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CONTENTS

Editorial Shisha Smoking is more injurious to Health than Cigarettes Smoking – Law Prohibits both

Dr. Mohsin Masud Jan
Editor

Shisha smoking is becoming common among youngsters in major cities of Pakistan. Shisha is particularly relaxing because of the atmosphere in which it is taken. Moreover, shisha offers a much more wholesome experience than cigarettes, its smokers say. One session of shisha smoking is said be equivalent to inhaling 100 to 200 times the volume of cigarettes, according to a report by World Health Organisation.

"If you look at the impact of taking shisha out of this culture, you're talking about disrupting and destroying a whole pattern of community activity," protests a shisha smoker as he inhales deeply through the water-pipe in which the scented tobacco is burnt using coal, passed through an ornate vessel.

The sociable nature of shisha smoking makes it popular amongst young people; especially students. Surpassing traditional gender stereotypes, shisha smoking is evenly distributed between both sexes. The reason why shisha smoking integrates so well into student life is because it is relatively inexpensive and gives an opportunity to socialise.

Peer pressure majorly influences such activities, especially for adolescents beginning to gain independence. Participation in such activities induces a feeling of group acceptance. Shisha smoking was widely seen as 'relatively harmless' which can be attributed to general ignorance. There is limited knowledge regarding the long-term medical complications of shisha smoking and its addictive nature, however, there is increasing evidence showing some serious health risks. It not only increases chances of cancer, tuberculosis, heart diseases, infection and bacteria from sharing mouth pieces but also reduces male fertility. Moreover, it is said some café walas were mixing drugs in shisha to give a high and were caught doing so which created much hue and cry.

Passive smoking of shisha is also a common concern. Exposing non-smokers to second hand smoke goes against their rights as Prohibition of smoking and Protection of nonsmokers Health Ordinance of 2002 supports this argument by banning smoking in public places. The definition of public places is often challenged by smokers, but the Article 2(c) of this ordinance clearly defines it and includes auditoriums, buildings, health institutions, amusement centres, restaurants, public offices, court buildings, cinema halls, conference and seminar halls, eating houses, hotel lounges, other waiting lounges libraries, bus stations or stands, sports stadiums, educational institutions, libraries and other such places which are visited by general public.

The Lahore High court on Wednesday clarified that shisha fell within the definition of 'smoking' in Prohibition of smoking and Protection of nonsmokers Health Ordinance of 2002. Smoking shisha is allowed but not in public places. And since shisha cafe is a public place, the shisha cafes which continued to serve shisha in rude defiance of the official orders issued by the city government under article 144 of Code of Criminal Procedure, need to stop serving it. Café owners led to a last ditch battle to exempt shisha from ban by proposing that they should be allowed to serve shisha in enclosed cabins or smoking in outdoor portions but LHC rejected that petition too.

This judgment is not well received by shisha smokers and many people anticipate that not serving shisha in cafes would cause shisha smoking to eventually fade away, ending the shisha pandemic. However, the cafes are no longer required to facilitate the smoking as shisha is widely available. It is a sad reality that if they are not allowed to smoke shisha in cafes the youth will turn to alternatives, and start smoking in private places such as homes and cars, once they master the art of assembling shisha.

Federal, Provincial and City Governments should take serious action against the cafes which provides shisha to youngsters.

Original Article

Frequency of HBs Ag and Anti-HCV in Trauma Patients

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ABSTRACT

Background: This study was carried out to determine the frequency of Hepatitis B&C Viral infection in patients undergoing emergency surgical operations after trauma, and to evaluate the associated risk factors.

Study Design: Descriptive Study

Place and Duration of Study: This study was conducted at General Surgical, Orthopaedic and Paediatric Surgery Department of Ghulam Muhammad Mahar Medical College Hospital Sukkur from May-2011 to April-2012.

Patients and Methods: All the patients who were admitted in the Surgical and orthopaedic department for emergency surgical operations followed by trauma were included in the study. The patients were screened for HBsAg and Anti-HCV using immunochromatography (ICT) method. Those who were weak positive by ICT were further confirmed by Enzyme Linked Immunosorbent Assay (ELISA).

Results: 592 patients were admitted in Surgical and orthopaedic department during a period of last one year for emergency operations after trauma and were screened for HBsAg and Anti-HCV. Out of these 592 patients 472 (79.7%) were males and 120 (20.27%) were females. Mean age of these patients was 40 years. After screening, 33 (5.57%) patients were found HBsAg positive and 117 (19.76%) were Anti-HCV positive, while 09 (1.5%) were positive for both.Hepatitis-B was found in 21 (2.3%) males and 12 (1.3%) females, while Hepatitis-C was predominantly found in 68 (7.44%) males and 49 (5.36%) female patients.

Parenteral injections by Quacks, previous surgery, blood transfusion and shaving by barbers were found to be the risk factors.

Conclusion: Higg frequency of HBs Ag and Anti-HCV was found in trauma patients undergoing emergency surgery. Our message is that "Prevention is better than cure". So it is essential to prevent the spread of Hepatitis B&C by screening every patient before surgery and counseling of patients.

Key Words: Hepatitis-B, Hepatitis-C, screening, trauma patients.

INTRODUCTION

Viral Hepatitis (HBV & HCV) is a major health problem affecting approximately two billion population worldwide. It is one of the single most important cause of chronic liver disease and hepato-cellular carcinoma in Pakistan and worldwide and is now spreading beyond endemic dimensions. The Hepatitis-B virus (HBV) was first isolated by Blumberg in 1963.[1] It has infected over 2 billion individuals worldwide. More than 520,000 people die each year from HBV related acute and chronic liver disease.[2] Hepatitis-C virus (HCV) infection is increasing even more rapidly and has occurred in endemic situation in most parts of the world, with a prevalence of about 3% worldwide.[3] Nearly 500 million people are estimated to be infected with Hepatitis-C worldwide.[4] Hepatitis-C virus infection progresses showly and carries a high risk of chronic liver disease (70-80%) and latter Hepatocellular carcinoma.[5] Hepatitis B&C viruses are known cause of infectivity leading to significant morbidity and mortality worldwide especially in the developing countries like Pakistan.[6] In Pakistan, a large proportion of the population is already infected with Hepatitis B&C with the prevalence of 10% for Hepatitis B and 4-7% for Hepatitis-C. Hepatitis B&C are commonly transmitted by percutaneous or permucosal exposure to contaminated blood or blood derived body fluids. So these are transmitted by contaminated blood transfusion, un-sterilized syringes and the surgical instruments, dental surgery, sexual contact, drug abuse, shaving razors, tooth brushes and shaving by barbers. Transmissions of blood borne HBV & HCV from health care professionals to patients have also been documented.[7,8] Number of patients with Hepatitis B&C being received for elective and emergency operations has increased tremendously. Thus healthcare providers especially Surgeons & Operation Theatre Staff has significantly increased risks of infectivity alongwith further transmission of the disease, if pre-operatively screening and standard precautions are not followed strictly.

This study is carried out to find out the frequency of Hepatitis B&C in patients admitted for elective surgery in Surgical Department, and to take the adequate protective measures in Operation theatres to avoid further spread of these infections.

PATIENTS AND METHODS

This study was conducted in the department of Surgery,orthopaedics and paediatric surgery, Ghulam Muhammad Mahar Medical College Hospital, Sukkur

during a period of last one year from May-2011 to April-2012. Ghulam Muhammad Mahar Medical College Hospital is newly established teaching hospital, providing services to patients of Upper Sindh, adjacent areas of Balouchistan and Lower Punjab. All patients undergoing elective surgery regardless of age, gender and nature of operations were selected for the study after taking informed consent. History and physical examination were recorded with special reference to risk factors and vaccination status. The patients were screened for HBs Ag and Anti-HCV using immunochromatography (ICT method). Those who were weak positive by ICT were further tested by Enzyme Linked Immunosorbent Assay (ELISA). In positive cases, LFT, PT & APTT & Ultrasound abdomen were performed.

Special precautions were taken during surgery of positive patients like hand free transfer of sharp cutting instruments, wearing double gloves and preventing pricking of needles during suturing. After surgery all patients were referred to Physician for further management in Liver Clinic established by Prime Minister's Program in our Hospital.

RESULTS

592 patients were admitted in Surgical,orthopaedic and paeds surgery department during a period of last one year for emergency operations followed by trauma and were screened for HBsAg and Anti-HCV. Out of these 592 patients, 472 (79.7%) were males and 120 (20.27%) were females. Mean age of these patients was 40 years. After screening, 33 (5.57%) patients were found HBsAg positive and 117 (19.76%) were Anti-HCV positive, while 09 (1.5%) were positive for both. Hepatitis-B was found in 21 (2.3%) males and 12 (1.3%) females, while Hepatitis-C was predominantly found in 68 (7.44%) males and 49 (5.36%) female patients. 90% of positive patients belonged to Rural Areas. Parenteral injections by Quacks, previous surgery, blood transfusion and shaving by barbers were found to be the risk factors.

Table No.I: HBs Ag & Anti-HCV Reactive patients (n=913)

HBS Ag	Anti-HCV
Male = 21 (2.3%)	Male = 68 (7.44%)
Female = 12 (1.3%)	Female = 49 (5.36%)
Total = 33 (3.61%)	Total = 117 (12.8%)

Age distribution is shown in Table-II. Risk factors identified in seropositive patients are shown in Table-III. No patient had history of vaccination against HBV. Screening for hepatitis B&C were advised to the family members of affected patients. All admitted patients who were not vaccinated and not suffering from Hepatitis B were also advised for vaccination.

Table No.2: Age distribution of HBs Ag & Anti-HCV Reactive patients

Age (in years)	HBs Ag n=33	Anti HCV n=117
01-10	0	0
11-20	04	03
21-30	07	06
31-40	09	43
41-50	05	25
51-60	04	21
61-70	04	22

Table No.3: Risk Factors identified in Hepatitis B&C Reactive Patients

Risk Factors	No. of patients n=150	% age
Barber Shave	37	24.66%
Dental Procedure	13	8.66%
Surgical Procedure	09	6%
Parental Injections	61	40.66%
Blood Transfusion	17	11.33%
History of Contact	11	7.33%
Drugs Addicts	02	1.33%

DISCUSSION

Hepatitis B&C are global problems. The incidence of Hepatitis B&C has achieved endemic situation in many countries of the world especially under-developed countries like Pakistan. In our country, it has been recorded at an alarming level is most parts, especially in rural areas. About 5% of general population and 10% of the adult population has been reported carrying this virus. In this study, 5.57% had Hepatitis-B and 19.76% had Hepatitis-C. The results of our study are comparable to studies done in different cities of Pakistan, Karachi HBV 6.5% and HCV 11.3%.[9], Ralwapindi HBV 2.8% and HCV 7.5%.[10] Nawabshah HBV 8.6% and HCV 11.6%.[11] and Jacobabad HBV 9.33% and HCV 14%.[12] Two studies done in Japan, one shows seropositivity of HBV 1.8% and HCV 7.1%, while other shows seropositivity of HCV 16.9%.[13,14] According to Cloud Hay & his colleagues, the prevalence of Hepatitis-C was 11.26% which is comparable to our study.[15] Ali and his associates[16] reported 5.1% patients suffering from Hepatitis-C in Gadap area. Leis and his co-workers[17] reported the prevalence of 35% in HCV & 4% in HBV in their patients operated at John Hopkins.

In this study, ratio of male is higher than female, in HBV 2.3% male & 1.3% female while in HCV 7.44% males & 5.36% females are reported. HCV were found more in the 4th decade of life. These factors are comparable to the study conducted by Merik and his co-workers at Greece.[18]

Most common route of transmission of Hepatitis B&C virus is parenterally, mainly as a result of contaminated blood transfusion or blood to blood contact, injury and

contaminated sharp instruments, with infected needle pricks or sexual contacts and also through perinatal vertical transmission from mother to child.[19]

The risk factors recognized in this study are summarized in Table-III. The most common risk factor was the use of contaminated syringes. History of I/V & I/M drug injections was found in 40.66% in this study in HBV & HCV reactive patients. Same risk factor is most frequently seen in the study by Zubia & Co-workers. They have noted history of parenteral therapy in 96% patients with HBV and 95.4% patients with HCV.[20] An average risk of transmission of HCV after needle prick injury is estimated to be about 0.3 – 1.8%.[21] with high prevalence of Hepatitis in 3rd world countries, exposure for the high risk group is much more in our local literature. In one local study, high frequency of injection use was found in 94% of HBsAg reactive patients and 92.5% in anti-HCV reactive patients.[22]. History of blood transfusion was present in 11.33% of HBS Ag and anti-HCV positive patients in this study. In one local study, history of blood transfusion was found in 74% of HBV seropositive and 40% HCV seropositive patients, which is quite high.[22] In our study, previous surgical history was also present in 6% and history of dental procedure was present in 8.66%, which is less than the study by Moosa and co-workers, who found past surgical history in 28.8% and history of dental procedures in 41.3%.[22]

In Pakistan like many other 3rd world countries, more than 80% of deliveries are conducted by traditional birth attendant in unhygienic conditions and without proper sterilization, which makes females more vulnerable to HBV & HCV infection. There are also millions of quacks and dental practitioners especially in rural area of Pakistan. They are using same syringes for more than one patients and surgical instruments without proper sterilization. In a multivariate analysis, three variables are significant regarding the prevalence of the disease, intravenous drug abuse, blood transfusion and low socioeconomic status.[23,24,25] In order to prevent Hepatitis, as an epidemic in our country, prevention and counseling should be specified in general. The awareness of its presence and the magnitude of risk should be known to patients as well as to health care providers. Surgeons, Theatre Staff, Nurses and other health care workers are at greater risk of acquiring these infections.

The study has its limitations that it is a hospital based study and its application to general population regarding the frequencies of HBV and HCV could not be done. Being a hospital based study, the frequencies of both viruses are higher than reported from epidemiological studies. Nevertheless it highlights the increased risk to the HCV from them and implementation of measures to reduce exposure.

CONCLUSION

High prevalence of HBsAg and Anti-HCV was found in patients pre-operatualy. Our message is that ***"Prevention is better than cure"***. So it is essential to prevent the spread of Hepatitis B&C by screening every patient before surgery and counseling of patients. The doctors and paramedical staff follow proper ethical practice ensuring use of sterile disposables where indicated and protecting patients and themselves from these viral infections.

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Original Article

Protective Role of Taurine on Tamoxifen-induced liver damage in Rats: A Morphological Study

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ABSTRACT

Objective: To study the protective role of taurine in tamoxifen- induced hepatic steatosis in albino rats

Study Design: Prospective experimental study

Place and Duration of Study: Department of Anatomy, Khyber Medical College, Peshawar, from July 2011 to November 2011.

Materials and Methods: Four groups of female albino rats, each containing 8 animals, were treated for 21 days as follows:

Group A served control, Group B treated with tamoxifen, Group C treated with tamoxifen plus taurine, Group D treated with taurine alone.

The animals were weighed at the start and end of treatment and then sacrificed under ether anaesthesia. The livers were fixed in 10% formalin and embedded in paraffin. H&E stained 4 µ thick sections were examined microscopically.

Results: There was significant decrease in the body weights of groups B and C as compared groups A and D. Significant increase in the body weights of group C rats in comparison with group B was noted. Histologically the livers of group B animals showed generalized microvesicular and macrovesicular steatosis, with no evidence of hepatocyte necrosis. In group C the fatty change was much less pronounced as compared to group B.

Conclusion: The study data suggest that taurine supplementation can reverse / attenuate the hepatic steatosis caused by tamoxifen treatment for 21 days, in albino rats.

Key Words: Hepatic steatosis, taurine, tamoxifen.

INTRODUCTION

Tamoxifen citrate is a non steroidal anti-estrogen drug used for the treatment and prevention of breast cancer[1]. It has been shown to be hepatotoxic and hepatocarcinogenic in rats[2,3,4]. Cases of liver injury induced by tomoxifen in humans (e.g. toxic hepatitis, steatosis, sub-massive hepatic necrosis and cirrhosis) have been described[6]. Tamoxifen produces oxidative stress in rat liver by overproduction of oxygen radicals during its metabolism. Lipid peroxidation is initiated through removal of hydrogen from unsaturated fatty acids; this leads to the formation of carbon-centered lipid radicals [4]. Addition of molecular oxygen to the lipid radicals form lipid peroxy radicals[5]. It appears that tamoxifen causes hepatic steatosis by derangement of mitochondrial function; this leads to impaired β-oxidation of fatty acids and production of reactive oxygen species and depletion of ATP. The protective effects of natural antioxidants against drug toxicities, particularly where free radical injury is the cause has been the focus of attention lately[6].

Taurine (2-amine ethane sulfuric acid) is a sulphur containing free amino acid, normally present in tissues including liver, brain, kidney and myocardium. The physiological and biological functions of taurine have been reported; it acts as antioxidant, membrane stabilizer, osmoregulator and neuromodulator[7]. Taurine is a non essential amino acid; its synthesis occurs chiefly in the liver from amino acids methionine and cystein[8]. Taurine, by its antioxidant action, has been shown to attenuate the oxidative stress and injury in the urinary bladder and kidney induced by nicotinamide[10], it ameliorates hypoxia induced lactic acidosis in brain, liver and heart[11], and reduces the severity of cyclophosphamide- induced hemorrhagic cystitis in rats[9].

Kerai et al[9] (1999) confirmed the protective role of taurine in ethanol induced hepatic steatosis. They noted that the effects of taurine on reversing hepatic steatosis may be due to the enhanced secretion of hepatic triglycerides, and that increased bile flow as a result of taurine treatment may contribute to the removal of lipid peroxides[9]. Taurine protects the liver against injury induced by agents such as carbon tetrachloride[15], acetaminophen[13], and thioacetamide[13]. Its restorative role in experimentally induced non- alcoholic steatohepatitis has been observed[14].

The purpose of this study was to find out the histological evidence of the effects of tamoxifen on rat liver and to find whether taurine, a sulfur containing amino acid, can offer any protection against the liver injury caused by tamoxifen, in rats.

MATERIALS AND METHODS

This study was conducted in the department of Anatomy, Khyber Medical College, Peshawar.

Tamoxifen citrate (Nolvadex®, ICI) and taurine (GNC, USA) were purchased from the local market.

Thirty two healthy adult female albino rats 90-120 days of age and weighing 200-300 gram, fed on standard chow and water ad libitum, were divided into four group of eight animals each and were treated for 21 days as follows:

Group A served as control.

Group B animals received tamoxifen 45 mg/kg body weight / day dissolved in drinking water and administered orally by gavage[16].

Group C animals received tamoxifen in a dose of 45 mg/kg body weight / day and taurine 1% solution as their sole source of drinking water.

Group D animals received 1% taurine solution as their sole source of drinking water[17].

Body weights of rats were recorded at the start of study and at the time of sacrifice.The animals were sacrificed under ether anesthesia. Livers were removed, weighed and examined grossly. Then they were fixed in 10% formalin and embedded in paraffin. 4 µ thick sections, stained with hematoxylin and eosin, were studied microscopically for cell morphology and lobular architecture. Histological diagnosis was made and results were tabulated.

RESULTS

The body weights of control (group A) and taurine-treated (group D) animals increased significantly (P value < 0.01) without any significant difference across the groups. There was a significant decrease (P value <0.001) between the initial and final body weights in tamoxifen-treated (group B), and tamoxifen plus taurine treated (group C) in comparison with group A (table 1). In comparison between groups B and C there was significant increase in the final body weights (P value <0.01) of group C in comparison with group B rats (Table 2).

Table No.1: *Mean Body Weights (BW) in grams at the beginning and end of three weeks treatment.

Group	Initial BW	Final BW	P Value
A	278.60±3.00	285.20±2.08	<0.01
B	273.60±6.49	233.20±5.21	<0.001
C	271.20±7.47	258.20±8.19	<0.001

*Mean±SEM

Table No.2: Comparison of *Mean Final Body Weights (grams) between group B and C.

Mean Final BW group B	Mean Final BW group C	P Value
233.20±5.21	258.20±8.19	<0.01

*Mean±SEM

Normal histological features were observed in the H&E stained sections of livers of group A and D animals (Figure-1). In the livers of group B animals there was distortion of lobular architecture and marked dilatation of central vein (Figure-2). Swelling of hepatocytes and obliterated sinusoids were seen. Fatty change was more prominent in comparison with an earlier study of one week duration[20]. Ballooned hepatocytes were seen in the zone III but no evidence of hepatocyte necrosis was found. Increase in the number of mononuclear cells in the region of portal triad was observed.

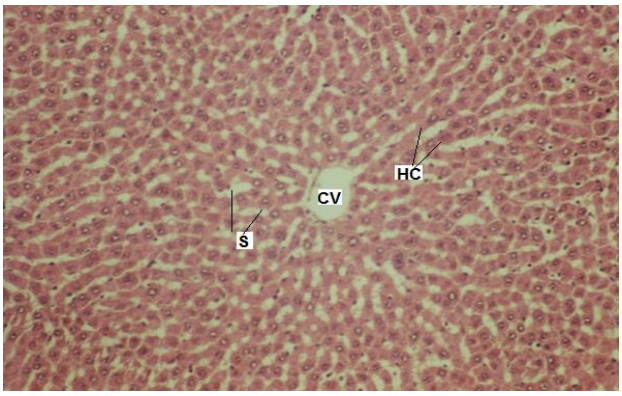

Figure No.1: Photomicrograph of liver lobule of control albino rat showing hepatic cords (HC) radiating from central vein (CV) and normal liver sinusoids (S): (H&E x200).

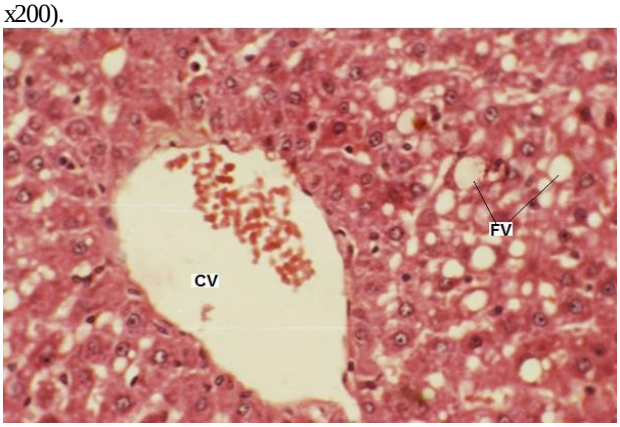

Figure No. 2: Photomicrograph of rat liver treated with tamoxifen for 21 days, showing dilated central vein (CV) and vacuoles of fatty change (FV): (H&Ex400).

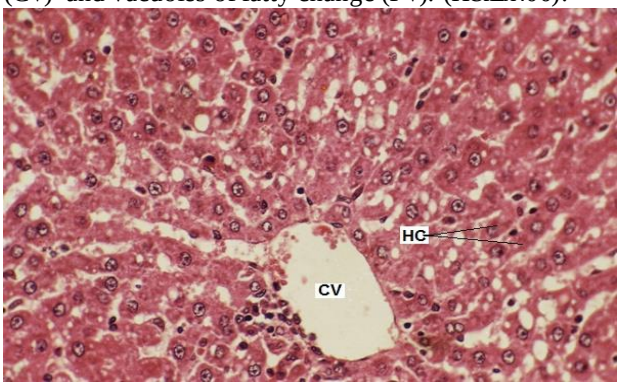

Figure No.3: Photomicrograph of rat liver treated with tamoxifen plus taurine for 21 days still showing dilatation of central vein (CV), restored arrangement of hepatic cords (HC) and reduced fatty change as compared to Figure-2. (H&E, x400).

In group C the lobular architecture showed little distortion but the arrangement of cells in cords was obvious. The central vein showed some dilatation, but the walls were not distorted. The fatty change was not as marked as in group B.

DISCUSSION

Liver injury caused by drugs is a major clinicopathological entity. There are about 900 drugs which are potentially hepatotoxic; the severity of injury ranging from mild to fatal[18].

The triphenylethylene antiestrogen drug, tamoxifen, is used worldwide for the treatment and prevention of breast cancer. Cases of tamoxifen-induced hepatotoxicity have been described, including toxic hepatitis, massive hepatic steatosis or multifocal hepatic fatty infiltration, and sub-massive hepatic necrosis in humans[5].

The decrease in the body weights of animals treated with tamoxifen (group B and C) coincides with the study of Lelliott et al[21]. The authors observed that tamoxifen was known to reduce food intake as well as body weight of tamoxifen-treated rats. Lopez et al[22] also observed that tamoxifen causes tremendous decrease in appetite via its direct action on the hypothalamus.

In the present study, the animals in group C showed significant increase in body weight in comparison with group B animals. This was because of the reduction of tamoxifen toxicity due to taurine treatment. This finding is in agreement with the findings of Naqvi and Ali (2008)[23], who described a weight gain in the rats treated with taurine plus tamoxifen as compared to rats treated with tamoxifen alone in a one week study. Hwang et al[24] studied the effects of taurine administration in rats treated with oxidized fish oil. They suggested that taurine improves the glutathione level in liver which leads to the improvement in body weight gain.

Microscopic examination of group-B animals showed swelling and ballooning of hepatocytes and marked fatty change. These findings correlate with the findings of Lelliott et al[21], who noted that 83% of tamoxifen-treated rats had microvesicular fatty change in their livers.

The finding of macrovesicular fatty degeneration and ballooning of hepatocytes were in agreement with the work of Angulo[25], in which the author has described the liver biopsy features of non alcoholic fatty liver disease. These include steatosis, mixed inflammatory cell infiltration, hepatocyte ballooning and necrosis, Mallory's hyaline and fibrosis. Pratt et el[26] and Hoof et al[27] have reported one case each with same words of macrovesicular fat infiltration, lobular inflammation and portal inflammation with fibrosis, in humans; these observations match with the findings in the present study.

The morphological examination of H&E stained sections of liver in group-C demonstrated that hepatic lobular architecture was comparable to control except mild dilatation of central vein. The fatty change showed a focal distribution and vacuoles were very much reduced in size. These findings can be attributed to the antioxidant, membranoprotective and detoxifying properties of taurine. These findings match with the findings of Chen et al[17], who studied the effects of taurine treatment in experimentally induced steatohepatitis in rats fed on high fat diet. The authors observed significant improvement in both histological and biochemical parameters. Kerai et al[10] suggested that taurine-induced reversal of fatty change is due to increased triglycerides secretion. They also suggested that an increased bile flow enhances the removal of peroxides.

CONCLUSION

The attenuation of fatty change by taurine administration is a finding of great importance. Tamoxifen causes non alcoholic fatty liver disease which can progress into steatohepatitis and cirrhosis in patients of breast cancer. The addition of taurine as a supplemental therapy to these patients can save them from fatty liver disease. Further studies are needed to confirm the findings on this topic.

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Original Article

Results of Distraction Compression and Compression Distraction in Segmental Defects of Tibia with the Use of Ilizarov's External Fixator

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ABSTRACT

Objectives:-To compare the results of distraction-compression and compression-distraction in segmental loss of tibia by Ilizarov extent fixator and to see the functional end results of each procedure.

Study Design: Comparative study.

Place and Duration of Study: This study was carried out in the Department of Orthopaedic, Nishtar Hospital, Multan from April 2008 to March 2010.

Materials and Methods: A total of 30 cases were included in the study.

Results:-Gap non-union in tibia is a frequently encountered problem in open tibial injuries. Their treatment have been unsatisfactory until the introduction of distraction histeogenesis by Ilizarov, before the end results were often amputation. Gap non-union of upto 5 cm can be managed by initial compression, later on the LLD is addressed and distraction histeognesis whereas gap of >5 cm are amicably managed by segment transport i.e. distraction and later compression between the transported segment to other end of the fracture.

