INSIDE THIS ISSUE

Editorial

The Menace of Hepatatis B and C: Prevention is Better than Cure

Syed Mohammad Tahir, Mohan Bhootrani

Viral hepatitis is a health problem for developed countries but it is disaster for developing country like Pakistan. According to World Health Organization (WHO) there are 350 million people with chronic HBV infection and 170 million people with chronic HCV infection worldwide[1, 2]. Hepatitis B is estimated to result in 563000 deaths and hepatitis C in 366000 deaths annually [3]. The carrier rate of Hepatitis B virus in Pakistan is reported to be 3-4%[4]. Therefore chronic hepatitis B is a severe problem in Pakistan [5, 6]. When compared to vertical transmission, which is less frequent,[7] horizontal transmission (particularly in early childhood), accounts for most cases of chronic HBV infection in intermediate prevalence areas like Pakistan [8]. Children may acquire HBV infection through horizontal transmission via minor breaks in the skin or mucous membranes or close bodily contacts with other children. Similarly the cases of HCV related chronic liver disease (CLD) in Pakistan has tremendously increased. In 1994 only 16.6%[9] patients of CLD were positive for anti-HCV antibodies; however more recent data show nearly 60–70% patients with CLD tend to be positive for anti-HCV [10, 11]. In some cases CLD may lead to hepatocellular carcinoma and in-fact it has recently been shown that nearly 50% patients with hepatocellular carcinoma (HCC) in Pakistan are anti-HCV positive[12]. The HCV may be transmitted in different ways but it appears that blood transfusions is still the major cause of HCV transmission in Pakistan as only 25% blood banks in fact screen blood for HCV; others do not do so probably to keep the cost down[13]. Other commonest route of transmission for HCV is use of non-sterile syringe/needle for therapeutic injections[14]. Our cultural belief is that parenteral therapy is more powerful and we see unjustified use of parenteral therapy both in the form of injections and I/V infusions[15] with expected increase in prevalence of the hepatitis. Other risk factors that may be responsible for HCV transmission include excessive use of barbers for shaving, ear piercing and non-sterile surgical and dental practices of unqualified unregistered practitioners (quacks)[16]. In a recent survey (2007-2008) carried out by Pakistan Medical Research Council in collaboration with Ministry of Health and Statistics Division, Federal Bureau of Statistics, it is shown that the overall prevalence of hepatitis B (HbsAg) is 2.5% and hepatitis C (HCV) is 4.9%. Gender showed no difference for HCV, however for HBV males outnumbered females. Overall HBeAg positivity was 14.4% with 17% in Balochistan, 15.3% in Sindh, 14.1% in Punjab and 8.4% in NWFP. For HCV the prevalence within provinces showed 5% in Sindh, 6.7% in Punjab, 1.1% in NWFP and 1.5% in Balochistan. For HBV the figures were 2.5% in Sindh, 2.4% in Punjab, 1.3% in NWFP and 4.3% in Balochistan. Pakistan is sixth most populous country and its estimated population in 2011 is over 187 million[5,6]. In other words we have 4.67 million peoples affected with HBV virus and about 9.16 millions with HCV. Government has taken measures to control the menace. According to The Nation[17], Prime Minister Program for Prevention and Control of Hepatitis was launched in August 2005 for a period of 5 years, initially with a cost of Rs 2.594 billion. Since then the number of patients with the disease reporting to Government Hospital have increased manifold, probably due to provision of free treatment, although on a limited scale. In 2005-06 soon after program was launched the number of poor patients, who were registered and treated at government hospitals were 10,815 and 1,000 for hepatitis C and B respectively. While for the year 2008-09 the figure is 84,773 and 7,204 respectively. Free treatment is restricted only to the poor patients through financial support provided by “Pakistan Bait-ul-Mal” and “Zakat and Ushr” departments**.** In Sindh, 31500 patients of Hepatitis C, 2750 of Hepatitis B and 200 of Hepatitis D have so far been treated under Chief Minister's Special Hepatitis Control Program[18]. Keeping in view the high prevalence rate of HBV and HCV, the efforts underway to cure the problem will remain fruitless. Therefore prevention strategies are best to cope with the problem of viral hepatitis. Many cases of HBV are transmitted vertically and therefore the perinatal Hepatitis B prevention program be implemented from primary to tertiary health care level[4]. The lady health visitors and dais must also be incorporated into this program. The goals of Hepatitis C prevention should be to decrease incidence of new cases by controlling HCV transmission. This can be achieved by identifying persons at risk for infection and provide knowledge regarding disease and spread, risk reduction counseling, HCV testing, and appropriate medical services including substance abuse treatment. Public service message be propagated through print and electronic media to increase awareness in general public.

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Original Article

Haemodynamic Effects of Fructose and Sucralose in Healthy, White Caucasian Males

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ABSTRACT

OBJECTIVE: To determine the acute haemodynamic changes produced by the ingestion of fructose or sucralose solutions in water.
SETTING: Medical School, University of Nottingham, Queen's Medical Centre, Nottingham, UK.
MATERIAL AND METHODS: Ten, healthy, non-smoking, white Caucasian males, aged between 18-40 years ingested solutions containing fructose (0.75 g/kg body weight) or sucralose dissolved in 500 ml of water, on separate days. Volunteers rested semi-recumbent on a bed in a thermo-regulated environment and a 'Finometer' was used to record beat-to-beat blood pressure (BP), cardiac output (CO), heart rate (HR), total peripheral resistance (TPR) and stroke volume (SV) for 30 min baseline, 5 min during ingestion and for 60 min post ingestion.
RESULTS: There was a significant rise in diastolic BP (DBP) and mean arterial pressure (MAP) from the baseline with fructose and sucralose drinks and in systolic BP (SBP) with the fructose drink ($P < 0.05$). Trends for a rise in systolic BP (sucralose), TPR, HR and CO (both fructose and sucralose) were observed. However, there was no statistically significant difference between the drinks containing either fructose or sucralose in the responses of the above variables.
CONCLUSION: Ingestion of fructose and sucralose increases BP. Sucralose produce effects that are similar but smaller than fructose.

KEY WORDS: Fructose, Sucralose, Blood pressure, Finometer.

INTRODUCTION

Consumption of fructose in the human diet has increased many-fold and constitutes around 8% of daily energy intake through items such as bakery products, soft drinks, fruit and fruit products[1,2]. Fructose has been in increasing use especially in soft drinks, which have become almost an integral part of the diet [1,3]. Fructose, as compared to glucose, does not stimulate insulin secretion or raise blood glucose levels [4] but its consumption is linked with detrimental cardiovascular effects and serious metabolic complications, especially in overweight and obese individuals [5]. In studies conducted on rats, it has been found that a high fructose diet resulted in hyperinsulinaemia, insulin resistance and a rise in systolic BP in male rats [6]. Animal studies also suggest that there is an increase in left ventricular weight in rats fed on a fructose-rich diet. Such a diet also increased angiotensin-II (AT-II) levels leading to an increase in TPR and BP with consequent left ventricular hypertrophy [7].

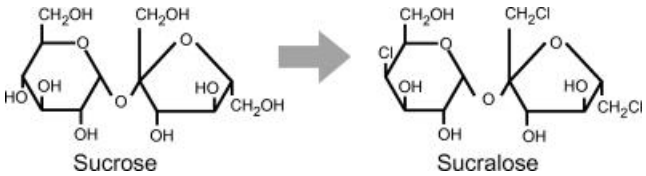
A recent study demonstrated a direct relationship between the acute consumption of fructose and an increase in systolic blood pressure (SBP) and diastolic blood pressure (DBP) in humans. In addition, ingestion of fructose significantly increased heart rate and cardiac output, together with a rise in respiratory quotient and oxygen consumption [8].

High carbohydrate diets rich in fructose and sucrose (a disaccharide containing 1 molecule of fructose and 1 of glucose) have potential effects on the serum triacylglycerol (TG) level, tending to increase it. Once fructose is ingested and absorbed, it is converted to fructose-1-phosphate in the liver by the enzyme, fructokinase, and subsequently glycerol-3-phosphate is formed which becomes the backbone for the synthesis of the TGs [9]. HDL cholesterol concentrations, on the other hand, are decreased, predisposing an individual to cardiovascular disease (CVD) [10,11]. Hence, diets high in fructose increase serum TG levels especially in men, whereas women show no such change [12,13], presumably because of female sex hormones [14].

Sucralose, a synthetic sweetener, is a non-caloric intense sweetener with 600 times more sweetness than sucrose. It is manufactured by substitution of hydroxyl group by chloride in a sucrose molecule.

FIGURE I: CONVERSION OF SUCROSE TO SUCRALOSE

(Taken from British Nutritional foundation Nutrition Bulletin, 2003)



It is reportedly safe to consume, well-tolerated by hu-

mans [15] with no effects on blood glucose and insulin levels or diabetic control, as assessed by HbA1c [16,17]. Sucralose is poorly absorbed and does not accumulate or dissociate in the human body and is excreted mostly unchanged [18]. However, evidence suggests that when rats were fed on sucralose at a concentration of 50,000 ppm, i.e., equivalent to 5% of the diet, a number of effects were evident at 4-8 weeks [19]. These included decrease in food intake by the animal, decrease in body weight gain and in the weight or relative weight of various organs. The organs affected were thymus, brain, spleen, adrenals, pituitary and heart, presumably because of consumption of a non-nutritive substance along with a decrease in food intake. Gavage feeding of larger doses for longer periods resulted in enlargement of the caecum and an increase in kidney weight [19].

In order to control for the sweetness of fructose, its effects were compared to those of sucralose. Thus, this study looked at acute effects of fructose and sucralose on the CV system in healthy, white Caucasian males.

MATERIALS AND METHODS

Ten healthy, non-smoking white Caucasian males were recruited for this study through recruitment posters in the Medical School, University of Nottingham and the Queen's Medical Centre, Nottingham. Subjects were aged 27 ± 2 years, weighed 77 ± 3 kg, and were 182 ± 2 cm tall; they were not on any regular medication. The study, of six months duration, was organized and funded by the School of Biomedical Sciences, University of Nottingham and approved by the University of Nottingham Medical School Ethics Committee.

Before coming for a medical screening session, volunteers were requested to avoid eating or drinking anything for at least 2h. The screening involved recording resting BP, height and weight, and a 6 lead electrocardiogram, and completing a medical screening questionnaire and consent form.

The study itself involved 2 visits. Subjects were advised to avoid sugar, sugar-containing soft drinks, bakery products, fruit or fruit products and strenuous exercise for 24 hr before each experimental visit and to use the lift to come to the haemodynamics laboratory.

Test-drinks were freshly prepared and volunteers were not told of the order of the drinks, which was randomized. Since the volunteers were of different weights, offering a fixed quantity of fructose to every volunteer could have resulted in GI upsets in some. Therefore, it was prudent to use fructose in quantities which would not cause GI upset but were sufficient enough to have effects, hence the fructose dose was calculated according to the body weight of the volunteer. Evidence suggests that 70g fructose is safe to consume and is fully absorbed [20]. Ten kg weight windows were created i.e., 65-74.9 kg, 75-84.9 kg and so on. A mid- point for each weight window was taken i.e., 70 kg for 65-74.9, 80 kg for 75-84.9; and a dose of 0.75 g/kg body weight fructose was calculated according to the weight window of the volunteer. (Personal experience indicated that a large amount, i.e., 1g/kg body weight may have caused some GI upset).

Taste-matching of the fructose containing drink and sucralose drink was done in preliminary studies by some staff of the School of Biomedical Sciences. The number of sucralose tablets was determined that taste-matched 52.5 g of fructose (i.e., corresponding to the 70 kg weight window). Employing simple calculations, the number of sucralose tablets to taste-match various measured quantities of fructose was then determined.

Protocol:

Upon arrival, volunteers were requested to void their bladder before the experiment began. Subject's age, gender, height and weight were entered in the Finometer (FMS, Finapres Medical Systems BV, The Netherlands), which was switched to Research Mode.

During the experiment, the volunteer lay relaxed on a bed, semi-recumbent, in a thermo- regulated room and had the Finometer attached, with the finger cuff placed around the middle phalanx of the middle finger of the left hand, and the brachial arterial cuff around the ipsilateral upper arm providing continuous measurement of BP, HR and also an estimate of SV, CO, and TPR, beat- by- beat, non-invasively.

Following a baseline recording period of 30 min, volunteers were offered a drink, containing either fructose (Fruisana; Danisco Sweeteners OY. Kotka, Finland) or sucralose (Splenda; McNeil Nutritionals Ltd) dissolved in 500 ml of water and a teaspoonful of cooking lemon juice, to be consumed over 5 min. Post -drink recording then continued for 60 min. The same protocol was followed on a separate day (at least 3 days later but usually within one week) with the exception that the test drink differed from the one consumed on the first experimental visit (i.e., sucralose or fructose).

Data analysis:

Collected data were down-loaded from the Finometer onto a remote PC using the 'Beat scope' software program. Data were averaged at 5 min intervals, resulting in 18 time points (0-17). The mean for time points 2, 3 and 4 was calculated for each variable, for each subject and for both visits and was used as the baseline. Time points 0, 1 and the time period when the sub-

jects consumed the test drink (i.e., time points 5 and 6) were not used. The subsequent time points were used as the post-drink period, i.e., 5 – 55 min post drink. Data were transferred to 'Biomed' (software program) data sheets which allowed statistical analysis to be performed using Quade, Friedman and Wilcoxon tests. CO, TPR and SV were factored by the weight of the subject and statistical significance was set as $P < 0.05$.

FIGURE II: PROTOCOL FOR DATA ENTRY

Mean

0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17

Baseline Post-drink period (5-55 min)

RESULTS

Significantly higher baseline HR and CO values were recorded during the fructose experimental visits compared to the sucralose visits. Higher baseline TPR values were observed during the sucralose visits, compared to the fructose visits **(Table I)**. All other baseline variables were similar for the two visits.

Haemodynamic changes with fructose and sucralose drinks:

Fructose:

With the fructose drink there were significant increases from the baseline ($P < 0.05$) in DBP (by 8% i.e., 5mmHg), in SBP (by 6%, 7 mmHg) and in MAP (by 6%, 5 mmHg), HR and CI (cardiac index) did not change significantly **(Figure III(a); Table II)**. The peak increases in DBP and MAP occurred 5 min post drink, whereas the SBP peak value was observed 20 min after the consumption of the drink.

As can be seen in Fig III (a), SBP remained elevated above baseline for 50 min after the drink (all values statistically significant by Quade test, $P < 0.01$ or < 0.001). DBP and MAP were significantly elevated above baseline for 45 min (P value varied between < 0.05 and < 0.001). No sustained changes in TPR, SV, HR or CI were noted after the fructose drink **(Figure III (b))**.

Sucralose:

Similar changes in BP were observed after the sucralose drink, with peak increases from the baseline in DBP (7%) and in MAP (6%) ($P < 0.05$), occurring 5 min after the sucralose drink. The apparent rise in SBP (4%) 5 min post-drink was not significant **(Figure IV(a); Table II)**.

DBP and MAP were significantly increased above baseline (P values ranged from < 0.05 to < 0.001) for most of the post-sucralose period, the only exception being time points 35 and 40 min in case of DBP and time point 40 in the case of MAP.

The peak rise in HR (8%) was observed 5 min after the drink ($P < 0.05$), which was however not sustained. TPR, SV and CI did not change significantly after the sucralose drink **Figure IV(b)**.

Comparison of fructose and sucralose effects:

There were no statistically significant differences between responses to the two drinks **(Figure V(a;b))**. It can be seen in Fig 5 (a) that there was a trend for greater BP responses to fructose compared to sucralose. However, when a Wilcoxon signed rank test was used to compare the AUC responses to the drinks, there were no significant differences, with all P values being substantially greater than 0.1.

TABLE I: BASELINE HAEMODYNAMIC VALUES FOR THE FRUCTOSE AND SUCRALOSE VISITS
Values are mean±SD

	Fructose		Sucralose	
	Baseline mean	**SD**	**Baseline mean**	**SD**
SBP mmHg	122	7	117	4
DBP mmHg	70	4	68	5
MAP mmHg	87	5	85	4
HR beats/min	56*	8	50	6
CO l/min	6*	0.78	5	0.57
TPR r units	0.9	0.09	1.0*	0.09
SV ml	104	8.95	100	7.34

l/min = Litres/min; r units = Resistance units; * = Significant difference in baseline value ($P < 0.05$).

