy.[4,5] The spectrum of ophthalmologic complications due to dengue fever may be due to thrombocytopenic state, with its resultant bleeding tendency, which gives rise to increased incidence of hemorrhage. These hemorrhages manifest as retinal blot hemorrhages in the macula and retinal periphery. A hypothesis about the pathogenesis of DHF, though proven true in vivo, involves immune clearance by way of induction of cross-reactive T-cell memory, T-cell proliferation, and recognition of dengue viral antigens on infected monocytes by sensitized CD4+CD8– and CD4–CD8+ cytotoxic T cells. This results in the release of cytokines with vasoactive and procoagulant properties (interleukins, tumor necrosis factor, platelet-activating factor, and urokinase).[6,7] Vasoactive and inflammatory mediators cause capillary leakage, which may form the basis for macular edema and breakdown of the aqueous blood barrier, resulting in anterior uveitis and periphlebitis. OCT is useful in detecting and monitoring the progress of foveolitis, showing a focal outer neurosensory RPE thickening corresponding to the round foveal yellowish lesion seen clinically, and in the detection and evaluation of Serous Retinal detachment and macular edema.[8] The most common fluorescein angiography findings include blocked fluorescence due to retinal hemorrhages and retinal vascular leakage and occlusion. Indocyanine Green angiography shows hypofluorescent spots corresponding to the subretinal lesions seen clinically and additional spots in areas without clinically evident dots and a large choroidal vasculopathy with hyperfluorescence and leakage.[9] Dengue-associated maculopathy was found to be more common with the virus serotype 1 compared to the serotype 2.[10] Management of Dengue fever systemic disease is mostly supportive. There is no established treatment for ocular manifestations of Dengue fever. Topical, periocular, oral and intravenous steroids and immunoglobulins have been advocated for the management of Dengue-associated uveitis and optic neuritis.[11,12] Visual prognosis is good in most patients, but Dengue-associated maculopathy and neuropathy may result in permanent visual impairment.[13,8]

CONCLUSION

The onset of visual symptoms usually occurs at the lowest platelet level, blurring of vision typically coincides with the nadir of thrombocytopenia and occurs close to one week after onset of fever. Hence a very careful observation by fundus examination may be required during this period. The clinical features of dengue retinopathy includes any one or all of the following such as retinal edema, blot hemorrhages, cotton wool spots, anterior uveitis, exudative retinal detachment.[8] Even though the disease is self-limiting and has a good prognosis, Topical, periocular, oral, intravenous steroids and immunoglobulins have been advocated for the management of dengue-associated uveitis and optic neuritis. The visual prognosis is good but some patients may experience mild relative central scotoma that may persist for month, but till now no statistical conclusion have been drawn about the efficacy of steroids in treating dengue retinopathy. The inference is that the clinicians should have heightened awareness of dengue-related ophthalmic complications and should facilitate prompt referral for ophthalmic assessment and management.

ACKNOWLEDGEMENT

Authors would like to acknowledge the contribution of Dr. Padmini. H.R, Professor and Head, Department of Ophthalmology, A.I.M.S, B.G. Nagara.

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How to cite this article: P Dinesh, Pranitha Prabhu, S Gita. "A Case of Unusual Manifestation of Dengue Fever". Int J Sci Stud. 2014;2(3):98-100.

Source of Support: Nil, **Conflict of Interest:** None declared.