Conclusion: Both methods are excellent if the limitations and principles are followed. Our recommendations are gaps of < 5 cm to be managed and compression-distraction of gaps of >5 cm to be managed with distraction-compression mode of treatment.

Key Words: Distraction Compression, Compression Distraction, Segmental Defects of Tibia, Ilizarov's External Fixator

INTRODUCTION

Segmental skeletal defect have always presented a perplexing problem for the Orthopedists. These segmental defects are most common in tibia than any other long bone of body. It may be caused by a high-energy trauma, particularly the road traffic accidents, fall from height and gun shot injuries.

The basic object of treatment of fractures of tibial shaft is to restore anatomy and regain function as early as possible. When a tibial fracture is accompanied by segmental defect, it presents a challenging problem, particularly in the presence of infection and instability. Significant bone loss is seen in only a few of tibial fractures, whereas it occurs in 17%-to-40% cases of open fractures[1].

A segmental defect may be due to bone loss at the time of original trauma, removal of nonviable bone fragment at the time of initial debridment, removal of dead bone in chronic osteomylitis or defects due to excision of tumor. In the past the treatment of choice was amputation[2].

There have been many methods to treat segmental defects of tibia[3] like by-passing the defect using fibula as the main stabilizer, this includes postero-lateral bone grafting and fibula-pro-tibia procedures. Filling the defect; this includes vascularised auto-geneous bone grafting, transplantation of allograft bone and segment transport and open bone grafting (Papineau's technique).

The concept of segment transport by distraction osteogenesis, for the treatment of segmental defect has been credited to Gavril Abramovich Ilizarov. He gave the concept of bone segment transport[4]. In year 1951, he developed circular ring external fixator and used it to treat various orthopaedic problems. In year 1956, during correction of an ankylosed knee after open osteotomy, he noticed callus in distraction gap. He developed a system in orthopaedics based on the ability of new bone formation in distraction gap under appropriate conditions, as well as to correct complex mal-alignment with minimal surgery and to overcome shortening and joint contracture by gradual stretching of soft tissue.

New bone formation can be identified within one week of the start of distraction with dual energy X-ray. As distraction proceeds, the gap is filled with the distracted callus, which later on becomes consolidated[5].

The defect is closed at the time of surgery and both proximal and distal fragment ends are compressed. Length is restored by corticotomy in the metaphyseal region of either fragment, followed by gradual distraction at the rate of 1 mm/day after allowing 10 days for callus formation[6]. A fibular osteotomy is done as a part of initial surgery before compression of the fragments.

Bone segment transport is used to treat large bone defects. After application of Ilizarov ring fixator, a corticotomy is performed in the metaphyseal region of either one or both fragment. Gradual distraction is

started to bridge the gap after ten days. Fibula is left intact during segment transport to increase stability[7] of the construct.

Ilizarov method which was developed during the 6th and 7th decade of the last century has offered a good alternative for the management of gap non-union, gaps after resection of tumours and infected non-union in addition to other benefits of this procedure[8].

Certain advantages inherent to the Ilizarov frame design are difficult to produce with large pin fixator. These include functional weight bearing during treatment, progressive correction of angulatory and torsional deformities and ability to apply compression, distraction and correction at multiple levels with single frame construct.

In compression distraction the non-union site is compressed earlier on whereas the length is regained subsequently. On the other hand in distraction compression the gap is bridged 1st and the compression across gap is the last event if the docking has occurred without any problem and then the compression is applied. This causes considerable increase in the time duration for union to occur to gain strength for assisted full weight bearing.

MATERIALS AND METHODS

This comparative study was carried out in the Department of Orthopaedic, Nishtar Hospital, Multan from April 2008 to March 2010. A total of 30 cases were included in the study. All patients with gap non-union of tibiall shaft were included in the study. Their age ranged from 25-58 years. Both sexes were included, though males were many more than female patients.

They were divided in two groups (A & B). In group-A the gap at non-union was < 5 cm whereas gap was > 5 cm in group-B patients. For group-A patients compression distraction method was adopted and for group-B distraction compression was adopted.

RESULTS

In this study we included 30 patients. These patients had been divided in 2 groups equally. In group-A 11 (73.3%) patients were male and 4 (26.7%) were female. The patients were of the age group ranging from 16-58 years. These patients had gap non-union of tibia with a bone loss of 5 cm or less. In group-B, 11 (73.3%) patients were male and 4 (26.7%) were female. The patients were of the age 15- -55 years. The patients in this group had bone defect of 5 cm to 10 cm.

Pin tract infection occurred in 5 patients. In two out of these five have mild degree for which daily dressing was done. One case had moderate infection. Oral antibiotics were advised while in remaining two having severe pin tract infection, wires have to be changed in group-A. Pin tract infection of mild degree occurred in 3 patients (20%), while severe pin tract infection occurred in one patient (6.66%), wire breakage occurred in three patients (20%). Two patients had skin invagination (13.33%) and persistent infection at fracture site remained in two patients (13.33%). Two patients had residual angular deformity (13.33%), 5□ valgus in one and other had 5□ anterior angulation in group-B.

In group-A the proximal 3rd was involved in 3 patients 20%. In 7 patients 46.7% the middle 3rd was involved site while 5 patients (33.3%) the distal 3rd of tibia was involved. Corticotomy was done in proximal 3rd of tibia in 10 patients (66.7%). In five patients corticotomy was done in distal 3rd of tibia (33.3%). The distraction was started 7th to 10th day of surgery. It was tried to start partial weight bearing in the 1st week. Pain had settled and most of the patients in group-A started weight bearing in 12 days of surgery. The union at fracture site was achieved between 18 to 30 weeks. The bone gap filled with distraction consolidated in 24 weeks to 37 weeks in all patients with average 30.13 weeks. The Ilizarov was removed 30 weeks to 42 weeks and PTB applied for 6.8 weeks. Two patients had residual mild infection at fracture site while wire breakage occurred in two patients. One patient had 5□ varus deformity at final assessment which was done 3 months after removing the patellar tendon bearing cast while another has 5□ valgus angulation in group-A.

To reduce the skin gap and to cover the bone cross leg flap was done in five patients (33.3%), GN flap in three patients (20%) and soleus flap in one 6.7%. The time interval between injury and application of Ilizarov was from immediate to 10 months (average 5.36 months). The shortening was from 5 cm to 10 cm (average 6.36 cm). Corticotomy was done in proximal tibia in 11 patients (73.33%) and in 4 patients distal tibia was corticotomy site (26.7%). The distraction at corticotomy site was started as 1 mm/day basis. It was started from 7th to 10th day of surgery. Dynamization of fixator was done 20 to 24 weeks (average 25.33 weeks). Consolidation was achieved from 24 weeks to 40 weeks (average 30.93 weeks). Full weight bearing was started after consolidation of fracture site from 24 weeks to 44 weeks (average 33.46 weeks). Ilizarov frame was removed from 30 weeks to 49 weeks (average 39 weeks). PTB was applied for 6-8 weeks so that union was attained in all patients in group-B.

The most of the patients in group-A have history of road traffic accident 11 (73.3%) patients while 2 (13.3%) have history of fall of heavy object on legs. Two (13.3%) patients have history of FAI. The time interval between trauma and application of Ilizarov frame vary. It ranges from 2 months to 7 months (average 4.26 month) and overall bone gap was 3.9 cm. In group-B, the mode of injury was road traffic accident in 9 (60%) patients, fall of heavy object on leg in 2 (13.3%) patients; FAI was in 2 (13.3%) patients as shown in Table-1.

The fracture took place in right side in 9 (60%) patients while left side was involved in 6 (40%) patients in group-A. Whereas in group-B. 8 (56.4%) patients had left side involvement and 7 (46.6%) had fight side involved (Table-2).

Table No.I: Causes of gap non-union tibia

Causes	Group-A	Group-B
RTA (open fracture)	11 (73.3%)	9 (60%)
Gun shots	02 (13.3%)	3 (20%)
Fall of heavy object	02 (13.3%)	3 (20%)

Table No.2: Side involvement

Side	Group-A	Group-B
Right	9 (60%)	8 (56.4%)
Left	6 (40%)	7 (46.6%)

DISCUSSION

Non-union of tibia is considered the most frequently observed, congenital, developmental or post-traumatic, long bone non-union. Among the complications of fractures, bone loss, non-union is most difficult to treat. In our study 30 patients with bone loss non-union were treated with Ilizarov method. They were reviewed with respect to age, sex, site and side of non-union, presence or absence of infection, length of bone loss, leg length discrepancy, bone length achieved, union achieved and complications in our patients.

The majority of our patients were young, 33.3% of patients were in their third and fourth decade. Average age among our patients was 30.3 years. Paley et al in their study showed average age of 34 years among their patients[7]. In a study showed average age of 34 years among their patients[9]. In another study showed average age 24 years in their patients with segmental defects of tibia[10]. Green et al in their study found average age of 32.8 years. Pasha et al showed average 27.9 years with bone loss non-union[11].

Male population was predominant in our study, 73.3% of our patients were male. Other studies showed 76% male and 24% female[7]. whereas predominance of 64.3% was shown in a study to treat non-union with bone loss with Ilizarov method[12]. Ilizarov and Ledyaev also showed male predominance 71.42% in their 21 cases of segmented defected treated by segment transport[13]. Awais and Akhtar found 80% males in treating tibial defects with segment transport[10].

In our study, right tibia was mostly affected (60%). in a study it is also found 70% of tibia and 30% femoral non-unions[10]. Tibia was most often involved, 65.62% had tibia non-union with bone loss. Right tibia was mostly affected 62.7%[14]. Bone bone loss or shortening is usually caused by resection of dead bone during debridement of open fractures caused by RTA, FAS, fall of heavy object and resection of tumour. The average bone loss in our study was 5.2 cm (ranges 3-10 cm).

Average bone loss in study conducted by Paley et al was 6.2 cm[7]. Another study showed 5.1 cm bone defect. In a latest study, 6.4 cm bone defect was treated with Ilizarov method[14].

Open fractures due to RTA were responsible for 73.3% of segmental defects and FAI 13.3% followed by resection of dead bone. In one study it is showed that predominant cause of segmental defect was open fractures in 77% cases and osteomyelitis in childhood in 23% cases[15]. Defect can be filled by segment transport. The new bone in distraction gap is formed eliminating need for bone grafting in fairly good number of patients 83.33%. Axial deviation of the segment can occur if segmental defect is large[16].

In our study, we had excellent results in 73% of patients, good results in 20% of patients, fair results in 6% of patients and poor results in 1% of patients. Tucker et al in their study found excellent results in 42.8%, fair results in 28.5% and poor results in 28.5%. Pasha showed excellent in 50% patients, poor results in 16.6% of patients.

Pin tract infection occurred at 10% insertion sites and 3.3% required removal and curettage because of loosening. It is found 29.6% pin tract infection but only 1.1% required removal and curettage of pin tract[17]. Pin tract infection occurred at 44% insertion sites[14]. The lower rate of pin tracts infection in our series was due to meticulous care during insertion and postoperative care emphasized to the patients.

In our study, ankle stiffness was observed in 20% of the cases that was treated with physiotherapy, knee contracture in 12.3%, slight equinus contracture in 6.66% that was treated with physiotherapy the major complications seen were delayed consolidation, Severe pin tract infection, skin invagination & Angulation.

Paley et al had found equinus deformity in 20% cases and amputation had to be performed in one case (4%)[16]. Green et al found pin tract infection commonly in treating segmental defects with Ilizarov method. One of their patients required amputation. Other complications in their patients included peroneal nerve paraesthesia, edema, early consolidation and joint contractures[11].

Ilizarov method is a comprehensive approach to all aspects of tibial non-unions and bone defects. This is only a semi invasive method as compared to much more invasive methods. It has high success rate, a low complication rate and allows immediate weight bearing and functional mobilization of the joints involved. The loading physiologic certainly helps in facilitating mineralization and consolidation of the regenerate bone, when distraction histeogenisis is being used to bridge the gap. The subsequent lengthening not only reduces the LLD created but also shortens the time duration of union at the gap ends of fracture early on. The difference between the compression distraction and distraction compression observed is that compression distraction only upto certain length i.e. <5 cm can be

compressed softly whereas in distraction compression any amount of gap can be bridged.

In distraction compression in additional procedure such as fibulectomy is needed if there is no LLD. Whereas in compression distraction fibulectomy has to be performed to allow for compression the adding one wire, produce to the setups with subsequent regaining of length.

CONCLUSION

Comparing the results of both procedures it becomes evident that both methods are acceptable under the limitation in which they are performed. Small gaps are good for compression distraction mode of management whereas large gaps of >5 cm should be managed with distraction compression method. As both methods give equally good comparable results. In our view the condition of the patients problem necessitates the choice of appropriate method, the Ilizarov apparatus is a good system to address these complex problems in satisfactory manner with least inconvience to the surgeon, this helps in psychological well being of the patient as they are provided with a positive hope for satisfactory management with early weight bearing.

Managing this series with Ilizarov method of bridging the gap has given us confidence in offering it as a primary mode of treatment in complicated open injures with segmental loss and also using it as a primary mode of management in bone resection for tumour surgery where limb salavage is possible.

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Original Article

Dexamethasone as an Adjuvant to Bupivacaine for Post Operative Pain in Supraclavicular Branchial Plexus Block

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ABSTRACT

Objective: To compare the onset of block, duration of analgesia and complications when dexamethasone is added to local anaesthetic bupivacaine in supraclavicular brachial plexus block for upper limb surgery.

Study Design: Quasi experimental study.

Place and Duration of Study: This study was conducted at the Department of Anaesthesia, PIMS, Islamabad from July2007 to June 2008.

Materials and Methods: Total sixty patients were included in this study. 30 patients were given supraclavicular block with 0.5% Bupivacaine plus normal saline and put in Group A and remaining 30 were given 0.5% bupivacaine plus dexamethasone and put in Group B. Study inclusion criteria were surgery of upper limb, age of the patient between 20 years to 60 years and anaesthesia physicial status (ASA) I, II, III. Variables recorded were onset of sensory and motor block for both groups and duration of sensory and motor block in both groups. Rescue analgesia requirement and complications were also noted in both groups.

Results: Demographically both groups were well matched .T. Test was used to compare the onset of sensory and motor block, duration of sensory and motor block and numerical pain score between the two groups. Chi-square test was used to compare rescue analgesia required and complications between the two groups. P-value less than 0.05 was considered statistically significant. The onset of motor block was similar in both groups (p=0.82) while onset of sensory block was earlier in dexamethasone group (P-0.014). The duration of sensory and motor block were significantly longer in dexamethasone group(B) than Bupivacaine group alone(A) (P= <0.001). Rescue analgesia required by the bupivacaine alone (A) was much earlier than dexamethasone group(B)(P= <0.001). No serious complications were noted in both groups.

Conclusion: The addition of dexamethasone to bupivacaine 0.5% solution in supraclavicular brachial plexus block prolongs the duration of sensory and motor blockade and provides greater pain relief also it shorten the onset of sensory block but has no effect on onset of motor block.

Key Words: Supraclavicular brachial plexus block, Dexamethasone, Bupivacaine.

INTRODUCTION

Regional anaesthesia has become more popular than general anaesthesia in recent years especially for limb surgeries[1]. Many studies are being done on benefits of local blocks verses general anaesthesia showing that regional blocks are associated with time efficient anaesthesia, faster recovery, fewer side effects, better analgesia and with better acceptance than general anaesthesia[2].

Regional anaesthesia technique used for surgery may have positive effects with less nausea, vomiting, reduced blood loss and excellent pain relief. There are many local anaesthetic techniques which can be continued in the postoperative period for postoperative analgesia i-e local infiltration of incision with long acting local anaesthetic[3,4]. Blockade of peripheral nerves and or plexuses[5] and continuous block techniques peripherally or centrally[6]. Brachial plexus is formed by the ventral rami of C_5-T_1. Nerve converge to form trunk, divisions and cords which are enclosed in a facial sheath. Brachial plexus anaesthesia is a technique well suited for upper limb surgeries[7], side effects like nausea ,vomiting ,sedation and poor pain control associated with general anaesthesia are possibly reduced with regional anaesthesia. Also the recovery time for the patient receiving Brachial plexus anaesthesia is reduced[8]. Brachial plexus block can be performed through many approaches like axillary, intersclenea, supraclavicular and infraclavicular[9]. In this study supraclavicular approach was used as it provides anaesthesia to entire limb, is easy to perform, has few complications, provide good postoperative analgesia and reduce the analgesic requirement in first 24 hrs. Inadequate post operative pain relief can delay the recovery, necessitate rehospitalization, increase the duration of hospital stay, increase health care cost and reduce patient satisfaction. A recent survey investigation of severity of pain following ambulatory surgery in 5703 patients indicated that 30% of the patients experienced moderate to severe pain post operatively[10]. Another study revealed 57% of patients experience moderate to severe pain following an operation in many cases[11]. Various local anaesthetics in

different concentrations have been used to evaluated the onset of block and duration of post operative pain relief in brachial. Plexus blocks[12]. Various adjuvant drugs like opioids, clonidine, midazolam, neostigmine, vasoconstritors and buprinorphin have been evaluated in conjunction with local anaesthetics to prolong the period of analgesia and provide postoperative pain relief[13,14]. Dexamethasone has been used in conjunction with local anaesthetic for pain relief in oral, general, ENT, ophthalmology and orthopedic surgeries[15]. Studies are being done in Pakistan to evaluate its role for post operative pain, nausea and vomiting[16]. This study was designed to evaluate the role of dexamethasone as adjuvant to bupivacaine for onset and duration of analgesia for post operative pain relief in supraclavicular block and also to observe complications associated with them. In this study we compared the role of Bupivacaine 0.5% 30 ml plus 2 ml of normal saline with Bupivacaine 0.5% 30 ml Plus Dexamethasone 8 mg 2 ml to see the onset of block, duration of analgesia and complications.

MATERIALS AND METHODS

The proposed study was a interventional, simple randomized, spanning over a period of one year was carried out at the department of Anaesthesia PIMS Islamabad. The study population included sixty patients. After approval of hospital ethical committee each patient eligible for the study as determined by inclusion and exclusion criteria was asked to give written informed consent for participation. The inclusion criteria was patients requiring upper limb surgery, ages between 20 to 60 years, Anaesthesia physicial status (ASA) I, II, III. The exclusion criteria was bleeding disorders, pregnant patients, psychiatric patients , patients with sepsis and patients with history of allergy to local anaesthetic. The study drug was prepared that is 0.5% Bupivacain 30 mls pulse 2 ml of N/S Group(A) or 0.5% Bupivacain 30 mls pulse 2 ml of Dexamethasone 8 mg Group(B). On arrival in OT intravenous access with 22 G cannula was established on contralateral arm. ECG, SPO2 and BP was monitored. Patient was placed in supine position with head turned away and ipsilateral arm adducted. The interscalenea groove and midpoint of clavical was identified.

After aseptic preparation of the area at a point 1.5 to 2.0 cm posterior to the mid point of clavical. A skin wheal with local anaesthetic 2% xylocain 3 ml was raised. A 22 G – 4 cm short bevel needle were placed caudally slightly in the medial and posterior direction until paraesthesia elicited in arm or hand. After the elicitation of paraesthesia and a negative aspiration of blood study drug was injected. Anaesthesia and analgesia was observed in post operative period up to 24 hrs. The assessment of onset of sensory and motor block was done every five minutes from time of injection of drug till the block is established. Sensory block was evaluated by temperature. Testing using sprit soaked cotton on skin dermatomes $C_2 – T_2$ where as the motor block was assessed by asking the patient to adduct the shoulder and flex the forearm and hand against gravity. Onset of sensory block is defined as time between injection of drug and complete loss of cold perception of hand while onset of motor block is defined as time from injection of drug to complete paralysis. Patient with incomplete block were excluded. Duration of sensory block is the time interval between injection of drug and onset of pain requiring analgesia. Duration of motor block is time interval between injection of drug and complete return of motor power. Pain was noted by numerical rating pain score scale. Zero (0) defined as no pain and 10 mean worst pain possible.

Rescue analgesia pethedine 0.5 mg /kg was given when pain score was more than 04. Pain score was recorded at (0) minute, 30 minutes, 2,6,12 and 24 hrs. Complications were also noted.

RESULTS

In this study sixty patients in two groups having 30 patients each were studied independently and then compared for onset of block, duration of analgesia and complications. The mean age for patients in dexamethasone group (B) was 34.37 with standered deviation of 11.30 versus 31.50 and standered deviation of 9.91 in bupivacaine alone group(A), which are almost similar as shown 1 in (Table1). There was a significant difference in the onset time of the sensory block (15.73 = 2.92 min) in dexamethasone group(B) versus (17.97 = 4.41 min) in bupivacaine alone group(A). A p value of (p=0.04) showing that onset was early in the dexamethasone group(B) (Table 2).

Table No. 1: Distribution of cases by age

Age	Bupivacaine plus normal saline(A)		Dexamethason adjucant to Bupivacaine (B)	
	Number	%	Number	%
20 – 30	18	60.0	14	46.7
31 – 40	08	26.7	09	30.0
41 – 50	03	10.0	04	13.3
51 – 60	01	03.3	03	10.0
Total	**30**	**100.0**	**30**	**100.0**
Mean ± SD	**31.50 ± 9.91**		**31.50 ± 9.91**	

However onset time of motor blockade (7.77 = 2.64 min) in dexamethasone group (B) versus (9.13 = 3.29 min) in bupivacaine alone group (A) were not significantly different and p value of (p=0.082) showing that onset of motor block was similar in both groups (Table 2). The duration of sensory blockade (17.37 = 1.58 hrs) in dexamethasone group (B) versus (10.4 = 0.93 hrs) in bupivacaine alone group(A) showed a prolonged effect of sensory blockade with addition of dexamethasone (p=<0.001) (Table 3). Also

duration of motor blockade (8.23 = 0.97 hrs) in dexamethasone group (B) versus (6.23 = 0.81 hrs) in bupivacaine alone group(A) was significantly longer in the dexamethasone group (P<0.001) (Table 3).

The mean of rescue analgesia required in dexamethasone group(B) was 17.57 hrs with standered deviation of 1.52 verses 10.40 hrs with standered deviation of 0.93 in bupivacaine alone group(A)was more than seven hours later than bupivacaine alone group(B) providing prolonged post operative pain relief (Table 4).

Complications observed were two cases of horners syndrome and one case of phrenic nerve block. No medical intervention was needed in these instances and condition resolved after 3 to 4 hours. No case of pnemothorax was observed in this study.

Table No. 2: Onset of sensory & Motor Block Comparison between Group A and B

	Onset of Sensory Block				Onset of Motor Block			
Group A Bupivacaine + Saline	**Mean**	**SD**	**t value**	**p value**	**Mean**	**SD**	**t value**	**p value**
	17.97	4.41	2.311	0.024	9013	3.29	1.770	0.082
Bupivac + Group Dexamethason	15.73	2.92			7.77	2.64		

Key: SD Standard Deviation.

Table No.3: Duration of Motor Block Sensory & Motor Comparison of Group A and B

	Duration of Sensory Block				Duration of Motor Block			
Group A Bupivacaine + Saline	**Mean**	**SD**	**T value**	**P value**	**Mean**	**SD**	**t value**	**p value**
	10.40	0.93	-20.74	<0.001	6.23	0.81	-8.629	<0.001
Group B Bupivac+ Dexamethason	17.37	1.58			8.23	0.97		

Key: SDStandard deviation

Table No.4: Rescue Analgesia required Comparison between Group -A and Group-B

Group	Mean	SD	t value	P value
Group-A (Bupivacaine + Saline)	10.40	0.93	-21.97	<0.001
Group-B Bupivacaine + Dexamethason	17.57	1.52		

Key: SDStandard deviation

DISCUSSION

Brachial plexus blocks are most extensively used peripheral nerve block technique. The advantages of Brachial plexus block include less nausea, vomiting, no airway intervention and earlier discharge for out patients. The Brachial Plexus supplies all of the motor and most of the sensory function of upper limb. The supraclavicular approach blocks the Brachial plexus in the area where it is more compact, Thus it has fastest onset time of any of the arm blocks and is ideal for surgery of forearm, elbow and hand. Supraclavicular block provide postoperative analgesia of short duration even when local anaesthetic like bupivacaine is used alone. Use of Dexamethasone with Bupivacain has been shown to reduce the overall pain scores and analgesia requirement in the post operative period without any apparent adverse effect[17]. Adding a steroid to local anaesthetic solution may not be indicated for all patients, for example diabetic patient may experience hyperglycemia and patient with continuing infectious process may be effected by anti-inflammatory effects of steroids. The safety of dexamethasone use in nerve sheath may raise some concerns.

In animal experiments, repeated intrathecal injection of small dose betamethasone[18] and triamecilononacetate[19] did not induce spinal neurotoxicity. In one study after approximately 2000 intrathecal injection of dexamethasone (8 mg) in 200 patients for treatment of post traumatic visual disturbance, no neurological disorders were found at one month follow up[20]. Nerve injury is a rare complication of dexamethasone injection and it usually occurs in the context of needle trauma[21]. Adverse effects with single dose of dexamethasone are probably extremely rare and minor in nature and previous studies have demonstrated that the short term (<24h) use of dexamethasone was safe[22]. Complications observed in this study were two cases of Horner's syndrome and one case of pherenic nerve block. All of these complications were watched carefully without any intervention and they all resolved in two to four hours. No case of pnemothorax was observed in this study. Complications of supraclavicular block of brachial plexus using compound classic and perivascular technique was studied in Iran in 320 patient over 3 years with result showing that most common complication was Horner's Syndrom 34%[23]. The second most common complication was hematoma 8.8% and lastly vascular injuries 2.5%. Rate of hematoma was directly related to the number of needle punctures. It was concluded in the study that with attention to avoidance of excessive needle advancement after the beginning of paraesthesia and slow injection of drugs, the rate of failure and complications can be reduced. Our results showed that

sensory block tended to last longer as compared to motor block which agrees with the observation be de Jong et a1[24]. These authors explained that larger motor fibers require a higher concentration of local anaesthetic than small sensory fibers. In recent years work done on supraclavicular block with dexamethasone as an adjuvant to local anesthetic shows significant increase in duration of post operative analgesia. Shrestha BR etal, compared the analgesic efficacy of local anaesthetic with and without dexamethasone in supraclavicular brachial plexus blocks[25]. In this study brachial plexus block was done with 40 – 50 ml of local anaesthetic with 1: 200, 000 adrenaline in one group and in the other group the block was performed with the same amount of local anaesthetic with dexamethasone. The onset of action and duration of analgesia in the two groups were compared and found to be significantly increased in dexamethasone group without any unwanted effects.

The analgesic effects of corticosteroids are suspected to be medicated by their anti inflammatory or immune suppressive effects. Holte and Kehlet investigated with the strong anti-inflammatory effect of glucocorticoids following major surgeries and found that single dose of glucocorticoid inhibits the synthesis and release of Pro inflammatory and anti inflammatory mediators[26]. The use of corticosteroid as an adjuvant to local anaesthetic for peripheral nerve block rarely has been described, and its mechanism of action is not clearly understood. The glucocorticoids cause skin vasoconstriction which is mediated by occupancy of classical glucocorticoid receptors rather than nonspecific pharmacological mechanism[27]. One possibility of prolong local anaesthetic effect is because of systemic effects of dexamethasone. Another believes that analgesic properties of corticosteroid are the result of their systemic effect[28].

The concept of steroid administration to address postoperative pain is still evolving. Steroids with or without local anaesthetic agents have been administered by surgeons across various medical specialties and with the use of different methods. The ideal dose and mode of administration are yet to be determined, but there is overwhelming evidence that corticosteroid increase the efficacy of postoperative pain reduction in a manner that does not compromise patient safety. The approach is simple and inexpensive. However there is still a need for further studies to validate the use of dexamethasone with bupivacaine or similar combinations as protocols of choice for post operative analgesic.