TABLE II: PEAK % CHANGE AND ABSOLUTE CHANGE FROM BASELINE WITH FRUCTOSE AND SUCRALOSE DRINKS Peak ΔTP* = time point of peak change post-drink (in min) Data are mean ± SEM

	Fructose %	Units	Peak Δ TP*	Sucralose%	Units	Peak Δ TP
SBP mmHg	6 ± 2	7 ± 2	20	4 ±1	5 ± 3	5
DBP mmHg	8 ± 2	5±2	5	7 ± 2	5 ± 2	5
MAP mmHg	6 ± 2	5 ± 2	5	6 ± 1	5 ± 2	5
HR beats/min	6±3	3±2	5	8±3	4±2	5
TPR r units	10 ± 5	0.07±0.03	35	4 ± 7	0.06±0.06	45

FIGURE III (a): CHANGE FROM BASELINE OBSERVED IN SBP, DBP AND MAP WITH FRUCTOSE DRINK. VALUES AT '0' ARE THE MEAN BASELINE, WHILE THE SUBSEQUENT VALUES (5-55 MIN) ARE AFTER COMPLETING THE DRINK. DATA ARE MEAN ± SEM. %Δ = PERCENT CHANGE

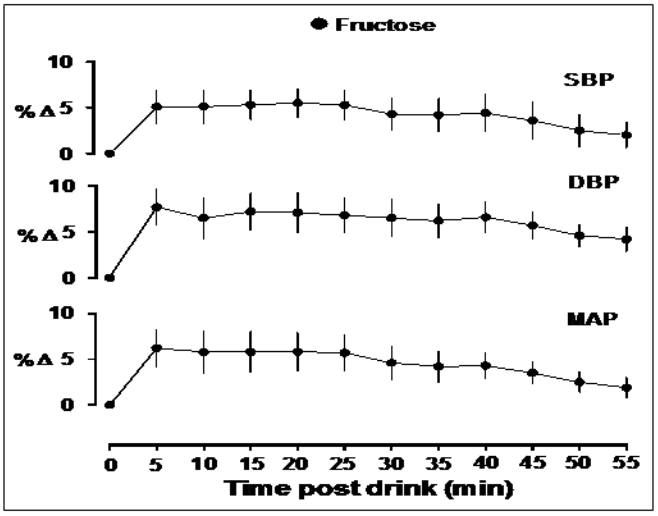


FIGURE III (b): NO SUSTAINED CHANGES FROM BASELINE WERE OBSERVED IN TPR, SV, HR AND CI WITH FRUCTOSE DRINK. VALUES AT '0' ARE THE MEAN BASELINE, WHILE THE SUBSEQUENT VALUES (5-55 MIN) ARE AFTER COMPLETING THE DRINK. DATA ARE MEAN ± SEM. %ΔF = PERCENT CHANGE FACTORED (BY WEIGHT OF THE VOLUNTEER)

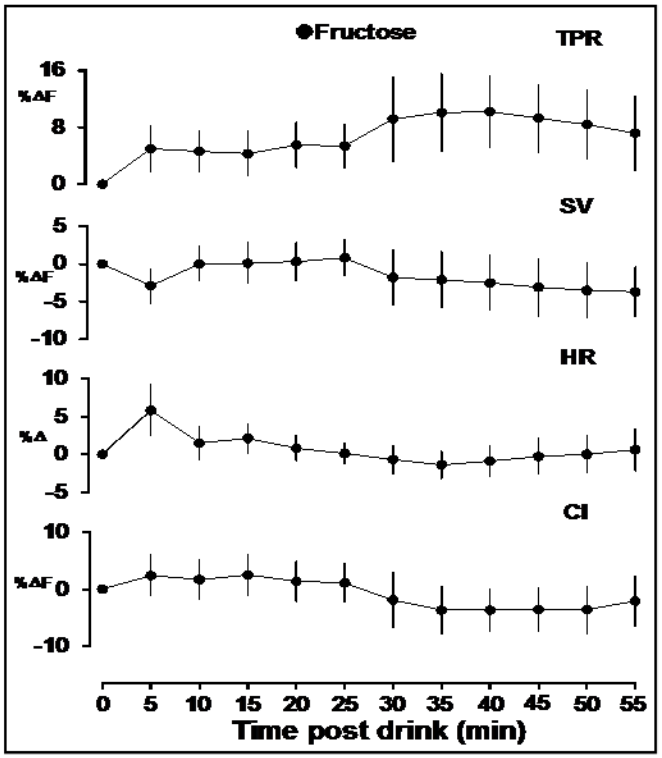


FIGURE IV(a): CHANGE FROM BASELINE OBSERVED IN SBP, DBP AND MAP WITH SUCRALOSE DRINK. VALUES AT '0' ARE THE MEAN BASELINE, WHILE THE SUBSEQUENT VALUES (5-55 MIN) ARE AFTER COMPLETING THE DRINK. DATA ARE MEAN ± SEM. %Δ = PERCENT CHANGE

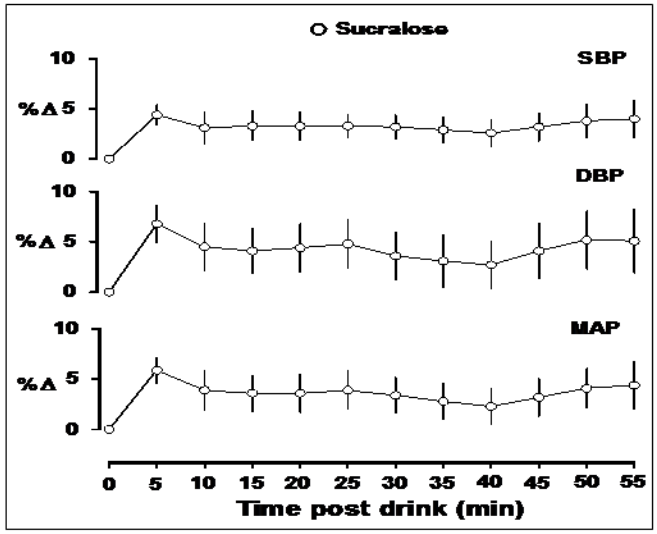
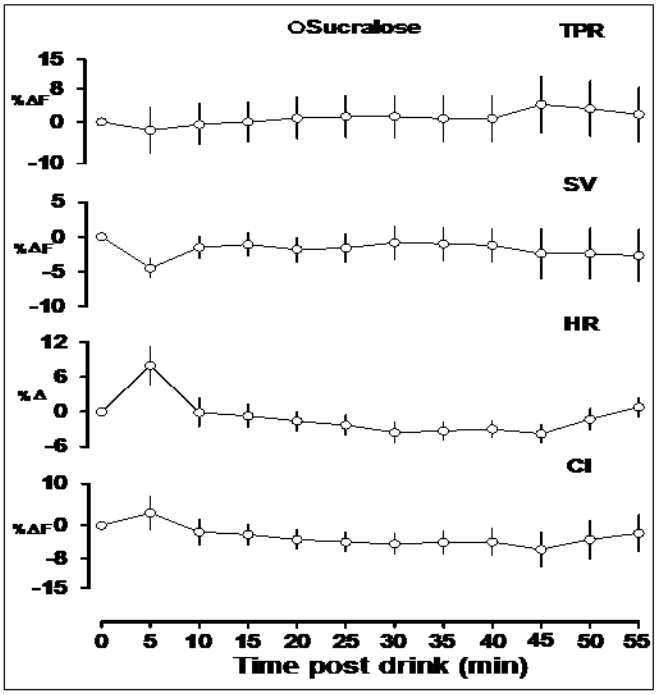


FIGURE IV(b): SIGNIFICANT CHANGE FROM BASELINE WAS OBSERVED IN HR, WHEREAS TPR, SV AND CI DID NOT CHANGE WITH SUCRALOSE DRINK. VALUES AT '0' ARE THE MEAN BASELINE, WHILE THE SUBSEQUENT VALUES (5 -55 MIN) ARE AFTER COMPLETING THE DRINK. DATA ARE MEAN ± SEM. %ΔF = PERCENT CHANGE FACTORED (BY WEIGHT OF THE VOLUNTEER)



There could be a number of possible mechanisms contributing to any possible increase in BP after fructose ingestion. Chronic ingestion of fructose in rats produced an increase in AT-II level but no change in BP [22] whereas fructose feeding in mice increased AT-II and SBP [25]. In the latter study, this rise in BP was associated with increased sympathetic activity, but no change in baroreflex sensitivity (BRS). By contrast Brown *et al.* (2008) showed acute fructose ingestion by human subjects was associated with an increased BP and cardiac sympathetic activity and a reduction in BRS. Research also suggests possible endothelial dysfunction ensuing from production of free radicals [26] and attenuated release of nitric oxide (NO) [27] in rats fed a fructose rich diet. Although fructose was used acutely in this study, this might have played a role in the failure of vasculature to relax, thereby increasing resistance in the system. A trend for a rise in TPR, although non-significant, on ingestion of fructose was observed that may be reflective of absent or defective vasodilatation. Lack of insulin secretion in response to fructose ingestion [28] and its role in producing vasodilatation may also contribute to the rise in BP. It is likely that ingestion of glucose may activate the SNS, which would normally increase BP, but glucose also stimulates insulin release, which could induce vasodilatation and prevent a change in BP. Thus, ingestion of a sweet drink may enhance SNS activity which in the absence of insulin response (e.g., fructose) leads to an increase in BP. Furthermore, sucralose would also not lead to an insulin response, so such a mechanism would explain similarities in effect of fructose and sucralose on TPR if the initial effect is due to the sweet taste. Activation of the SNS in producing a rise in BP has been shown to be of importance, as in fructose fed rats sympathectomy resulted in abrogation of development of hypertension [29]. Evidence suggests that thermogenesis, i.e., the increase in energy expenditure after nutrient ingestion, is greater for fructose than for the equivalent amount of glucose [30] and as the SNS is a regulator of adaptive thermogenesis, i.e., non-shivering thermogenesis and dietary thermogenesis [31,32], it is possible that the SNS is activated by the consumption of fructose.

This study differed from the one conducted by Brown *et al.*(2008) in various ways. Their volunteers, 9 males and 6 females, sat in a chair, with CV and haemodynamic parameters recorded using finger plethysmography for BP, electrocardiography for HR and impedance cardiography for SV. The CV effects of ingestion of water and 60 g fructose and/or glucose (used as a standardized dose) dissolved in water were determined with 10 ml of lemon juice added to the drinks. Data were averaged at 15 min intervals. In contrast, in the present study 10 volunteers, all male, rested in bed and the Finometer recorded beat-to-beat CV parameters. The quantity of fructose was determined according to the body weight of the volunteer to avoid any untoward effects (i.e., GI upset) and that of sucralose to match the sweetness of the fructose used. A teaspoon (5 ml) of lemon juice was used. Data were averaged at 5 min enabling to monitor any changes more closely.

A transient rise in HR was observed 5 min after ingestion of the two drinks with a corresponding, statistically non-significant, fall in SV. This may be reflective of a continuation of the change that took place due to the drinking process and associated movement of the body. A transient statistically non-significant rise in CI was also observed 5-15 min post drink, in the case of fructose, but overall there were no substantial changes in CI after fructose or sucralose which is consistent with the results presented by Brundin and Wahren, who found no change in cardiac output 60 min after fructose ingestion in healthy, male volunteers [33].

There is little or no evidence suggestive of CV effects of sweeteners, such as sucralose, but the present study produced results showing such effects. Sucralose appeared to have CV effects that were similar in direction but smaller in magnitude than the values recorded with fructose. It is concluded that consumption of fructose and sucralose increases BP. Sucralose may produce effects that are smaller in magnitude as compared to fructose. However, further studies with more statistical power and with non-sweetened water as a control are required for this to be said more confidently.

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Original Article

The Frequency of Preclinical Nephropathy in Patients of Type II Diabetes Mellitus with Diabetic Retinopathy

Hina Khan, Mazhar Ishaq, Sameer Shahid Ameen, Rizwan Hashim, Muhammad Aamir Arain, Zamir Iqbal

ABSTRACT

OBJECTIVE: To determine the frequency of preclinical nephropathy in patients with diabetic retinopathy and its correlation to the severity of retinopathy.
STUDY DESIGN: Prospective case study.
PLACE AND DURATION OF STUDY: Department of Ophthalmology, Military Hospital (MH), Rawalpindi for six months
METHODS: Ninety (90) diabetic patients (thirty in each grade of retinopathy i.e. background, preproliferative and proliferative) with no known renal dysfunction were included in the study. They were investigated for albumin/creatinine ratio of a spot urine sample. The outcome of renal function was described as either positive or negative. The cutoff value for albumin creatinine ratio was 300 mg/g. The various grades of retinopathy were compared to the values of urine albumin creatinine ratio, to find the correlation.
RESULTS: Five (17%) patients with background diabetic retinopathy had preclinical nephropathy. Seventeen (60%) patients with preproliferative diabetic retinopathy and 27 (90%) of patients with proliferative diabetic retinopathy had preclinical nephropathy. The frequency of nephropathy correlated to the severity of retinopathy (correlation co efficient, r value: 0.630) and p value of <0.001.
CONCLUSION: It is important for ophthalmologists to carefully consider the renal status of any patient with retinopathy as this can influence the progression of retinopathy and its response to treatment.

KEYWORDS: Diabetes mellitus, Diabetic nephropathy, Diabetic retinopathy, preproliferative, proliferative.

INTRODUCTION

Diabetic retinopathy (DR) is the leading cause of acquired and permanent blindness in the United States and the United Kingdom. [1] Although in much of the developing world, the main causes of blindness has been cited as cataract and trachoma, the increased trend towards sedentary life styles, obesity, lack of exercise and unfavorable eating habits has recently and dramatically increased the incidence of diabetes and its complications in our country. [1] DR has been found to be the most common complication of diabetes mellitus in many studies [2] thus making it a significant cause of acquired permanent blindness in our setup as well. The medical, social and financial impact of this disease is substantial. [3]

With the advent of new and improved treatment modalities that can effectively deal with diabetic retinopathy, the emphasis today lies on early detection of retinopathy and the recommendation is to greatly adhere to the treatment strategies outlined after extensive research.

The importance of this study is twofold. First, it is important to know how many of the patients presenting to our clinics in Pakistan with diabetic retinopathy also have renal dysfunction. Renal disease stays quiescent until it has progressed to a stage of marked and often irreversible damage to the renal tissue. At this stage, not only is the treatment less effective but also very costly for the patient as well as the health care system. On the other hand, Diabetic macular edema (DME) can lead to blurred vision at a very early stage in the course of diabetic eye disease and assure that the patient seek consultation. Here, knowledge of the probability of having occult nephropathy determined by the severity of the retinopathy can lead to prompt and early referral to nephrologists and curb this preclinical renal disorder at a stage where it is not only reversible but also cost effective. Secondly, it has been highlighted above that the presence of nephropathy in a diabetic patient is a risk factor for the development as well as the progression of diabetic retinopathy. Moreover studies have also shown that the long term benefit of pan retinal photocoagulation is

adversely affected by the concomitant existence of diabetic nephropathy.

It will also be interesting to know how results of a study of this nature conducted in Pakistan compares with the data from studies carried out abroad. Here, unfortunately, patients generally present at a later stage principally due to lack of awareness about their disease, low literacy levels and poor socioeconomic status compared with societies with more developed healthcare systems and educational backgrounds.

The purpose of this study was to determine the frequency of pre clinical diabetic nephropathy in patients with diabetic retinopathy (DR) and to determine the correlation of preclinical diabetic nephropathy to the grade of diabetic retinopathy. The results of this study may aid in developing a protocol for early detection of diabetic nephropathy for its effective management.

MATERIALS AND METHODS

The study was conducted at The Department of Ophthalmology, Military Hospital (MH) Rawalpindi. The duration of the study was 06 months. A total of 90 diabetic patients were selected by non-probability purposive sampling technique. It was a prospective case study. Inclusion criteria was type 2 diabetes diabetic retinopathy of any severity while exclusion criteria was ocular pathology obscuring proper visualization of the fundus e.g. dense cataracts, vitreous hemorrhage, vitritis, corneal opacities and any comorbidity of chronic diseases that could impair renal function e.g. pyelonephritis, hypertension and cardiac failure.

All diabetic patients presenting to the ophthalmology out patient department of the Military Hospital, underwent a dilated fundus exam. Those having retinopathy were graded according to international criteria (Eva Kohner's classification) as follows:-

Background (Grade I): Hard exudates, dot and blot haemorrhages.

Preproliferative (Grade II): Cotton wool spots and intraretinal microvascular abnormalities.

Proliferative (Grade III): Neovascularisation. Although stereoscopic fundus photography is more reliable and was employed in many similar international studies but it is costly and time consuming. Therefore, the expertise of a senior ophthalmologist of our department was used for diagnoses and grading of the severity of retinopathy.

Those that met the selection criteria were then informed about the study. An informed written consent was obtained from all patients participating in the study for further investigation and using this data for research.

Demographic information was collected i.e. name, age, sex and address.

The clinical history, symptoms, their severity and duration was recorded. They were asked for the presence / absence of visual deterioration, floaters and flashes of light, pain, night blindness and alterations in colour perception. The past ocular and systemic history regarding cataracts and cataract extraction, ocular surgeries, glaucoma, optic neuropathies was noted. The findings of ophthalmic examination i.e. visual acuity and intraocular pressures and grade of retinopathy were also noted. They were then investigated for the presence of preclinical nephropathy by evaluating the spot urine sample and determining the albumin to creatinine ratio. Preclinical nephropathy was defined as the range of albumin hyper-excretion that exceeds the normal range but fall short of detection by standard proteinuria test. The cutoff value was taken as 300mg/g. This test is more convenient and better for screening of preclinical nephropathy than 24 hour urinary sample collection for microalbuminuria. All information was collected on a proforma

Data analysis

SPSS version 11 was used to analyze the data. The variables of clinical assessments have been described as frequencies and proportions. The outcome of renal function has been described as either positive or negative with 300mg/g as the cut off value. The outcome of various retinopathy grades were compared with the urine albumin/creatinine ratio to find the correlation. The effect of confounders was eliminated by stratification. An 'r' value (coefficient of correlation) was calculated. P value of less than .05 was taken as significant.