CONCLUSION

In conclusion, the addition of dexamethasone to bupivacaine 0.5% solution in supraclavicular brachial plexus block prolongs the duration of sensory and motor blockade and provides greater pain relief, also it shorten the onset of sensory block but has no effect on onset of motor block. Complications associated with the block and dexamethasones were also negligible. Further studies are needed to evaluate the optimal dose of dexamethasone to be used for prolonged brachial plexus block as well as the mechanism of this effect, also to evaluate any side effects associated with it.

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Original Article

Diagnostic Evaluation of Fine Needle Aspiration Biopsy in Lung Cancer

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ABSTRACT

Objective: To evaluate the yield of Fine Needle Aspiration Cytology (FANC) in suspected lung cancer.
Study Design: Observational Study
Place and Duration of Study: This study was conducted at the Department of Pulmonology, Bolan Medical College Quetta from Jan 2009 to Aug 2009.
Materials and Methods: Thirty Cases both male and female were included in the study. The lesion was localized with recent PA and Lateral Chest X-Rays and ultra sound. A 22 guage needle was attached to 10cc syringe. The needle was introduced into the lesion under local anaesthesia. On reaching the mass slight suction was applied and few in and out movements were made, the needle was taken out and 3-4 slides were made of the aspirate , fixed immediately with alcohol.
Results: Among thirty cases, malignancy was proved in 21 cases while in 3 cases FNAC was positive for malignancy but no call type was revealed. In six cases malignancy was not found. Among proven 21 cases 14 had squamaus call carcinoma , 6 had Adeno carcinoma and one had small call carcinoma.
Conclusion: FNAC of the peripheral lung lesions is a safe , quick and reliable method of establishing diagnosis of lung cancers where bronchoscopic help is not available or the tumor is not with in reach of bronchoscope.
Key Words: Fine needle aspiration cytology (FANC) Pneumothorax (PTX).

INTRODUCTION

Bronchongenic carcinoma is the most commonly diagnosed malignancy through out the world[1-2].
Different studies conducted in Pakistan show that malignancies of the lungs are common among males in Pakistan[3-6].
Fine needle aspiration is widely used technique[7]. Percutaneous FNAC/B of the lung has been used in the diagnosis of chest diseases over a century. The first reported aspiration lung biopsy was performed in 1883 by Lyden and three years latter, Menetrier was the first to diagnose lung carcinoma by FNA[8].
About 80% of lung cancer are visible on bronchoscopy, which is indicated in most patients in whom diagnosis is suspected. Peripheral lung cancers are not visible at bronchoscopy and fine needle aspiration cytology/biopsy can be done for confirmation of diagnosis[9]. FNAC allows a minimally lnvasive, rapid diagnosis of tissue but does not preserve its histological architecture[10].

MATERIALS AND METHODS

This study was conducted in The Plumonology Department Bolan Medical Collage Quetta. Thirty patients were included in this study who were suspected to be suffering from lung cancer on clinical and radiological basis. Prior to FNAC all the cases underwent fiberoptic bronchoscopic examinations. The lesion was localized with recent PA and lateral chest radiograph and lateral chest radiograph and ultrasonographically. A 22 gauge needle was used and it was attached to 10 cc of syringe. The needle was introduced into the lesion under local anaesthesia. On reaching the mass, Slide suction was applied and few in and out movements were made, the needle was taken out and 3-4 slides were made of the aspirate. Which were fixed immediately with alcohol and send to pathology laboratory for cytological examination.

RESULTS

Age and sex distribution is shown in table 1. The highest incidence was observed in the 4th and 5th decades. Among the 30 cases 26 (87%) were males and 4(13%) were females. The male to female ratio was 6:5:1.

Table No.1: Age and Sex Distribution

Age	Male	Female	Total	Percentage
31-40	2	---	2	6.66
41-50	6	1	7	23.33
51-60	9	2	11	36.66
61-70	7	1	8	26.66
71-80	2	---	2	6.66
Total	26	4	30	
%age	87	13	100	100

Table No.2: Presenting Complaints 30 cases

Symptoms	No. of Patients	Percentage
Cough	25	82%
Chest Pain	20	67%
Haemoptysis	18	60%
Weight Loss	15	50%
Fever	13	43%
Expectoration	12	40%
SVCO	2	6%
Anorexia	2	6%

In present study the commonest presenting symptom was cough in 25 (83%) cases followed by chest pain in 20 (67%) cases. Other symptoms according to frequency of occurrence are shown in Table 2.

Malignancy was confirmed in 21 (70%) cases and in 3 (10%)Cases there was suspicion of some underlying malignancy, and no diagnosis could be made in 6 (20%) cases.

Table No.3: Diagnostic Yield of FNAC

Diagnosis Made	No. of Cases	% age
Malignancy Confirmed	21	70%
Suspicion of Malignancy	3	10%
No Diagnosis	6	20%
Total	30	100%

Out of these 21 (70% Malignancy proven case 14 (66.6%) had squamous cells carcinoma. 6 patients (28.6%) had adenocarcinoma while one patient (5.8%) had small cell carcinoma.

Table No.4: Cytological Typing of Malignancy

No. of Patients	Percentage	Malignancy
14	66.6	Sq. Cell CA
06	8.6	Adeno CA
1	5.8	Small Cell CA
Total 21	100%	

Table No.5: Complications of FNAC

No. of Cases	Percentage	Complication
3	10%	PTX
4	13%	Chest Pain

DISCUSSION

Bronchogenic carcinoma is the most common malignant tumour. This is the leading cause of cancer deaths in men and women. Thirty five thousand people die each year from lung cancer with a male to female ratio of 3:5:1 in U.K[11].

The incidence of lung cancer is between age fifty five and sixty five years[12]. In the Present study the highest incidence was observed in the age group from 50-70 years. Cigarette smoking is a direct cause of about 85% lung cancer. In this all male patients were smokers while the female patients denied smoking.

Different techniques used to diagnose pulmonary malignancies include bronchoscopic biopsy, brushings, washings, Transthoracic core needle biopsy, open lung biopsy, lymph node biopsy and Fine Needle Aspiration Biopsy / Cytology[1].

Fiberoptic bronchoscopy has revolutionized the diagnosis of bronchogenic carcinoma but is not helpful in peripheral lesions. These lesions always pose difficulties in the diagnosis. These difficulties have been overcome by the introduction of Fine Needle Aspiration. Fine Needle Aspiration has gained tremendous popularity in the last few decades [13-14]. FNAC is useful in deciding the therapeutic approach in patients in whom results of bronchoscopy and sputum cytological study are not diagnostic[15].

When FNAC is performed properly the sensitively is high 80% and specificity more than 90% for malignant diseases, but is considerably less accurate for benign diseases[7].

Other studies which have been conducted in different countries, the sensitively of FNAC in diagnosing malignant disease of the lungs has varied from 64% to 97%[16-18]. Diagnosing metastatic or recurrent malignanacy by FNAC generally has high specificity and sensitivity[19].

In the present study, the sensitivity of FNAC was 70% which is almost similar to other studies[16-18].

There are four major histotypes of primary lung cancer. Squamous cell carcinoma and adeno carcinoma are the main types, about 30-35% each small cell carcinoma and large cell carcinoma account for about 20-25% respectively[20].

Initially the incidence of squamous cell carcinoma used to be high i.e. 45-60% and Adeno carcinoma was low 10-12% but now different studies shown that pattern of bronchogenic carcinoma is changing and adeno carcinoma is becoming more prevalent[21].

The present study showed, sq. cell CA 66.6% adeno carcinoma 28.6% and small cell carcinoma 5.8% . This is similar to the reported incidence in the past from other countries. This may be due to the fact that bronchogenic carcinoma formerly in our community was not a common disease. It is now towards increase due to increased cigarette smoking in the community. The behaviour may be similar as it used to be in other communities in the past. Somehow the study was small of only 30 cases and a larger study is required to further support this incidence.

The complication of pneumothorax ranges from 9% to 61%[22] while in our study the percentage of pneumothorax was only 10% and four patients (13%) complained of chest pain

CONCULUSION

From the present study it is evident that FNAC of the peripheral lung lesions or larger lesions is very safe, quick and reliable method for establishing diagnosis of lung cancers where bronchoscopic help is not available or the tumour is not with in the reach of bronchoscope. The complication rate is low. Only 10% developed pneumothorax, out of which one needed chest intubaion for three days. Thirteen percent had mild chest pain. Hence it is recommended that FNAC should be performed more frequently without any fear when ever indicated.

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Original Article

Medical Rehabilitation Services for Addict Prisoners Confined in District Jail Lahore

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ABSTRACT

Introduction: Drug addiction is one of the leading causes of crime. The quality of health care in prisons is patchy around the country and do not meet the needs required. Rehabilitation is a planned intervention that attempts to change or alter whatever aspects cause addiction and to reduce the likelihood of recidivism.

Objectives: The objective of the study was to assess the medical related rehabilitative services rendered by prison department for addicted prisoners and to formulate recommendations for improvement of rehabilitation services in prisons.

Study Design: Observational Study.

Place and Duration of Study: This study was conducted in District Prison Lahore in February, 2011.

Materials and Methods: Total population of District Jail Lahore was 4330 out of which 1072(24.8%) were addicted prisoners. Out of 1072, 218 addicted prisoners were randomly selected for the study. Majority of addict prisoners 153 (70.2%) were 21-40 years old while 127 (58.3%) were illiterate. 179 (82.1%) addict prisoners were in habit of using opiate derivatives. 137 (62.8%) addict prisoners were not provided with detoxification treatment upon entry into to prison. 120(55%) addict prisoners were provided medical facilities after delay of many hours. Personal hygiene was good while orodental hygiene was just satisfactory.

Results: Illiteracy, scarcity of resources, low socio-economic status and poverty were the major factors that motivated them to start taking drugs. Literacy rate should be increased, vocational training, health education and proper job opportunities should be provided to young population to overcome the problem of drug addiction.

Conclusion: Addict prisoner must have access to doctors and treatment must be provided to them without delay as loosing freedom should not mean losing health. Drug trafficking in Jail should be controlled. Addiction should be treated as a disease and not as a sin which will help addicts to keep them away from drugs.

Key Word: Addiction, Prisoners, Rehabilitation Services, Jail.

INTRODUCTION

Prison derived from old French word prisoun is a place in which people are physically confined and usually deprived of a range of personal freedom. Other terms are penitentiary, correctional facility and jail. [1]

In the United States "jail" and "prison" usually refer to different subtypes of correctional facility. Jails are conventionally institutions which house both inmates awaiting trial and convicted in less serious offences. Prisons only house convicted felons, usually for longer periods of time than jails[2]. While in Pakistan and UK jails or prisons are meant to keep all kind of condemned, convicted and remand prisoners[3].

Drug abuse refers to the use of a drug for a purpose for which it was not intended, or using a drug in excessive quantities. Drug addiction is a state of physical or psychological dependence on a drug.[4] All sorts of different drugs can be abused. Peer pressure, emotional distress, poverty, illiteracy and low self-esteem can all lead individuals to abuse drugs. Another important factor is the widespread belief that drugs can cure tuberculosis, coughs, pains of all kinds, piles, hernias, rheumatism, stomach ulcers and dysentery.[5]

Many of the petty crimes such as burglary and theft, are committed by addicts who need money to purchase drugs.[6]

The largest numbers of drug addicts to be found in any institution are in prison throughout Pakistan, which constitute somewhere between 20-40%.[7] In 15.07.2010, total number of prisoners confined in 32 jails of Punjab were 52863 against the capacity of 21527 inmates accommodation.[8] Reported number of prisoners held in 211 countries all over the world are 9.25 million.[9] Almost 50% are incarcerated in the US, Russia and China.[10] Most addicts are between 20 and 40 years of age which is the productive age for the country development. The quality of health care in prisons is the country is not up to the standard required. Many addict prisoners have had little or no regular contact with health services and rehabilitation services before coming to prison. They tend to come from sections of society with high level of social exclusion and have poorer physical and mental health than the general population. Most prisons do not succeed in making themselves drugs free. Imprisonment does not seem to motivate prisoners to stop their drug use. In some cases prisoner may even start using more drugs or relapse from withdrawal due to factors associated with imprisonment such as depressing environments, lack of purposeful activity, and lack of contact with family and friends.[11]

Upon entering into prison the addict inmates are not properly interviewed for predisposing psycho social factors which leads them to initiate drug taking

behavior along with kind and amount of drug to which he is used to. They are confined in barracks specified for addict prisoners. These barracks are over crowded through out the province. Symptomatic medication is being prescribed to those addicts whose condition is deteriorating or who are experiencing severe withdrawal symptoms. Addict's treatment regimen consists of major tranquilizer such as Largectil, Serenase or Kemadrin the other medicines used are diazepam, Lexotanil or Phaenargan.[7] Other aspect of this issue is that healthcare staff cannot determine the beginning or end of treatment because prisoners are liable to be moved or released from the prison with little notice.

Currently except for Peshawar jail, there are no programmes or services available in other prisons for treatment and rehabilitation of drug addicts. This was made possible in Peshawar Jail with the collaboration of NGO Dost Foundation by establishing a programme using the 12- step modality in the jail.[7]

In fact, addict inmates who receive effective treatment during incarceration have a recidivism rate that is 50 percent lower than non-addict inmates. In the long run, treating addicts in prison could save a considerable amount of money by addict rehabilitation.

Very few studies have been conducted about rehabilitation services for addicts in prisons of Pakistan. Keeping this in view the present research was planned to evaluate the treatment, other medical aspects and rehabilitation services provided to drug addicts at District Jail Lahore to improve the health of Prisoners and to suggest some beneficial measures.

MATERIALS AND METHODS

This study was conducted in District Prison Lahore to assess the medical related rehabilitation services provided to the addict prisoners in February, 2011. Out of 1012 male addict prisoners, 218 were selected by convenient sampling based upon their willingness. The prisoners were interviewed, on structured performa, demographic profile recorded. Information about the rehabilitation services was entered in performa, data analyzed and presented in tabulated form.

RESULTS

This study was conducted to assess the medical related rehabilitative services rendered by prison department for addict prisoners.

The population studied in prison comprised of 218 (male) drug users, the minimum age was 12 year, the maximum age was 80 years, In age group up to 20 years there were 24 (11%) drug users, maximum number 153 (70.2%) of drug users were in group 21 – 40 years, in age group 41 – 60 years there were 34 (15.6%) drug users and in age group of 60 – 80 years there were 7 (3.2%) drug users. (Table No. 1)

As per educational status 2(0.9%) had passed F.A, 5 (2.3%) were matriculate, 10 (4.6%) were under matric, 33 (15.1%) were able to write and 41 (18.8%) were able to read. Rest of 127 (58.3%) were illiterate. (Table – 2)

Among these drug users 179 (82.1%) were in habit of using opiate derivatives, 18 (8.3%) were I/V drug users, 14 (6.4%) used Bhang, 4 (1.8%) were alcoholic and 3(1.4%) were using crack (cocaine) (Figure – 1)

Reasons for initiation of drug usage by studied population were very varied as 118 (54.1%) started taking drugs for sexual pleasure, 71 (32.6%) were inspired by peer pressure, 26 (11.9%) to overcome grief and depression, 3 (1.4%) in anger to show agitated behavior against family. (Figure – 2)

Out of the 218 addicts prisoners, 137 (62.8%) were not provided with detoxification treatment upon entry into prison, 62 (28.5%) addicts were given detoxification treatment in barracks while 19 (8.7%) were detoxified in the hospital (Table No. 3).

To overcome urge for drugs in prison out of 218, 29 (13.3%) were taking tea, 177 (81.2%) were smoking cigarettes, 2(0.9%) were chewing tobacco pan and 10(4.6%) were using naswar (Figure – 3).

Table No.1: Frequency distribution of Age Addict Prisoners n= 218

Age Group	Frequency	Percentage
Less than 20 Years	24	11.0%
21 – 40 Years	153	70.2%
41 – 60 Years	34	15.6%
61 – 80 years	7	3.2%
Total	218	100.0%

Table No.2: Frequency distribution of educational status of addict prisoners n= 218

Educational Status	Frequency	Percentage
F.A.	2	0.9%
Matric	5	2.3%
Under Matric	10	4.6%
Able to Write	33	15.1%
Able to Read	41	18.8%
Illiterate	127	58.3%
Total	218	100.0%

Table No.3: Frequency distribution of detoxication treatment of addict prisoners n = 218

Detoxication Treatment	Frequency	Percentage
Not received	137	62.8%
Received in jail hospital	19	8.7%
Received in barracks	62	28.5%
Total	218	100.0%

Out of 218 addict prisoners, 9 (4.1%) had no access to doctor, 75 (34.4%) were given treatment without any delay, 120 (55%) were provided medical facilities after delay of many hours while 14 (6.4%) were attended by medical staff after delay of many days (Table – 4).

The result about the health education of hazardous effects of drugs and associated disease indicated that, 189 (86.7%) addict prisoners were told at least once

about the ill effects of addiction along with ill effects of associated diseases like Hepatitis B, HCV, HIV/AIDS and STI. 8 (3%) were provided health education about ill effects of addiction while 21(9.6%) were not provided any education about ill effect of drugs or associated disease (Table – 5).

Table No. 4: Frequency distribution of access to medical facilities in jail n= 218

Access to Doctor	Frequency	Percentage
Nil	9	4.1%
Immediate	75	34.4%
Delay of 3 – 24 hours	120	55.0%
Delay of 1 – 7 days	14	6.4%
Total	218	100.0%

Table No.5: Frequency distribution of health education about hazardous effects of drug and associated diseases n= 218

Health Education by Jail Management	Frequency	Percentage
Hazards of addiction only	8	3.7%
Related diseases hazards	189	86.7%
Nil	21	9.6%
Total	218	100.0%

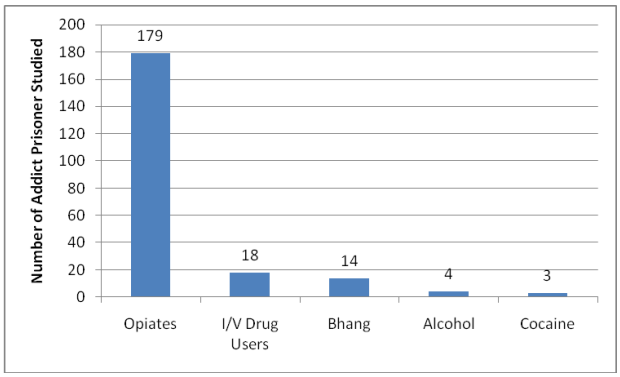

Figure No. 1: Type of drugs used by studied population

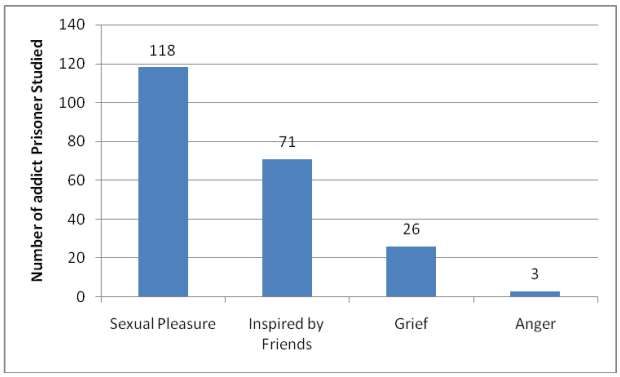

Figure No. 2: Reasons for initiation of drug usage by studied population

About the availability of drug and its usage in jail and in judicial lock up of session / civil courts, 64 (29.4%) prisoners said that smuggled drugs were being used in jail for addiction while 154 (70.6%) denied that. 97 (44.5%) prisoners gave opinion that drug were used in judicial lock up attached with courts while remaining 121 (55.5%) said that drugs were not available in judicial lock up (Figure – 4).

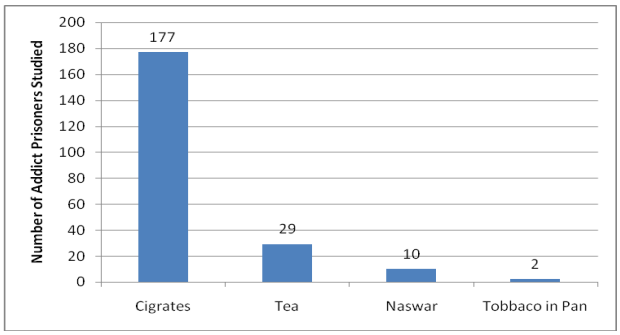

Figure No. 3: Items used in jail by addict prisoners to overcome urge for addiction

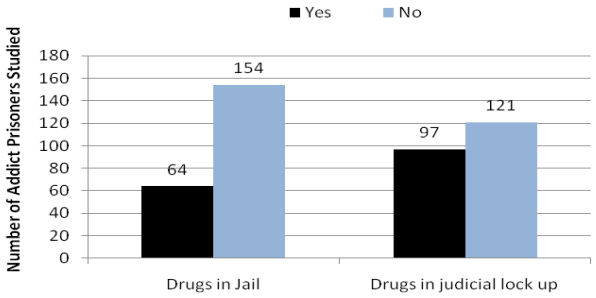

Figure No.4: Availability of smuggled drugs and its usage in jail and judicial lock up

DISCUSSION

A large number of prisoners are incarcerated all over world consisting of a large proportion of drug addicts or drug users which are increasing day by day and becoming a burden over jail authorities as well as over the entire country.

Rehabilitation is a planned intervention that attempts to change or alter whatever aspects cause addiction and to reduce the likelihood of recidivism. Drug rehabilitation is the medical psychotherapeutic treatment used to enable a patient to cease substance abuse and become a normal and productive member of society.

Present study revealed that District Jail Lahore consisted of 24.8% addict prisoners of total jail population. This corresponds to findings of the study, conducted by Saeed and Zafar who reported that population of Central Jail Faisalabad comprised of 24% addict prisoners[4]. Another study showed that China had 1570000 prisoners on July, 2010; out of these 10% were illicit drug users[12]. Majority 70.2% of the drug users in our study belonged to productive age group 21-40 years. A similar study conducted at Tai Lam Jail, Hong Kong, showed that majority of addicts was in the same age group[13]. They were taking drugs due to

domestic problem like scarcity of resource and other family issues. Drug addiction was one of the leading causes of crime which brought them into the jail. With little attention of society and government initiatives, these people can become a useful citizen. Due to negligence of parents, children start taking drugs in early age. So the parent's role can not ignored to keep their children away from such ill habits.

The results of our study clearly indicated that 58.3% of addicts were illiterate and among those majority 27.5% were laborers prior to confinement. In similar study conducted in Faisalabad, showed that 94.9% were illiterate[5].This indicated that literacy level has significant importance and illiteracy was the major cause of drug abuse. Proper education will be helpful to prevent them from taking drugs.

Maximum usage of opiate derivatives by drug addicts is supported by, similar studies done at Hong Kong and Central jail Faisalabad where 80% and 73.7% addict prisoners were using opiate derivatives respectively [13,4]. In UK majority of male prisoners were poly drug users. 24% were using crack, 27% amphetamine 49 % Opiate derivatives and 58% were using alcohol[11]. In another study it was found that in prisons of UK prisoner use different items for addiction for example, Cannabis, Heroin, Amphetamine and Crack.[14] In American prisons more than 50% prisoners are alcohol and drug addicts.[15] Alcoholics and crack users were less in our study which may be because alcohol is not easily available and crack is much costly in our society.

Commonest cause of addiction is to get sexual pleasure which was also found in other studies.

Timely and proper treatment is the basic right of the prisoners during their stay at Jail. It was found that majority (61.4%) were provided with delayed treatment. In US jails only 10% of addict prisoners in state prison and 3% in local jail receive formal treatment prior to release.[16] In studies in Central Prison Rawalpindi and district Jail Peshawar, it was found that the jail hospital as a routine do not provide medical intervention as they have no provision of medicine for detoxification[17]. Only 28% of jail and prison administration of USA reported that their institution had detoxified the arrestees.[18] Timely services along with essential drugs are very much required to rehabilitate such people.

Health education seminars were held for addict prisoners about how to avoid drugs and information about hazardous affects of drugs. Prisoners were also told about drugs associated diseases like Hepatitis B, HCV, HIV/Aids and STIs but these seminars were not held regularly. In contrast to our study in District Jail Peshawar, counseling and health education seminar were held daily for 30 days for each group of addict prisoners[6]. That was made possible with the help of trained team of NGO i.e. Dost Foundation. In another study it was seen that injection drug users are a high risk group for HIV epidemic and evidence shows that blood borne viruses spread upto 10 times quicker in prisons setting than in other environment.[19]

Another major problem was also observed that drugs were available in the jail for the addict prisoners. 29.4% prisoners confirmed that smuggled drugs are available in jail while 44.5% prisoners gave information that drug are available in judicial lock up attached with courts. The study conducted at Central Jail Faisalabad confirmed that 61% prisoners were using drugs in jail[3]. Above results indicate that drugs are easily available in the jail. A survey of drug treatment unit at Saughton prison Edinburgh indicated that drugs are smuggled in to the prisoner and readily obtained in the residential block.[20]

CONCLUSION

Drug addiction is a major public, social and health problem of the world. The pattern of drug addiction varies from country to country and society to society, thereby creating somewhat different social and political consequences. However all societies with drug abuse or addiction share the problem of diseases, poverty, crime, loss of productivity and disturbed family life.

Pakistan is a country where crime rate is increasing rapidly due to poverty which causes frustration and leads people toward addiction and crime. Our jails are crowded by addict prisoners. District jail Lahore was selected to know the rehabilitative services for addict prisoners confined in the jail. Low level of education, bachelor life, social degradation and poverty were the major issues for motivations towards drug addiction. Opium derivatives were the major source of addiction commonly used for purpose of sexual pleasure.

Detoxification measures in jail were not satisfactory and health education was also not up-to required standard. Personal hygiene of addicts was satisfactory while orodental hygiene was poor.

Psychological support was poor both from medical and administrative authorities of jail along with relatives. Comfortable environment like, sunlight, silence, proper space, ventilation, fresh air, proper heating and cooling facilities are also part of rehabilitation services.

Trafficking of drugs inside jail and its availability in court's judicial lock up is an unacceptable situation which should be reduced by participation of jail and police administration and by implementation of law.

Recommendations

Illiteracy is a root cause of drug addiction. Literacy rate should be increased and proper job opportunities should be provided to young population to overcome the problem of drug addiction.

Detoxification treatment should be provided to all addict prisoners at the time of their entry in jail.

A psychologist must be available in the district jail hospital to help the addict prisoners to give up the use of drugs.

Addict prisoners must have access to doctors and treatment must be provided to them without delay.

Friends and family members must visit the addict prisoners on regular basis to share their problems and provide support.

Strict and effective measures to control drug trafficking into the jail should be implemented and severe punishment should be given to the drug trafficking and financier.

Drug abuse treatment centre should be established inside the jail and proper facility should be provided for treatment of addicts in the jail and Medical Officer should be trained for this purpose.

Health education Programme should be launched regularly inside the jail to inform the addict prisoners about hazardous effects of drugs and associated diseases.

Effort should be made to remove the causes responsible for addiction such as mental worries, domestic problem, frustration, and economic problem etc.

Facilities for vocational training to keep the drug addict busy should be provided in the jail.

Mass media campaign on television, radio and newspaper should be considered to motivate addicts for rejection of addiction.

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Original Article

Increasing Tendency of Suicide Terrorist Attacks in Pakistan

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ABSTRACT

Purpose of Study: The main focus of studying suicide terrorist attacks in Pakistan was to assess the damages produced by these attacks and to study various factors which stimulate the attackers not only to blow themselves but also to take lives of many innocent peoples who are not involved in any activity provoking for these attacks.

Objective: To study the increasing tendency of suicide terrorist attacks in Pakistan with reference to various factors involved in the issue.

Study Design: Data is based on different sources and personal study of some of the cases which were visited for forensic examination.

Place and Duration of Study: This study was conducted at Rawalpindi, Islamabad and Muzaffarabad Azad Kashmir. The duration of study was from 2005 to 2011.

Materials and Methods: The data was collected from different sources and by personal study.

Results:-Increasing tendency of suicide terrorist attacks in Pakistan and their outcome is shown in tables 1& 2.

Conclusion:- Tendency of suicide terrorist attacks in Pakistan is increasing day by day with the involvement of external factors.

Key Words: Suicide, Terrorist attacks, Blast injuries, Explosive material, Extremist,

INTRODUCTION

In a suicide terrorist attack a terrorist carrying explosive material blows himself on a target to cause maximum number of deaths and serious bodily injuries to the victims and thus creating panic. These attacks are called suicide because the attackers use the means which inevitably bring about the end of their own lives, and as these attacks are intended to cause the deaths of other persons therefore, they are also rightly given the name as homicide attacks.

The suicide terrorist attacks are the ugliest and the most terrifying form of terrorism in Pakistan. During the study of the project, it was noticed that from 2005 to 2011, Pakistan has witnessed some of the worst blood sheds due to suicide attacks in the country. Moreover, it is regretting and condemning that the most of the attacks were targeted against the innocent civilians at busy places like markets, schools, mosques, shrines and funeral prayers. Some of these were targeted on army centres, police training centres and police stations.

The act of giving one's own life and at the same time taking the lives of many other innocent noncombatant persons is a very difficult task therefore; there must be certain factors which compel the suiciders to do such brutal and inhuman acts. It is quite obvious that the main evil culprit for provoking the religious extremist groups to conduct suicide attacks are the anti Islamic bad policies of Western countries and their wish to become dominant over the world. These policies have developed hatred particularly in the religious extremist warring groups. It was in the reaction of US invasion in Iraq and Afghanistan that the religious insurgent elements carried out the wave of suicide attacks in the region.

As regards Pakistan, the turning points were obviously the involvement of foreign agencies in our internal affairs, operation in Lal Masjid Islamabad, military operation in tribal areas and drone attacks in Pakistan. The religious warrior groups overtone to martyrdom and having belief that their sacrifices will be rewarded in the afterlife, designed the suicide attacks.

Terrorists usually use whatever is available to improvise explosive devices. The most commonly used materials are commercial gelatin, sugar sodium chlorate mixture, Nitro Gricol, Nitro cellulose, Nitro Naphthalene, Ammonium Nitrate, Fuel Nitrate oil, detonators and shrapnel. Different approaches are utilized in assembling the devices. The container may be of any material such as plastic, glass bottles, metallic pipes or cylinders which can be made airtight. The explosive material is either used in vests or in belts and the detonating device is operated by switching on the fuse. In another way a vehicle with explosive material is hit on the target.

Outcome of suicide blasts depends on various factors like physical characteristics of explosive material, distance of victim from point of detonation, surrounding environment and other environmental hazards. There are four basic ways in which the injuries are caused to the victims which are, injuries due to primary, secondary, tertiary and miscellaneous effects. A person can be injured in a terrorist blast in the following ways:

(i). When he is wearing explosive material and is in direct contact with the material then his body is blown to pieces which are dispersed in all directions to hundreds of yards. The head, face and lower limbs are usually found from the scene while the rest of the body is blown away to pieces.

Suicide Blast

(ii) The persons who are very close to the point of detonation receive multiple mixed fatal injuries due to pressure waves, vaccum waves, hot gases, fumes and splinters. Persons in this region receive severe extensive injuries and the most of the fatalities occur in this region. The specific injuries in this region are due to propagation of shock waves through the body. Transit of these waves through lungs can cause tear of alveolar septa, development of alveolar hemorrhages, pulmonary edema, respiratory distress and bronchopneumonia. This effect of lung injury is called "blast lung." Middle ear is also susceptible to be damaged resulting into deafness.

Figure 1

Figure 2

Figure 3

Figure 1 & 2 = Heads and faces of terrorists who were wearing vests with blast material and who blew themselves on the target at Muzaffarabad.

Figure 3= body of a severely injured person who was in close range of blast.

MATERIAL AND METHODS

The field of study of suicide terrorist attacks in Pakistan was selected for the period from 2005 to 2011. The data was collected from police department, Bomb Disposal Squad Department, Newspapers, Internet and self visit to some of the cases as a Forensic expert.

RESULTS

The intensity of suicide attacks in Pakistan has been progressively increasing in number and ferocity by the passage of time due to increase in the intensity of factors involved.

The following table will show year wise number of attacks and causalities from 2005 to 2011.

Table No.1: show year wise number of attacks and causalities from 2005 to 2011

Sr.No.	Year	No. of Attacks	Deaths	Injured
1.	2005	12	140	320
2.	2006	18	280	600
3.	2007	22	350	780
4.	2008	36	560	1230
5.	2009	86	1220	2350
6.	2010	52	1230	2160
7.	2011	25	450	560
	Total	**251**	**4230**	**8000**

From the view of the above table it is obvious that the number of attacks have progressively increased as a result, the damages were also proportionately heavy with the passage of time.

Depending upon various factors, the injuries produced in a terrorist explosive attack are tabulated as below:

Table No.2: Range with affected injuries and body parts involved

Range	Affected Injuries	Body Parts involved
Blast Contact	Parts blown to pieces & dispersed in an area of about hundred yards.	Those parts of the body which are in direct contact with the blast material.
Persons in very close range	Bodies are usually mutilated and receive mixed injuries i.e. burns, penetrating injuries, fractures, amputations and blast wave injuries.	Those parts of the body which are at the level of blasted material.
Persons at near range	Penetrating ballistic and blunt injuries.	Any part of the body
Persons at a distance from 10 to 50 yards	Few mixed penetrating and blunt injuries.	Any part of the body
Explosion related disease	Illnesses or diseases from complications of existing conditions for example Shock, Angina, Hyper Tension, COPD or other breathing problems for sudden fright, smoke, toxic fumes and dust.	Internal systems of the body.

DISCUSSION

Suicide bombing became a tool of revenge or terrorism about one century ago. The act of self sacrifice during combat appeared in large scale at the end of World War II when the defeated desperate Japanese Kamikaze bombers used to blow the explosive laden aircrafts at the targets. Later on the technique of suicide attacks was used as a military tactic aimed at causing material damage.

In 1972 Japanese Red Army (JRA), a terrorist organization and the popular front for liberation of Palestine (PFLP) conducted suicide operations in Israel. The members of JRA became the instructors of suicide explosive operations and established several training camps in Middle East.

The first modern suicide bombing was conducted in 1981 by Tamal Tigers in Sri Lanka who perfected the tactic and inspired its use elsewhere. Since then this practice has spread to dozens of countries. The hard hit areas are Sri Lanka, Lebanon, Israel, Chechnia, Afghanistan, Iraq & Pakistan.

The number of suicide attacks in the world has been growing continuously since 1980. In 1980 there were about 5 attacks in one year. In 2000 the number increased to 80 per year whereas in 2005 it grew to 460. Since 2005 Pakistan is being facing the worst of these suicide terrorist attacks. The most terrifying thing is that the attacks are being made in the busy public places killing thousands innocent persons. The matter which makes us more grieved and depressed is that the foreign agencies are providing frame work for these attacks and the sufferers are innocent Muslims. The attackers are facilitated and are backed by foreign agencies and the people who become the target are mostly innocent.

Medico legal aspects: The distribution of injures often helps to determine relationship of the victim to explosion. When pieces of multiple mutilated bodies are found then there is a problem concerning the number and identification of the victims. When portions of the bodies are recovered then the pieces must be carefully examined. The parts which can help in establishing the number of victims must be set aside. Pieces of scalp, skin, jaws, joints, spines, pelvis and limbs have to be arranged in separate identifiable groups. Remains of clothing can also help in identification.

Finger printing and DNA finger printing can help in confirmation of identification.

CONCLUSION

(I) The present situation of suicide terrorist attacks is no doubt connected with the Anti-Muslim policies of super powers and foreign agencies. These policies are creating more and more hatred for western countries. It seems that with the passage of time, not only the frequency of such incidences will increase but their intensity and brutality will also increase. It is therefore, the responsibility of western countries to realize the situation and review their policies particularly about the Muslim countries.

(2) .Muslim countries can also play vital role to stop these attacks by promoting their interrelations, trade and defense matters and should solve their problems by their own, instead of taking part in the war of others.

(3). The Religious scholars and warrior groups should re-consider their policies of killing innocent, non combat persons. They should firmly stick to the teachings of Islam by which suicide is strictly prohibited and killing of one innocent person is like killing of whole world.

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Original Article

Pattern of Ossicular Damage in Chronic Supparative Otitis Media

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ABSTRACT

Objective: The aim of this study is to determine pattern of ossicular damage in chronic supparative otitis media.
Study design: Prospective Study.
Place and Duration of Study: This study and was conducted in Karachi and Medical and Dental College and Abbasi Shaheed Hospital during the period of October 2006 to October 2010.
Patients and Methods: 288 patients were selected in this study and intra-operative findings of ossicles were noted.
Results: Total number of patients was 288, in which female was slight domination with 54.1%. Maximum incidence was noted between the ages of 16-30 years of age which was 180 patients. 209 patients presented with central perforation.140 cases had no ossicles damage while 148 cases had one or more ossicles damage. **Conclusion:** Chronic supparative otiits media may cause no ossicular damage of ossicles damage. Ossicles damage can be prevented by early diagnosis and proper management.
Key Words: Chronic supparative otitis media, Ear discharge, Ossicular damage.

INTRODUCTION

Otitis media is an inflammation of the middle ear[1]. Otitis media is three types, Acute, Subacute and Chronic supparative otitis media. Chronic supparative otitis media is the long standing infection of the middle ear cleft and characterized by discharging ear and permanent perforation [2]. Chronic otitis media is one of the common ear diseases in south east Asia having a prevalence of approximately 5.2% in the general population [3]. Frequent upper respiratory infection, poor socio-economic condition (overcrowded housing) [4], poor hygiene and nutritional definciency all may cause chronic supparative otitis media [5, 6.]

Chronic supparative otitis media (CSOM) clinically divided into, 1) Tubotympanic type, which is also called safe or benign type and 2) Attico-antral type which is also called unsafe or dangerous type. Risk of complication is more in latter type[7]. Pathologically, divided in to 1) healed otitis media, 2) Inactive (mucosal) chronic otitis media, 3) active (mucosal) chronic otitis media, 4) Active squamous epithelial otitis media 5) Inactive squamous epithelial otitis media. In many developing countries, CSOM is the most frequent cause of moderate hearing loss (40-60 db) [8]. Ossicular damage is one of the sequel of prolong discharge from the ear. It may present in both cholesteatoma and non-cholesteatomatous types of chronic supparative otitis media [9]. Ossicles damage this disease due to 1) Squamous epithelium, which penetrates of the Haversion system of the ossicles and causes avascular necrosis of the bone, 2) Inflammatory exudates which contain proteases, collagenouses and 3) Rim of granulation tissue which surrounds the cholesteatoma [10]. The aim of this study was to determine the status of ossicles in chronic supparative otitis media.

PATIENTS AND METHODS

This prospective study was conducted in ENT department of Karachi Medical and Dental college and Abbasi Shaheed hospital during the period from October 2006 to October 2010. During this period, all the patients who came in ENT department of Abbasi Shaheed hospital with the ear discharge proper history taken and complete examination were done and recorded in predesigned proforma. Culture and sensitivity of the pus were carried out. All relevant investigations were done. X-ray mastoid was also carried out and where required C-T scan was done. Before surgery, Pure tone audiometer and Speech audiometry was done. Intra-operative finding of ossicles were noted. During this period, 309 patients with chronic supparative otitis media (CSOM) admitted in the ENT ward in which 288 undergone surgery included in this study while 21 patients excluded from the study due to revision ear surgery or not fit for the surgery.

Inclusion Criteria: History of ear discharge three months or more

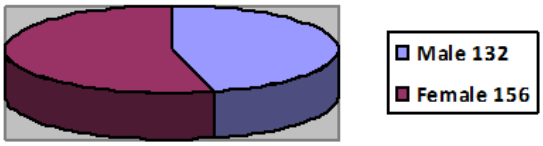
Exclusion Criteria:

- Revision ear surgery.
- Not fit for surgery due to medical reason.

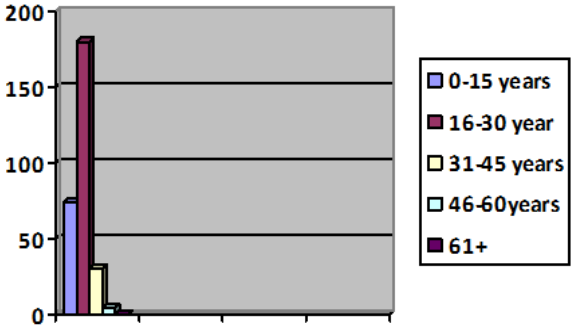
RESULTS

Total number of patients in this study was 288. Female was slight domination with 156 cases (54.1%). Female

male ratio was 1.18:1. Maximum incidence of age was between 16-30 years which was 180 cases followed by between 0-15 years of age which was 74 cases. Central perforation was found in 209 cases. In 140 cases, all ossicles were intact. Muti-ossicles damage was Malleus and Incus which was 56 cases. Single most frequent ossicle damage was Malleus, in 46 patients.

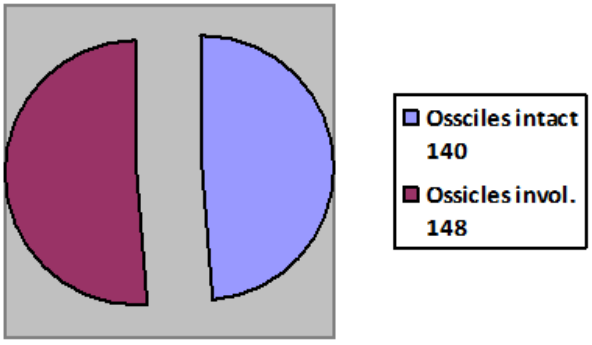


Pie Chart: Male and Female



Age Incidence

Perforation:
Central perforation: 209, 72.5%
Marginal perforation: 79, 27.4%



Ossicles Involvement

Table: Ossicles Involved

Absent Malleus	Absent Incus	Both malleus and Incus	Malleus, incus with suprastructur of stapes	Malleus, Incus with stapes
46	28	56	12	6

DISCUSSION

Chronic supparative otitis media(CSOM) is defined as "Persistent or intermittent ear discharge from non-intact tympanic membrane for more than three months". Chronic supparative otitis media may cause permanent damage to the ear, mastoid pathologies and extra-cranial complicaiton[11] The word wide prevalence of CSOM is 65 to 330 million people, and 39 to 200 million (60%) suffer from clinically having impairment [12]. In middle ear, intact ossicles are very essential to conduct the sound from external ear to inner ear. Howard (2007) stated that conductive hearing loss occur due to impairment of sound impulses before they enter the inner ear [13]. Hearing loss is reported in about 50% of cases of CSOM[14].

In the study, female was slight more, 54.1% as compared to male, 45.8%. Female male ratio was 1.18:1. One study also showed domination of disease in female 53% and 47% in male [15]. Salam et.al study also showed 60% involvement of female [16]. On the other hand Vanderveen et.al showed no differences between sexes in patients of CSOM [17], Maximum incidence of CSOM noted in young age group between the age of 16-30 years of age which was 62.5% followed by 0-15 years of age which was 25.6%. According to Shafiq Islam et.at study showed highest number of patient was in the group of 21-30 years of age [18]. The pattern of tympanic membrane perforation was Central in 72.5% cases and marginal 27.4%. Study showed central perforation was more 92% as compared to marginal perforation [15]. In intra-operative findings of ossicles 48.6% had all the three ossicles were intact and mobile and 51.3% patients found one or multi-ossicles damage due to the disease. Marfani et.al study showed 30% patients had mobile and intact ossicles [10]. In ossicles damaged, the frequent multi-ossicle involvement is Malleus and Incus, in 56 patients followed by Malleus, Incus and Suprastructure of stapes.. The most frequent single ossicle involvement is mallues 46 cases followed by incus which was 14 cases. Different study showed that long process of Incus is frequently involved due the disease [19, 20]. But in our study, frequent single ossicle involved is malleus and this is may be due to the prolong tympanic membrane perforation which leaves the handle of malleus exposed [10].

CONCLUSION

Chronic suppurative otitis media is the common disease in Southeast Asia. Damage of ossicles may cause conductive hearing loss. Multi-ossicular and single ossicle both were involved. Ossicles damage and complications can be prevented by early diagnosis and proper management of the disease.

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Original Article

To Assess the Morbidity Associated with the use of Intra-Nasal Splints and its Role in the Prevention of Nasal Adhesions

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ABSTRACT

Objective: To assess the morbidity associated with the use of intra –nasal-splints and its role in the prevention of nasal adhesions.
Study design: Prospective study.
Place and Duration of study: This study was conducted at Benazir Bhutto Shaheed Teaching Hospital Abbottabad ,from July 2010 to August 2011.
Materials and Method: Randomized prospective clinical method compared between patients with and without nasal splints. The author observed 256 patients operated on for Septoplasty in the Benazir Bhutto Shaheed Teaching hospital Abottabad. They were assessed fro the complications and discomfort of splints.
Results: The group with the nasal splints, observed poor quality and the recovery was not well tolerated by majority of them. This group also observed sever pain during the removal of splints. In contrast in patients without the nasal splints the complications were minimum with good quality.
Conclusion: Although the nasal splints are widely used, it does not provide maximum protection to prevent adhesions formation. Furthermore morbidity associated with the splints does not justify its regular use.
Key Words: Septoplasty, Nasal-Splints, Adhesions, Deviated Nasal Septum.

INTRODUCTION

Although the diversion of the septum and / or the nasal pyramid occurs in all races and in almost all age ranges, it is more diagnosed in young adults[1]. As a result surgical correction of septal deviation is one of the most common ENT procedure. .The various complications of septal surgery are post-operative pain and discomfort, headache, hemorrhage, vestibulitis, septal perforation, septal haematom, cerebrospinal leak, palatal perforation ,toxic shock syndrome ,and the formation of adhesions between the nasal septum and the lateral nasal wall.[2]Intranasal splints have been used to maintain septal stability and to prevent intranasal adhesions following septal surgery. However their efficacy and attendant morbidity have received little attention[3]. The morbidity associated with the nasal splints, do not justify their everyday use with the intention of preventing the formation of adhesions, the nasal splints increases co morbidities such as post-operative pain and discomfort.[4] The aims of this study are to define the role of nasal splints in preventing the nasal adhesions and the morbidity associated with the use of nasal splints.

MATERIALS AND METHODS

A randomized prospective clinical study, in which 256 patients were evaluated, between 18 to 57 years of age .The study was conducted at Benazir Bhutto Shaheed Teaching Hospital Abbottabad (Khyber pukhtunkhwa, Pakistan),from July 2010 to September 2011.
The patients were selected for surgery complaining of significant nasal obstruction due to nasal septal deviation and evaluated by detailed medical history , physical examination and necessary investigations.. A printed Performa was used for each patient to record the age, sex, presenting complaints and the clinical findings. The surgeries were executed always under general anesthesia and orotracheal intubation, and used the nasoseptal access with under-osteo-perichondriam, with the production of tunnels between the mucosa and the septum osteocartilagenous skeleton (cottle's technique).[5]
Patients were divided into two groups, one with intranasal splints(Group A,128) and the other without the splints(Group B,128). The splints were made up of plastic sheets cut from empty containers of intravenous infusion and fixed with no.1 silk suture through the septum. Nose was packed with Furacin soaked ribbon gauze, which were removed after 24-48 hours in all the cases. The splints were removed after 08 days. The patient's subjective complaint regarding post-operative pain was noted during 24-48 hours after surgery during which pack remained in and during the week following that. During this incidence of septal haematoma,septal and septal abscess was also noted. Three weeks later, each patient was finally evaluated for the presence of septal perforation, adhesions ,crusting and the patient's satisfaction with the result of surgery.

RESULTS

A total of 256 patients were studied, in which 128 were splinted. Out of which the male were 130(53.1%) and the female were 126(49.2%), with a mean age of 32.4years(range,18-57years) The pain and discomfort

was generally observed in many patients during the first 24 hours after the surgery during which they had packs in their noses ,but thereafter the patients with splints (Group A) showed a major discomfort. The incidence and the severity of pain was more in group A as compared to group B (Table. No 1). In group the nasal splints were removed on 4th post operative day due to intolerance in 04 patients.

Table No.1: Distribution of Pain

	No. of patients (group A,n 128)	No. of patients (group B,n 128)
Mild pain	12(9.3%)	84(65.6%)
Moderate pain	100 (86.9%)	44(34.3%)
Sever pain	6(6.2%)	nil

Table No.2: Incidence of Vestibulitis

	No. of patients (group A,n 128)	No. of patients (group B,n 128)
Mild vestibulitis	63(49.2%)	nil
Moderate vestibulitis	58(45.3%)	nil
Sever vestibulitis	7(5.4%)	nil

Majority of the patients in group A developed vestibulitis in contrast to group B where no vestibulitis was noted (Table.No.2). Majority 102 (79.6%) of the patients in group A were having sever difficulty in breathing in the post-operative period due to splints, whereas in group B only 32 (25%) complaint of only mild nasal obstruction.

The incidence of septal abscess was 0.78% in group A and no case was observed in Group B. 02 (1.5%)patients in group A and 03 (2.3%) in group B developed septal haematoma. 06(4.6%) patients with splints and 07(5.46%) without splints developed adhesions between the septum and lateral nasal wall . 04 patients in group A were ended with a septal perforation as compared to 02 patients in group B.

Furthermore almost all splinted patients experienced sever pain at the time of removal of the nasal splints.

DISCUSSION

As much as 75% to 80% of the general population is estimated to exhibit some type of anatomical deformity of the nose, most commonly deviated nasal septum[6].Septoplasty is the preferred surgical treatment to correct a deviated nasal septum. Though 60%to 70% of the surgeons generally use the nasal splints, their situation, efficacy and attended morbidity have received surprisingly little attention[7].

These splints are associated with increased post-operative pain and discomfort. Guyuron et al. came to the conclusion that 60%of his patients complained of an extreme discomfort, when compared to the patients without splint)[8].Our study comparing both groups confirm the same statement. According to the Pringle,the incidence of adhesions formation is 5.2%which is only 1.3%greater than those who always use splints. In a study by Al- Mazrou et al[9] splints were shown to offer no additional help in preventing the adhesions formation.

There is very slight but a definite risk developing the toxic shock syndrome[10]. Watson et al. has reported the recurrence of intranasal adhesion despite the use of nasal splints.[11] Considerable morbidity with nasal splints has been reports by Von Schoenberg et al.[12.]

This study also confirms the finding of Eduardo et al. that though Septoplasty with nasal splints is very widespread in the surgical middle, it does not provide the patient's satisfaction.[13]

It can be seen that a significantly higher rate of complications and the morbidity is associated with the use of nasal splints.

CONCLUSION

The complications and the morbidity associated with the intra nasal splints does not justify their regular use .The incidence of nasal adhesions can be reduced by careful nasal toilet.

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Original Article

Crime Related Use of Benzodiazepine in District Peshawar

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ABSTRACT

Background: The number of reported crime in which the victims were first rendered unconscious; lacking awareness of his or her surrounding and later the planned crime ensued. Blood and urine samples were collected and tested for sedative hypnotics at the toxicology lab. The specimens, all of them were tested positive for benzodiazepine.

Study Design: Cross Sectional study.

Place and Duration of Study: This study was conducted at Toxicology Laboratory, Department of Forensic Medicine and Toxicology, Khyber Medical College, Peshawar from 01.01.2010 to 31.12.2010.

Materials and Methods: The study was conducted on 77 samples of urine and blood obtained from the victims who were brought over by police to the tertiary care hospitals in district Peshawar.

Results: The procedure to find out the exact subtype was with the help of High Performance Liquid Chromatography (HPLC) in the Toxicology laboratory. The chemical analysis revealed that all the samples obtained from the victims carried Clonazepam a subtype of Benzodiazepine.

Conclusion: Easy availability of benzodiazepine and other narcotic analgesics across the country renders these technically dangerous medicines into the hands of criminals resulting in heinous and monstrous consequences.

Key words: Benzodiazepine, Clonazepam, Crime, Toxicology, HPLC

INTRODUCTION

In the last two years, district Peshawar had more than 200 cases of car snatching in which 80% were taxicabs and 20% were private vehicles. The crime was committed after the criminals gave the driver some edibles, which after ingestion made the recipients unconscious. Police brought over these victims to casualty department of LRH, HMC or KTH in an unconscious state.

The chemical examination of the specimens, i.e. urine & blood taken from the victims at the casualty department, showed that they were given an overdose of Benzodiazepine. After collection of information it was decided to find out the exact substance that was used to commit the crime.

MATERIALS AND METHODS

The study was conducted on 77 samples of urine and blood obtained from the victims who were brought over by police to the tertiary care hospitals and the samples were then brought over to the Toxicology Laboratory, Department of Forensic Medicine & Toxicology, Khyber Medical College, Peshawar between the time period 01.01.2010 to 31.12.2010.

The procedure to find out the exact subtype was with the help of High Performance Liquid Chromatography (HPLC) in the Toxicology laboratory [2]. The chemical analysis revealed that all the samples obtained from the victims carried Clonazepam a subtype of Benzodiazepine. In 80% of cases Clonazepam drop preparations were used for committing crime.

Data revealed that less than 2% came into the category of accidental poisoning involving children, psychiatric patients and older people having senile dementia[3]. Teenagers and young adults sometime used it as an exhibitional poison.

RESULTS

Clonazepam is a Benzodiazepine having anxiolytic, anticonvulsant, muscle relaxant and hypnotic properties. Onset of action is within 20 minutes, duration of action is up to 8 hours, protein binding is 85% and half life is 19-50 hours. Time to peak serum concentration is 1-3 hours. Steady state is 5 to 7 days, its excretion is mainly in urine, less than 2% is unchanged and 98% is present as a glucoronide or sulphate conjugate 9.

In tablets form Clonazepam is available in the dose of 0.5mg, 1mg and 2mg. Drops preparation contains 0.1mg of Clonazepam per drop, the solvent used in these drops is a highly volatile alcohol, this preparation is tasteless and odorless, the trade name of this preparation is Rivotril[4].

Flumazenil acts as an antidote by binding to CNS Benzodiazepine receptors and competitively blocks benzodiazepine activation of inhibitory GABAnergic synapses[7]. With Flumazenil, victims regain immediate consciousness, thus verifying the diagnosis of Clonazepam poisoning.

GABA is formed in the brain cells from glutamate and functions as an inhibitory neurotransmitter. Glutamate acts as an excitatory neurotransmitter and when bound to adjacent cells encourages them to evoke and send nerve impulse. GABA does the opposite and tells the adjoining cells not to elicit, not to send an impulse. Clonazepam enhances the availability of GABA and suppresses the spike and wave discharge by depressive nerve transmission in the motor cortex [8].

Effects on the CNS can lead to ataxia, confusion, depression, dizziness, drowsiness, fatigue, hallucination, memory disturbance, slurred speech, vertigo, coma, intellectual ability reduction and psychosis[8].