RESULTS

A total of 50 (55.6%) male patients and 40 (44.4%) female patients completed the data **(Figure I).** The mean age was 58.3±9.7 yrs (range 35 to 79 yrs). The mean duration of diabetes was 12.7±3.7 yrs.

Forty-nine (54%) patients with retinopathy had underlying preclinical renal dysfunction **(Figure II)**. Five (17%) diabetics with background diabetic retinopathy (BGDR) had preclinical nephropathy. Seventeen (60%) with non-proliferative diabetic retinopathy (NPDR) and 27 (90%) with proliferative diabetic retinopathy (PDR) had preclinical nephropathy **(Figure III)**.

The frequency of nephropathy highly correlated with the severity of retinopathy (r value 0.630) and this correlation was statistically significant ($P < 0.001$).

FIGURE I: GENDER DISTRIBUTION

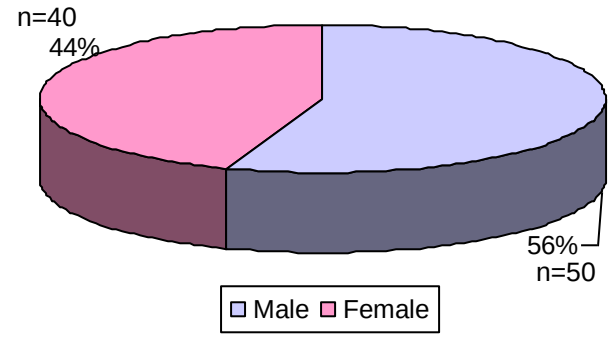


FIGURE II: FREQUENCY OF PRECLINICAL NEPHROPATHY IN 90 PATIENTS OF DIABETIC RETINOPATHY

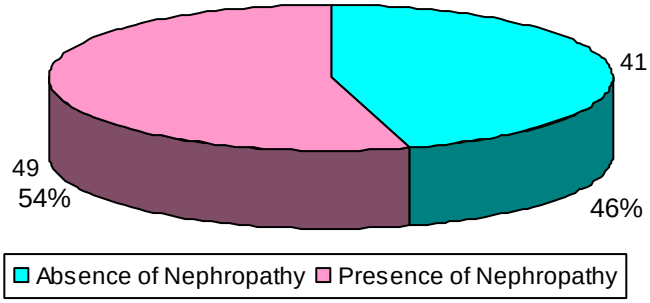
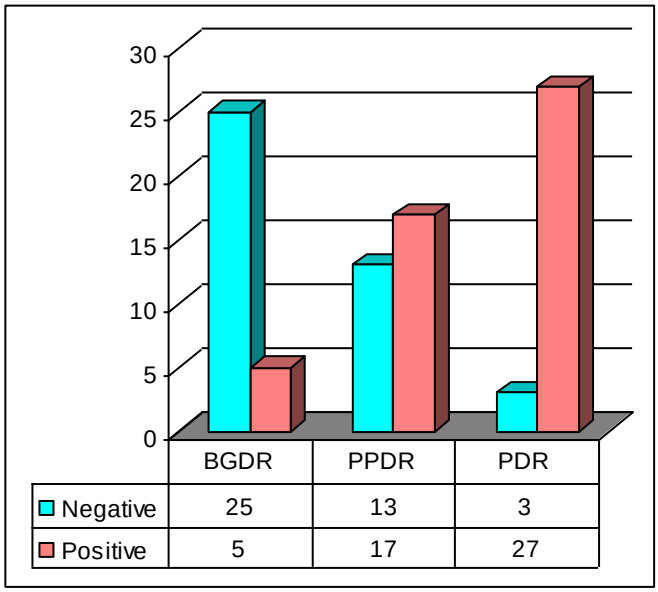


FIGURE III: CORRELATION OF PRECLINICAL DIABETIC NEPHROPATHY TO THE GRADE OF DIABETIC RETINOPATHY



DISCUSSION

A relationship between renal and retinal angiopathy in diabetes has been studied internationally[4]. Many studies can be found in international literature based on different research designs (i.e. cross sectional, [5,6,7] and longitudinal,[8,9,10] studies) that support a relationship between diabetic retinopathy and nephropathy. Possible confounders like hypertension probably intervening between a direct relationship between our two study parameters have also been sought and it seems that this relationship is complex and is indicative of a common end pathophysiology stemming from microangiopathy. Many side risk associations of both retinopathy and nephropathy independently have been found like longstanding hyperglycemia, high HbA1c levels, duration of diabetes and hypertension[11,12,13]. Still other studies negate a direct relationship between the two i.e. retinopathy and nephropathy like the microalbuminuria collaborative study group repo [14] in opposition to those that support it. [15]

Conversely, there are studies in which nephropathy has been used as a predictor of retinopathy [16] and in a prospective study involving 211 patients with type I Diabetes mellitus (DM), the prevalence of PDR increased from 7% at onset of microalbuminuria to 29% four years after the onset of microalbuminuria as compared with 3% and 8%, respectively, in patients without persistent microalbuminuria. Similar studies done on other ethnic groups have also come up with consistant results but no such study was found in local literature[17,18]. Wisconson Epidemiology Study of Diabetic Retinopathy (WESDR) stated that gross proteinuria at baseline increases the risk of developing microalbuminuria as well.

The clinical relevance of this study is beneficial to both the ophthalmologist and an internist in their approach to a patient with diabetes and its complications as discussed below.

The results of this study agree with other related studies published in international literature. Renin Angiotensin System Study (RASS) [19] stated the correlation of severity of retinopathy to the renal anatomical abnormalities. RASS study concludes that even renal anatomical dysfunction can be compared and correlated to the severity of retinopathy. Another remarkable observation is that RASS commented that the occurrence of kidney dysfunction in individuals with diabetic retinopathy is more frequent when we consider it in terms of anatomical dysfunction rather than functional dysfunction. Our results show a similar frequency of nephropathy to each grade of retinopathy even though a renal functional parameter was employed. This might indicate that had an anatomical criterion been employed to assess renal pathology in our set up, the frequencies would have been much higher.

Factors like poverty, difficult access to ophthalmic health care, lack of awareness, the silent nature of diabetes, all seem to explain the striking results of this study and highlight the importance of using one ab-

normality as a tool to predict the presence of another diabetic complication.

Ahmed et al [15] in their study conducted in Saudia Arabia determined the predictive value of retinopathy with the rationale that this particular diabetic complication can be easily detected on a routine ophthalmic visit making it a cost effective, non invasive and convenient tool for predicting the presence of other diabetic complications. The results of the study in our setup are comparable to the findings of the above-mentioned study but again the respective percentages of nephropathy in this setup were much higher. Furthermore Ahmed et al [15] also concluded that retinopathy can serve as a valuable predictor for the presence of other diabetic complications such as neuropathy and cerebrovascular disease.

Rema et al [21] conducted a study on the risk factors influencing the long term results of panretinal photocoagulation in patients with diabetic retinopathy. This study was conducted in Chennai, India. It concluded that the duration of diabetes, the pre-treatment visual acuity and the presence of proteinuria significantly affected the visual acuity at one year following PRP. It appears that the presence of underlying undiagnosed and untreated nephropathy in patients being treated with PRP may be negatively influencing the benefit of this modality of treatment in Pakistan.

CONCLUSION AND RECOMMENDATIONS

The results of this study indicate that diabetic retinopathy shows a state of generalized vascular damage and supports the views for a common pathogenesis of retinopathy and other diabetic complications. Moreover, the frequency of nephropathy rose with increased severity of retinopathy. These results suggest that retinopathy (especially PDR) can be considered a risk indicator for preclinical nephropathy.

DM is a systemic disease with numerous complications in organs other than the eye. The presence and severity of retinopathy highly correlates with the presence of nephropathy. Since this relationship can have important clinical bearing in the treatment of diabetic patients it is therefore recommended that the renal status of any patient with diabetic retinopathy be assessed as it can influence the progression of retinopathy and its response to laser treatment.

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Original Article

Outcome of Primary Percutaneous Coronary Intervention (PCI) of Ostial versus Nonostial Occlusion of Left Anterior Descending Artery

(Study conducted at National Institute of Cardiovascular Diseases, Karachi)

Muhammad Tariq Farman, Naveed Ullah Khan, Jawaid Akbar Sial, Tahir Saghir, Tariq Masood, Syed Nadeem Hasan Rizvi, Khan Shah Zaman

ABSTRACT

OBJECT: The object of this study was to compare the outcome of Primary PCI of ostial versus non ostial occlusion of LAD artery.

MATERIALS AND METHODS: This observational study was conducted at National Institute of Cardiovascular Diseases Karachi, Pakistan from January 1st, 2008 to December 31st, 2008. A total of 70 patients presented to the catheterization laboratory for Primary PCI of LAD artery in whom baseline coronary angiogram showed acute occlusion of left anterior descending artery were enrolled for the study. All Patients received Aspirin, Clopidogrel and Platelet Glycoprotein IIB IIIA inhibitor. Patients were followed at one month, 3 months and 6 months.

RESULTS: Out of 70 cases 50 had nonostial and 20 had ostial occlusion. Baseline characteristics were similar between both groups. Stenting was done in 95% of all patients and was similar in patients with ostial or nonostial narrowing. Procedural success was the same for ostial and nonostial Primary PCI (100% vs. 96%). Six months event free survival was also similar in both groups (75% vs. 76%). Total event rate and mortality was also same in both groups (25% vs. 24% and 10% vs. 10%).

CONCLUSION: Primary PCI of ostial LAD occlusion with suitable anatomy is as safe and similar as non ostial LAD occlusion and optimal results can be achieved in this high risk group of patients in a developing country at a tertiary care public sector hospital. To validate our results further studies with larger cohort are needed.

KEY WORDS: ST-segment elevation, Myocardial Infarction, Primary Percutaneous Coronary Intervention, Ostial Left anterior descending artery, stenting.

INTRODUCTION

In patients with acute ST elevation myocardial infarction (STEMI), it is now an established fact that revascularization with primary Percutaneous Coronary Intervention (PCI) provides better outcome as compared to pharmacological treatment.[1,2] But whether this mode of treatment is equally beneficial in patients with acute ostial occlusion of left anterior descending (LAD) artery, is not known. In the era of balloon angioplasty, ostial PCI was considered as having increased risk with decreased success.[3] Although, stenting has decreased the risk of elastic recoil and dissection, even then precise stent placement can be challenging. Proximal misplacement may jeopardize the adjacent coronary ostium by causing a stent "jail" with or without plaque shift. At the other end, distal misplacement may cause an incomplete coverage of the ostium and hence may lead to restenosis. Moreover, patients with acute occlusion of ostial LAD artery are more likely to have in heart failure and shock. PCI in these unstable patients is more risky and likely to have worse outcomes. Therefore in this study, we compared difficult PCI of ostial LAD with non ostial PCI in patients with acute LAD occlusion.

Primary PCI is being done at our centre since 1999, but initially it was offered to those in whom Thrombolytic treatment is contraindicated. However, for the last two years it is being offered to all patients with acute STEMI. Although this primary PCI program has been running successfully since 2007, the key question is whether we can truly offer this facility in high risk group of patients in a public sector tertiary care centre?

Although outcomes of primary PCI are well known and well evident, the outcomes of primary PCI of acute ostial left anterior descending (LAD) artery occlusion are not known. The primary object of our study was to determine outcomes in patients undergoing primary PCI for STEMI due to occlusion of ostial LAD. Our secondary object was to compare the outcomes of ostial LAD occlusion with primary PCI of non ostial

LAD occlusion.

MATERIALS AND METHODS

Patient population: This was an observational study conducted at National Institute of Cardiovascular diseases (NICVD) Karachi from January 1st 2008 to December 31st 2008. All adult patients (≥18 years old) with chest pain lasting >30 minutes, ST elevation of ≥1 mm in ≥2 precordial leads, and coronary angiogram showing occlusion of LAD artery were included in this study. Informed consent was taken and detailed questionnaire was filled of those patients who agreed for primary PCI.

Only those ostial lesions were treated with primary PCI in whom the ostial plaque did not seem to be involve the distal left main and/or ostium of LCx (Left Circumflex) artery. Moreover, angle of LAD ostium with LCx artery was more than 70º. All other ostial lesions were excluded from the study. Patients who underwent rescue PCI or primary PCI of LCx or right coronary artery were excluded from the study. Patients who received Thrombolytic therapy within 24 hours of hospital admission, those who were diagnosed as Non ST elevation Myocardial Infarction (NSTEMI) and those presenting beyond 24 hours with resolved symptoms were also excluded from the analysis.

Procedure

Primary PCI of the LAD artery was performed in standard method using a variety of guiding catheters, coronary wires, balloons and stents. The majority of interventions were performed through the femoral route. However, the choice of access was on discretion of operators and considerable number of interventions was performed through radial route. All patients received 5000-10,000 units of intravenous unfractionated heparin, Aspirin 300-mg, clopidogrel 600-mg (loading dose), and Platelet glycoprotein IIb IIIa inhibitor. Thrombus extraction catheter (export catheter), intracoronary nitroprusside and adenosine use were at the discretion of operators. All patients were prescribed Aspirin 300-mg, Clopidogrel 75-mg and Atorvastatin 20-40 mg./Rosuvastatin 10-20 mg daily at the time of discharge from the hospital. Patients were followed at one month, 3rd month and 6th month of procedure.

Data collection

The prospective information on variables including age, gender, history of diabetes, hypertension, hyperlipidemia, smoking, prior PCI or coronary artery bypass grafting (CABG), presence of cardiogenic shock, need of intubation and/or intra-aortic balloon pump (IABP), angiographic and procedural details (ostial involvement, segment of vessel, side branch involvement, use of stents, GP IIb IIIa inhibitors, Thrombolysis in Myocardial Infarction (TIMI) flow, and Tissue Myocardial perfusion (TMP) grade and Electrocardiogram (ECG) findings were recorded.

TIMI flow, TMP grades and ST resolution (on 12- lead ECG strips) were visually determined and documented by two independent observers before and after PCI and in case of controversy third expert opinion was taken as final.

Definitions

Ostial lesion was defined as being located within 3-mm of the ostium of the left anterior descending artery. Non ostial lesion was defined as being located ≥3 -mm away from the ostium.

Cardiogenic shock defined as systolic blood pressure (SBP) of <90-mmHg for at least 30 minutes, or requirement of inotropic support to maintain a SBP >90-mmHg. PCI success was defined as achievement of vessel patency to a residual ≤30%. Major bleeding was defined as a hematoma ≥10-cm in diameter or bleeding requiring transfusion, vascular surgery or resulting in major morbidity. TIMI flow grades were defined as: Zero – total occlusion resulting in no antegrade flow, 1 – minimal penetration of contrast across the obstruction but fails to opacify the vessel, 2 – contrast opacifies the vessel beyond the occlusion but with delay, 3 – normal complete perfusion of entire vessel without any delay. TMP grades were defined as: Zero – minimal or no myocardial blush, 1 – dye stains the myocardium and this stain persists on the next injection, 2 – dye enters the myocardium but washes out slowly and strongly persists at the end of injection, 3 – normal entrance and exit of dye in the myocardium. Complete ST resolution was defined as ≥70% ST resolution compared to baseline ECG.

Timing variables were documented as follows: (1) Symptom onset to Emergency Room (ER) time was defined as the time duration between the onset of symptoms to the time of presentation to the ER. (2) Door-to-Lab time was defined as the time taken for the shifting of patient to the Catheterization Laboratory from the point of entry to the ER. (3) Door-to-balloon time was defined as the time taken for the first ballooning from the point of arrival to the ER.

Patients were followed in out patient department (OPD) after one month, 3rd month and at 6th month. Those patients who could not come in OPD, they were contacted through telephone and follow up documented.

Data were managed and analyzed on Statistical Package for Social Sciences (SPSS) Version 10.

RESULTS

A total of 137 patients opted primary PCI out of them 70 underwent PCI to LAD and remaining 67 were ex-

cluded from the study due to reasons mentioned above in the study protocol. Patients who underwent ostial PCI (n = 20) were compared with patients who underwent non ostial (proximal, mid or distal LAD segments) PCI.

Table I shows the baseline demographic and clinical characteristics of both groups. These features did not differ significantly between the two groups. The mean age was just under 51 years in both groups. The frequency of hypertension was nearly same in both groups but diabetes was more common in ostial group although not significantly. The trend of presentation with bundle branch block and cardiogenic shock was seen more commonly with ostial group. Similarly trend of requirement of inotropic support and IABP was towards ostial group. Door to balloon time was nearly same in both groups. In hospital mortality did not differ significantly among the two groups.