Neuromuscular effects can lead to co-ordination abnormalities, dysarthria, muscle weakness, tremors and myalgia. Ocular effects can cause blurred vision, abnormal eye movements, diplopia and nystagmus[9]. All the above effects when compounded can give an ideal situation for criminal to carry out his or her desired offence with minimal resistance on part of the victim. Ethyl alcohol, Cimitidine, Contraceptive pills, Flucanazole and Isoniazide enhances the CNS depressant effects of Clonazepam. Proton pump inhibitor increases serum concentration of Clonazepam.

DISCUSSION

Psychoactive products are chemicals that cross the blood brain barrier and act primarily upon the central nervous system and affect the brain functions, resulting in changes in perception, mood, consciousness, cognition,and behavior[1] . These substances may be used by amateur to purposefully alter one's consciousness or for ritual and spiritual, purposes or be used as a tool to augment the mind, commit crime or used as a medication.

Since psychoactive substances bring about subjective modifications in consciousness and mood and these changes, which even are not included in its medicinal domain, lead to health risks and negative outcomes[9].

Benzodiazepines are by and large one of the most ill-used psychoactive substances. Its misuse is steadily raising and is now a major problem for the law enforcing agencies. Invariably no one has focused on the intensity with which it's being abused and its frequent misuse alongside other narcotic drugs, especially alcohol, stimulants and opiates is an eye opener. Benzodiazepines have been used as a tool of murder by serial killers, and murderers. Benzodiazepines have also been used to assist in the crime of rape and robbery . With this drug, dependence has been linked to shoplifting due to the psychogenic fugue state caused by the chronic use of the drug. When benzodiazepines are used for criminal intentions against a victim, the drug is frequently blended with edibles and soft drinks; here the choice benzodiazepine is Rivotril drops.

Another psychoactive product, Restoril is the most common benzodiazepines used in rape cases. Alprazolam is another benzodiazepine seen abused for the purpose of carrying acts of incest and for corrupting teenage girls. Some benzodiazepines are associated with law-breakings in a bigger way when taken in combination with other narcotics in the crime syndicate[10].

Another strong benzodiazepine flunitrazepam (Rohypnol) has strong amnesia-producing effects, this can lead these drug abusers to get pitiless and also cause feelings of being unbeatable[11]. This has led to some acts of extreme violence to others, often leaving abusers with no remembrance of what they had done in their drug-induced state. Different benzodiazepines have dissimilar abuse potential; the more rapid the increase in the plasma level following ingestion, the greater the intoxicating effect and the more open to abuse the drug becomes.

CONCLUSION

In the medical setting, psychoactive drugs as a treatment for illness are widespread and generally accepted. But concern exists when one encounters free availability of these products in the market. Psychoactive drugs are commonly prescribed to patients with psychiatric disorders. However critics believe that certain doctors over prescribe drugs such as antidepressants and stimulants, which endanger patients' judgment and self-direction.

Although Clonazepam is the drug of choice for the supportive treatment of epilepsy. seizures, it is used as an anxiolytic and it has a potent role in burning mouth syndrome. The free availability of this drug preparation across the counter in our pharmacies makes it vulnerable for misuse by criminals, junkies and other antisocial elements. Clonazepam as a controlled drug should only be dispensed when prescribed by a registered medical practitioner

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Original Article

Etiology and Diagnosis of Obstructive Jaundice, Our Experience

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ABSTRACT

Introduction: Obstructive jaundice is a common problem faced by surgeons.

Objectives: To ascertain various etiologies of obstructive jaundice in our set up and to evaluate the usefulness of available diagnostic modalities.

Study Design: Descriptive Study.

Place and Duration of study: This study was conducted at Allied and District Head Quarter Hospital, Faisalabad from April 2010 to Sep. 2010.

Materials and Methods: Eighty-five patients with obstructive jaundice were included in the study. They were evaluated on the basis of history, clinical examination, biochemical tests and ultrasonography. CT scan abdomen was done in suspected malignant cases only. Operative findings were compared with preoperative ultrasound and CT scan findings. The results were then prepared and analyzed.

Results: In our study, 56.5% patients were of benign etiology and 34.5% were of malignant etiology. Female to male ratio was 2:1. Serum bilirubin was raised more in malignant diseases than in benign diseases. An accuracy of 80% of ultrasound and 86% of CT scan abdomen was found out after performing different surgical procedures in our patients. In benign group of patients the most common cause was choledocholithiasis, 47.1% while in malignant group the most common cause was carcinoma of head of pancreas, 34.1%.

Conclusion: Common causes of obstructive jaundice in our study were choledocholithiasis and carcinoma head of pancreas. Ultrasound is a reliable tool for diagnosis of obstructive jaundice, and CT scan is helpful in evaluation of malignancy.

Key words: Obstructive jaundice, Choledocholithiasis, choledochoduodenostomy, Hepaticojejunostomy.

INTRODUCTION

Jaundice is the greenish- yellow discoloration of the skin and sclera and when it is associated with history of itching, clay colored stools and dark colored urine the diagnosis of obstructive jaundice is almost certain. Hyperbilirubinaemia becomes clinically evident when bilirubin level exceeds 3 mg/dl.[1, 2]Both benign and malignant conditions can lead to obstructive jaundice. Malignant causes account for more than half of the causes.[3]Malignancy is the commonest cause of obstructive jaundice in Pakistan as well as in the subcontinent.[4]

Determining the exact cause of obstructive jaundice is often a complex and challenging affair. An early and accurate diagnosis and treatment affect the outcome of the patients' condition profoundly.[5, 6] Initial assessments to ascertain the etiology of obstructive jaundice requires detailed history and good clinical examination followed by certain biochemical tests and various imaging techniques.[7]Management of obstructive jaundice depends upon type of etiology, fitness of the patient and therapeutic facilities that are available. Obstructive jaundiced patients should be managed expeditiously to avoid the dreadful complications like cholangitis.[8]Different surgical options are available for the treatment of different causes of obstructive jaundice.[9]

MATERIAL AND METHODS

Inclusion Criteria: All patients with obstructive jaundice presenting to Allied and DHQ Hospitals above 12 years of age were included in our study.

Exclusion Criteria: Patients with medical jaundice, advanced malignancy with distant metastasis, patients unfit for surgery due to medical problems and patients unwilling for surgery, were all either excluded or dropped from our study.

Patients of obstructive jaundice were admitted in surgical units of Allied and DHQ Hospitals through OPD. They were evaluated on the basis of history, clinical examination, biochemical tests and ultrasonography. The patients with suspicion of malignancy on ultrasound were further evaluated with the help of CT scan abdomen. All the patients were subsequently operated and pre-operative findings of imaging modalities were compared to operative findings and accuracy rate of ultrasonography and CT scan was evaluated. The final diagnosis achieved either by histopathology or operative findings were recorded and the etiological incidence of various diseases was calculated. The chi-square test was applied for

qualitative data to compare differences of frequencies for significance, while the students T test was applied for quantitative data to compare differences of means for significance. P values of data <0.05 were considered significant. Data were analyzed using SPSS programme.

RESULTS

All 85 patients in our study underwent laparotomy either for confirmation of diagnosis or for definite surgical treatment. All the cases were diagnosed on the basis of histopathology or operative findings. Number of patients with benign and malignant etiologies of obstructive jaundice in our study has been shown in table I.

Table No.1: Patients with benign and malignant etiologies

Benign causes of obstructive jaundice	No. and percentage of Patients	Malignant causes of obstructive jaundice	No. and percentage of Patients
Choledocholi-thiasis	40(47.1%)	Carcinoma head of Pancreas	29 (34.1%)
Benign CBD Stricture	06(7.1%)	Carcinoma Gall Bladder	6 (7.1%)
Liver Abscess	01(1.2%)	Cholangio-carcinoma	2 (2.4%)
Choledochal-cyst	01(1.2%)		
Total	48(56.6%)		37 (34.5%)
Grand total of patients	85 (100%)		

The age range of patients in our study was from 12 to 85 years. Average age for different causes of obstructive jaundice was 43 years. The maximum incidence of benign disease was found in the age group of 21-30 years and for malignant disease it was 51-60 years. Mean age for malignant disease was 58 years with 12.5 as standard deviation, and mean age for benign diseases was 41 years with 17.6 as the standard deviation. P value for age, by applying Student's T Test, was 0.000 for etiology and was highly significant. Number of male and female patients with benign and malignant etiologies and their ratios has been shown in table 2.

Table No.2: Male to female ratio

No. of patients	Benign causes	Malignant causes	Total
No. of male patients	12(41.4%)	17(58.6%)	29 (34.1%)
No. of female patients	36(64.3%)	20(35.7%)	56 (65.9%)
M:F ratio	1:3	1:1.17	1:1.93

Liver function tests were performed in all 85 patients and were deranged. Serum bilirubin ranged from 3.5 mg/dl to 22.8 mg/dl. The mean level of serum bilirubin was 10.56mg/dl with 5.17 as standard deviation. There was strong statistical association of serum bilirubin level with etiology (P value: 0.000). Serum alkaline phosphatase ranged from 395 U/L to 2300 U/l. Mean level of Serum alkaline phosphatase was 944.74 U/L with 470.6 as standard deviation. There was strong statistical association of serum alkaline phosphatase with etiology (P value 0.001). Serum bilirubin and serum alkaline phosphatase were raised more in malignant diseases than benign diseases.

Ultrasound abdomen was also used in all 85 patients to differentiate between medical and surgical jaundice. In 68 patients findings were compatible with operative findings, in 17 patients the findings were inaccurate, an accuracy of 80%. CT scan of abdomen was performed in malignant cases, 37 patients. Diagnosis was supported by operative findings in 32 cases and in 5 cases preoperative findings were not comparable, an accuracy of 86%. Different surgical procedures performed in different benign and malignant etiologies of obstructive jaundice in our study have been shown in table 3.

Table No.3: Procedures performed

Serial No.	Causes of obstructive jaundice	Procedures performed	No. of patients	%age
1	Carcinoma head of pancreas	Biopsy was taken in 17 cases followed by ERCP	17	20%
		Choledocho-duodenostomy	2	2.4%
		Double Bypass gastrojejuno-stomy, cholecystoje-junostomy	8	9.4%
		Whipple operation	2	2.4%
2	Carcinoma Gall Bladder	Biopsy was taken	6	7.1%
3	Cholangioca rcinoma	Biopsy was taken	2	2.4%
4	CBD stone	CBD exploration and T tube insertion	36	42.4%
		Choledochodu odenostomy	4	4.8%
5	Liver abscess	Open drainage	1	1.2%
6	Benign CBD stricture	Hepatico-jejnnostomy	6	7.1%
7	Choledochal cyst	Hepatico-jejnnostomy	1	1.2%
Total			85	100%

Different postoperative complications of above mentioned procedures have been shown in table 4. Statistically significant association of complications was found with etiology, benign/malignant (P value 0.0498).

Table No.4. Post operative complications

	Complications	No. and percentage of patients
1	Biliary leakage	02 cases (2.4%)
2	Sub-hepatic collection	03 cases (3.5%)
3	Chest infection	08 cases (9.4%)
4	Wound infection	10 cases (11.8%)
5	Patients died during the hospital stay	03 cases (3.5%)

Total 6 patients in our study had their serum bilirubin level more than 20 mg/dl out of them 3 patients had good post-operative recovery and 3 had complications.

DISCUSSION

Our study of 85 patients revealed 48 cases (56.5%) of benign causes and 37 cases (43.5%) of malignant causes. This observation is in contrary to Jamil M et al 2000[10] who showed malignant incidence of 75%. Aziz M et al made similar observation; they showed the malignancy incidence of obstructive jaundice to be 84%.[11] A study conducted by Saddique and Iqbal whose figures are 54.17% and 45.83% respectively for malignant and benign etiologies of obstructive jaundice which are comparable to our results.[9] In other studies it has been documented that malignancy is more common cause of obstructive jaundice. [3,11] These differences in results may be due to different geographies or due to the difference in study durations.

In malignant group of 37 patients in our study carcinoma head of pancreas was diagnosed in 29 patients (78.4%), carcinoma gall bladder in 6 patients (16%) and cholangiocarcinoma in 2 cases (5.4%). The malignancy incidence increased as age progressed. In contrast, Aziz M et al in their study have documented carcinoma gall bladder to be the main cause, present in 44 patients (52%), carcinoma pancreas was present in 26 patients (31%) followed by cholangiocarcinoma in 8 patients (10%) and hepatoma in 6 patients (7%).[11] This difference may be due to geographical variation or the duration of study. Our study was conducted over six months time while their study was conducted over a period of two years.

In benign group of 48 patients, CBD stone was the commonest cause occurring in 40 patients (83.3%) followed by benign CBD stricture in 6 patients (12.5%), choledochal cyst 1 patient (2.1%) and liver abscess in 1 patient (2.1%). Benign causes of obstructive jaundice were more common in younger age group, highest in 21-30 year range. Hotineanu V et al 2005 conducted a study on surgical strategy in the management of benign obstructive jaundice and made a similar observation regarding the different benign causes. In their study CBD stones were diagnosed in 75% of patients.[12]

Admassie D et al (2005) evaluated the validity of ultrasonography in 05 patients from Ethiopia and showed benign causes to be more common cause of obstructive jaundice a result similar to our observation.[13]

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In our study one patient of liver abscess presented with obstructive jaundice. Cushieri A et al (2002) have reported 7 % of patients with liver abscess can present with jaundice.[1]

One patients of choledochal cyst presented with obstructive jaundice in our study. This is not, an unusual presentation as has also been reported by other studies.[17, 18]

Cholangiocarcinoma was present in 02 patients as cause of obstructive jaundice in our study, which is relatively less as compared to other reported studies. Aziz M et al (2004) have reported 10% incidence of cholangiocarcinoma as compared to our 2.4%.[11]

LFTs were done in all 85 patients and were found deranged. Serum bilirubin was raised more in malignant cases than in benign cases as reported by Hayat JO et al (2005) in their study.[19] Same was the case with alkaline phosphatase. Alkaline phosphatase was raised more in malignant diseases than in benign cases an observation, which was also reported by Nychytailo MIU et al 2004.[20]

It was found in our study that diagnostic accuracy of ultrasound was 80% which is comparable to Verma SR et al (2011) who showed 87.3% diagnostic accuracy of ultrasound in obstructive jaundice.[7] CT scan abdomen was used in the evaluation of malignant cases in our study. CT abdomen showed accuracy of 86% in diagnosing malignant causes of obstructive jaundice. CT scan is traditionally used for evaluation and staging of malignant cases especially carcinoma gall bladder as observed by Rao ND et al 2005.[21]

Benign CBD strictures were managed by doing Roux-en-Y hepaticojejunostomy in six patients. Hepaticojejunostomy is recommended as the procedure of choice in the management of CBD injuries and strictures as it is very effective on long-term basis as compared to endoscopic approach as recommended by Kaman L et al 2004.[16] Insertion of endoprosthesis or dilatation is successful in 60-90% of benign CBD strictures. Jacobs et al 2005 used this technique with good results. Hepaticojejunostomy was also done in one case of choledochal cyst.[22] Incision drainage (open) was adopted for one case of liver abscess.

Seven cases of carcinoma of pancreas, 6 cases of carcinoma gall bladder and 2 cases of

cholangiocarcinoma were operated with palliative or therapeutic intent but only biopsy was done because of advanced disease. In such patients diagnostic laparoscopy may be used initially to avoid unnecessary surgery as recommended by Saeed M et al 2003.[23]

In 18 patients of carcinoma head of pancreas palliation with triple bypass procedure and in two patients, choledochojejunostomy was done. In most of the patients endoprosthesis (endoscopic stenting) to relieve the jaundice is the preferred management as shown by Geraci G et al 2005 in their study regarding management of carcinoma pancreas.[24]This facility unfortunately is not available in our set-up.

Whipple's procedure was performed in 2 cases of carcinoma head of pancreas (6.9% of pancreatic tumours in our study) with good results. Surgical resection is only possible in about 10% of cases as many patients have locally advanced or metastatic disease at the time of presentation as Thomson BN et al 2006 documented in their series.[25]

In our study, the most common post operative complication was wound infection occurring in 11.8% cases. Other complications like biliary leakage (2.4%), sub-hepatic collection (3.5%), and chest infection (9.4%) were also noted. Three patients (3.5%) died during hospital stay in our study. The complications rates are comparable to other studies. Hussain D et al (2004) reported wound infection in 9.9% cases, leakage in 6.67% cases and in- hospital mortality of 9.99%.[26]

CONCLUSION

Common causes of obstructive jaundice in our study were choledocholithiasis and carcinoma head of pancreas. Ultrasound is a reliable diagnostic tool for obstructive jaundice, and CT scan is helpful in evaluation of malignancy.

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Original Article

A Study of Fire-Arm Injuries in District Haripur, Pakistan

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ABSTRACT

Objective: Study of firearm injuries of cases brought and treated at DHQ Teaching Hospital Haripur to know rate of morbidity, mortality and full recovery.

Study Design: Original study.

Place and Duration of Study: This study was conducted at the District Headquarter Teaching Hospital, Haripur from 1st Jan, 2009 to 31st Dec, 2010.

Materials and Methods: All living victims of firearm injury brought and admitted in DHQ Hospital Haripur in during this period were included in this study, ward records, police investigation reports and discharge reports were made part of this study, Performa were made and filled directly from these reports.

Results: A total 110 victims of firearm injuries were admitted and treated in DHQ Hospital Haripur from 1st Jan, 2009 to 31st Dec, 2010. Most affected age group was 10 to 30 years (70%), male to female ratio was 9:1. Victims from rural area were 65% while 35% were from urban areas. Most affected body region was Abdomen & Pelvis. Full recovery occurred in 74.54% cases, some degree of disability occurred in 13.63% and death occurred in 8.18% cases.

Key Words: Firearm, High velocity rifled firearm, amputation, Entry & Exit wounds.

INTRODUCTION

Firearm weapons are used mostly for committing Homicide[5] and Suicide[17] all around the world. Homicide generally means "Killing of a human being by the conduct of another human being" and suicide means "Intentional self-killing". The firearm weapons cause grievous and fatal injuries that is why these are commonly used for homicidal deaths and injuries. No place on this planet is totally free from firearms. The reasons for wide spread use of firearms to commit homicide and suicide are;

1. These cause damage to the vital organs like brain, heart, lungs and liver which cause, most probably, death.
2. Firearms can be used from a distance so that the safety and escape by the assailant from the crime scene is ensured.
3. The victim has little time to reach the hospital because of massive hemorrhage that usually causes death in short period of time, even if the victim reaches the hospital the treatment to save life is limited as it needs facilities and skilled trauma surgeons that are not available in every hospital.

   Firearms were first produced in China by the great Mongol emperor Gingiz Khan about 1000 years ago and since then there has been consistent progress and development in this field improving the efficacy regarding effective range, lethal physical damage at the target (human body) and the speed & mechanism of action. Now-a-days the commonly available small firearm weapons include manually operated, semi-automatic and fully automatic firearm weapons like single & double barreled shotguns, repeater shotguns, klashinkov & kalakov sub-machine guns, assault rifles, pistals and revolvers.

The use of firearms has increased highly throughout the world specially in the 3rd world countries of Africa, South America and South East & Far East Asia where small firearms reached in large scale supplied by foreign powers to various rebellious groups which serve their bested interests in the name of so called independence and separatist movements, Foreign powers like USA and Ex USSR played crucial role in flooding 3rd world countries with small firearms to destabilize them and control their resources.

MATERIALS AND METHODS

This study was conducted at DHQ Hospital Haripur which is also teaching hospital for Abbottabad International Medical College, Abbottabad (AIMC). The study was carried out by the department of Forensic Medicine of AIMC. All victims of firearm injuries admitted in the hospital from Jan 2009 to Dec 2010. (Total of 110 cases) were admitted during this period and were made part of this study. Hospital record of medico-legal reports, treatment provided in the hospital, police investigation report, resulting morbidity and mortality reports and follow up of the cases, constituted material for the study Performa were designed to record Date, Day & Time of injury, arrival in hospital, type of injury, number of injuries, body region involved, number entry of and exit wounds, type

of firearm weapon, place of crime scene, medical treatment given and outcome of the treatment.

RESULTS

A total number of 110 cases of firearm injuries were studied who were admitted to surgical, orthopedic and medical wards, they comprised of 99 male and 11 female victims so the male to female ratio was 9:1 (Table – 1). Age of the victims was from 10 to 66 years (Table – 2) most affected age group was 21 – 30 years (40%) followed by 10 – 20 years (30%), 31 – 40 years (20%), 41 – 50 years (5.45%), 51 – 60 (2.7%) and 61 – 70 years (1.8%). Majority of the victims were brought from rural areas of district Haripur (65%); 24 cases from Khanpur (21.8%), 21 cases from Kot Najeebullah (19.09%), 12 cases from Seri Kot (10.9%). While the rest 35% cases were brought from urban areas of Haripur. Sites (region) of firearm injury on the body (Table – 3) were; Abdomen & Pelvis 57 cases (51.8%), chest 30 cases (27.27%), Extremities 12 cases (10.9%), Head & Neck 3 cases (2.72%) and multiple regions involved 8 cases (7.27%). High velocity firearms were used in 90% cases, shotguns in 8% cases and explosives used in 2% cases. Homicidal assaults were reported in 77 cases (70%), attempted suicide in 5 cases (4.4%), self-inflicted fabricated injuries in 2 cases (1.8%), accidental cases were 9 (8.9%) and 16 cases (14.54%) remained unknown.

Table No.1: Gender based firearm injuries and percentage

S. No	Gender	No of Cases	Percentage
1	Male	99	90%
2	Female	11	10%

Table No.2: No and percentage of various age groups of the victims of Firearm injuries

S. No	Age in Years	No of Cases	Percentage
1	10 – 20	33	30%
2	21 - 30	44	40%
3	31 – 40	22	20%
4	41 – 50	06	5.45%
5	51 – 60	03	2.72%
6	61 – 70	02	1.8%

Total firearm wounds were 314 (Table – 4) out of which entry wounds were 186 (59.23%) and exit wounds were 128 (40.76%). Single entry wounds found in 60 cases (54.6%), two entry wounds found in 28 cases (25.45%), three entry wounds recorded in 18 cases (16.36%) and four entry wounds in 4 cases (3.63%). In 24 cases no exit wound found (21.8%), single exit wound in 52 cases (47.27%), two exit wounds in 28 cases (25.45%), three exit wounds in 4 case (3.63%) and four exit wounds in 2 cases (1.8%). All 110 cases were admitted to hospital and required medical treatment given in time, in spite of reasonable medical care death occurred in 9 cases (8.18%), complete recovery recorded in 82 cases (74.54%), some degree of disability resulted in 15 cases (13.63%) and fate of 4 cases could not known since they could not be treated (3.63%).

Table No.3: No and percentage of firearm injuries on various body regions

S. No	Body Region	No of Cases	% age
1	Head and Neck	03	2.72%
2	Chest	30	27.27%
3	Abdomen and Pelvis	57	51.8%
4	Extremities	12	10.9%
5	Multiple Sites	08	7.27%

Table No.4: No of cases and percentage of Entry and Exit Firearm wounds

S. No	Wound	No of Cases	% age
1	Single Entry Wound	60	54.6%
2	Two Entry Wounds	28	25.45%
3	Three Entry Wounds	18	16.36%
4	Four Entry Wounds	04	3.63%
5	No Exit Wound	24	21.8%
6	Single Exit Wound	52	47.27%
7	Two Exit Wounds	28	25.45%
8	Three Exit Wounds	04	3.63%
9	Four Exit Wounds	02	108%

Table No.5: Outcome of medical care No and percentage

S. No	Fate	No of Cases	%age
1	Death Occurred	09	8.18%
2	Disabilities	15	13.63%
3	Complete recovery	82	74.54%
4	Unknown	04	3.63%

DISCUSSION

Pakistan is placed among the countries having high rate of homicide[18] by use of firearms. Some of the reasons for preferred use of firearms are;

1. Easy availability of variety of manual, semi-automatic and automatic firearm weapons in the local market.

2. Availability of firearm weapons and their ammunition at affordable cost.

Both the above mentioned factors are the direct result of mass influx of Afghan refugees into Pakistan in early 1980s and the armed conflict & civil war in the neighboring Afghanistan.

3. Relatively lenient Govt policy regarding issuance of the license for firearms.

4. Rising intolerance in the society has increased sudden provocation over pity issues. Firearms are

frequently used for homicide in disputes of property, family feuds, enmity running from generations and in terrorist attacks. The most frequently used firearm weapons are high velocity rifled firearms (rifles, pistols and revolvers). Measures can be taken to control and minimize firearm weapons through proper legislations[14].

On the national level, in Pakistan, the Russian made Klashinkov rifle (in fact a sub-machine gun) was first introduced in late 80s soon after the Russian invasion of Afghanistan. The gun reached every nook & corner of the country since then and now hardly any place in Pakistan is free from this deadly weapon. Moreover Ex Government of Pakistan also contributed in the large scale spread of this weapon by issuing its licenses to the civilian population in large number. The deadly firearm weapons influx in Pakistan was one of the consequences of so the called war on terror and civil war in the neighboring country Afghanistan. The weapons are smuggled by Afghan refugees and arms smugglers operating on the Pak-Afghan border.

Traditionally Khyber Pakhtun Khwa and Federally Administered Tribal Areas (FATA) were famous for possession and use of firearms but it is talk of the past now since variety of deadly firearms have reached Punjab, Sindh and Baluchistan in large scale. The recent police operation in Karachi was countered by civilians through the use of rocket launchers, grenade attacks besides klashinkov firing. The rate of homicide by firearm is 90% in Peshawar[3] which is almost the same as in Faisalabad[18], Lahore[6] and Karachi[10].

On international level the rate of homicide[18] by ranges from less then 1 per 100,000 of population per year to 15 per 100,000 of population per year, for example in Egypt, England, UAE and Qatar it is less that 1 to 1 per 100,000 of population per year while it is 6 to 15 per 100,000 of population per year in USA, Mexico and Columbia[18]. So Haripur being 7 per 100,000 population per year is among the high rate of homicide by firearms.

CONCLUSION

Firearm weapons are the most commonly used weapons for homicide and suicide beside accidental firearm injuries. Firearm injuries are dangerous and lethally grievous injuries which makes the firearm weapons as ideal weapons for committing homicide and sometimes suicides. The increasing trend of using the deadly firearm weapons needs to be controlled and this can only be done through a joint, co-ordinated and effective collective efforts by various sections of the society. Universities, Schools and Madressahs can deliver much by preaching the right conduct of life in line with injunctions of Islam and humanity, by condemning hate, by discouraging spread of hatred and violence, by guiding people to resolve their disputes through peaceful means of dialogue and negotiations based on our religion and traditions. We need to improve our police and other security agencies by introducing new technologies and modern methods of investigations. We need to develop trauma centres in each Tehsil level hospitals beside providing training to trauma surgeons at our postgraduate medical institutions so that the firearm victims are given prompt and effective medical treatment immediately without wasting any time.

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Original Article

Effect of Green Tea Polyphenols on HbA1C in Type 2 Diabetic Patients

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ABSTRACT

Objectives: In many previous studies, green tea has been shown to prevent and treat type 2 diabetes16-18.. Some controversial results have also been noticed in few studies. Primary objective of the present study was to determine the effect of green tea polyphenols on glycaemic control among the patient with type 2 diabetes.

Background: Conflicting data exists according to previous studies about green tea that it might have a positive effect on the glycaemic control in patients with diabetes mellitus type 2. The aim of the present study was to give evidence whether a crude extract of green tea improves glycated haemoglobin A1C (HbA1C) and fasting plasma glucose in patients with type 2 diabetes.

Study Design: Study was prospective, interventional and randomized.

Place and Duration of Study: This study was conducted at the Department of IMBB (Molecular Biology), University of Lahore from April 2007 to June 2007.

Materials and Methods: A total of 60 patients, 20 with diagnosed diabetes mellitus type 2 taking oral anti-diabetics and 20 diabetic individuals who were not taking any hypoglycemic drug, of either sex were randomly assigned to take green tea extract twice a day, at the dose of 15 gram, for 3 months. A group of 20 healthy subjects was also enrolled in the study.

Results: A very significant difference between the pre- and post-intervention fasting plasma glucose level was observed in both the groups of diabetic patients while no significant difference was seen regarding HbA1C level. Significant changes were not observed in either of the parameters in healthy individuals, as was expected throughout the study. No adverse effects were observed in any of the three groups.

Conclusions: The green tea extract seems to have a moderate effect in reducing fasting plasma glucose concentrations in diabetic patients with poor glycaemic control.

Key Words: Green tea polyphenols, diabetes mellitus type 2, fasting plasma glucose, HbA1C.

INTRODUCTION

One of the deadliest diseases ever known, Diabetes Mellitus, has also been one of the most silent.

The subcontinent currently has 47 million people with diabetes that will grow to 80 million by the year 2025[1]. Despite the advances in the treatment, incidence of diabetes is not falling down. Herbs have been used for food and medicinal purposes for centuries[2]. Increasing dissatisfaction over undesirable side effects and the cost of conventional medicines, has led people choose some alternative mode of treatment. Amongst these, tea is the most commonly used beverage, second after water, first cultivated by China and India, with a lot of health benefits[3]. Green tea has been shown to lower high serum cholesterol level[4-6], treating periodontal diseases[7], improving osteoporosis[8], and as a strong anti-oxidative, anti-mutagenic and anti-carcinogenic agent in many types of cancers [9-12].

All tea plants belong to same species, *sinensis* and all teas, black, green, oolong belong to same plant, camellia sinensis[13]. The difference between the teas is in their processing. Green tea is prepared in such a way as to preclude the oxidation of green leaf polyphenols. The unfermented GT leaves contain the highest concentration of powerful antioxidants called polyphenols and the healthful properties of GT are largely attributed to these compounds[14]. It contains a variety of polyphenols, including flavanols, flavandiols, flavanoids and phenolic acids. Polyphenols may account for up to 30% of the dry weight and they give GT a somewhat bitter flavour. Most of the GT polyphenols are flavonols, commonly known as catechins. Some major GT catechins are, Epigallacatechin Gallate (EGCG) 60%, Epigallocatechin (EGC) 20%, Epicatechin Gallate (ECG) 13%, Epicatechin (EC) 6% and Gallocatechin (GC) 2%[15]. Green tea is commonly sold as rolled dried leaves usually taken as brewed in hot water.

MATERIALS AND METHODS

Study was prospective, interventional and randomized. Seventy subjects were approached from friends, immediate families and private clinics. Sixty out of them were enrolled and placed in three groups A, B and C; each containing 20 individuals each.

Group A: Healthy individuals.

Group B: Diabetic patients who were on oral hypoglycemic drugs.

Group C: Diabetics who were not taking any medication.

Inclusion Criteria: Healthy volunteers and non-complicated diabetic patients of either sex were included.

Exclusion Criteria: Women with menorrhagia and individuals taking anticoagulant therapy were not included[19].

Study was planned to be done primarily in TUOL. All the individuals were explained about the study and written consent was taken. A clinical questionnaire was filled for each subject to get a full account of present and past illness, family and drug history, their dietary habits and physical activity (Table 1).

Dosage: Crude extract of two tea bags, twice a day (150mg/kg body wt) was planned to give for three months. Brewing method was explained to the participants.

RESULTS

Twelve hour fasting blood sugar levels and HbA1C were estimated at day one. Then fortnightly their blood sugar levels were taken and physical condition was assessed to see any adverse effect. At the end of study again sugar levels and the level of HbA1C were repeated.

Blood sugar estimations were carried out by enzyme oxidase method (GOD-PAP method) [20] using Apel PD-303 (Japan) UV spectrophotometer. A1C levels were done from a private lab.

Statistical data thus collected was subjected to paired student t-test analysis. The difference was considered significant when P<0.01(Table 2).

Table No.1: Basic Characteristics of Study Population

Groups of Subjects:		A	B	C
N		18	16	17
Gender	Male	5	4	3
	Female	13	12	14
Family history of diabetes	Yes	6	10	11
	No	12	6	6
Family history of hypertension	Yes	7	6	8
	No	11	10	9
Hypertension	Yes	0	13	12
	No	18	3	5
Diabetes (year)		nil	8.8+/-5.2	4.3+/-2.6
Age (year)		20.5+/-3.5	54.76+/-7.6	53.1+/-11.9

Data are means+/-SD or *n* (%)
Group A: Healthy Individuals
Group B: Diabetics without any medication
Group C: Diabetics on medication

Relative to initial concentrations, modest effects on blood sugar levels were seen in diabetic individuals (from 142+/- 20 to 126+/-16 P<0.01) in group of diabetic who were already on hypoglycaemic drugs. A very significant reduction in FBS observed in patients who were not taking any medication (from 181+/- 51 to 131 +/-34 P<0.01). Results in healthy individuals were not significant (from 89+/-7 to 84+/- 8 with P<0.01).

Final levels of A1C were not significant in any of the three i.e., from 7.8 +/- 0.9 to 7.6 +/- 1.2 in group C; 8.4+/1.6 to 8.3+/-1.5 (P=0.34) in group B while 6.1+/-0.6 from 6.0+/-1.2, (P=0.00) in group A.

Table No.2: Study Variables

	A	B	C
Fasting Blood Sugar at baseline (mg/dl)	89+/-7	181+/-51	142+/-16
Fasting Blood Sugar post intervention	84+/-8	131+/-34**	126+/-16*
HbA1C baseline (%)	6.1+/0.6	8.2+/-1.6	7.8+/-0.9
HbA1C post intervention	6.0+/-1.2	8.3+/-1.5	7.6+/1.2

Data are means +/- SD
Values of blood sugar levels have been rounded up.
** significant from baseline P<0.001
* significant from baseline P<0.01

DISCUSSION

Green tea has been used in Asian countries since ages for the treatment of various ailments. Its inverse relationship with blood glucose levels has been studied extensively in animals and in humans. To our knowledge this was the first study to evaluate the effect of green tea on glycemic control in type 2 diabetes in Pakistan. Similar study has been done to show the effect of green tea on fasting glucose level but not on A1C by the writer herself[21]. Our recent results are in consistence with the results of Todd A MacKenzie, who showed a significant reduction of fasting blood glucose but no effect on the HbA1C in 3 months period after the treatment with green tea polyphenols on the diabetic patient who were already taking hypoglycaemic drugs[22].

Hiroshi et al, also have shown the effect of green tea extract in diabetic mice after administering various doses (30, 150, 300mg/kg) [23]. There was mild lowering of FBS at 150mg/ kg, while significant lowering of FBS seen on 300mg/kg. No elevation of serum insulin levels was observed by them during the decrease in blood sugar level. All the studies done previously, have shown reduction in FBG while poor control on glycaemia with HbA1C which means maintaining only FBS does not rule out the possibility of developing diabetic complications. Hosoda et al. gave similar results on FBS level in diabetics with oolong tea but they did not measure A1C[24]. The reported benefits of green tea on FBS but negligible effect on HbA1C can

best be explained by the relatively small contribution of green tea on random glucose levels.

This study had several limitations. It is possible, but unlikely, that subjects might be taking inadequate dose of GTP, as they were not on strict observation. The dose given twice a day perhaps was not sufficient to maintain the therapeutic level throughout 24 hours period, to achieve good glycaemic control. The dose could have been made more frequent to achieve a good therapeutic level

It is also possible that 90 days duration is not enough periods to maintain 120-day lifespan of red blood cells showing false-negative results. Although, we believe those 90 days is a sufficient time to show a positive effect. However Todd A MacKenzie recommended the regular intake of green tea on an account of its other health benefits, but evidence that it improves glycemic control, is limited and conflicting.

In summary, this study provides evidence that Green Tea is not effective in improving glycaemic control in type 2 diabetes. Consistent with other recent researches, our failure to demonstrate any effect on Hb A1C, introduces significant doubt regarding the efficacy of green tea in diabetic subjects.

CONCLUSION

The green tea extract seems to have a moderate effect in reducing fasting plasma glucose concentrations in diabetic patients with poor glycaemic control.

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Original Article

Pterygium Excision and Limbal Conjunctival Autograft with Versus without the use of Mitomycin-C in Patients below the age of 45 Years

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ABSTRACT

Objectives: To compare pterygium recurrence following excision with limbal conjunctival autograft with application of Mitomycin-C versus non application of Mitomycin-C in patients below age 45 years.

Study Design: Randomized Control Trial.

Place and Duration of Study: This study was conducted at the Department of Ophthalmology, NMC, Multan from 15.06.2009 to 15.12.2009.

Materials and Methods: Total 86 patients with the age range 25-44 years were selected for this study and categorized randomly into two groups, group-I (n=43) and group-II (n=43). Pterygium surgery was performed with limbal conjunctival autograft without the use of Mitomycin-C in group-I and with the use of Mitomycin-C in group-II. Three patients out of 86 cases did not visit for follow-up.

Results: Pterygium was more prevalent in males (n=65, 75.58%) and majority of the patients (n=36, 41.9%) were between 41-44 years of age. There were 7 (17.07%) cases of recurrence observed in group-I and only 1 (2.38%)case of recurrence in group-II, the difference in recurrence rate was statistically significant (p=0.02).

Conclusion: For pterygium surgery, limbal conjunctival autograft combined with intraoperative application of Mitomycin C is recommended.

Key words: Pterygium, Mitomycin-C, Limbal conjunctival autograft.

INTRODUCTION

A pterygium is a triangular fibrovascular subepithelial ingrowth of degenerative bulbar conjunctival tissue over the limbus on to the cornea1.This is generally situated on the nasal side but sometimes occurs both nasally and temporally and rarely on the temporal side2. This is more common in the tropical and subtropical countries. Pterygium interferes with vision by occluding optical axis or by producing changes in the corneal curvature3. It is frequent in hot, dry, windy, dusty and smoky environment4. Outdoor workers are usually affected more common than those who work in indoors.

Patients younger than the age of 15 years rarely acquire pterygium. Although, the prevalence of the lesion increases with age, the highest incidence occurs between the ages of 20 and 49 years5.

Besides hereditary factor6, there is considerable scientific evidence to support the theory that sunlight is the principal etiologic factor in pterygium formation7. The cornea and conjunctiva absorb most of the long infrared and short ultraviolet rays that reach the earth from the sun. These rays when absorbed cause tissue damage, the infrared by their thermal action and ultraviolet by their abiotic effect. Corneal stem cells are susceptible to noxious stimuli such as ultraviolet radiations, dry, dusty, windy and sandy environmental conditions.

The excision of a pterygium with bare sclera was widely practiced because it was believed to be safe and simple. However, with time it became apparent that the recurrence rate was unacceptably high, ranging from 55.9% to 89%8.

Several methods are used for the treatment of pterygium such as transplantation of pterygium head, conjunctival flaps, conjunctival autografts, lamellar keratoplasty, mucous membrane grafts, chemotherapy by thiotepa or by Mitomycin-C, radiation therapy by radon bulbs, radium plaques or beta radiations9.

Mitomycin-C (MMC) and limbal conjunctival autograft (LCAU) are two known useful adjuvants in the prevention of pterygium recurrence[10]. Various studies have reported the efficacy of Mitomycin-C in reducing the reccurence rate following pterygium surgery[11,12]. Furthermore, the application of intraoperative 0.02% Mitomycin-C for five minutes is efficient in reducing the recurrence rate to minimum[13].

MATERIALS AND METHODS

This study was carried out in Ophthalmology department of Nishtar Medical College and Hospital, Multan. The patients were selected from Eye OPD Nishtar Hospital, Multan. There were total 86 cases of pterygium excision with limbal conjunctival autograft, in which 43 cases were with the use of Mitomycin-C and 43 cases were without the use of Mitomycin-C. Patients age range was between 25-44 years. After briefing the merits and demerits of both the procedures to the patients, a formal informed consent was taken. 43 cases were operated with limbal conjunctival autograft

without the use of Mitomycin-C. 43 cases were operated with limbal conjunctival autograft with the use of Mitomycin-C. In both of these groups topical local anesthesia 2% xylocain was given at the site of the pterygium. In group I after excision of pterygium,limbal conjunctival graft was taken from superotemporal area and sutured from limbus to limbus with 10-0 nylon. In group II after excision of pterygium, Peroperative 0.02% Mitomycin-C was applied to the scleral bed by a silicon sponge for three minutes. After that copious irrigation of this area was done with balanced salt solution for five minutes. Later on, limbal conjunctival autograft was taken from supero-temporal area and was sutured from limbus to limbus with 10-0 nylon as mentioned in group-I.

Follow up period was at 1st week, 4th week, 12th week and 24th week (final outcome) to see the presence or absence of pterygium recurrence.

RESULTS

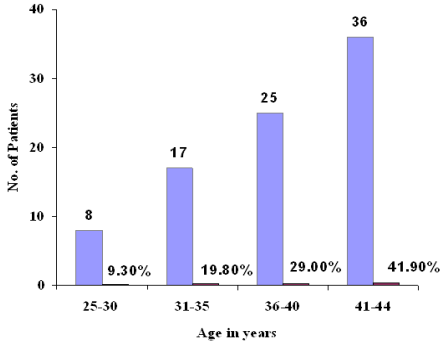
Eighty six patients were operated during this study. According to the age, they were categorized into four groups as shown in graph. Majority of the patients (n=36, 41.9%) were between 41-44 years of age as shown in graph. Mean and standard deviation for age of our study was 39.12 ± 5.53 years.

Seventy six (88.37%) patients had only single nasal pterygium while ten (11.63%) patients had two pterygia at the time of presentation. Eighty three (83) patients came for follow up, out of those, forty one (41) cases were from group I and forty two (42) cases from group II.

During each follow up, patients were evaluated postoperatively for reccurence. There were 7 (17.07%) recurrences observed in group-I and only 1 (2.38%) recurrence in group-II. The difference in recurrence rate was statistically significant (p=0.02) as shown in table.

Foreign body sensation, lacrimation and photophobia were encountered in many patients of both study groups. As compared to the group-I, there was delayed epithelialization of the wound in group-II.

No intra-operative complication was observed during this study. None of the patients developed symblephron, degenerative calcification, uveits or cataract.



Graph: Age Distribution of Patients.

Table No.1: Recurrence rate of Pterygium

Recurrence	No. of patients and Percentage (%)		P value
	Group-I	Group-II	
Yes	7 (17.07%)	1 (2.38%)	
No	34 (82.92%)	41(97.68%)	0.02

DISCUSSION

The pterygium is one of the commonest disorders in a tropical country such as Pakistan. Exposure to ultra violet light is presumed to be the most important risk factor14. High intensities of UV-B light are hazardous to the eyes. Its exposure can cause welder's flash and may lead to cataract and pterygium15. In our study, majority of the patients were between 41-44 years age.

These present findings appeared to be supported to certain degree by the general observation made by Saleem et al16 that maximum incidence in their study was in 31-40 years of age group. After surgical removal, a pterygium may recur.

Of the many procedures used over the years to improve the surgical success rate, two are currently enjoying widespread popularity, with high rates of success repeatedly reported in multiple independent studies. One is excision of the pterygium with a conjunctival autograft and the other is excision of a pterygium with intraoperative application of Mitomycin-C (MMC)17.

Mitomycin-C is commonly recommended to reduce recurrence. It is an antineoplastic antibiotic with radiomimetic properties that selectively inhibit DNA, RNA and protein synthesis18,19,20. .

Regarding the recurrence of pterygium, results of our study were also confirmed by the study of Frucht et al21. Their research analysis revealed a significantly lower recurrence rate (p=0.038) in patients treated with conjunctival autograft combined with intraoperative low-dose MMC than those who were treated with conjunctival autograft only. In our study, the difference in recurrence rate between the two groups was also statistically significant (p=0.02) as shown in table 2.

Our results of group-I are in close agreement with another report of Ali and Qazi who studied evaluation of recurrence following pterygium excision with limbal stem cell autograft. They found 14.8% frank recurrence7.

CONCLUSION

In our study we concluded that Pterygium reccurence is significantly less common when treated with limbal conjunctival autograft combined with intraoperative application of Mitomycin-C as compared to those were treated with only conjunctival autograft.

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Original Article

Mean Eruption Ages and Emergence Sequences of Permanent Mandibular first Molar and Central Incisor in local population of Lahore, Pakistan

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ABSTRACT

Objective: To find out the mean eruption age and emergence sequence of permanent Mandibular first molar and central incisor in local population of Lahore, Pakistan.

Background: Mandibular first molar and central incisors are the first permanent teeth that erupt in mouth. The timing of these teeth is useful to determine early or delayed eruption. It also helps in prophylactic measures, as water fluoridation. Useful in pediatric dentistry e.g. as one of the milestone, orthodontic dentistry, for diagnosis of certain growth disturbances. Useful in forensic dentistry for estimation of age, developmental differences and similarities among populations. This study standard may ensure international comparability to assist clinicians.

Study Design: Cross-sectional

Place and Duration of Study: This study was conducted at the Department of Oral Biology, KEMU, Lahore from 1st March 2010 to 15 January 2011

Materials and methods: Four thousand primary school children of both genders aging between 5-9 years were examined. Ethical permission was obtained. Consent was obtained. Emergence of teeth was noted in three anatomical stages. Teeth were noted by two-digit system of FDI (Federation Dentaire Internationale), on Performa. Statistical analysis was done by SPSS version 13.

Results: In male mean eruption age of Lower Central Incisor was 7.29 years with emergence range of 6.75- 8.14 years. Whereas Lower First Molar was 6.93 years, with range of 6.46–7.93 years. In female mean eruption age of Lower Central Incisor was 6.84 years, with emergence range of 6.08- 7.48 years. And of Lower First Molar was 6.87 years, with range of 6.75 – 7.32 years. P-value less than 0.05 was assumed significant.

Conclusion: Mandibular central incisor & first molar eruption ages are later in both genders compared to Western standards used in our clinical and basic sciences.

Key words: eruption age, permanent central incisor, first molar.

INTRODUCTION

Eruption is derived from Latin word 'erumpere' means to break out. Dentition begins to form at approximately 13-16 weeks in utero and continues up to late adolescence, when the development of permanent third molar gets completed[1-2] It is genetically regulated process involving the cells of tooth organ and surrounding alveolus[2-4] This physiological phenomenon starts with eruption of primary teeth followed by permanent dentition. Eruption of deciduous teeth, their shedding and subsequent eruption of the permanent dentition are orderly, sequential and age specific events.[2-5]

In literature emergence or eruption of tooth is in fact described as the moment tooth pierces the gingiva or keratinized mucosa and becomes clinically visible. [3-6]

There was no information available for the deciduous or permanent dentition eruption ages of local population. This cross-sectional multistage random sampling study in Lahore (Punjab) was the first investigation carried out in Pakistan for the mean eruption ages, range and sequence of mandibular permanent first molar and central incisor in both genders. This study provided the standards of eruption norms for comparison and use in basic and clinical sciences as reference data in addition to Western standards.

MATERIALS AND METHODS

Cross sectional multistage random sampling technique was used. A total number of 4000 primary school children of both genders were examined, during study period from 1st March 2010 to 15 January 2011. All clinically healthy participants were included. Children under weight or with any congenital disease were excluded. Their ages were between 5-9 years. King Edward Medical University Ethical Review Committee permitted for research, and higher study board approved the study. Consent was obtained from heads of schools. Visual examination with manual palpation was performed in good light using disposable gloves and mouth mirror. Findings were recorded on Performa, by two-digit system of FDI (Federation Dentaire Internationale), adopted by World Health Organization (WHO). Emergence of teeth was noted in three stages depending clinical emergence of crown in oral cavity,

distributed as; eruptive stage 1; occlusal/upper one third of tooth crown pierced gingiva, eruptive stage 2; occlusal and middle (upper two thirds) of crown visible in oral cavity, eruptive stage 3: entire crown visible/tooth in occlusion. Data was entered in SPSS version 13, and quantitative statistics was applied to all three eruptive stages. Mean eruption age, standard deviation, emergence range and sequence were determined at each stage in both genders. Normality of data was checked by One Sample Kolmogrove Simirnove test. P value less than 0.05 was assumed as significant. Independent sample t-test was applied for comparison between two genders.

RESULTS

In this study total participants were 4000, their ages were between 5-9 years. The mean age of children was 7.14 years, with SD ± 1.29. (Table 1) Among them male were 1616 (40.40%) and females were 2384 (59.60%). The male to female ratio was 0.68:1.

Eruption age of mandibular left & right central incisor and 1st molar is given respectively, at each emergence stage. Mean of left and right side of jaw at each stage is shown. Mean of all stages is determined as mean eruption age. Emergence range is time period from first emergence stage to third stage.

In male mean eruption age of central incisor is 7.29 years, SD±0.83 and SE 0.13.While emergence range is 6.75-8.14 years. The lower first molar mean age is 6.93 years, SD± 0.76, and SE 0.12, with range of 6.46-7.93 years. P value = 0.000, showing highly significant results. (Table 2)

In female it was observed that left and right side central incisor erupted with statistically insignificant differences at eruptive stages. In contrast molar showed slight earlier eruption at all stages on right side. The mean eruption age of central incisor is 6.84 years, SD± 1.06 and SE 0.18. And the lower first molar mean eruption age is 6.87 years, SD±0.84, and SE 0.17. The p value is 0.000, showing highly significant results. (Table 3)

In male lower first molar shows earlier emergence sequence than incisor. Whereas emergence range of both the teeth shows no statistically significant difference.

In female lower central incisor emergence sequence is earlier than molar, but the difference is statistically insignificant. Central incisor showed increased emergence range compared to molar. Both genders showed the t-test value -4.722 with p value 0.000, highly significant results. (Table 4)

Table No.1: Mean age of the school children
n = 4000
Age of participants is between 5-9 years

Mean Age of Participants in years	7.14
Standard Error (SE)	0.02
Standard Deviation (SD)	± 1.29

n = Total number of participants

Table No.2: Mandibular central incisor and first molar eruption age on left & right side of jaw at each emergence stage with mean of all eruptive stages in male

Lower Central Incisor Eruptive Stage 1					Lower First Molar Eruptive Stage 1			
Side of jaw	n	Eruption age in years	SD	SE	n	Eruption age in years	SD	SE
Left	28	6.79	± 0.74	0.14	13	6.08	± 0.34	0.09
Right	31	6.72	± 0.62	0.11	20	6.85	± 0.91	0.20
Mean of sides	29.5	6.75	± 0.68	0.12	16.5	6.46	± 0.62	0.14
Eruptive Stage 2					Eruptive Stage 2			
Left	14	7.05	± 0.90	0.24	6	6.26	± 0.48	0.19
Right	8	6.92	± 0.85	0.30	10	6.58	± 0.69	0.22
Mean of sides	11	6.98	± 0.87	0.27	8	6.42	± 0.58	0.20
Eruptive Stage 3					Eruptive Stage 3			
Left	1155	8.14	± 0.95	0.02	1324	7.94	± 1.08	0.02
Right	1152	8.14	± 0.96	0.02	1326	7.93	± 1.09	0.02
Mean of sides	1153.5	8.14	± 0.95	0.02	1325	7.93	± 1.08	0.02
Mean of all stages	1194	7.29	± 0.83	0.13	1349.5	6.93	± 0.76	0.12

p value = 0.000 Key words: n = Number of participants, SE = Standard error, SD = Standard deviation

DISCUSSION

In this study four thousand primary school children between ages of 5-9 years were examined. The mean age of sample was 7.14 years, SD±1.29 and SE 0.02. (Table1) Among them male participants were 1616 (40.40%) and female were 2384 (59.60%) respectively. The male female ratio was 0.68:1. (Graph1) Coincides with data by Gupta and others.[3-7] It has been recommended that standards of teeth eruption norms should be established of the population in which applied. Mean eruption age standards of Saudi Arabia,

Iran, Turkey, Malaysia, India and other populations of world showed some deviation of eruption age and sequences from European standards used in our practice. [8-11] Mandibular first molar and central incisors are the first permanent teeth erupting in oral cavity.

Table No.3: Mandibular central incisor and first molar eruption age on left & right side of jaw at each emergence stage and mean of all eruptive stages in female

Lower Central Incisor Eruptive Stage 1					Lower First Molar Eruption Stage 1			
Side of jaw	n	Mean eruption age in years	SD	SE	n	Mean eruption age in	SD	SE
Left	12	6.06	± 1.16	0.33	11	6.84	± 0.64	0.19
Right	10	6.10	± 0.94	0.29	16	6.66	± 0.59	0.14
Mean of sides	11	6.08	± 1.05	0.31	13.5	6.75	± 0.61	0.16
Eruptive Stage 2					Eruption Stage 2			
Left (31)	17	6.99	± 0.96	0.23	5	6.58	± 0.62	0.27
Right (41)	18	6.96	± 0.94	0.22	4	6.54	± 0.81	0.40
Mean of sides (31+41)	17.5	6.97	± 0.95	0.22	4.5	6.56	± 0.71	0.33
Eruptive Stage 3					Eruption Stage 3			
Left (31)	1704	7.54	± 1.21	0.02	2062	7.34	± 1.22	0.02
Right (41)	1913	7.42	± 1.20	0.02	2092	7.31	± 1.23	0.02
Mean of sides (31+41)	1808 .5	7.48	± 1.20	0.02	2077	7.32	± 1.22	0.02
Mean of all stages (1 – 3)	1837	6.84	± 1.06	0.18	2095	6.87	± 0.84	0.17

p value = 0.000 Key words: n=Number of participants SE=Standard error SD=Standard deviation

Table No. 4: Comparison of mandibular central incisor and first molar mean eruption age, sequence and emergence range in both genders

	Central incisor		First molar	
	Mean eruption age in years	Eruption range in years	Mean eruption age in years	Eruption range in years
Male	7.29 years	6.75-8.14 years	6.93 years	6.46-7.93 years
Female	6.84 years	6.08-7.48 years	6.87 years	6.75-7.32 years

Independent t-test showed p value = 0.000 significant result
In male mean eruption age of Lower Central Incisor = 7.29 years
Emergence range of Lower Central Incisor = 6.75- 8.14 years
Mean eruption age of Lower First Molar = 6.93 years
Emergence range of Lower First Molar = 6.46 – 7.93 years

In female mean eruption age of Lower Central Incisor = 6.84 years
Emergence range of Lower Central Incisor = 6.08- 7.48 years
Mean eruption age of Lower First Molar = 6.87 years
Emergence range of Lower First Molar = 6.75 – 7.32 years

In females mean eruption age is earlier than males

Therefore Uysal and colleagues correlated first molar eruption with skeletal maturity.[12] Likewise sequence differences of central incisor and first molar are also investigated at large in literature. [3-8, 13,14] Eruption age differences of teeth on left and right side of jaw were not observed in literature. A few studies showed the eruption differences on sides of jaw, the difference is statistically insignificant. [11] The same has been observed in my study. Therefore age on both sides calculated as mean age for the respective emergence stage.