Table II shows the angiographic and procedural details of the patients undergoing primary PCI of ostial

TABLE I: CHARACTERISTICS OF PATIENTS UNDERGOING PRIMARY PCI OF (OSTIAL VS NON OSTIAL) LEFT ANTERIOR DESCENDING ARTERY AT NICVD

Baseline Demographic and clinical characteristics	Ostial n=20(%)	Non ostial n=50(%)	P Value
Age (mean {SD}) in years	49 {11.4}	50.9 {12.1}	0.74
Male gender (%)	18 (90)	42 (84)	0.71
Past Medical history			
Hypertension	09 (45)	27 (54)	0.67
Diabetes	06 (30)	09 (18)	0.43
Current Smoker	08 (40)	15 (30)	0.60
Admission Characteristics			
AWMI+BBB	02 (10)	03 (06)	NS
Cardiogenic Shock	02 (10)	04 (08)	NS
Inotrops required	02 (10)	04 (08)	NS
Intubation required	01 (05)	03 (06)	NS
IABP required	02 (10)	03 (06)	0.60
Timing Variables (Mean (minutes) {SD})			
Chest pain to ER	120.4 (84.9)	117.4(108.4)	0.91
Door to Laboratory	72.2 (82.1)	72.3 (52.8)	0.99
Door to Balloon	105.6 (83.4)	104.2(53.8)	0.93
Death (In-hospital)	02 (10)	04 (08)	NS
Death (cardiogenic shock)	02 (10)	02 (04)	NS
Death (no cardiogenic shock)	00	02 (04)	NS

PCI = percutaneous coronary intervention; SD = standard deviation; AWMI = Anterior wall Myocardial infarction; BBB = Bundle Branch Block; IABP = intra-aortic balloon counterpulsation; ER = emergency room; NS = non significant

TABLE II: ANGIOGRAPHIC AND PROCEDURAL CHARACTERISTICS OF PATIENTS UNDERGOING PRIMARY PCI OF OSTIAL VS NON OSTIAL LAD AT NICVD, KARACHI

Angiographic and procedural characteristics	ostial n = 20(%)	Non ostial n = 50(%)	P-value
Single Vessel CAD	14 (70)	33 (66)	NS
Two Vessel CAD	01 (05)	04 (08)	NS
Multivessel CAD	05 (25)	13 (26)	NS
Type A	04 (20)	04 (08)	0.40
Type B	05 (25)	16 (32)	NS
Type C	11 (55)	30 (60)	NS
Artery size in mm (mean [SD])	3.2 [0.34]	3.0 [0.30]	NS
PCI Technique			
Predilation of the lesion	12 (60)	19 (38)	0.12
Direct stenting	06 (30)	19 (38)	NS
Direct stenting followed by Post dilation	01 (05)	08 (16)	NS
Stenting not done	01 (05)	04 (08)	NS
More than one lesions stented	04 (20)	04 (08)	NS
Stent size - 3.0-3.5 mm	17 (85)	39 (78)	NS
BMS used	19 (95)	47 (94)	NS
Side branch involvement	14 (70)	33 (66)	NS
TIMI flow (pre procedure)			
0	10 (50)	30 (60)	NS
I	06 (30)	18 (36)	NS
II & III	04 (20)	02 (04)	NS
TIMI flow (post procedure)			
I	00	01 (02)	0.40
II	01 (05)	02 (04)	NS
III	19 (95)	47 (94)	0.41
Glycoprotein IIb/IIIa inhibitor use	20 (100)	50 (100)	NS
Thrombus visualized	19 (95)	48 (96)	NS
Use of Export Cathter	16 (80)	43 (86)	NS
Clot retrieval	07 (35)	21 (42)	NS
Use of Adenosine	05 (25)	12 (24)	NS
Post PCI Tissue Myocardial Perfusion			
0 & I	14 (70)	35 (70)	NS
II & III	06 (30)	15 (30)	NS
Procedural success	20 (100)	48 (96)	NS
Table Death	00	01 (02)	NS

PCI = percutaneous coronary intervention; LAD = left anterior descending; CAD = coronary artery disease; mm = millimeter; BMS = bare metal stent; TIMI = thrombolysis in myocardial infarction; NS = non-significant

vs. non ostial LAD occlusions. Most of these features did not differ between the two groups. Nearly 95% of lesions were stented in both groups and high procedural success (ostial = 100%; non ostial = 96%) was achieved. One patient was died on table in non ostial group.

Table III shows comparison of outcomes at six month of follow up between the groups of patients undergoing primary PCI of ostial vs. non ostial LAD occlusion. Death rate was similar in two groups although hospital death was slightly higher in ostial group. Total event rate did not differ significantly between the groups (25% vs. 24%) and event free survival at 6 month follow up was nearly same in both groups (75% vs. 76%).

TABLE III: OUTCOME OF PATIENTS UNDERGOING PRIMARY PCI OF LEFT ANTERIOR DESCENDING (LAD) ARTERY - 6 MONTHS OF FOLLOW UP

Major Adverse Cardiac Event (MACE)	Ostial n = 20 (%)	Non-ostial n = 50 (%)
Death : in-hospital	02 (10)	04 (08)
Death : follow up	00	01 (02)
Death : all patients	02 (10)	05 (10)
CABG : in-hospital	00	00
CABG : follow up	01 (05)	04 (08)
Heart Failure	00	01 (02)
Recurrent MI	01 (05)	02 (04)
Stent Thrombosis	01 (05)	00
Total event rate	05 (25)	12 (24)
Event free survival at 6 month	15 (75)	38 (76)

PCI = Percutaneous Coronary Intervention; CABG= Coronary artery bypass grafting; MI=Myocardial Infarction

DISCUSSION

Ostial lesions have peculiar pathological and morphological features. These lesions are technically more demanding and challenging and have inferior outcomes when compared to non ostial lesions. These lesions contain higher calcium and fibrous tissue and they tend to have increased elastic recoil activity.[4,5] Apart from that, increased intimal hyperplasia has been noted after stenting. Due to these factors most of the operators prefer to deploy drug eluting stent (DES), just like in other complex lesion subsets. Although the available data are limited, the DES appears to successfully manage the problem of restenosis. However, even with DES, ostial lesions appear to be correlated with poorer outcomes. The location of these lesions poses inherent challenges to the operators due to limited angiographic views, highly variable ostial anatomy, unstable guide support, accentuated cardiac motion and usually significant myocardium in jeopardy. In addition to these technical challenges, presence of thrombus, sicker clinical condition and presence of heart failure in patients with acute occlusion of ostial LAD makes the PCI more risky and likely to have worse outcomes. However, data is not available in this regard particularly in our part of the world.

This is the first report about the comparison of outcomes of primary PCI of ostial versus non ostial occlusions of LAD artery. Baseline demographic, clinical and angiographic features were nearly similar in patients who underwent ostial and non ostial primary PCI. However, there was a disparity between the numbers of patients in two groups. Ostial group had significantly less number of patients (n = 20) as compare to non ostial group (n = 50). As we enrolled the consecutive patients who underwent primary PCI during the period of one year, this disparity was inevitable and unavoidable. This may also be due to the selection bias of the operators towards more suitable anatomy while dealing with ostial lesions particularly if we keep considering the reasonable number of patients who excluded from the study.

An interesting and encouraging trend emerged from our study was a high procedural success rate (100% vs. 96%) and an excellent overall in-hospital survival rate (90% vs. 92%) in ostial as well as non ostial primary PCI of LAD artery. The high rates of initial success and TIMI 3 flow were almost equivalent in both groups. This may be surprising but considering the fact that characteristic changes in chronic ostial lesions like increased fibrosis content, calcification and increased elastic recoil develop over a longer period of time and that may not be present in acute ostial lesions and during the early stages of disease. Besides that majority of ostial lesions were predilated in our study group that may also explain high procedural success rate although aggressive debulking was not required, probably due to the same reasons mentioned above. An excellent overall in-hospital survival also needs discussion. The fact that is well evident from literature that eversince various balloons, stents and other devices are introduced the success rate of ostial PCI is over 95% and risk of serious complications has reduced considerably.[6] Mavromatis et al in his study has also reported similar in-hospital survival rate but increased TLR at 1 year in ostial PCI group.[7] We reported six months follow up that did not show any significant difference, however, further follow up is needed to know the long term difference.

In our study bare metal stents (BMS) have been used in ~ 95 % of patients in both groups. Although safety of drug eluting stents (DES) in primary PCI has been

observed recently in various trials, [8-10] however, neither it is generally recommended in all patients of Primary PCI nor it become a routine to use DES in the setting of STEMI at our centre. Secondly, financial constraints do not let the operators free to use DES that is more expensive as compare to BMS. Further more primary PCI itself is an expensive mode of treatment and adding the cost of DES makes it much more expensive and difficult to bear for most of our patients in a public sector hospital. In our study despite of this limitation in-hospital and six month follow up did not show any significant difference between the two groups. Although various studies have shown similar result in-hospital and short term outcome of ostial LAD PCI either with BMS and DES but at 9 months follow up there was significantly higher Target Lesion Revascularization (TLR) and Major Adverse Cardiac Events (MACE) in ostial LAD lesions when treated with BMS. [11,12] However, the data on primary PCI of ostial LAD with DES is scarcely available therefore it can not be concluded that outcome of primary PCI of ostial LAD would be better with DES.

There are certain other findings in our study that need further discussion. ~ 85 % patients of our study groups were male. This was probably due to gender bias that is present in our male dominant society where female gender, in general, is a less privilege part of the society. This is consistent with other studies on acute MI and reflects the gender discrimination commonly seen in the Indo-Pakistan subcontinent.[13,14]

The mean age in our study groups was less than 51 years that is lower than the reported studies from the western world. However, this lower age at presentation is again consistent with other studies in Pakistan on acute MI and probably reflects premature atherosclerosis that is commonly seen in southeast Asia.[15]

The rate of predilation was higher in ostial lesions as compare to non ostial although it was not statistically significant (60% vs 36%). This was not unusual as ostial PCI needs more debulking than nonostial PCI due to its unique pathological and morphological features as mentioned above. This is also to prevent plaque shift and to achieve a larger lumen diameter without reliance on stenting. [7]

The mean door-to-balloon (DBT) time was ~ 105 minutes in both groups. This was definitely higher than the standard of 90 minutes. [16] Where as door-to-Laboratory time was more than 72 minutes. This means that the reason for delay was not related to the handling of risky and technically difficult patients but actually delay was related to shifting the patient from ER to Catheterization laboratory. This is understandable if we consider the cost difference between the pharmacological and percutaneous treatment for STEMI. As we are lacking state funding for these types of expensive procedures, patients have to bear most of the cost. This complicates the decision making and hence resulting in delays to definitive treatment.

What would be the implications of our study? It has been shown in our study that Primary PCI is a viable therapeutic option and can be performed in public sector tertiary care hospitals with excellent immediate, short and long term outcomes not only in low risk patients but also in high risk and technically difficult patients. These results can be achieved despite relatively long symptom onset to ER and door-to-balloon times. As incidence of ischaemic heart disease has been increasing in our part of the world, acute STEMI will continue to suffer our young adult workforce. Left anterior descending artery is the culprit in majority (>53%) of STEMI. [17] This predicts the danger to our young population. Although pharmacological treatment (Streptokinase) is widely available at most of urban Pakistan, the efficacy of this treatment in achieving TIMI 3 flow is approximately 50%.[18] Therefore strong commitment is needed and effective measures should be taken to make this expensive Primary PCI treatment widely available to save our young productive workforce.

Study Limitations

The sample size of our study was very small although we collected the data for complete one year. Secondly, there was a disparity and the numbers of patients were grossly unequal between the two groups. Due to these reasons data analysis was difficult and turned insignificant when compared. Therefore, we need to enroll more patients to validate our results in larger cohort.

CONCLUSION

Primary PCI of ostial LAD occlusion with suitable anatomy is as safe and similar as non ostial LAD occlusion and optimal results can be achieved in this high risk group of patients in a developing country at a tertiary care public sector hospital. To validate our results further studies with larger cohort are needed.

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Original Article

Use of Sural Flap in Wound Coverage in Lower Limb

Muhammad Ahmad

ABSTRACT

OBJECTIVE: To present the experience with sural flap in reconstruction of soft tissue defects of lower leg, ankle and foot.

SETTINGS: Private Practice (Aesthetic Plastic Surgery), Rawalpindi, Pakistan; from June 2005 to February 2008.

PATIENTS AND METHODS: All the patients preceding with wound on foot, ankle or lower leg region were included in the study. Distally based sural neurocutaneous flap was used to cover the defects. The flap was marked in the prone position and it was outlined on the posterior lower 2/3 of leg according to the size and location of the defect. The flap was raised from distal to proximal. Donor site was closed primarily in its proximal part only. The remaining defect was reduced to a smaller size and covered with the split-thickness skin graft.

RESULTS: Distally based sural flap was used in 10 cases for soft tissue coverage. Mean age of the patients was 40.2 years. The flap size varied from 12 × 4 cm to 20 × 6 cm. Average length of the flap was 15.6 cm, and width was 5.3 cm. The flap survived in 90% of the patients. Partial flap loss (3 × 2 cm) was seen in one patient. Partial wound dehiscence was seen in 20% of the patients.

CONCLUSION: The reverse sural artery flap is a reliable option for the reconstruction of defects of lower leg, ankle and heel region.

KEYWORDS: Wounds, Sural Neurocutaneous flap, Sural artery flap, Sural Nerve, Split thickness skin graft.

INTRODUCTION

Soft tissue reconstruction of the lower third of the leg, heel, and ankle region is a challenging problem because of a severe shortage of locally available tissues that could be reliably used for coverage.[1,2] The various cases of these defects include trauma, infection, ischaemia and tumour resection. The limited mobility, poor vascularization and subsequent poor healing encountered, all these demand a detailed knowledge of the local anatomy to select the best surgical alternative for individual cases [3]. Various flaps have been used including local, distant and free flaps [2,4,5].

Because the aim of the reconstruction is to cover the defect in the simplest way and with minimal donor-site morbidity without sacrificing a major artery or nerve, local flaps seem to be a reliable option. With the better understanding of cutaneous vascular anatomy, distally based sural neurocutaneous flap by Masquelet et al in 1992 have become a reliable option [6].

The blood supply of the flap is derived from the small arteries that accompany the sural nerve along its course in the posterior aspect of the distal two-thirds of the lower leg [7]. It is not a sensate flap and the sural nerve is sacrificed with the flap elevation [5]. This flap provides a good option for the coverage of wide range of defects around foot and ankle region. A few studies have been carried out in Pakistan but none has been carried out in private setup [7-10].

The purpose of this article is to share the experience with the use of sural flap in reconstruction of soft tissue defects of lower leg, ankle and foot.

PATIENTS AND METHODS

This prospective study was conducted in a private setup from June 2005 to February 2008 in patients having wound on foot, ankle or lower leg region. Distally based sural neurocutaneous flap was used to cover the defects. All the patients having direct trauma to the lower leg and those who had peripheral vascular disease were excluded from the study. All the diabetic patients were evaluated thoroughly for any peripheral vascular disease. History of smoking was also noted specially.

In traumatic defects, delayed reconstruction following repeated debridements, was planned in 5 patients whereas in 2 patients, flap was performed on emergency basis. The choice between delayed or immediate coverage based on the local condition of the wound, exposure of the vital structures and general condition of the patients. Wound condition, presence of any devitalized tissue and slough was noted. Condition of the underlying wound bed was noted. Any exposure to the underlying bone or tendon was also noted.

Operative technique:

The surgery was performed under general/spinal anaesthesia. A tourniquet was applied. The flap was

marked in the prone position. The axis of flap corresponded to the course of the sural nerve and lesser saphenous vein. The flap was generally centered between the popliteal fossa and mid-posterior leg with a width of up to 12 cm, but the length was extended upto 2cm to the Achilles tendon. The flap was outlined on the posterior lower 2/3 of leg according to the size and location of the defect.

The flap was raised from distal to proximal in the plane beneath the deep fascia and above the gastrocnemeus muscles. The sural nerve and lesser saphenous vein were ligated, divided and elevated with the flap. The pedicle was freed to the level above the lower most peroneal perforator in the posterolateral intermuscular septum located 5cm above the tip of lateral malleolus **(Figure I)**. All the flaps were raised as fasciocutaneous, none as adipofascial. Donor site was closed primarily in its distal part only. The remaining defect was reduced to a smaller size and covered with the split-thickness skin graft. Postoperative flap monitoring was done by visual and needle prick every 6 hourly for the 1st 24 hours and then 8 hourly for the next 48 hours. A splint was used for 3 weeks. Full weight bearing on heel was not permitted before six weeks.

Data Collection Procedure:

Data was collected using a proforma. Personal information about the patients was used to assess age distribution, sex distribution and co-morbid conditions. Cause of the wound , site and size of the wound were noted. Condition of the wound and any involvement of the bone was also noted.

A detailed analysis of the data collected was carried out and inference was drawn. Data were inferenced in the form of tables, figures etc. using Microsoft Excel® ™

RESULTS

Distally based sural flap was used in 10 cases for soft tissue coverage. Mean age of the patients was 40.2 years (range 28-60 years). The male to female ratio was 4:1. The aetiology of the defects included trauma (70%), diabetic ulcers (10%) and infection (20%) **(Table I)**. Underlying bone was exposed in 30% of the cases and 40% of the pateitns had some degree of devitalized tissue/slough in the wound bed which was removed surgically. The flap size varied from 12 × 4 cm to 20 × 6 cm. Average length of the flap was 15.6 cm, and width was 5.3cm.

The flap survived in 90% of the patients. Partial flap loss (3 × 2cm) was seen in one patient, which involved the distal part of the flap which was managed conservatively and later skin grafted. Slight epidermolysis was noted in one patient involving an area of 2 × 1 cm. Partial wound dehiscence was seen in 20% of the patients. The wound coverage was satisfactory after the flap.

Case 1:

A 60 years male had a diabetic ulcer on the heel for the last 2 years. The underlying bone was visible **(Figure II)**. The sural flap was harvested and used to cover the defect. The postoperative result was satisfactory. The weight bearing was started after 8 weeks.