Mean eruption age of lower central incisor in both genders:

Mean eruption age of lower central incisor in female at stage 1; was 6.08 years, SD±1.05 years. In male age was 6.75 years, with SD±0.68 years, shown in (Table 2&3). This result showed earlier eruption in female as compared to male. Increase in mean age observed in our study is consistent with Indian population results, as sharing same demographic characteristics. However the eruption ages of Westerns, as taught in our medical

practices are not in lieu with the results shown in my study and in Indian literature. [3,7-8]

The age of lower central incisor eruption at stage 2, in female was 6.97 years with SD±0.95, while in male was 6.98 years with SD±0.87 (Table 2&3). Age is directly proportional to eruption of teeth. In literature increase in age has been seen to increase eruption frequency.[3, 15-17]

The eruption age of incisor at stage 3, in female was 7.48 years with SD±1.20. Whereas in male was 8.14 years with SD±0.95 (Table2&3). Earlier eruption of permanent teeth among females is in accordance with literature. [3, 7-8]

The mean of all three eruption stages determined as mean eruption age of central incisor in female was 6.84 years with emergence range 6.08-7.48 years and SD±1.06. Whereas in male mean age was 7.29 years, and range was 6.75-8.14 years, SD±0.83, (table 2-4). World wide studies presented their eruption norms in months. Therefore for the easiness of comparison, our study mean ages are also shown in months. In females 82 months (6.84 years) and in male 87 months (7.29 years). Our study results and data of Saudi Arabia both showed later eruption age compared to European standards.[2,18]Our study eruption standards for permanent lower central incisor mean eruption age can be compared with standards of various countries established in months. These countries include South Africa 65 months, Ghana 63 months, Nigeria 75 months, USA 77 months, Australia 78 months, Iran 82 months. [17,18]Their standards were calculated only with single stage in all age groups, whereas in this study age has been calculated at three emergence stages. Nizam showed the youngest eruption age 5 years for any permanent tooth, lower 1st molar or central incisor in girls and 4.94 years in boys. His results are different than the universal standard, which is earlier eruption of permanent teeth in girls, an established fact because of earlier development of secondary sex characters. [2-4,7,9,19] Blankenstein showed 1 to 6 months earlier permanent teeth eruption in female compared to male as in our study.[20] Whereas Turk female lower central incisor eruption age 6.71 years, is in accordance to our results 6.84 years for incisor. (see table 3&4) [19] Whereas in Turk male mean age was 6.56 years, compared to this study 7.29 years. These differences could be result of factors mentioned as socio-economics and height & weight. [21] My results are in accordance to results by Gupta, stating that differences in populations are common. [3,21]

Mean eruption age of lower first molar in both genders

Eruption age of lower 1st molar at stage 1, in female was 6.75 years, with SD±0.61, whereas in male was 6.46 years, with SD±0.62, (table 2&3). Earlier eruption of molar in male seen at this stage needs further research.[21] Results of this eruptive stage are in agreement with results of Nizam, who stated earlier eruption in boys. [21]

Eruption age of lower first molar at stage 2, in female was 6.56 years, with SD±0.71, whereas in male was 6.42 years, with SD±0.58, (table2&3).

Molar erupted earlier at stage 1 & 2 on right side in females. In contrast to left side in male. These results revealed affect of functional lateralities as right or left sidedness in sample seen by Heikkinen on tooth eruption.(26) Whereas stage 3, showed emergence age differences on sides of jaw, statistically insignificant.[17-21]

Eruption age of lower first molar at stage 3 in female was 7.32 years, with SD±1.22, whereas in male was 7.93 years, with SD±1.08. (Table 2&3) These results are in accordance to results by Gupta. Who showed one year later eruption of mandibular incisor and 1st molar in Indian population compared to Western standards that we use. [3,7]

Mean of all eruptive stages determined as eruption age standard for lower first molar in female was 6.87 years, with emergence range 6.75-7.32 years, SD±0.84, whereas in male was 6.93 years with range of 6.46-7.93 years and SD ±0.76, (table 2-4). Whereas in this study lower first molar mean eruption age in months for comparison with other international studies are: in female 82 months, while in male 83 months. Saudi population mean age of lower 1st molar was 71.7 months, [18] earlier than the results of our study. This could be due to socioeconomic, genetic and increased height and weight standards. As children with standard height and weight showed earlier eruption. [17,18-21]

Mean eruption age of lower 1st molar in male can be compared with South Africa = 62 months, Ghana = 57 months, Nigeria =72 months, USA = 74 months, Australia = 78 months, Iran = 82, Lahore (Pakistan) 83 months. [10,18-19] Results of our study are in accordance with results of India, Iran, Australia and Saudi Arabia as compared to data in text books of dental anatomy. [2-4,7,21] Mean eruption ages of lower incisor and 1st molar in this study are in accordance with literature, showing insignificant differences when compared with other eruption studies.[3,8,17,21]Chohan and colleagues showed the mean eruption age of lower first molar 6.0 years, [21] whereas of females in Turkey age was 6.23 years with SD±1.03. Their results showed lesser differences when compared with Westerns due to economic and racial similarities. Whereas mean age of male in Izmir was 6.03 years with SD±0.85, while compared to our study is in partial agreement.[19-21]Mean eruption age of lower central incisor and 1st molar are earlier in female compared to male [13,11,18-21]

CONCLUSION

According to our study the mean eruption age of permanent mandibular first molar and central incisor in both genders is about one year later than the Western Standards. Therefore, the range of eruption age is also higher for both teeth in both genders. Females showed earlier eruption of both teeth than males.

Recommendations: The eruption standard of this study conducted in local population of Lahore showed increase in mean eruption age and also range i.e. about one year later in both genders as compared to Western standards. Therefore it is recommended that these standards should be applied in local population of our country for best interests of local public and specialists. This research should also be conducted in other urban and rural populations of Pakistan, not only for mandibular central incisor and first molar but also on deciduous and other Permanent teeth by public as well as private sector.

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Original Article

Atherogenic Index of Plasma in Normotensive Adults with Type 1 Diabetes Mellitus

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ABSTRACT

Objective: Type 1 diabetes is an organ specific autoimmune disease characterized by a progressive cell-mediated destruction of beta cells of the pancreas which leads to an absolute dependence on insulin for survival and maintenance of health. The present study was designed to look at the levels of atherogenic index of plasma (AIP) in normotensive adults with type 1 diabetes mellitus. The study was also intended to look for the difference, if any, in AIP levels between type 1 diabetics and the control healthy group.

Study Design: Observational and comparative study.

Place and Duration of Study: This study was conducted at Department of Biochemistry and Clinical Chemistry, Khyber Medical College, Peshawar from July 2006 to December 2006.

Materials and Methods: In this study 30 patients with Normotensive Type 1 Diabetes Mellitus and 30 healthy control individuals were included. Blood samples of patients and control individuals were collected and analyzed for glucose, lipid profile and AIP was evaluated.

Results: The age and the body mass index (BMI) were having no significant statistical difference between the patient and the control group. Blood glucose, lipid profile and AIP were found to be significantly higher in normotensive type 1 diabetic patients when compared with control subjects.

Conclusion: The study emphasizes that the determination of Atherogenic index of plasma as a routine measure can be used as an early predictor of atherosclerotic complications in diabetes mellitus.

Key Words: Atherogenic Index of Plasma, AIP, Dyslipidemia, Type 1 Diabetes Mellitus, Diabetes Mellitus.

INTRODUCTION

Type 1 diabetes is an organ specific autoimmune disease characterized by a progressive cell-mediated destruction of beta cells of the pancreas which leads to an absolute dependence on insulin for survival and maintenance of health[1]. The global number of individuals with diabetes in 2000 was estimated to be 171 million (2.8% of the world's population), a figure projected to increase in 2030 to 366 million (6.5%), 298 million of whom will live in developing countries[2].

Although most attention has focused on the increase in type 2 diabetes, a parallel rise in type 1 has occurred. A type 1 diabetic has always been known as disease of childhood, but more recent epidemiological studies have indicated that the incidence of type 1 diabetes is comparable in children and adults[3]. In the younger type 1 diabetes mellitus patients acute complication such as hyperglycemia and ketoacidosis are the main causes of death while renal and cardiovascular disease are responsible for the majority of deaths in the older population[4]. As in persons with type 2 diabetes and the general population, dyslipidemia is a significant risk factor for coronary heart disease (CHD) for type 1 diabetic patient. Dyslipidemia is a preventable major risk factor for coronary heart disease[5].

Diabetic dyslipidemia is generally characterized by increased plasma triglyceride (TG) and decreased high density lipoprotein – cholesterol (HDL-C) concentrations, a preponderance of small, dense low density lipoprotein (LDL) and an increased apolipoprotein B concentration[6]. The level of dyslipidemia predicts macrovascular complication such as coronary heart disease in patients with type1 diabetes mellitus[7]. Identification of risk factors, such as dyslipidemia is considered of great importance in terms of avoiding chronic micro and macro vascular complications[8].

Atherogenic index of plasma (AIP) is defined as logarithm of plasma triglyceride concentration to the concentration of high density lipoprotein cholesterol[9]. AIP provides information about the atherogenicity of plasma and quantifies the response to therapeutic intervention[10]. It is also considered as a significant predictor of coronary heart disease[11]. This study evaluates the level of atherogenic index of plasma in normotensive adults with type 1 diabetes mellitus.

MATERIALS AND METHODS

A total of 60 subjects were included in this study. Thirty previously diagnosed Type 1 diabetic patients and equal number of control (non-diabetic) healthy individuals having no history of taking lipid lowering drugs , multivitamins especially antioxidant vitamins and not suffering from coronary heart disease, hypertension or any other disease participated in this study.

The study was conducted in Department of Biochemistry and Clinical Chemistry, Khyber Medical College Peshawar. Blood samples were collected from

normotensive Type 1 diabetic adult patients as well as from the control subjects in the morning after an over night fast. Serum was separated after blood was allowed to clot by centrifugation at 2500 rpm for 15 minutes. Estimation of serum glucose determination was done immediately. Blood glucose, triglycerides, cholesterol and HDL-c were analyzed by enzymatic colorimetric method, using kits supplied by Randox Laboratories Ltd. Ardmore, United Kingdom. LDL-c and VLDL-c were calculated by Friedewald's formula[12] and Wilson's formula[13] respectively. Atherogenic Index of Plasma (AIP) was calculated as log (TG/HDL-C)[14].

The results were expressed as mean ± SD. Statistical significance was evaluated by Students t-test was applied and differences among two groups were considered significant at $P<0.05$.

RESULTS

The study population consisted of 30 known cases of type 1 diabetes mellitus and 30 healthy controls. The mean values of age in case of type 1 diabetes mellitus (34.47 ± 5.34 yrs), the control group (35.37 ± 4.33 yrs) and the mean values of BMI in case of type 1 diabetic group (21.73 ± 3.72 Kg/m^2), control group (22.97 ± 1.67 Kg/m^2), were all indifferent statistically.

Table No. 1: Blood Glucose, Lipid Profile and Atherogenic Index of Plasma of control subjects and Normotensive Adult Type-1 Diabetic Individuals

	Control (n=30)	Normotensive Adult Type-1 Diabetic (n=30)
Glucose (mg/dl)	91.87 ± 6.32	201.10 ± 46.64 *
Triglycerides (mg/dl)	131.70 ± 13.29	174.70 ± 30.09 *
Cholesterol (mg/dl)	179.53 ± 23.68	225.47 ± 30.66 *
HDL-c (mg/dl)	51.87 ± 8.74	34.83 ± 4.63 *
LDL-c (mg/dl)	101.37 ± 26.80	155.62 ± 27.18 *
VLDL-c (mg/dl)	26.33 ± 2.73	35.00 ± 6.10 *
AIP	0.05 ± 0.08	0.34 ± 0.09 *

P < 0.001 as compared to Control subjects

Comparison of serum glucose and lipid profile between normotensive type 1 diabetic adult patients and healthy control subjects is shown in Table 1. Fasting serum glucose, total cholesterol, triglycerides, LDL-C were found significantly high ($P<0.001$) in normotensive type 1 diabetic adult patients when compared with non diabetic subjects, on the other hand the levels of HDL-C was found to be significantly lower ($P<0.001$) in type 1 diabetic patients as compared to control group. Plasma atherogenicity (Atherogenic index of plasma) was found significantly high ($P<0.001$) in normotensive type 1 diabetic adult patients when compared with (non diabetic) healthy control group.

DISCUSSION

Diabetes is a chronic illness that requires continuing medical care and ongoing patient self-management education and support to prevent acute complications and to reduce the risk of long-term complications[15]. Patients with diabetes mellitus develop atherosclerotic vascular disease earlier with great severity than non-diabetic subjects. Approximately 35% of patients with insulin dependant diabetes mellitus die of coronary artery disease by the age of 55 years[16]. Although the prognosis of the type 1 diabetes mellitus has improved considerably over the past 50 years, it is still exceeds that of general population[4]. The present study reveals increased concentration of triglycerides, total cholesterol, low-density lipoprotein cholesterol and very-low-density lipoprotein cholesterol; whereas the high-density lipoprotein cholesterol levels were significantly lower in normotensive Type1 Diabetic adults as compared to the healthy non-diabetic control subjects.

Torres-Tamayo and colleagues[17] noticed increased triglycerides and total cholesterol levels in Type1 Diabetic patients. A group of research workers also reported significantly higher serum total cholesterol and apolipoprotein B levels in Type1 Diabetic group of patients[18]. In a study by Perez et, al. comparison of adult Type 1 diabetics with non diabetic patients showed a higher LDL-C , total triglyceride and low HDL-C levels in 16%, 5%, and 20% of patients and 13%, 6%, and 9% of controls, respectively . Diabetic women showed more hypercholesterolemia than non-diabetic women[19]. EURO DIAB IDDM complication study on type 1 diabetic adults reports the prevalence of LDL hypercholesterolemia in 45% in men and women while hypertriglyceridemia was observed to be 12% in men and 8% in women[20]. Sarman and group showed significant higher levels of serum total cholesterol and apolipoprotein B in type 1 diabetic patients as compared to non diabetic subjects[18].

AIP indicates a balance between the actual concentration of plasma triglyceride and high density lipoprotein, which predetermine the direction of cholesterol transport in an intravascular pool is the flux of newly produced cholesteryl esters by lecithin cholesterol acyl transferase (LCAT) towards atherogenic LDLs or beneficial HDLs[21]. The atherogenic index of plasma has recently been proposed as a marker of plasma atherogenicity because it is increased in people at higher risk of coronary heart disease and is inversely correlated with LDL particale size. AIP values of - 0.3 to 0.1 are associated with low coronary artery disease (CAD) risk, 0.1 to 0.24 medium and above 0.24 high risk[22].

CONCLUSION

The study emphasizes that the determination of Atherogenic index of plasma as a routine measure can be used as an early predictor of atherosclerotic complications in diabetes mellitus.

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Original Article

Incidence of Common Benign Breast Diseases among 'ANDI Classification'

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ABSTRACT

Objectives: To observe the incidence of common benign breast diseases among 'ANDI classification' in patients attending DHQ hospital D .G Khan medical college D.G Khan and to compare the management provided, with international literature.

Study Design: Prospective Study.

Place and Duration of Study: This study was carried out in surgical outpatient department and surgical wards of DHQ hospital D .G Khan Medical College D.G Khan from June 2011 to May 2012.

Materials and Methods: This prospective study was carried out on female patients presenting with sings and symptoms of benign breast disease in surgical outpatient department and surgical wards of DHQ hospital D .G Khan medical college D.G Khan, in a period of 12 months from June 2011 to May 2012. A total of 100 patients were included in the study.

Results: During the 12 month study period, a total of 161 patients with suspected benign breast disease were evaluated and out of them 100 patients were included in study. As regards menopausal status, 93 (93%) were pre-menopausal and 7 ((7%) patients were post-menopausal. Out of 100 patients, 69 (69%) were married and 31 (31%) women were unmarried. The age of the patients was 15-50 years. Incidence of Fibroadenoma was 62% and Mastalgia was found in 27 patients (cyclical 15 (55.5%) and non-cyclical 12 (44.5%).

Conclusion: In the modern era of advanced technology, most sophisticated procedures of diagnosing and treating the breast disease, like mammoscintigraphy and MRI are lacking in our institution. Provision will definitely benefit the patients and will provide an opportunity to surgeons to take appropriate decisions regarding the management of breast diseases.

Key Words: Benign breast diseases, Relative risk, Subsequent carcinoma.

INTRODUCTION

Over her life time, a woman can encounter a broad variety of benign breast conditions. These include normal changes that occur during the menstrual cycle as well as several types of benign breast disorders. What they have in common is that they are not cancers. Even among breast lumps that warrant a biopsy, some 80 percent prove to be benign.

Benign breast disease is a common disorder. It is at least 10 times more common than breast cancer[1], compared with cancer of breast, the impact of benign diseases of the breast is of trivial significance for the patient affected by them. However, since they cause similar, if not identical, symptoms these conditions are important. On the average, for every single breast cancer referred newly for a surgical opinion 19 additional patients are seen with symptoms and sings which prove to be due to benign conditions[2]. Up to 30percent of women will suffer from a benign breast disorder requiring treatment at sometime in their lives[3].

During the past decade there has been increasing interest in benign breast disease for a number of reasons. Firstly, patients demand investigations and treatment for symptoms of benign breast disease. Secondly, there is the question of premalignant disorders and histological features which may imply an increased risk of breast cancer. Finally, the underlying cause of complaints about the breast proves to be benign in the overwhelming majority of cases[4]. Breast symptoms; induce such a great anxiety in the patients that malignancy need to be excluded as speedily as possible[2].

Benign breast disorders encompass a wide spectrum of clinicopathological features ranging from near normality to severe diseases. The breast may be regarded as physiologically dynamic structure in which cyclical variations are superimposed on changes of development and involution through out the woman's life. These physiological changes may themselves be so extensive that they may fall outside what is regarded as the normal spectrum. The histological features of an individual abnormality must therefore be evaluated within the context of a wide range of normality.

It has therefore been suggested that the broad concept of benign breast disease should be reconsidered. Many so called disease of the breast might now be regarded more accurately as disorders that are based on aberration of normal development and involution. A comprehensive classification, which puts all such processes of aberration of normal development and involution into a single framework is the 'ANDI classification' This classification allows histological entities, such as cysts and fibroadenomas, to be considered as aberration of normal physiology and not 'disease' which allows a much lower risk and anxiety to be attached to the term benign breast disease. Hence

benign breast disorders classified in, 'ANDI classification' are included in this study.

In the past it was difficult to assign an accurate cancer risk to many of the histological subgroups. It has produced a detailed classification of proliferative lesions of the breast, which led to the American College of Pathologists Consensus Statement, assigning a relative risk assessment to these histological categories. Which demonstrate a 1-2fold increased cancer risk in patients with proliferative disease with no atypia and a 4-5 fold increased risk in those with atypical hyperplasia[1]. The coexistence of a positive family history with atypia on biopsy increased the risk to nearly nine times the general population[5].

It is of fundamental importance to the clinician to have accurate information available to counsel patients with benign breast disease and determine whether regular follow up is required. Careful clinical evaluation and sympathetic reassurance are the cornerstones of management for the majority of women. When symptoms remain problematic, then therapeutic intervention is indicated. However, a structured treatment plan, with objective assessment of treatment end point, will provide relief of symptoms in the majority of patients.

MATERIALS AND METHODS

This prospective study was carried out on female patients presenting with sings and symptoms of benign breast disease in surgical outpatient department and surgical wards of DHQ Hospital DG Khan Medical college DG Khan in a period of 12 months from June 2011 to May 2012. A total of 100 patients were included in the study.

RESULTS

During the 12 month study period, a total of 161 patients with suspected benign breast disease were evaluated and out of them 100 patients were included in study. As regards menopausal status, 93 (93%) were pre-menopausal and 7 ((7%) patients were post-menopausal. Out of 100 patients, 69 (69%) were married and 31 (31%) women were unmarried. The age of the patients was 15-50 years. Incidence of Fibroadenoma was 62% and Mastalgia was found in 27 patients (cyclical 15 (55.5%) and non-cyclical 12 (44.5%). While the incidence of other less common benign breast diseases cyclical nodularity, Duct ectasia and intraductal papilloma was 04%, 05 and 02% respectively

Table No.1: Patients presting with lump:Incidence of solid/cystic, benign/malignant (n=124)

Physical character	% age of Patients	Histopathology % of BBD	% of CA
Solid	90.3	90.2	9.8
Systic	09.7	09.7	0%

Table No.2: Nature of mastalgia (n=27)

Nature of mastalgia	No. of Patients	% age
Cyclical	15	55.5%
Non-cyclical	12	44.5%

Table No.3: Fine needle aspiration biopsy of breast lumps (n=35)

Results	No. of Patents	% age
Benign	24.0	68.6
Equivocal	04.0	11.4
Malignant	07.0	20.0

Table No.4: Incidence of individual benign breast disease among 'ANDI' (n=100)

Disease	No. of Patients	% age
Fibroadenoma	62	62.0
Cyclical mastalgia	15	15.0
Non_Cyclical mastalgia	12	12.0
Cyclical nodularity	04	04.0
Duct ectasia	05	05.0
Intraductal papilloma	02	02.0

DISCUSSION

Benign breast disease is a common disorder. It is at least 10 times more common than breast cancer[6]. Recent media publicity and growing breast awareness have increased referrals to hospital for breast symptoms and currently benign to malignant ratio of 10:1 is being seen.

Fibroadenoma is benign breast growth, which usually occur in young women. They are very common cause of breast masses and most fibroadenomas present in girls aged 16-24 years[4]. The overall mean age at presentation is near 30 years. In this study the mean age at presentation proved to be 32 years (rang 15-49 years), which is slightly more than the above reported mean age, it is perhaps because of our social set up and shyness due to religious background, so the patients in early age group are hesitant to consult for their breast symptoms or problems.

Fibroadenoma accounts for 15% of all palpable breast masses in women30-40 years of age. Though the exact prevalence of fibroadenoma is unknown, an autopsy series of 225 women showed that 80% of women under 40 years of age had nonpalpable fibroadenomas[7]. In our study the incidence proved to be 38.5% (62 patients) in palpable breast lumps with the suspicion of benign lumps, that is comparable to international literature reporting 36%[8]. The relative increased incidence could be because of study based in smaller number of patients in a limited geographical area, of Southern Punjab.

As the natural history of the fibroadenoma varies, they may grow, regress or remain unchanged. Daagensen[9], observed most fibroadenomas stop growing when they reach 2-3cm in size. Because fibroadenomas are benign

lesions, one may argue that their removal is not indicated, a diagnosis based on clinical diagnosis alone, however, is not absolute. Given that the clinical diagnosis of a fibroadenoma at biopsy is inaccurate 27-50% of the times[10,11]. In our study it proved to be inaccurate in 45 (28%) of the times. The safest clinical course is to obtain a tissue diagnosis, so excisional biopsy remains the procedure of choice in women above the age of 25 years.

The conservative management of fibroadenomas that are clinically and cytologically benign has been shown to be safe and acceptable to patients: hence some of our patients under the age of 25 years were given the option of conservative management . Majority 60(96.7%) refused to accept this option, but only 2(3.3%) with cytologically proved benign lesions . Both of them were followed up for 6 months, and a slight increase in the size of the lump was noticed and ultimately both were subjected to excision on their wish and were histopathologically proved to have fibroadenomas .So all of our patients were treated by excision of the lumps as they did not accept the offer of conservative management, the cause of nonacceptance was a fear of malignancy which wane of after excision and histopathological examination

1(1.6%) of our patient had multiple fibroadenomas, two in number in the same (upper outer) quadrant of the ipsilateral breast though the incidence of multiple fibroadenomas reported in international literature is 10-15%[9,10].

None of the histopathological report of our patients showed any associated carcinoma, though 160 cases of fibroadenoma have been known to be associated with carcinomas[12,13].

Recurrence of fibrodenoma was not observed in any single patient in our study, though it is not uncommon[4], and any may be due to metachronus fibroadenoma, incomplete removal or missed at operation and finally it may be the mode of presentation of a previously undiagnosed phyllodes tumor.

Regarding fibroadenoma and subsequent risk of breast cancer, our study period of 12 months was insufficient to observe this aspect of the disease. Though in two early studies, only 1 patient in 317 subsequently developed cancer[14,15]. Of interest is report by Dupont and coworkers which describes certain histologic and cytologic patterns of fibroadenoma defined as fibroadenomas with cysts, sclerosing adenosis, epithelial calcification, or papillary changes had an increased relative risk of 3.1. We did not enjoy the provision of having a histopathological report mentioning these variants of fibroadenoma in our study.

Mastalgia: Pain is the most common reason for referral to a breast clinic and accounts for upto50% of patients seen, and of all cases presenting with breast pain40% have cyclical mastalagia[4]. Cyclical mastalgia accounts for two-thirds of cases[1]. The traditional surgical view, that pain in the breast was largely an expression of psychoneurosis, was dismissed in other studies. They showed clearly that the majority of women with mastalgia are psychologically stable, suggesting that in most cases, aberrant physiological or pathological processes underlie the symptoms rather than neuroticism. Patients in our study were also asked for having any psychological problem but no one admitted to document that.

The incidence of breast pain in our study is 27 (16.7%). 15 (9.3%) patients proved to have cyclical mastalgia and 12 (7.4%) had non cyclical mastalgia. As mastalgia remains a poorly characterized, under reported symptom, but it is among the most frequent reasons for breast consultation in general pratice[16]. When questioned, nearly 66% of women reported breast pain, 21% of which is severe[17]. The incidence in our study is significantly low, which could be for the reason that women in our society are quite shy and reluctant to consult doctor for such a secret and trivial symptom. But the incidence of consultation for this symptom is among the increase in relatively higher socioeconomic, literate elite class, because of increasing awareness of beast cancer and the possibility that mastalgia may indicate the cancer, hence the majority 20 (74%) patients presenting with breast pain in our study were from a higher socioeconomic, well of and educated family background.

Cyclical mastalgia was bilateral in 14 (93.4%) patients and unilateral in 1(6.6%) patient in our study which is comparable to international literature mentioning that cyclical pain which is usually bilateral, although it may be unilateral, varies during the menstrual cycle and relieved by the onset of menopause[1]. Regarding the intensity of pain, it was severe in 4 (27%) patients, severe enough to significantly interfere with the patient's every day activities, though reportedly incidence of such a severity is 21% which is relatively lower than our study, no known reason could be accorded to this observation.

Mean age of patients presenting with cyclical mastalgia in our study is 26 year, while the mean age recorded in international literature is 35 years, these are comparable with a relatively younger age group in our study, could be a racial and geographical variation in our subtropical region due to early menarche and early marriages with active reproductive life. The result of our study in this regard is comparable with international literature, that is, more than 80%of women require no treatment other than simple reassurance[4].

The Result of our study show that patients suffering from benign breast disease, especially among 'ANDI classification' are young women below the age of 30 years, with few exceptions found in relatively older age group. In this regard the results of our study are similar to those reported in other population where the peak age incidence of benign breast diseases was 20-29 years[18].

CONCLUSION

In the modern era of advanced technology, most sophisticated procedures of diagnosing and treating the breast disease, like mammoscintigraphy and MRI is lacking in our institution. Provision will definitely benefit the patients and will provide an opportunity to surgeons to take appropriate decisions regarding the management of breast diseases.

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Original Article

Assessment of Metabolic Derangements in Diabetes and Associated Hyperglycemic Emergencies

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ABSTRACT

Objective: To assess and compare the plasma insulin level and Pre-treatment metabolic and acid base status findings in patients with uncontrolled T1DM, uncontrolled T2DM, DKA and HHS with healthy non-diabetic subjects.

Study Design: A retrospective analytical study.

Place and Duration of Study: This study was conducted at the Army Medical College, Rawalpindi during the period from 2004 to 2006.

Materials and Methods: This study was conducted on TIDM, T2DM, DKA and HHS patients and monitored insulin level, plasma osmolality, serum electrolytes and arterial blood gases levels revealed that the clinical records and data confirmed and described each event and its likely causes.

Results: Ketoacidosis was frequently seen among persons with type 1 diabetes with marked hypoinsulinemia, hyperkalemia and acidosis. Hyperinsulinemia, acidosis and hyperosmolality were the significant finding in HHS.

Conclusion: The observed association between insulin level and pretreatment metabolic and acid base derangements were statistically highly significant.

Key Words: diabetic ketoacidosis (DKA), Hyperosmolar hyperglycemic state (HHS), Oxygen saturation, plasma osmolality, Hypokalemia.

INTRODUCTION

A dwarfish thief today, diabetes, is a menace that haunts the society, thriving every single moment. The onset of T2DM is mostly seen in middle-aged adults; whereas, T1DM is usually seen at a younger age group[1]. Uncontrolled and persistent hyperglycemia in diabetes can lead to the development of serious life-threatening medical emergencies i.e. diabetic ketoacidosis (DKA) and Hyperosmolar hyperglycemic state (HHS)[2]. HHS, first reported by Sament and Schwartz in 1957[3], is characterized by significant hyperglycemia, hyperosmolality and dehydration without marked ketoacidosis. It is mostly a consequence of T2DM. Its diagnosis was established by the American Diabetic Association according to which diagnostic features are plasma glucose level $\geq$ 600 mg/dl, serum osmolality $\geq$ 320 mOsm/kg, severe dehydration, blood pH >7.30, Bicarbonate conc. > 15 mEq/L and altered sensorium[4].

Diabetic Ketoacidosis, usually a consequence of T1DM, is typically characterized by hyperglycemia (blood glucose $\geq$ 300 mg/dl), low plasma bicarbonate level (< 15 mEq/L), and acidemia (blood pH $\leq$ 7.30) associated with ketonemia, ketonuria and altered sensorium. Absolute insulin deficiency, in T1DM, impairs uptake and utilization of glucose by the cells leading to hyperglycemia and ketoacidosis. HHS is less common than DKA and differs in the degree of dehydration, ketosis, and acidosis[4].

Serum Osmolality: Hyperglycemia and associated dehydration raises plasma osmolality due to increase in the number of osmotically active glucose particles. It is a diagnostic feature of HHS[5].

Plasma Electrolytes: Electrolyte balance is vital for normal functioning of cells and various systems of our body. Significant electrolyte abnormalities are seen in DKA and HHS. Osmotic Diuresis leads to significant loss of salts, mainly potassium and sodium, into the urine leading to Hypokalemia and hyponatremia respectively. In DKA, Ketoacids are excreted in urine as salts of potassium and sodium. Hence, Hypokalemia is a potentially lethal complication of DKA. However, due to hypoinsulinemia and raised plasma osmolality, intracellular potassium moves into the extracellular fluid. Hence, clinically initial laboratory tests may show hyperkalemia. Correction of acidosis and insulin administration will force the Extracellular potassium to move back into the cells resulting in lethal Hypokalemia[6].

Acid Base balance: In both hyperglycemic states of DM, ketoacids (i.e. β-hydroxybutyrate and acetoacetate) and lactic acid overproduction seriously alters the blood pH and develops acidosis. The bicarbonate ions act as a buffer to maintain the normal blood pH. Hence, Bicarbonate levels are measured to assess the acid base status of body fluids (normal 22-30 mmol/L). As severity of hypoinsulinemia increases, more ketoacidosis results in fall of blood pH and metabolic acidosis is induced[7].

MATERIALS AND METHODS

The present retrospective, analytical case control study was conducted during the period of 2004 -2006. Non-

probability convenient sampling technique was used. The sample size was 72. The patients were selected from Military hospital (MH), Combined Military hospital (CMH) Rawalpindi. Patients were divided into five groups:

Control Group (n = 25) Non diabetic healthy subjects, having a fasting blood glucose level $\leq$ 6 mmol/L.

Patients with Uncontrolled T2DM (n = 20). Already diagnosed cases of T2DM and treated with oral hypoglycemic, were included in this group.

Patients with Uncontrolled T1DM (n = 14). Already diagnosed type 1 diabetics, who were on insulin therapy, were included in this group.

Patients with Diabetic ketoacidosis (DKA) (n = 9) This group comprised of comatose or semi-comatose patients having findings of acetone breath, ketonuria, random blood glucose level > 10 mmol/L, serum osmolality <350 mOsmol/L and Arterial blood pH <7.35.

Diabetic Patients with Hyperosmolar hyperglycemic state (HHS). (n = 4)

Patients having findings of HHS like absence of acetone breath and ketonuria, Random blood glucose levels > 30 mmol/L and Serum Osmolality > 350 mOsm/L.

Laboratory investigations: Venous blood was analyzed for plasma glucose, Osmolality and serum electrolytes. Arterial Blood samples were analyzed for arterial blood gases and degree of acidosis.

Plasma glucose was estimated by an enzymatic colorimetric method (glucose Oxidase enzyme), Plasma insulin level was estimated by enzyme — linked immunosorbent assay (ELISA) technique (8), Plasma osmolality was determined by Freezing point depression method, Plasma electrolytes, blood gases and pH was estimated by Ion selective electrode method, conc. of HCO_3^- ions was calculated by using the measured parameters in the Henderson — Hasselbalch equation[9].

RESULTS

Results are summarized and shown in tables 1 – 2. Table 1 shows the distribution of sex, age, plasma glucose, plasma Insulin, serum sodium and serum potassium levels among various study groups as compared with controls. Mean age of patients with Diabetic ketoacidosis was significantly lower ($p < 0.05$) whereas significantly higher in patients with type 2 DM ($p < 0.05$) and HHS ($p < 0.001$). Mean plasma glucose level in patients of all four groups was significantly higher ($p < 0.001$) as compared with control subjects. Mean plasma insulin level in the patients of uncontrolled T2DM was significantly higher ($p < 0.05$) and significantly lower in patients with T1DM ($p < 0.05$) and DKA ($p < 0.01$) as compared with control subjects. The mean plasma sodium level was significantly lower in patients with Uncontrolled T1DM ($p < 0.001$), DKA ($p < 0.05$) and HHS ($p < 0.001$). The mean plasma potassium level was significantly higher in patients with Uncontrolled T1DM and DKA ($p < 0.001$), T2DM ($p < 0.05$) and HHS ($p < 0.01$).

Table No. 1: Comparison of gender, age, plasma glucose, plasma Insulin, serum sodium and potassium levels of various study groups (values= mean± s.e.m).

		Control(25)	T2DM (20)	T1DM (14)	DKA (09)	HHNK (04)
Sex	Males	50 %	56 %	58 %	65 %	59 %
	Females	50%	44 %	42 %	35 %	41 %
Age (years)		38.5 ± 1.3	49.2±3.1*	32.0 ± 2.5	29 ± 5.8*	63.45 ±5.8***
Plasma glucose(mmol/L)		5.35 ± 0.1	18.7± 1.23***	17.9± 0.82***	28.6 ± 0.4***	39.7 ± 0.38***
Plasma insulin (ng / 100 ml)		56.5 ± 10.8	83.0 ± 0.25*	31.5 ± 1.36*	17.5 ± 1.43**	44 ± 1.02
Serum sodium (mmol/L)		137 ± 0.5	137.5 ± 0.7	130.6 ± 1.28***	136.8 ± 0.3*	134 ± 0.4***
Serum potassium (mmo1/L)		3.7 ± 0.20	4.02 ± 1.2*	4.8 ± 0.8***	4.53 ±0. 23***	4.4 ± 0.2**

Table 2 shows the comparison of plasma osmolality, blood pH, PCO_2, PO_2 Plasma HCO_3, Base excess and Oxygen saturation of various study groups with the control group. Mean plasma osmolality was significantly higher in the patients with uncontrolled T2DM ($p < 0.01$), uncontrolled T1DM ($p < 0.05$), DKA and HHNK ($p < 0.001$) as compared with control subjects. Blood pH was significantly lower in the patients with T1DM ($p < 0.01$), DKA ($p < 0.001$) and HHS ($p < 0.05$). Plasma HCO_3 was also significantly lower in the patients with HHS ($p < 0.05$) and DKA ($p < 0.001$). PCO_2 was significantly lower ($p < 0.05$) in DKA. Highly Significant base deficit ($p < 0.001$) was observed in patients with DKA as compared with the control group. Oxygen saturation was found to be

significantly lower (p <0.001) in the patients with T1DM, DKA and HHS.

Table No.2: Comparison of plasma osmolality, blood pH, PCO_2, PO_2, Plasma HCO_3 , Base excess and Oxygen saturation of study groups.

	Control (25)	T2DM (20)	T1DM (14)	DKA (09)	HHNK (04)
Plasma osmolality (mOsmol/Kg of water)	280 ± 0.6	299 ± 1.9**	290 ± 1.4*	325.9 ± 3.1***	367 ± 2.2***
pH	7.43 ± 0.02	7.42 ± 0.04	7.36 ± 0.13**	7.33 ± 0.07***	7.37 ± 0.33*
Plasma HCO_3 (mmo1/L)	23.7 ± 0.2	25.0 ± 0.4	26.0 ± 2.2	14.4 ± 2.5	16
PCO_2 (mm Hg)	38.0 ± 0.9	38.25 ± 2.5	37.44 ± 1.786	26.75 ± 3.25*	30.12 ± 0.24
PO_2 (mm Hg)	85.2 ± 2.7	87.21 ± 1.37	79.5 ± 3.21	86.5 ± 10.2	84.9 ± 2.10
Base excess/Deficit	2.6 ± 0.2	3.0 ± 0.4	3.2 ± 1.4	0.3 ± 2.0***	3.8 ± 1.7*
Oxygen saturation (%)	96.2 ± 0.2	96.4 ± 0.3	90.6 ± 1.6***	79.2 ± 7.0***	81.0 ± 2.1***

As compared with normal control subjects
*p <0.05 (significant).

**p <0.01 (very significant). ***p <0.001 (highly significant).

DISCUSSION

This study focused primarily on assessment and comparison of the plasma insulin level and pre-treatment metabolic findings in patients with uncontrolled T1DM, uncontrolled T2DM, DKA and HHS with healthy non-diabetic subjects.

Age & Sex Distribution: It was noted that various types of diabetes and associated hyperglycemic emergencies were more common in males. T1DM and DKA were mostly seen in younger age group. This finding was in accordance with previous studies[10].

Plasma Insulin & Hyperglycemia: Significant insulin excess was observed in uncontrolled T2DM due to insulin resistance mainly affecting adipose tissues, liver, and muscle cells. Marked hyperglycemia induces more insulin production. The decreased number of insulin receptors also contributes in hyperinsulinemia in T2DM[11]. This also shows the inability of cells to properly oxidize glucose resulting in hyperglycemia[5]. Hypoinsulinemia observed in T1DM and DKA, determines the intensity of osmotic and ketotic excess. If plasma insulin and glucose levels are monitored regularly, metabolic disturbances can be minimized i.e. more careful management of TIDM can make DKA preventable[12].

Most of the patients belonged to lower socioeconomic status. In our study negligence in treatment, poor dietary habits and lack of exercise were also found among major causes of uncontrolled hyperglycemia[13].

Plasma Osmolality was significantly raised in DKA and HHNK. As the magnitude of hyperglycemia and dehydration is more marked in HHS, hence the degree of hyperosmolality was also more marked[14].

Electrolyte disturbances: An inverse relationship between the serum concentration of sodium and potassium was observed in diabetic patients. Serum sodium level was significantly decreased in patients with uncontrolled TIDM, DKA and HHS. Osmotic diuresis leading to electrolytes loss, older age, severe dehydration and impaired fluid intake in HHS accounts for higher mortality[15].

The ketoacids fully dissociate at physiological pH. So ketonuria leads to excretion of positively charged cations (i.e. Na^+, K^+, NH_4^+). The hydrogen ions are titrated by plasma bicarbonate, resulting in metabolic acidosis and retention of anions leads to increase in the plasma anion gap[16].

During DKA and HHS, hyperglycemia and increased plasma Osmolality results in intracellular dehydration which is associated with a shift of potassium out of cells into the extracellular space leading to hyperkalemia. This is further enhanced by acidosis and the breakdown of intracellular protein secondary to insulin deficiency. Moreover, insulin deficiency prevents re-entry of K^+ into the cells. Hence it is a false hyperkalemic state. Osmotic diuresis and ketonuria leads to increase K^+ loss in urine. Hypokalemia can be prevented by better intake of food, salt and fluid prior to diabetic emergencies. Whereas, diabetic patients with poor history of food, salt and fluid intake develop acute metabolic decompositions, dehydration, hyperos-molality and impaired renal function leading to an increased anion gap and altered sensorium[17].

Arterial Blood Gases: Analysis of the blood Ph, PCO_2 and PO_2 is essential to evaluate the severity of disease. Acidemia was observed in T1DM, DKA and HHS. In DKA, ketoacids dissociate and get neutralized by the bicarbonate ions; hence, serum bicarbonate level is decreased[18]. This leads to the increased anion gap, a

characteristic feature of DKA. Metabolic acidosis leads to hyperventilation resulting in decreased PCO_2[19].

In HHS, hyperglycemia is usually accompanied with lactic acidosis. This can also be aggravated by oral hypoglycemic drugs[20].

Oxygen saturation represents the amount of oxygen carried by erythrocyte hemoglobin and helps to assess the extent of hypoxia and acidosis. It was markedly reduced in T1DM, DKA and HHS due to tissue hypoxia. These findings are in accordance with the previous studies[21].

CONCLUSION

With increase in severity of insulin deficiency, drastic outcomes of DM in the form of DKA and HHS result with serious metabolic and acid base disturbances. Improvement in glycaemic control can decrease the severity of the symptoms. Moreover patients should be educated about the importance of low calorie diet, regular exercise and glycaemic control to avoid fatal complications of DM.

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Original Article

Antihyperglycaemic and Antihyperlipidemic Effects of Ethanolic Extract of Syzygium Aromaticum(Clove) / In Streptozotocin induced Diabetic Rats

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ABSTRACT

Objective: The purpose of the present study was to assess the effect of ethanolic extract of Syzygium aromaticum buds in streptozotocin(STZ) induced diabetes in rats.

Study Design: Randomized controlled trial

Place and Duration of Study: This study was conducted at the Department of Pharmacology, Islamic International Medical College, Rawalpindi from 1st Jan 2011 to 30st June 2011.

Materials and Methods: Single injection of STZ was given intraperitoneally to rats and rats showed fasting glucose level over 280mg/dl were included in the study. After induction of diabetes all rats were divided into, normal control group (A), diabetes positive control group (B), and the two groups (C and D) served as experimental groups while group E served as standard as it received glibenclamide. Group C and D diabetic experimental rats received ethanolic extract of Syzygium aromaticum at 250 mg/kg and 500mg/kg of body weight orally for eight weeks on daily basis. On the other hand group E rats received glibenclamide at 0.5 mg/kg body weight orally for eight weeks. Blood samples were collected after eight weeks.

Results: The diabetic positive group rats showed variable increase in serum levels of glucose, triglycerides, low density lipoprotein (LDL) and total cholesterol levels. Serum high density lipoprotein (HDL) levels decreased in diabetic positive group. Syzygium aromaticum 250mg/kg and 500mg/kg dose and glibenclamide significantly decreased the levels of these parameters in rats. On comparison Syzygium aromaticum 500mg/kg dose reduced glucose and lipid levels more, effectively than the 250mg/kg dose of Syzygium aromaticum and glibenclamide. Syzygium aromaticum constituents, especially polyphenols and flavonoids have strong anti-oxidant activity which might be involved in glucose and lipid lowering effect.

Conclusion: Syzygium aromaticum ethanolic extract decrease glucose and lipid levels in experimentally induced diabetic rats.

Key Words: Syzygium aromaticum, diabetes, oxidative stress, streptozotocin, total cholesterol, serum triglycerides, LDL (low density lipoproteins), HDL (High density lipoproteins)

INTRODUCTION

Diabetes mellitus (DM) is a syndrome characterized by chronic hyperglycaemia and relative insulin deficiency, resistance or both.[1] Diabetes mellitus is not a single disease but basically a group of disorder which is characterized by hyperglycemia, hyperlipidemia, glycosuria, ketonemia and if prolong leads to diabetic complications such as nephropathy, neuropathy and retinopathy.[2] Worldwide more than 140 million people suffer from DM, making it one of the most common non-communicable diseases. Diabetes and hyperlipidemia are also the major cause of conditions associated with atherosclerosis like coronary artery disease, cerebrovascular disease and peripheral vascular disease.[3] Different Studies indicate that reactive oxygen species play a key intermediate role in the pathophysiology of diabetes and its complications.[4-5] Hyperglycaemia also attenuates anti-oxidative mechanisms through non enzymatic glycosylation of anti-oxidant enzymes.[6-7] Dietary modifications and drug therapy have shown promising results to regulate glucose, HDL and LDL cholesterol levels and to reduce subsequent risk of coronary artery disease associated pathological conditions. But due to high cost and adverse effects of glucose and lipid lowering drugs, peoples are now diverting to certain natural substances. The use of such substances are grown faster over the past few years which is undoubtedly driven by the belief that they are relatively safe, easily available and affordable.[8] STZ induced hyperglycaemic rats have been used mainly as a model of diabetes. STZ is synthesized by streptomycetes achromogenes and is used to induce both type 1 and type 2 DM.[9]

Syzygium aromaticum are the aromatic dried flower buds of a tree in the family Myrtaceae. Syzygium

aromaticum is widely cultivated in Indonesia, Sri-Lanka, Brazil, Pakistan and India. It is used in limited amounts in food products as a fragrant, flavoring agent and condiment. Syzygium aromaticum, usually called as clove, is used as a topical antiseptic and local anaesthetic in dentistry.[10-11]. It is also used as antibacterial, antifungal, antimicrobial, antiinflammatory and insecticidal.[12-13] Clove oil mainly constitutes eugenol, isoeugenol and caryophyllene contributing pharmacological role to Syzygium aromaticum. Eugenol comprises 72-90% of the essential oil extracted from cloves. Other important constituents of clove include polyphenols, beta-caryophyllene , tannins, flavonoids, kaempferol, rhamnetin, terpenoids like oleanolic acid, stigmasterol and campesterol.[14]
The purpose of the present experimental model was to observe the effect of Syzygium aromaticum in STZ induced diabetes in wistar rats.

MATERIALS AND METHODS

Animals: Sixty adult male Wistar rats weighing 200-250g were procured for this study. They were kept in the experimental research laboratory of Islamic International Medical College, Rawalpindi, under day and night conditions. Prior to the commencement of the experiments, all animals were kept for one week under the same laboratory conditions, at a temperature of 22 ± 2 ^{0}C, relative humidity of 70 ± 4% and 12 hour light/day cycle. They received nutritionally standard diet and tap water. The care and handling of rats were in accordance with the internationally accepted standard guidelines for use of experimental animals.

Chemicals/Instruments: Commercially available kits (Randox) for biochemical analysis of glucose, cholesterol, triglycerides, LDL and HDL, 95% ethanol, pre-coated TLC(Thin Layer Chromatography) plate silica gel GF254 and toluene. The standard compounds used are ellagic acid, gallic acid and protocatechuic acid. The instruments used were soxhlet and rotary evaporator and centrifuge (Germany), TLC scanner III (Camag, Switzerland) with win CATS software.

Plant materials and preparation of the extract: Clove buds were collected from local market of Rawalpindi and were authenticated from a botanist. Clove buds were coarsely powdered using a grinder. 500 g powdered form of clove was dissolved in 2L of 95% ethanol. The extraction was carried out by mixing the powdered clove in ethanol by Soxhlet apparatus for 72 hr. The extract was filtered and the solvent i.e., ethanol was allowed to evaporate using rotary evaporator at temperature 40-45°C. Thus the highly concentrated ethanolic extract was obtained .The yield of extract was 8.6% w/w in terms of dried starting material. The extracts obtained were stored at -20°C till used for experimental purposes.[15] The clove buds (voucher no. 0525) and extract (voucher no. 0526) were deposited in Pharmacology laboratory, Islamic International Medical College, Rawalpindi. This extract got standardized from Riphah institute of Pharmaceutical Sciences, Islamabad.

Experimental Procedure: After acclimatization, 10 rats were labeled as control. All other rats were starved for 16 hours and diabetes was induced by using a single intraperitoneal injection of freshly dissolved streptozotocin (60 mg/kg) in 0.01M citrate buffer (pH 4.5).One week after the streptozotocin injection, rats were assessed for diabetes and those with fasting blood glucose over 280 mg/dl were included in this study.[16] Thereafter, all rats were divided into five groups each having 10 animals. The control rats (Group A) were fed on standard diet with tap water and received no drug. Group B i.e. diabetic control rats received 60 mg/kg of STZ as a single intraperitoneal injection and were fed on standard diet and tap water. Group C i.e. experimental group rats received 60 mg/kg of STZ as a single intraperitoneal injection and ethanolic extract of *Syzygium aromaticum* buds in a daily oral dose of 250 mg/kg for a period of sixty days. Group D i.e. experimental group rats received 60 mg/kg of STZ as a single intraperitoneal injection and and ethanolic extract of *Syzygium aromaticum* buds in a dose of 500 mg/kg body weight daily (orally) for a period of sixty days .Group E standard group rats received 60 mg/kg of STZ as a single intraperitoneal injection and glibenclamide orally at a dose of 0.5mg/kg for sixty days.

Sample collection: Blood sampling through tail vein was performed at 2 intervals (0, 8 weeks) following same protocol every time. Twenty four hour after administration of the last dose of extract i.e. on 60th day and after overnight fasting, the animals were weighed and anaesthetized under ether vapours. A sample of 2ml blood was drawn from tail vein from all animals. Blood was transferred to the sterile vacuotainers with gel and allowed to clot at room temperature for one hour. It was then centrifuged for ten minutes at a speed of 3000 rpm. Serum was separated and stored in sterile eppendorf tubes at -20°C for analysis of biochemical parameters.[17]

Biochemical Analysis: Glucose levels were estimated using commercially available kit (Randox, UK) based on glucose oxidase method.[18] Total cholesterol levels were estimated using commercially available kit (Randox, UK) based on enzymatic endpoint method.[19] Serum triglycerides were estimated by commercially available kits (Randox, UK), based on GPO-PAP method[20] while serum HDL by precipitant method.[21] Serum LDL was estimated using commercially available kit (Randox, UK) based on an established method.[22]

Statistical Analysis: The data was entered and analysed using SPSS 17.0 (Statistical Package for Social Sciences). All data are shown as mean ± S.E.M

(standard error of mean). One way ANOVA (analysis of variance) was applied to observe group mean differences. Post Hoc Tukey test was applied to observe mean differences among the groups. A p-value of <0.05 was considered as statistically significant.

RESULTS

The biochemical parameters showed that the injection of STZ caused a significantly (p<0.01) increased serum glucose levels in the rats of group B, C , D and E as compared to control group. On the other hand, simultaneous administration of ethanolic extract of *Syzygium aromaticum* resulted in a significant (p<0.01) decrease in the serum glucose levels of rats in groups C and D when compared with that of group B. Also simultaneous administration of glibenclamide resulted in a significant (p<0.01) decrease in the serum glucose levels of the rats in groups E when compared with that of group B.

The total cholesterol, serum triglycerides and serum LDL levels showed significantly (p<0.01) increased levels in the rats of group B, C, D and E as compared to control group. On the other hand, simultaneous administration of ethanolic extract of *Syzygium aromaticum* resulted in a significant (p<0.01) decrease in the cholesterol ,serum triglycerides and serum LDL levels of rats in groups C and D when compared with that of group B. Also simultaneous administration of glibenclamide resulted in a significant (p<0.01) decrease in the cholesterol and serum triglycerides levels of the rats in groups E when compared with that of group B. However the simultaneous administration of glibenclamide resulted in an insignificant decrease in LDL levels of the rats in groups E (p=0.25) animals when compared with that of group B (diabetic group) rats.

Serum HDL showed significantly (p<0.01) decreased levels in the rats of group B, C, D and E as compared to control group. On the other hand, administration of ethanolic extract of *Syzygium aromaticum* to group C and D and glibenclamide to group E for eight weeks resulted in a significant (p<0.01) increase in the serum HDL levels of the rats in groups C ,D and E when compared with that of group B.

DISCUSSION

Diabetes is a chronic and systemic disease that triggers life-changing complications in virtually every system of the body.[23] Hyperglycemia, abnormal lipid and antioxidant profiles are the most usual complications in diabetes mellitus. It has been established that hyperglycemia is the principal cause of diabetic complications. People with diabetes exhibit a pattern of dyslipidemia characterized by elevated triglycerides, LDL and low levels of HDL.[24] Many in vivo and in vitro studies indicated that oxidative stress is one of the major pathophysiological mechanisms involved in the development of diabetes.[25,26] Effective control of blood glucose level is a key step in reversing diabetic complications and improving the quality of life in diabetic patients.[27] A number of plants are being assessed for their therapeutic potential as there is a growing trend towards the use of natural remedies as adjuncts to conventional therapy. It is well documented that modulations of oxidative stress through treatment with antioxidants can effectively reduce glucose and lipid levels.[28,29]

Table No. 1: Mean± SEM values of different biochemical parameters in all groups (A, B, C , D and E)

Parameter	Group A	Group B	Group C	Group D	Group E
Serum Glucose mg/dl	130.54±5.18	298.49±1.95*	200.23±6.41**	148.80±4.72**	209.70±4.87**
Total Cholesterol (mg/dl)	119.43±8.07	208.95±7.57*	180.59±3.63**	160.72±4.18**	184.29±3.67**
Serum Triglycerides(mg/dl)	65.45±4.61	177.47±4.68*	152.83±4.54**	117.53±4.85**	158.05±4.43**
Serum LDL (mg/dl)	39.02±2.42	151.48±6.07*	130.30±4.59**	103.30±4.11**	138.41±4.47
Serum HDL (mg/dl)	31.51±1.56	14.74±1.12*	23.85±1.48**	34.13±1.25**	23.68±0.90**

* p<0.05 when compared with group A (control)

** p<0.05 when compared with group B (diabetic)

The present study showed a significant elevation in the levels of serum glucose, triglycerides, LDL and total cholesterol of group B diabetic rats as compared to group A normal rats. Serum HDL levels was reduced in group B rats as compared to group A rats. Administration of syzygium aromaticum ethanolic extract to group C and D and Glibenclamide to group E brought the levels of these diagnostic parameters in the serum of group C , D and E animals towards normal as compared to group B rats (Table 1). When we compare mean values of group C and D with group B, although both decrease lipid levels, but group D reduced the levels more as compared to group C. When we compare mean values of group C and D with group E, although Glibenclamide decrease glucose and lipid levels, but syzygium aromaticum ethanolic extract reduced the levels more as compared to glibenclamide. Syzygium aromaticum also increased the level of HDL more as compared to glibenclamide (Table 1), showing better effectiveness of syzygium aromaticum ethanolic extract over glibenclamide. Our results are in accordance with the reports by others who used chemical antioxidants and diet of natural antioxidant plants.[30-31]

The main constituents in syzygium aromaticum are eugenol, polyphenols and flavonoids. The proposed mechanism of syzygium aromaticum in reducing the glucose and lipid levels could be due to the antioxidant mechanism. Atawodi et al. in 2011 showed that polyphenols in syzygium aromaticum have antioxidant activity.[32] Robards and Antolovich in 1997 have critically reviewed the analytical chemistry of bioflavonoid and it was found that flavonoids possess antioxidant activity, they are potent free radical scavengers and metal chelators and they also inhibit lipid oxidation which is a key step in the formation of atherosclerotic plaque.[33]Therefore, in our study polyphenols and flavonoids in syzygium aromaticum might have a role in decreasing glucose and lipid levels in rats. Further experiments are needed to determine the actual mechanism of action of the active constituents of the syzygium aromaticum plant fractions.

CONCLUSION

The results of the present study indicate that the treatment with *syzygium aromaticum* ethanolic extract decreased glucose and lipid levels in diabetic rats. The *syzygium aromaticum* ethanolic extract, showed better results as compared to glibenclamide.

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