Case 2:

A 28 years male presented with a workplace accident which resulted in a wound on the dorsum of the foot. Sural flap was planned and executed successfully **(Figure III)**. There was a slight postoperative oedema which relieved later on. The flap was a bit bulky initially but later debulking was performed.

TABLE I: DETAILS OF THE PATIENTS

Age	Sex	Cause	Location	Flap Size
29	M	Road Traffic Accident	Heel	15×5
32	M	Workplace accident	Dorsum of foot	20×6
36	M	Road Traffic Accident	Dorsum + Medial Melleolus	12×6
51	M	Infection	Heel	17×6
60	M	Chronic ulcer (diabetic)	Heel	18×5
28	M	Workplace accident	Dorsum of foot	16×5
36	M	Road Traffic Accident	Mid foot	14×5
48	M	Road Traffic Accident	Heel + Mid foot	16×6
39	F	Road Traffic Accident	Dorsum +Lateral Melleolus	15×5
43	F	Infection	Heel	12×4

DISCUSSION

A soft tissue defect of the lower third of leg and foot presents a challenging problem because of the tightness and poor circulation of the skin, and the limited units available for reconstruction. Various local muscle, musculo-cutaneous, fascio-cutaneous and free flap alternatives have all been used. Distally based myofascial flaps are unreliable; intrinsic muscle flaps from the forefoot have limited effective range and lack significant dimensions[12,13]. Reverse island flaps like peroneal artery flap, anterior tibial artery flaps, and posterior tibial artery flaps have the disadvantage of sacrifice of a major artery of the leg [14-16]. Muscle flaps

FIGURE I: FLAP ANATOMY AND LANDMARKS

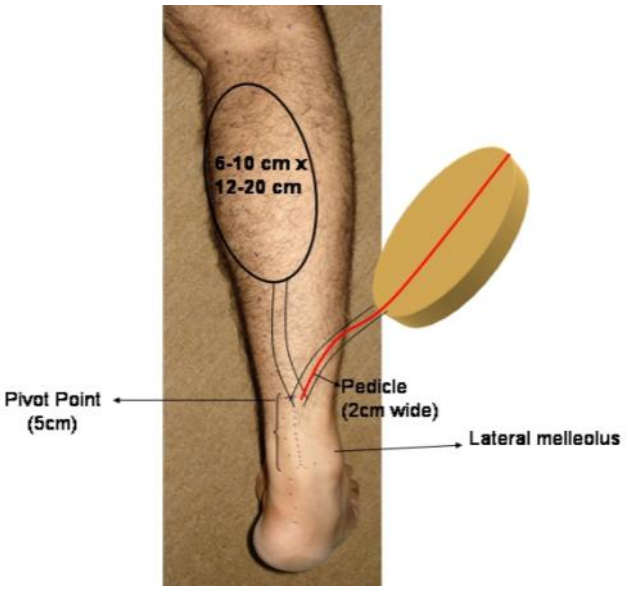
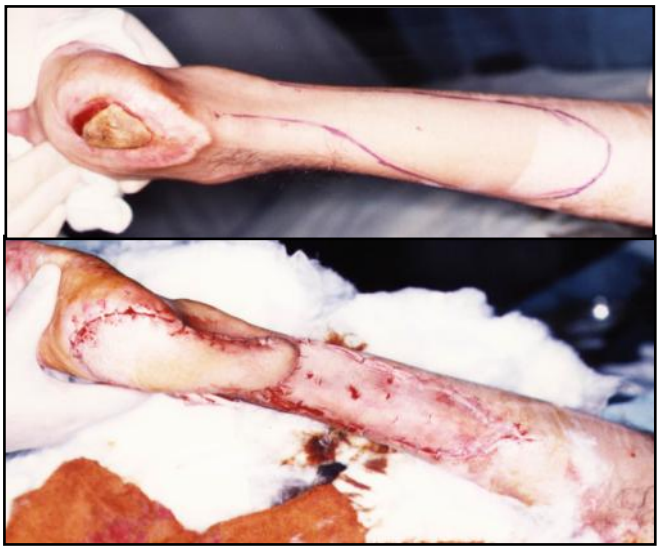


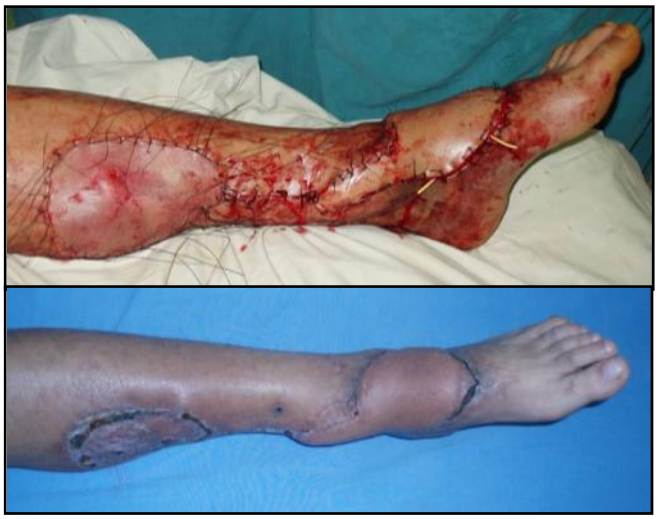
FIGURE II: PRE & POST OPERATIVE PHOTO-GRAPHS



in this region are of restricted use [17]. Microsurgical flaps are a good alternative despite being of laborious execution, as they need skilled personnel and sophisticated equipment[18,19]. Moreover the morbidity and operative time are also increased.

Elaboration of the concept of fascio-cutaneous flaps by Ponten and common use of distally based island flaps limited the use of other techniques in lower leg, ankle and heel reconstruction [4]. Different terminologies such as neurocuateous flap, distally based superficial sural artery flap, reverse sural island flap, and more precisely lesser saphenous sural veno-neurofascial flap have all been used for the same flap described by Mosquelet et al, and subsequently used

FIGURE III: PRE & POST OPERATIVE PHOTO-GRAPHS



by Hasegawa et al [5,20].

The reverse sural artery flap is a distally based, type A, fasciocutaneous flap based on the sural arterial network [20]. Peroneal artery septocutaneous perforators anatomose with the superficial sural arterial network [19]. The subcutaneous network is oriented longitudinally with many transverse anastomoses producing a reliable vascularised flap. Venous drainage of the reverse sural artery flap passes through the superficial venous network of the superficial sural vein, the short saphenous vein, and septo-cutaneous veins of the peroneal vein [20].

Ideal flap thickness and quality, minimal donor site morbidity, the lack of functional loss, short recovery time, and wide arc of rotation and safe vascularity are the significant advantages of the reverse sural artery flap.

The male to female ratio in the present study was 4:1 whereas it was 1.9:1 in the study by El-Din et al [21]. Heel was involved in 50% of the patients in the present study as compared to 64.7% in the study by El-Din et al [21]. Similarly heel was involved in 57.1% of the patients in the study by Mak [22]. Mean patient age was 44.2 years in the present study which is less than the study by Mak (66.3 years) [22]. This is in contrast to the observation by Hassanpour et al [23]. In a study by Chai, 15 flaps were reported [24]. The size in this study ranged from 8 × 9 cm to 13×31cm which is similar to the present study. The pivot point was approximately 5cm above the tip of lateral malleolus. Similarly in the study by Buluc, island flap was designed [1]. The pedicle was dissected to 3 cm and was tunneled through the skin; 73% flap survived completely with no venous congestion in any flap. We used island flap in 9 cases whereas non-island flap was used in one case only.

In a large series of 84 patients by Akhtar et al, the flap survival was 79%[8]. The flap length varied from 5 cm to 15 cm and width was 4– 2 cm. There are two main disadvantages of concern. First is the sacrifice of sural nerve resulting in the numbness in the nerve distribution; but none of the patient in this study complained of any disturbance. Second disadvantage is the skin grafted area.

Another important point is the bulkiness of the flap. Although the flap shrinks to some amount but it may be a problem initially, especially for wearing the footwear. In our series there was no flap necrosis. There was a partial flap necrosis of the terminal part of the flap in one case. One case of epidermolysis of flap margin was also seen.

Similarly, this flap is easy to perform even without microsurgical instruments or anastomoses with a loupe magnification. The principle vascularization of the lower limb is also preserved.

CONCLUSION

The reverse sural artery flap is a reliable option for the reconstruction of defects of ankle, foot and heel region.

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Original Article

Risk of Type II Diabetes in Viral Hepatitis B and C Patients

Habibullah Shaikh, Khemomal A. Karira, Ali Akber Rahu, Qurban Hussain Shaikh, Yasmin Shaikh, Mona Rani

ABSTRACT

OBJECTIVE: To find out the prevalence of type II diabetes in viral hepatitis B and C patients of different age groups with and without cirrhosis.

METHODS: This observational study was carried out in the Department of Biochemistry, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Center Karachi, during the period June 2007 to June 2008. Eighty hepatitis B and C virus infection positive patients with and without cirrhosis were selected for study after confirmation of their diagnosis by ELISA method. Normal subjects were selected as controls for study. Blood glucose was estimated by Hexokinase method, while enzymes assay was done by enzymatic (kinetic) method. Data analysis including paired and correlation analysis were carried out and P value upto 0.05 was considered significant.

RESULTS: The number of diabetic patients was high (55%) in age group 40-49. Patients with cirrhosis of hepatitis C were having high risk (40%) than of hepatitis B (23%) of developing diabetes. This trend was also observed in patients of without cirrhosis (27% hepatitis C, 10% hepatitis B). Increasing fasting blood glucose level associated with increase in hepatic enzymes (AST and ALT) levels was observed. It was an indicator of ongoing liver damage in co-morbid condition of viral hepatitis.

CONCLUSION: In addition to the derangement of liver function, patients of viral hepatitis B and C can be at the risk of development of type II diabetes. Earlier measures are needed for the prevention of the disease at earlier stage of development.

KEY WORDS: Type II diabetes, insulin resistance, cirrhosis, viral hepatitis B and C, ELISA.

INTRODUCTION

Viral hepatitis is an infection of hepatocytes that produces necrosis and inflammation of the hepatic tissue.[1] Among different viruses, hepatitis B and C are the most common causes of chronic liver disease and cirrhosis worldwide. Patients with dual HBV and HCV infections have more severe liver disease and are at an increased risk for progression to hepatocellular carcinoma.[2,3] In endemic areas, majority of the individuals are infected by vertical transmission in the early childhood.[4] Most infections of hepatitis B and C viruses are caused from unsafe injection practices. These may also occur due to medical, surgical or dental treatment and by vertical transmission from mother to child.[5] Multiple sexual partners is the most commonly reported factor for patients with acute hepatitis B. Other factors associated with patient-to-patient transmission include multidose vials, finger-stick devices, acupuncture needles and jet injection guns.[6]

The hepatitis B virus (HBV) and hepatitis C virus (HCV) are noncytopathic, hepatotropic members of the hepadnavirus and flavivirus families respectively and cause acute and chronic necro inflammatory hepatic disease and hepatocellular carcinoma.[7] The inflammatory process in liver is progressive and lead to cirrhosis in 20-50% of patients after 10-20 years.[8] In addition to liver disease, viral hepatitis infection is associated with changes in cognitive and psychiatric functions, a decreased quality of life and an increased prevalence of diabetes mellitus[9]. In chronic infection, it is associated with glucose intolerance.[10]

Diabetes mellitus is a clinical syndrome characterized by hyperglycemia due to absolute or relative deficiency of insulin. It occurs most often either due to autoimmune type 1 or to adult onset type II diabetes.[11] Chronic viral hepatitis is associated with the increased risk of development of type II diabetes mellitus due to impaired glucose metabolism.[12] However, no single mechanism can explain the link between hepatitis virus infection and type II diabetes mellitus. The fatty degeneration and cirrhosis have been associated with abnormal glucose regulation. The fatty change is related to intracellular fat accumulation and insulin resistance.[13] The virus core protein inhibit secretion of very low density lipoprotein in the hepatic tissue and consequently induces fatty degeneration.[14] Hepatitis virus is also able to trigger autoimmune mechanism against the insulin producing pancreatic beta cells in susceptible individuals. Other factors, such as obesity characterized by high body mass index, advanced age and family history of diabetes are associated with the higher prevalence of diabetes in the viral hepatitis infected population.[16]

The present study was designed to find out the prevalence of type II diabetes in viral hepatitis B and C patients of different age groups with and without cirrhosis.

SUBJECTS AND METHODS

This was an observational study carried out in the Department of Biochemistry, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Center Karachi, during the period June 2007 to June 2008. Patients were selected for the study with the collaboration of Liver Clinic, medical wards and PMRC, JPMC, Karachi. Finally 80 patients of both genders with an established diagnosis of hepatitis B and C and with and without cirrhosis were recruited. Patients were divided into different groups according to cause and type of their disease: group I, hepatitis B patients without cirrhosis; group II, hepatitis C patients without cirrhosis; group III, hepatitis B patients with cirrhosis and group IV, hepatitis C patients with cirrhosis. (Patients whose case history showed a concomitant presentation with the conditions like prior anti-viral treatment, pregnancy, a body-mass index > 25, family history of diabetes, and with any other associated chronic illness were excluded from the study. Similarly patients with hepatitis B and C virus co-infection were also excluded from the study.) For comparative analysis, a control group of 20 normal subjects matched for age and gender were also enrolled in the study.

Six ml of venous blood was collected from the superficial vein of each subject with the help of disposable syringe under all aseptic measures and aliquoted in plain test tubes without anticoagulant; 1.8 ml blood was transferred into a tube containing 0.2 ml citrate for prothrombin time, while remaining blood after clotting was centrifuged to obtain serum. After that serum was labeled and stored at -70ºC in freezer for later analysis.

The estimations of fasting blood glucose was done by Hexokinase method (DiaSys, Germany), hepatic enzymes (AST and ALT) by enzymatic (Kinetic) method (Merck, Germany) and serum albumin by Monochromator (End Point) method (Merck, Germany) by using analyzer of Slectra Junior of Vital Scientific (Netherland), while prothrombin time was analyzed by one stage (coagulation) method (Bio Merieux, France) using Hemaclot Human (Germany) Analyzer.

Statistical Analysis:

Data analysis including paired and correlation analysis were carried out by using SPSS version 10.0 for windows. Paired sample t-test was used to determine the significance of changes in quantitative parameters. P value of 0.05 or less was considered to indicate statistical significance.

RESULTS

The number of diabetic cases present in different groups were, in group I: 2 (10%), group II: 5 (23%), group III: 6 (27%) and in group IV: 9 (40%). The mean age of patients was 39 years with a range of 20-59 years. The age wise prevalence of diabetes was 1 (4%) in 20-29 years age group while 5 (23%) in 30-39 years, 12 (55%) in 40-49 years and 4 (18%) in 50-59 years age groups respectively. Therefore patients of hepatitis B and C with cirrhosis were greater having diabetes and also majority of patients were of older (30-49 years) group **(Table I)**.

The mean values of age, fasting blood glucose and prothrombin time were statistically significant ($P<0.05$) in groups III and IV as compared to control. Whereas mean values of AST and ALT were statistically highly significant in all groups. However albumin showed statistically significant mean values in all groups as compared to control **(Table II)**. The fasting blood glucose in all groups showed significant ($P<0.01$) positive correlation with prothrombin time, AST and ALT, while negative correlation with albumin **(Table III)**. Thus high fasting blood glucose level in patients with cirrhosis concomitant with ongoing liver damage was an indicator of development of co-morbid condition in these patients.

TABLE I: DISTRIBUTION OF DIABETICS IN DIFFERENT GROUPS AND BY AGE

Groups	No: of Subjects	No: of Diabetics Subjects	Age Group			
			20-29	30-39	40-49	50-59
Group I	20	2 (10%)	0	1	1	0
Group II	20	5 (23%)	1	1	2	1
Group III	20	6 (27%)	0	1	4	1
Group IV	20	9 (40%)	0	2	5	2
Total	80	22 (17.6%)	1 (4%)	5 (23%)	12 (55%)	4(18%)

Criteria of DM = Fasting Blood Glucose > 110 mg/dl and Insulin > 9 µU/ml

Group I: Hepatitis B patients without cirrhosis. Group II: Hepatitis C patients without cirrhosis.

Group III: Hepatitis B patients with cirrhosis. Group IV: Hepatitis C patients with cirrhosis.

TABLE II: COMPARISON OF BIOCHEMICAL PARAMETERS BETWEEN DIFFERENT GROUPS

Parameter	Control (n=20)	Group I (n=20)	Group II (n=20)	GroupIII (n=20)	Group IV (n=20)
Age (Years)	36.4±1.93	36.4±1.93	36.4±1.93	41.9±1.39*	41.9±1.42*
Fasting Blood Glucose(mg/dl)	88±3.40	89±3.60	94±4.80	117±10.87*	134±15.85*
Prothrombin time (Control: 11 to 16 sec)	13.7±0.38	17.2±1.02	16.1±0.69	19.4±1.28*	19.6±0.95*
AST (U/L)	15.2±1.08	76.6±7.36**	72.9±5.95**	123.7±17.41***	128.2±15.65***
ALT (U/L)	27.4±1.25	81.6±7.94**	79.4±5.90**	95.6±10.42**	87.1±10.65**
Albumin (g/dl)	4.66±0.14	3.86±0.11*	3.56±0.15*	2.87±0.08**	2.88±0.06**

Individual values are expressed as mean ± SEM.
* P<0.05, ** P<0.01, *** P<0.001.

TABLE III: CORRELATION COEFFICIENT (R) BETWEEN FASTING BLOOD GLUCOSE AND VARIOUS BIOCHEMICAL PARAMETERS OF VIRAL HEPATITIS

Parameter	Group I (n=20)	Group II (n=20)	Group III (n=20)	GroupIV (n=20)
Prothrombin time	0.91*	0.77*	0.80*	0.46*
AST (U/L)	0.97*	0.95*	0.91*	0.91*
ALT (U/L)	0.96*	0.91*	0.86*	0.50*
Albumin (g/dl)	-0.82*	-0.41	-0.62*	-0.44

* P<0.05

DISCUSSION

Viral hepatitis exists throughout the world and is a major global health problem. Hepatitis B, C and D viruses cause persistent and chronic infection. Hepatitis B and C viruses involve liver and also produce extrahepatic manifestations. Type II diabetes mellitus is one of the complications of the disease. It is a co-morbid condition of chronic liver disease and biochemical evidence of ongoing liver damage may be detected in a large proportion of diabetic patients.[15] Custro *et al*.[16] reported that the incidence of diabetes mellitus in adults with chronic hepatitis B and C is four times higher than that in general population. As the disease progresses, the risk of developing type 2 diabetes is increased due to development of resistance to the action of insulin, which ultimately leads to increased blood glucose level (hyperglycemia).

Because age is an important risk factor for type 2 diabetes, Papatheodoridis *et al*[15] and Wang *et al*[17] analyzed the relation of viral hepatitis infection and type 2 diabetes according to different age groups, and found age as an important risk factor for type 2 diabetes in both hepatitis B and C virus infected cases and its association with older age. They also observed that the risk of diabetes was not much different in those ≥ 60 years of age, perhaps because of the fact that those patients, who have both viral infection and diabetes mellitus, are more likely to die of advanced liver disease. In our study also majority of the diabetic cases were of older age group.

In present study we observed that the number of diabetic patients with cirrhosis were twice (33.5%) than that without cirrhosis (16.5%). This reflects the need for diagnosis of diabetes at the earlier stage of acquiring hepatitis, because diabetes itself increases the rate of progression of fibrosis. These findings match with the study of Mason *et al*[18], who also observed the increasing number of diabetic patients with increase in severity of disease.

In the studies of Papatheodoridis *et al*[15] and Qureshi *et al*[19], more number of hepatitis C virus infected cases were observed as diabetic than hepatitis B virus infected cases. We also observed the more number of diabetic cases (35%) in hepatitis C virus induced patients with and without cirrhosis, as compared to hepatitis B virus induced patients (20%). It probably reveals the effect of causative organism on the development of diabetes.

Biochemical analysis revealed that fasting blood glucose levels were associated with higher levels of AST and ALT, along with derangement of other biochemical parameters, which indicates ongoing liver damage associated with the development of type II diabetes. These observations are in accordance with the study of Alizadeh *et al*[12], Wang *et al*[20] and Papatheodoridis *et al*[15] who observed the development of diabetes in association with liver function deterioration in hepatitis B and C infected patients.

CONCLUSION AND RECOMMENDATIONS

The patients of chronic viral hepatitis B and C and cirrhosis, with the advancement of disease, can be at the risk of development of type II diabetes, in addition to the derangement of liver function.
Further studies at mass level are highly suggested to highlight the risk and to suggest the measures needed for the prevention of the disease at earlier stage of development.

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Original Article

Darn Repair of Primary Inguinal Hernia- A Safe and Effective Method: Experience of 110 Cases with One-Year Follow Up

Mohammad Azam Mengal, Mohammad Aslam Mengal

ABSTRACT

OBJECTIVE: To evaluate the efficacy and safety of darn method with polypropylene in primary inguinal hernia repair in terms of postoperative complications and early recurrence rate.
STUDY DESIGN: Descriptive case series study.
PLACE AND DURATION OF STUDY: This study was conducted in surgical Unit II Sandeman Provincial Hospital Quetta, from January 2008 to March 2010.
PATIENTS AND METHODS: One hundred ten patients of primary inguinal hernias were included in the study. After examination/investigations, patients were operated for hernia repair by darn procedure, under spinal or general anesthesia. All the patients were discharged on 2nd to 4th postoperative day. These patients were followed up after one week, three weeks for early complications and after three months, six months and one year for early recurrence.
RESULTS: Out of 110 patients, 18 (16.4%) patients presented as direct hernias, 89 (80.9%) indirect hernias, 3 (2.7%) were with dual oblique; in (55.5%) of the patients hernia was right sided, (38.2%) had left sided and (6.4%) had bilateral inguinal hernias respectively. Mean age of the patients was 42.06 years. Fifty-one patients were operated under spinal and 59 under general anaesthesia. Overall, postoperative complications were seen in 9.9% patients. Complications developed were 2.7% wound infection, 1.8% scrotal hematoma and 3.6% urinary retention. Postoperative neuralgia was 0.9%. Only one patient (0.9%) developed recurrence of hernia.
CONCLUSION: We concluded that in primary inguinal hernias darn repair with polypropylene is safe, effective, and economical method with low recurrence rate.

KEY WORDS: Inguinal hernia, darn repair, polypropylene, post operative complications, recurrence.

INTRODUCTION

Groin hernias contribute about 75% of external abdominal wall hernias. Approximately 65% of inguinal hernias are indirect and 35% are direct.[1] Surgery is the treatment of choice for inguinal hernias to prevent complications.[2] Inguinal hernia repair is the most common operation undertaken in routine surgical practice with an annual incidence of 13 per 1000 population of all age groups.[3] There have been many developments in groin herniorrhaphy by surgeons such as Halsted, McVay, Maloney, Shouldice and Bassini's pioneer work.[4] Several methods have been developed over the years to improve the traditional methods of hernia repair, the most important recent innovations being the Lichtenstein mesh repair.[5] Due to the low complication rate (<1%) it has got popularity in inguinal hernia repair.[6] However Lichtenstein procedure is expensive and if the mesh becomes infected, then it requires removal.[7] Recently laparoscopic mesh repair has become popular.[8] It as well requires learning curve and is expensive.[9] The Shouldice method is a recognizably excellent procedure but is time consuming and requires a higher level of surgical expertise.[10]

Since the introduction of darn method by Maloney et al, many surgeons employ darn as sole technique for inguinal hernia repair.[11-13] Due to its low complication rate darn method has proved to be good alternative to Lichtenstein mesh repair.

In our region most of the patients are unaffordable, because of poor socioeconomical status. Due to cost, availability of mesh, prolong learning technique and availability of laparoscopic facilities, these techniques are impracticable in our setup. Darn repair almost has same outcome as other techniques but it is cost effective, easy to learn and perform. The aim of study was to evaluate the safety and efficacy of primary inguinal hernia repair with polypropylene Maloney's darn technique in terms of early complications and early recurrence.

PATIENTS AND METHODS

One hundred and ten patients with primary inguinal hernia operated with darn technique between January 2008 and March 2009 were included in this study. All patients were males with the age ranging from 20 to 75 years (mean 42.06 years). Patients with irreducible, strangulated, obstructed and recurrent inguinal

hernias were excluded from the study. Inguinal hernia was diagnosed by clinical examination. Mode of presentation of hernia was usually the appearance of reducible lump in groin or inguinoscrotal region. Preoperative investigations were performed that included complete blood count, urine D/R, HbsAg, anti HCV, serum urea, creatinine, blood sugar, ECG (only patients >50 or have co morbidity) and chest X-ray.

After informed consent, all patients were operated for primary inguinal hernia repair by Maloney's darn procedure using No.1 non-absorbable polypropylene sutures. The method was started with the same steps as in other hernia repairs. After dealing with the sac, darning was made between the conjoint tendon and inguinal ligament. For making darn, the first stitch was taken from periosteum of the pubic tubercle then passed through the medial end of the inguinal ligament as well as good bites of the rectus muscle with its sheath were taken to ensure a good darn in the critical medial angle of the repair. Along the upper edge, the sutures were taken from the rectus sheath in continuation with the conjoined tendon. To avoid splitting of inguinal ligament the lower stitches were taken in a spread out way, some were taken from front while others further behind. These sutures were continued even beyond the internal ring by displacing the spermatic cord laterally. The second layer of darn was completed in same manner but the direction of stitches was opposite to first layer. At the medial end the darning was completed by a stitch through periosteum of pubic tubercle and lower rectus sheath. After ensuring, that the fashioned darn was without tension the cord was then laid down on its newly constructed bed. The external oblique aponeurosis, subcutaneous tissue and the skin were sutured in layers. All Patients were operated under, spinal or general anaesthesia. Three doses of injectable broad-spectrum antibiotic for prophalyxsis given; first dose of injection was injected at the time of induction of anesthesia and then repeated 08 hour interval and followed by oral antibiotic for three days. Post operatively pain scores were recorded at 24 hours interval using verbal rating score. According to pain scoring analgesics were given. Patients were discharged on 2^{nd} to 4^{th} postoperative days. The patients were examined on 7-8 days after discharge for early complications and removal of skin stitches. The patients were strictly advised to avoid physical exertion and heavy weight lifting for at least twelve weeks. All patients evaluated for early complications up to three weeks and followed for early recurrence for a mean period of one year.

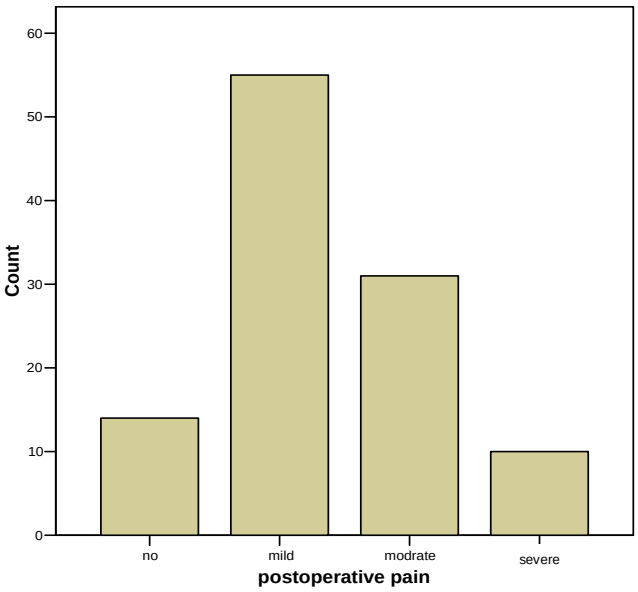
RESULTS

Out of 110 patients 11 (10%) developed complications **(Table I)**. Early complications included three (2.7%) cases of wound infection treated by removal of stitches with antiseptic dressing and broad-spectrum antibiotic, two (1.8%) cases developed scrotal hematoma, managed conservatively, our four (3.7%) patients developed urinary retention, catheterization for 12 hours resolved the problem, none of these patients had any difficulty in urination after removal of catheter. One (0.9%) patient had neuralgia at the operation site, which resolved in due course of time. In our study we observed postoperative pain within first 24 hours in 78.2% patients out of them 55 (50%) mild, (31) 28.2% moderate, (10) 9.1% experienced severe pain respectively while 14(12.7%) patients did not complain of any pain. **(Figure I)** All patients who had pain were given analgesics according to verbal scoring. They were managed by diclofenic sodium 50-mg 8 hourly. None of them required narcotic analgesics. Hospital stay ranged from two to four days, mean 2.91 days. Only one patient in this study developed recurrence of hernia. We did not observe testicular atrophy in any patients.

TABLE I: POSTOPERATIVE COMPLICATIONS

Complications	Number of Pts	Percentage
Wound infection	3	2.7%
Scrotal hematoma	2	1.8%
Neuralgia	1	0.9%
Urinary retention	4	3.6%
Recurrence	1	0.9%

FIGURE I: POSTOPERATIVE PAIN DURING FIRST 24 HOURS



DISCUSSION

The groin is one of the weakest points of abdominal wall and is common site for hernia formation.[4] In our study incidence of hernia found in third and fourth decade of life and more common type is indirect right sided. Inguinal hernia repair is commonly performed by general surgeons by different techniques. Selection of technique for inguinal hernia repair are influenced by some factors such as rate of recurrence, shorter hospital stay, low complications, lower pain perception, low cost and easy to learn. These reflect the rate of success in hernia repair. Maloney darn repair is the method that almost fulfills the above criteria. A survey regarding the technique of inguinal hernia repair in UK demonstrated that darn repair was being the sole method used by 35% of consultants.[7]

There are some technical factors attribute to recurrence, such as poor tissue dissection, repair of tissues in excess of tension and lack of familiarity of surgeons with the procedure. We performed tension free darn repair and ensured a good darn in the critical medial angle of the repair. We experienced very low recurrence rate, which is quite comparable to other studies.[7,10,13,14] We select the Maloney's darn method because it is cost effective and safe method in our setup as shown in other studies.[12,13,15,16]

Shouldice repair technique is more difficult to perform which involves extensive dissection and associated with significant postoperative pain and discomfort.

In contrast, Maloney's darn repair no attempt is made to approximate the conjoint tendon to the inguinal ligament, consequently that is tension free repair with minimal dissection, decreased operative time, less pain and early ambulation. For that reason, darn repair is the most common repair method employed by the surgeons.[17]

Laparoscopic inguinal hernia repair introduced almost a decade ago; however, the laparoscopic approach in hernia surgery remains controversial. This method has been criticized because of its technical complexity; in addition to associated complications at the early phase of the learning curve.[9] National Institute for Clinical Excellence in UK has recommended the use of laparoscopic surgery for recurrent and bilateral hernias.[10]

As compared to Letenctine, laproscopic and Shouldice technique, darn repair with proline is cost effective and easy to learn.

In our study the infection rate was 2.7% which is similar to other studies.[7,13] In Lichtenstein repair if mesh becomes infected then it requires removal, whereas the darn has better chance to heal without removal.[6] We observed less number of complications such as scrotal hematoma 1.8%, urinary retention 3.7%, neuralgia 0.9% and there was no testicular atrophy. However, postoperative pain was observed during first 24 hours, which responded to analgesics.

CONCLUSION

In primary inguinal hernia repair by using polypropyline darn method is simple, easy to learn and it can be performed consistently. In terms of early low recurrence rate and fewer postoperative complications, it is concluded that Maloney darn repair is safe, effective and economical method for primary inguinal hernias repair.

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Original Article

Psychiatric Morbidity in Psychoactive Substance Users – A Multicentre Study in Hyderabad

Nadeem Ahmed, Moin Ahmed Ansari, Raza Ur Rehman

ABSTRACT

OBJECTIVE: To study the pattern of psychiatric morbidity in psychoactive substance users at Sir Cowasjee Jehangir Institute of Psychiatry and Combined Military Hospital Hyderabad.
SETTING: This descriptive study was done at Sir Cowasjee Jehangir Institute of Psychiatry and Combined Military Hospital Hyderabad simultaneously from 10th Jan 2009 to 10th July 2009
PATIENTS AND METHOD: Total 150 patients presented with history of psychoactive substance use since last 1 year and showing psychiatric morbidity on PSE (urdu version) were selected by non-probability convenient sampling. Patients having psychiatric morbidity before substance use were excluded from the study. Demographic variables were collected on a semi-structured proforma. Psychiatric symptomatology was collected using PSE (urdu version). Diagnosis of psychiatric morbidity was made by using ICD-10 criteria for mental and behavioral disorders due to psychoactive substance use. Proportions of psychiatric morbidity were calculated by SPSS version 10.0.
RESULTS: Out of 150 subjects 72 used cannabis, 38 used Heroin, alcohol intake in 25 cases, Benzodiazepine tablets in 13 cases, Gutka in 2 cases. Poly drug abuse was found in 30 cases abusing alcohol and benzodiazepines. Dependence syndrome (35%) followed by anxiety disorders (22%) acute and transient psychotic episode (39%) was main morbidity in cannabis. Dependence syndrome (46%) followed by antisocial personality disorder (10%) depression (25%) and anxiety disorders (16%) were main morbidity in heroin abuse. Depression (42%) followed by anxiety disorders (30%), dependence syndrome (10%) and antisocial personality disorder (8%) was main morbidity in alcohol abuse. Dependence syndrome (42%) depression (23%) anxiety disorders (20%) dissociative disorder (10%) and deliberate self harm (5%) were psychiatric morbidities in benzodiazepine abuse.
CONCLUSION: This study showed that there is significant psychiatric morbidity associated with various types of psychoactive substance abuse. These morbidities not only pose a diagnostic dilemma but also have importance in management and prognosis of psychoactive substance use.

KEY WORDS: Psychiatric morbidity, dependence syndrome, psychoactive substance, depression, anxiety.

INTRODUCTION

Drug abuse, misuse, addiction are major issues in society because of their enormous personal, social and economic costs. Significant proportions of severe drug abusers are psychiatrically ill. Drug misuse is becoming more frequent in patients with other psychiatric disorders, where it can lead to problems in treatment and poor outcome. Foregoing other reasons, alcoholics will point to anxiety as their reason for drinking.[1] Indeed social anxiety is one of the most common causes of alcoholism in young men.[2] Depression is particularly likely to lead to excess alcohol intake. Alcohol is also one of the most serious risk factors for suicide. There is increasing use of cannabis and stimulants in patients with schizophrenia. Stimulants can offset some of more negative aspects of neuro-leptic treatment, especially loss of drive and motivation. The reason for use of psychedelics include search for meaning or mystical experiences, which can precipitate psychotic episodes and may act as the trigger for schizophrenia[3]. The role of personality is another major issue with some believing in "addictive personality" and other suggesting different personality types might predispose to different aspects or forms of drug misuse.[4,5] Depression (30%)personality disorder (6%) generalized anxiety disorder (4%) phobic disorder (2%) panic disorder (2%) and dysthymic disorder (2%) were found to be major psychiatric morbidities in a study carried out in Pakistan in 2003[6]. In this regard the local studies on psychiatric comorbidity in opioids[7] and pattern of drug abuse in Pakistan have found significant psychiatric morbidity[8]. Similar ratios of psychiatric morbidities are found in some other international studies[9].

This study was designed to find out psychiatric mor-

bidity in substance users in two major psychiatric facilities at Hyderabad Sindh i.e. Sir Cowasjee Jehangir Institute of Psychiatry and Combined Military Hospital Hyderabad.

MATERIAL AND METHODS

This study was carried out at Sir Cowasjee Jehangir Institute of Psychiatry and Combined Military Hospital Hyderabad over a period of 6 months starting from 10th Jan 2009 to 10th July 2009. Patients of either sex who reported during the study period to both psychiatric facilities with history of psychoactive substance use for last 1 years aging between 20 years to 40 years constituted the study population. Patients selected for this study from Combined Military Hospital were civilians reporting to psychiatrist for OPD/indoor management as CNE (cases not entitled). Patients having psychiatric morbidity before starting use of psychoactive substance or having a co-morbid psychiatric disorder or on any prescription of psychotropic medication were excluded from the study. Out of these 150 patients were found having psychiatric symptoms on PSE (urdu version)[10] as screening tool. Patients were interviewed by two psychiatrists independently. Semi-structured proforma was used to record demographic variables. Psychiatric morbidity in psychoactive substance users was recorded using ICD-10[11] diagnostic criteria. Proportion and percentage of psychiatric symptoms were calculated using descriptive statistics by SPSS 10.0.

RESULTS

Among 150 subjects males were 130 (86.67%) and females were 20 (13.33%). Mean age was 32.5 years. Ninety-three (62%) were unemployed and 91 (60.67%) were uneducated. Cannabis was reported most frequent substance used by 72 (48%) cases followed by heroin used by 38 (25.33%) cases. Poly-drug abuse was present in 30 (20%) cases **(Table I)**. The pattern of psychiatric morbidity in different substance abusers is detailed in **Table II**.

TABLE I: PSYCHOACTIVE SUBSTANCE USE (n=150)

Substance	Frequency
Cannabis	72 (48%)
Heroin	38 (25.33)
Poly drug abuse(Alcohol & Benzodiazepines)	30 (20%)
Alcohol	25 (16.66%)
Benzodiazepine Tablets	13 (8.66%)
Gutka	2 (1.33%)

TABLE II: PATTERN OF PSYCHIATRIC MORBIDITY

Cannabis Abuse (n=72)	
Acute and transient Psychotic episode	28 (38.89%)
Dependence syndrome	25 (34.72%)
Anxiety disorders	16 (22.22%)
Acute confusional state	3 (4.17%)
Heroin Abuse (n=38)	
Dependence syndrome	18 (47.37%)
Depression	9 (23.68%)
Anxiety disorders	6 (15.79%)
Antisocial personality disorder	4 (10.53%)
Deliberate self harm	1 (2.63%)
Alcohol Abuse (n=25)	
Depression	11 (44%)
Anxiety disorders	9 (36%)
Dependence syndrome	3 (12%)
Antisocial personality disorders	2 (8%)
Benzodiazepine Abuse (n=13)	
Dependence syndrome	6 (46.15%)
Depression	3 (23.08%)
Anxiety disorders	2 (15.38%)
Dissociative Disorders	1 (7.69%)
Deliberate self harm	1 (7.69%)

DISCUSSION

Psychoactive substance use is not only on an increasing trend in our country but it's a progressing menace in developed countries. The mean age of substance abuse came out to be 32.5 years in this study and cannabis was found to be abused by 48%. Sixteen year olds from United States and United Kingdom topped the league in lifetime experiences of any illicit drug in comparison of 23 countries.[12] Around one in four of British population have tried an illegal drug at some time. Peak age occurs in late teens and early twenties. Cannabis accounts for 85% of this and most cannabis abusers never use another illegal drug. In traditional cannabis using countries, such as Egypt and India, recreational use is uncommon and heavy cannabis use is confined to small and marginalized groups in population.[13] The lifetime prevalence of cannabis abuse and dependence in United States has

been estimated at 4.4% of adults.[13] However the dependence syndrome came out to be 34.72% in this study. In traditional cannabis using cultures, such as India, the "cannabis psychosis" has been reported in which symptoms are preceded by heavy cannabis use and remitted after psychosis.[15] The percentage of acute and transient psychotic episode in cannabis users in this study came out to be 38.89%. There is clinical and epidemiological evidence that cannabis use exacerbate the symptoms of schizophrenia in affected individuals.[16] Therefore the relationship found in this study needs further research. Alcohol is one of the most widely used psychoactive substance. Approximately 8 out of 10 persons living in Europe and America would report drinking in their life time.[17] The percentage of alcohol abuse came out to be 16.66% in this study. Edwards and gross proposed the existence of alcohol dependence within a syndrome model.[18] Field trails conducted as a background to the preparation of ICD-10 have all contributed to the body of research evidence.[19] The percentage of dependence syndrome came out to be 12% in this study which opens further venues of clinical management. About one-third of male patients and up to 50% of female patients have experienced longer periods of severe depression with alcohol.[20] Depression was found in 44% of patients. Almost all groups of drug users had a significant percentage of cases fulfilling the criteria of depression and apart from depression being the known psychiatric morbidity; the probable reason of such high occurrence may be a developing comorbidity or a symptomatology of dependence syndrome because of socioeconomic deterioration and recession of self-esteem in such cases. These attributes need further research. In clinical studies between 20% to 70% of patients with alcoholism also suffer from anxiety disorders.[21] In this study the percentage of anxiety disorders was 36%. It is now widely accepted that the alcoholics do not present a homogenous pre-morbid personality profile, however some distinctive trait clusters have been identified.[22] Antisocial personality disorder was found in 8% of patients in this study. The current prevalence of heroin use in United Kingdom is thought to be less than 1%[23]. The percentage of heroin users in this study was 25.33%. Several studies have found that 70% of heroin addicts meet diagnostic criteria for a current psychiatric disorder, frequently depression, antisocial personality, and alcohol dependency[24]. Dependence syndrome (47.37%) followed by antisocial personality disorder (10.53%), depression (23.68%) and anxiety disorders (15.79%) were found to be main morbidities of heroin users in this study. Pattern of misuse of benzodiazepines vary from episodic use of non prescribed medication with up to 15% of young people reporting some experience with benzodiazepines to continuous high dose use.[25] In this study percentage of benzodiazepine misuse alone was 8.66% and in combination with alcohol was 20%. Dependence syndrome (46.15%) depression (23.08%) anxiety disorders (15.38%) dissociative disorder (7.69%) and deliberate self harm (7.69%) were psychiatric morbidities in benzodiazepine abuse. A significant proportion of sample was female abusers and the most common substances of abuse in females were benzodiazepines and average duration of abuse was one year. Only 2 cases of Gutka abuse were found to have psychiatric morbidity of dependence and anxiety. Although there is no reference of gutka abuse in literature, however, many research projects are going on the subject and this finding can provide a food for thought for further research.

CONCLUSION

This study shows that there is significant psychiatric morbidity associated with various types of psychoactive substance abuse. These morbidities not only pose a diagnostic dilemma but also have importance in management and prognosis of psychoactive substance use. This calls for a multidisciplinary team management with active community partnership. The diagnosis and management of dependence syndrome associated with psychoactive substance use need further research as it has a significant diagnostic and management implication. The phenomenon of "Cannabis psychosis" screened as acute and transient psychotic episode in this study needs to be further studied as it has known association with schizophrenia. Amotivational syndrome associated with cannabis needs a well planned study. Management of depression and anxiety disorders has an imperative role in diagnosis and management of substance abuse. Similarly antisocial personality disorder and deliberate self harm not only complicate the management of substance abuse but also are poor prognostic factors. Poly drug abuse also poses a considerable challenge in the management of alcohol and benzodiazepine abuse. The pattern of substance abuse and psychiatric morbidity in females needs further research.

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Original Article

Patterns of Ocular Trauma at Rawalpindi General Hospital

Muhammad Aslam Bhatti, Qamar Farooq, Syed Imtiaz Ali

ABSTRACT

OBJECTIVE: To evaluate the patterns of ocular trauma, its causes and prognostic value of presenting visual acuity in final outcome of ocular injuries.
STUDY DESIGN: Retrospective.
PLACE AND DURATION OF STUDY: Rawalpindi General Hospital from April 2007 to April 2008.
PATIENTS AND METHODS: Medical records of all ocular trauma cases among 600 patients admitted during study period in Eye Ward were analysed. The details of patients regarding age, gender, causes and record of visual acuity at admission and discharge from hospital were entered into specially-designed performa.
RESULTS: Among 93 (15.5%) eyes that suffered globe trauma 73 (78.49%) were of males and 72 (77.42%) were presented in patients up to 30-years of age. The common causes of ocular trauma were occupational 35 (37.63%), play & sport injuries 24 (25.81%) and road traffic accident 19 (20.43%).
At the time of admission visual acuity of 42 (45.2%) eyes was near blindness, whereas at the time of discharge 69 (74.2%) had visual acuity <1/60.
CONCLUSION: Ocular trauma is a major health problem. Young male under age of 30 years were main victims. Majority of ocular trauma was due to occupational and sports injuries.

KEY WORDS: Ocular trauma (OT), Open-globe injury, Closed-globe injury, presenting visual acuity, cause, ocular trauma Scale (OTS).

INTRODUCTION

Ocular trauma is one of the leading causes of unilateral blindness worldwide. It is defined as the result of mechanical, thermal, electrical or chemical injury to the eye.[1] Blunt trauma is more common than penetrating injuries and it represent a spectrum from a mild corneal abrasion to forced blunt trauma causing a marked tissue disruption.[2]

Ocular trauma is also a public health problem leading to visual impairment and blindness that has an important socioeconomic implication. The cost of rehabilitation and care is tremendous, so prevention of injury is an opportunity to reduce morbidity and mortality with significant saving in both financial and functional terms.[1]

Initial presenting visual acuity in ocular trauma has prognostic value and is an aid in counseling and in treatment of eye injury patient. It also directs attention towards resources needed and rehabilitation process.[5]

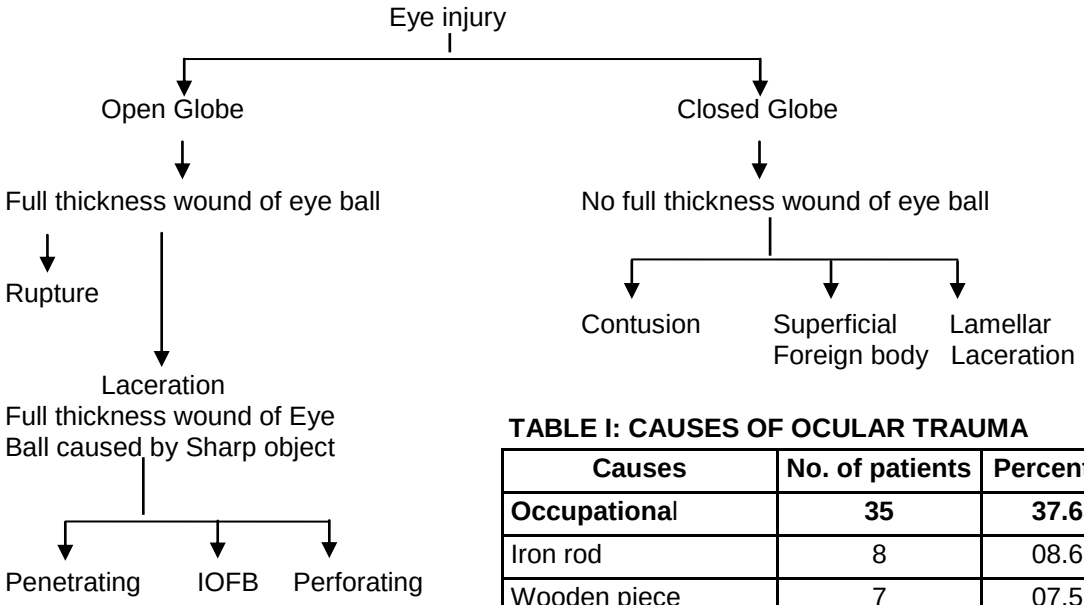
The aims of this study were to determine the pattern of ocular trauma at RGH Rawalpindi, causes of injury and prognostic value of presenting visual acuity in final visual outcome.

PATIENTS AND METHODS

This retrospective study was conducted at Rawalpindi General Hospital, Rawalpindi Pakistan. Records of ocular trauma cases admitted in Eye Ward from April 2007 to April 2008 were reviewed. The details of all ocular trauma cases regarding socio-demographics, history, cause of injury, visual acuity at the time of presentation and discharge, any pre-existing ocular disease, ocular treatment, and presence of intraocular foreign body were noted on a predesigned proforma. Visual acuity was classified with widely endorsed terminology as per description of American Academy of Ophthalmology.[1]

Variables that influence the prognosis of visual outcomes were recorded, which included type of injury, grade of injury based on visual acuity at initial examination, presence of relative afferent papillary defect in involved eye, and zone of injury. Adnexal, eyelids, superficial abrasions and burns not conforming to this classification were excluded.

Visual acuity was recorded with the help of Snellen's chart that included E-chart, English alphabets, Urdu alphabets for adults, Snellen's pictures and E-chart for patients between 6 to 10 years age. In patients less than 6 years, visual acuity was recorded with the help of Kay pictures, Snellen's pictures chart and counting of fingers. In addition to visual acuity, slit lamp examination, intraocular pressure, direct and indirect ophthalmoscopy findings was recorded. X-rays, ultrasonography and CT scanning findings of injured eye was recorded in cases where suspicion of intraocular or



retrobulber IOFB and fracture of orbital walls were present.

Whole data collected was analyzed through SPSS (V.16). The quantitative data was presented as mean with standard deviation and qualitative data as frequency with percentages in the form of tables.

RESULTS

During the study period total 600 cases were admitted in Eye Ward. Out of these 93 (15.5%) eyes suffered globe trauma and 26 (4.3%) with adnexal eye injuries. Unilateral injured cases were 79 (91.86%) and bilateral injured cases were 7 (8.14%) due to coalmine blast, stone blast and road traffic accident.

Among 93 eyes of globe trauma 73 (78.49%) were of males and 72 (77.42%) were presented in patients up to 30-years of age. The common causes of ocular trauma were occupational 35 (37.63%), play & sport injuries 24 (25.81%) and road traffic accident 19 (20.43%) as detailed in **Table I**.

Open globe trauma was present in 66 (70.97%) cases with pure corneal (zone I) involvement in 26 (39.4%), coneoscleral (zone II) in 24 (36.4%) and postsclera (zone III) in 16 (24.3%) eyes. Closed globe injuries were present in 27 (29.03%) cases with external globe (zone I) injury in 15 (55.6%), anterior segment including posterior lens capsule and pars plicata (zone II) in 10 (37%), and posterior segment past posterior lens capsule (zone III) in 2 (7.4%) eyes. Comorbidities in these cases are detailed in **Table II**.

At the time of admission visual acuity of 42 (45.2%) eyes was near blindness, whereas at the time of discharge 69 (74.2%) ha visual acuity <1/60, as detailed in **Table III**.

TABLE I: CAUSES OF OCULAR TRAUMA

Causes	No. of patients	Percentage
Occupational	**35**	**37.63**
Iron rod	8	08.60
Wooden piece	7	07.53
Grinder piece	4	04.30
Metal piece	4	04.30
Coal mine blast	3	03.23
Stone blast	3	03.23
Metal pin	2	0215
Rubber pipe	2	02.15
Bull horn	1	01.08
Lime burn	1	01.08
Play and sports	**24**	**25.80**
Ball& cricket related	11	11.83
Stone throwing	5	05.38
Wooden stick	2	02.15
Dog bite	2	02.15
Fire cracker	2	02.15
Safety pin	2	02.15
Road traffic accident	**19**	**20.43**
Domestic	**5**	**5.38**
Knife	1	01.08
Cane opener	1	01.08
Iron nail	1	01.08
Scissors	1	01.08
Acid burn	1	01.08
Firearm	**5**	**5.38**
Assault& fighting	**5**	**5.38**
Total	**93**	**100%**

TABLE II: CO-MORBIDITIES AMONG OPEN AND CLOSE GLOBE TRAUMA

Co-morbidities	Open Globe Trauma	Close Globe Trauma
Cataract	25 (37.87%)	9 (33.33%)
Uveal tissue pro-lapsed	22 (33.33%)	0 (0%)
Hyphema	05 (7.57%)	9 (33.33%)
Vitreous hemorrhage	02 (3.03%)	0 (0%)
Intra-Ocular Foreign Body	06 (9.09%)	0 (0%)
Corneal foreign bodies	02 (3.03%)	2 (7.41%)
Chorioretinal damage	02 (3.03%)	1 (3.07%)
Glaucoma	02 (3.03%)	1 (3.07%)
Subluxation/ dislocation of lens	0 (0%)	2 (7.41%)
Blow out fracture	0 (0%)	1 (3.07%)
Retinal detachment	0 (0%)	2 (7.41%)

TABLE III: GRADING OF OCULAR TRAUMA BASED IN PRESENTING VISUAL ACUITY & VA ON DISCHARGE FROM HOSPITAL

VA-Visual Loss	Visual Acuity at admission	Visual Acuity at discharge
NPL-Complete Blindness	14 (15.05%)	14 (15.05%)
PL-CF at1/2m-Near Blindness	42 (45.16%)	35 (37.6%)
1/60-5.5/60-Severe to Profound Visual Loss	13 (14%)	18 (19.35%)
6/30-6/18-Mild to Moderate Visual Loss	15 (16%)	16 (17.20%)
≥6/12	9 (9.7%)	10 (10.7%)

DISCUSSION

Ocular trauma is present in all societies but the nature varies according to environment and socioeconomic background.

In our study and other local & international OT studies, males were more exposed than females, (78.5% versus 21.5%). These figures are similar to that quoted by Baber TF [6] 79.66%: 20.33% and 75.5%:24.5% by Abeba Bejiga[5]and by Khan et al[7], (84.7%: 15.3%), 4:1 by Strahlman[8] and 86% by Monestam & Bjornstig[9]. It is due to fact that males remain engaged in outdoor activities playing, driving, fighting and other laborious physical work; more prone to OT as well as general physical injuries.

The most vulnerable age group is <30 years (87.43%). This corresponds to 84% quoted by Shahwani MA[10] and 75.5% by Abeba Bejiga[5]. Children <10 years suffered 22.6% and 11-30 years got 54.83%. Children <10yrs inflicted OT due to unsupervised games like cricket, stones & sticks throwing, firecrackers and playing with dogs. Age between 11-30 yrs is full of zeal and enthusiasm, full of activities. Young least bothered about preventive measures during playing, driving and during wheeling of motorbikes are more prone to general as well as OT.

After cataract, glaucoma and trachoma, OT and especially occupational OT is one of the leading cause of unilateral blindness and low vision in Pakistan.[11]

In our study occupational trauma is the major cause of OT 37.63% followed by play & sport in 25.80%. This differs from Baber TF[6] study where violence related OT is 37.37% & occupational is 24.4%. Fasih U[11] reported 72.00% occupational trauma in her study at Abbasi Shaheed Hospital Karachi. Differences in percentage are due to particular environment in which studies were done. Karachi is well industrialized as compared to Rawalpindi. Moreover, workers at small as well as large industries are not provided with good protective ocular goggles and facial helmets. Study at Peshawar reported violence; the common etiology might be due to traditional and environmental background and civil unrest due to Afghan war. A study carried out at Lahore, occupational OT was found to be 54% of all OT. The suffrer were mostly adult between 21-30 years old. Another study Victoria Eye Injury Surveillance System found that work related OT was 15% of all OT[12]. This figure show remarkable difference in results from our study. This may be due to proper use of protective measures by worker during work in developed countries.

Play and sports were 25.80% & was the second frequent cause of OT in this study. This correlates with N.W.F.P. study by Khan et al[7] in which 33.7% fell into accident at play. A study from India by Panda et al[13] in which commonest cause of OT was attributed to sports and play. Cricket ball and stone throwing during playing were the common causes. Unattended children playing with dogs, with wooden sticks & with fire crackers were the next common etiologies. Use of protective facial guards and supervised games in children can prevent this visual loss significantly during play & sports.

Road traffic accidents were the third common factor (20.43%) in this study. Baber TF[6] quoted 3.52% and Ali[9] reported 7.46% road traffic accident cases. Higher

percentage in our study may be attributed to non use of seat belts, rash driving and young driver not observing the traffic's laws.

In our study open globe injuries contributed 70.96% that correspond with Soliman Mahmoud M[15], hospital based, in Egypt that is 80.4% but percentage higher than Baber TF[6] that is 46.18% and Khan[7] et al, 61.64%. This is due to fact that closed injury like corneal foreign body conjunctival laceration and partial scleral found and photo-keratitis like cases were repaired on OPD bases and are not included in our study as compared to study by Baber TF [6] where corneal and conjunctival laceration, odema, corneal foreign, conjunctival foreign body were included in study.

Closed globe cases were 29.06%.Out of these 33.33% presented with cataract and 29.62% with hyphema those are comparable with local as well as international studies. Incidence reported by Baber TF [6] 43% comprising of 6.33% cataract & hyphema 24.79%. Ali[7] reported traumatic cataract 54% hyphema 36%. Soliman [15] reported 33% hyphema.

Modeled on the Apgar test, the OTS (ocular trauma scale) uses initial visual acuity and injury type to predict an outcome at the time of presentation. By using OTS system Dr. Kuhn[16] can quickly, and with a high degree of accuracy predict to patients their chances for visual recovery.

In this study, presenting visual acuity in 93 patients (93 eyes) consisted of 14 (15.05%) presented with No Perception of Light, 42 (45.16%) with Counting Finger-Hand Movement (near blindness) at ½ meter, 13 (14%) with 1/60-5.5/60 (severe to profound visual loss), 15 (16.13%) with 6/30-6/15 (mild to moderate visual loss) and 9 (9.7%) with ≥6/12(minimal visual loss).

This corresponds to Soliman[15] findings i.e. presenting VA in 80% cases was less than 1/60 in 8% was between 1/60 to 6/60 (moderate) and in 15% was good in our study visual acuity on leaving the hospital, 49 (62.65%) eyes had VA of 1/60 (VA of 14cases (15.05%) was No Perception of Light and in 35 (37.63%) was Counting Finger at 1/2 meter)[1], in 18 (19.35%) was 1/60-5.5/60, in 16(17.20%) was 6/30-6/18 and 10(10.75%) was =or> 6/12. In Solimon's study[15] VA on leaving the hospital was as follows: 77.1% had <1/60, 3.9% had between 1/60-6/60 and 19% had 6/36. The comparison of this study and Solimon's study showed that poor initial VA correlates with poor final VA outcome.

The management of a patient's expectations in regard to their visual prognosis following severe OT is highly important. After sustaining a serious OT, the first question patients ask is whether they will lose some or all of their vision. Record of presenting initial VA and zone of OT is the answer.

Ocular trauma is a major cause of preventable monocular vision impairment throughout the world. So provision of full facial guards at places of work, at playground, wearing of seat belts during driving, obeying of traffic's rules and supervision of children during play can prevent eye injuries, the morbidity and economic losses associated with OT. Public awareness programs regarding prevention of OT should be launched through newspapers, radio, and T.V. and school health services.

CONCLUSION

Ocular trauma is a major public health problem. Majority of cases were male under the age of 30 years. Open globe injuries are more frequent. Occupational, play & sports and road traffic accidents are the major causes. Presenting initial visual acuity has its prognostic value in final visual outcome and an aid in counseling, treatment of eye injury patients and ablity to direct attention towards resource needs and rehabilitation during the treatment process, may bring better outcome.

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Events

Conference Theme "Millennium Development Goals and the Role of Infectious Diseases"
Organized by: Infectious Diseases Group, Pakistan Paediatric Association
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8th Asia Pacific Medical Education Conference (APMEC)
http://medicine.nus.edu.sg/meu/apmec8/
<Extension of Early Bird Registration>
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Early Bird Registration Deadline: 30th November 2010
Organised by:
Medical Education Unit (MEU)
NUS Yong Loo Lin School of Medicine
National University Health System
For enquiries:
apmec@nuhs.edu.sg

3rd Middle East Cardiovascular Conference
At this year's **Arab Health Congress,** is running the **3rd Middle East Cardiovascular Conference.** This conference is designed to provide cardiologists with in-depth information on the latest therapeutic techniques and management options for various cardiovascular diseases.
Would you like to share your expertise and experience with other like minded professionals?
We are looking for presentations for the following conference sessions (but don't let this limit your imagination):
Prevention of cardiovascular disease
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Vascular disease management
Valve disease - aortic valve
Valve disease - mitral valve
Heart failure
Management of arrhythmias
Challenging issues in cardiovascular disease
Submitters will be contacted individually by 15 September 2010 about their submissions (only if accepted).
The Middle East Cardiovascular Conference is accredited by the Cleveland Clinic Foundation Center for Continuing Education Speakers do receive FREE registration for the length of their applicable conference.
For consideration, please e-mail me, Mariam Oudah at mariam.oudah@iirme.com with the following information by
31 August 2010:
Kind regards,
Mariam Oudah
Conference Producer

10th Asia Pacific Congress of Endoscopic and Laparoscopic Surgery 2011
Congress Secretariat & Housing Bureau
c/o Ace:Daytons Direct (International) Pte Ltd
2 Leng Kee Road #04-01 Thye Hong Centre Singapore 159086
Tel:+65 6379 5261 (admin) Fax: +65 6475 2077
Email: admin@elsa2011singapore.com This e-mail address is being protected from spambots. You need JavaScript enabled to view it
www.elsa2011singapore.com

19th International Congress of the European Association for Endoscopic Surgery (EAES) in collaboration with and incorporating the 15th National Congress of the Italian Society of
Endoscopic Surgery (SICE)
15-18 June 2011
Torino, Italy
Address Luchthavenweg 81005, 5657 EA Eindhoven, The Netherlands, Tel:+31 40 252 52 88,
Fax:+31 40 252 31 02,
E-mail: info@eaes.eu
http://www.eaes-eur.org/Navigation/Events/EAES-2011-Congress.aspx

DENTISTRY:
TITLE: 68th MDA/FDI World Dental Federation Congress
PLACE: KLCC Kuala Lumpur.
DATES: June 10 to 12, 2011
DETAILS: www.mda.org.my

TITLE: FDI Annual World Dental Congress – New Horizons in Oral Health Care
PLACE: Mexico City
DATES: September 14 & 17, 2011
DETAILS: http://www.fdicongress.org/

Events

PAEDIATRIC SURGERY:
TITLE: 12TH European Congress of Paediatric Surgery
PLACE: Barcelona
DATES: June 15 to 18, 2011
DETAILS: www.eupsa.org

TITLE: 2nd EUPSA-BAPS Joint Congress
PLACE: Rome - Italy
DATES: June 13 to 16, 2012
DETAILS: www.eupsa.org

TITLE: VEGAS COSMETIC SURGERY - 2011
PLACE: UK
DATES: June 27 to July 22, 2011
DETAILS: www.crgh.co.uk; ivfmatters@gmail.com

TITLE: Intensive course aimed at Gynaecologists and Obs & Gyn
PLACE: Bellagio – Los Vegas
DATES: June 22 to 26, 2011
DETAILS: www.vegascosmeticsurgery2011.com

TITLE: Sri Lankan Association of Paediatric Surgeons (SLAPS), the 2011 annual scientific sessions of the Federation of Association of Paediatric Surgery of SAARC countries (FAPSS).
PLACE: Sri Lanka
DATES: August 24 to 27, 2011
DETAILS: lamahewa@sltnet.lk

ORTHOPAEDICS:
TITLE: eCM XII 2011
PLACE: Davos, Switzerland
DATES: June 22nd to 24th 2011
DETAILS: http://www.ecmjournal.org/ecm_meetings/ecm_12/index.shtml

NEUROSURGERY:
TITLE: The 2011 Annual Conference for the Society for
Progress & Innovation In the Near East (S.P.I.N.E.)
PLACE: Beirut, Lebanon
DATES: June 22 to 25, 2011
Email: Michela.Capobianco@neareastspine.org

TITLE: 14th INTERIM MEETING OF THE WORLD FEDERATION OF NEUROSURGICAL SOCIETIES & 15TH CONGRESS OF CONTINUOUS EDUCATION OF THE BRAZILIAN SOCIETY OF NEUROSURGERY
PLACE: Brazil
DATES: September 14 to 17, 2011
DETAILS: http://xa.yimg.com/kq/groups/1979466/1874998235/name/folder_eletronico_ingles.pdf

TITLE: Endoscopy skull base course
PLACE: *Paris*
DATES: June 28-29, 2011
DETAILS: http://xa.yimg.com/kq/groups/1979466/770779156/name/7583%20BAXTER%20Programme%20SBESC%20A5%20150311.pdf

TITLE: National Conference of Neurosurgery
PLACE: Abbottabad
DATES: October 7 to 9, 2011
DETAILS:

TITLE: 14th EUROPEAN CONGRESS OF NEUROSURGERY
PLACE: Rome
DATES: October 9 to 14, 2011
DETAILS: http://www2.kenes.com/eans/Pages/Home.aspx

PAEDIATRICS:
TITLE: 5th. EUROPAEDIATRICS
PLACE: Vienna
DATES: June 23 to 26, 2011
DETAILS: http://www.epa-unepsa.org/

PSYCHIATRY:
TITLE: Association for Rational Emotive Behaviour Therapy (REBT) Annual Conference and masterclasses.
PLACE: London, UK
DATES: June 28-29, 2011
DETAILS: http://bit.ly/hYfyFN

ENT:
TITLE: NAPST 2011 SLEEP CONFERENCE
PLACE: Kuala Lumpur
DATES: July 2 – 3, 2011
DETAILS: www.napst.wordpress.com; dan@sleep-asia.com

TITLE: E-Boss 2011 International Workshop on Endoscopic Endonasal Base of Skull Surgery and Sialendoscopy
PLACE: India
DATES: August 19 to 21, 2011
DETAILS: honeypriya193@yahoo.com; pat@academiceventmanagement.com

TITLE: 2011 Annual Meeting & OTO EXPO of the AAO-HNSF
PLACE: San Francisco, California,
DATES: September 11 & 14, 2011
DETAILS: http://www.entnet.org/annual_meeting/callPapers2011.cfm

Events

ANAESTHESIA:
TITLE: 9th Congress of SAARCAA
PLACE: Banglore - India
DATES: August 25 to 28, 2011
DETAILS: http://saarcanaesthesiacongress.in/index.php

EDUCATION:
TITLE: AMEE 2011
PLACE: Vienna
DATES: August 27 to 31, 2011
DETAILS: www.amee.org; amee@dundee.ac.uk

UROLOGY:
TITLE: 1st. Meeting of European Association of Urology Section of Urolithiasis (EULIS)
PLACE: London
DATES: September 7 to 10, 2011
DETAILS: http://eulis2011.uroweb.org/home

TITLE: SIU 2011 BERLIN
PLACE: ICC - Berlin.
DATES: October 16 – 20, 2011
DETAILS: www.siucongress.org

SURGERY:
TITLE: 1st. WORLD CONGRESS ON SURGICAL TRAINING
PLACE: Gothenburg - Sweden
DATES: September 8 & 9, 2011
DETAILS: http://www.surgicon.org/index.htm

GENERAL SURGERY:
TITLE: 6th ANNUAL SURGICAL WEEK FOR CO-LORECTAL DISEASES
PLACE: Karachi - JPMC
DATES: October 3 to 6, 2011
DETAILS: Email: drshamim_qureshi@yahoo.com

PAEDIATRIC SURGERY:
TITLE: 52 ANNUAL MEETING OF THE EURO-PEAN SOCIETY FOR PAEDIATRIC RESEARCH
PLACE: Newcastle – U.K.
DATES: October 14 – 17, 2011
DETAILS: Email: espr2011@kenes.com; https://www.kenes.com/mailing/espr2011/

WORLD CONGRESS:
TITLE: 37th World Hospital Congress - 'Healthcare in a Changing World: Overcoming the Challenges'.
PLACE: U.A.E. - Dubai
DATES: November 8 to 10, 2011
DETAILS: www.ihfdubai.ae

CONGRESS:
TITLE: Sepsis Congress
PLACE: New Delhi - India
DATES: November 12 and 13, 2011
DETAILS: www.apcc-india.com

ONCOLOGY CONFERENCE:
TITLE: 10th Shaukat Khanum Memorial Cancer Symposium
PLACE: Lahore - Pakistan
DATES: November 18 to 20, 2011
DETAILS: symposium@skm.org.pk; www.shaukatkhanum.org.pk

SURGICAL CONFERENCE:
TITLE: SURGICON 2011
PLACE: Karachi - Pakistan
DATES: November 21 to 24, 2011 workshop
November 25 to 27, 2011 conference
DETAILS:

DENTISTRY – ORTHODONTICS:
TITLE: 10th ARAB ORTHODONTIC CONGRESS 2011
PLACE: Dubai - UAE
DATES: November 24 to 25, 2011
DETAILS: Email: evt.orthodontics2011@mci-group.com

EDUCATION:
TITLE: 15th Ottawa Conference on the Assess-ment of Competence in Medicine and the Healthcare Professions
PLACE: Kuala Lumpur – Malaysia
DATES: March 9 - 13, 2012
DETAILS: Email: amee@dundee.ac.uk

CARDIOLOGY:
TITLE: WORLD CONGRESS OF CARDIOLOGY (WCC-2012)
PLACE: Dubai - UAE
DATES: April 18 to 21, 2012
DETAILS: www.worldcardiocongress.org

TITLE: WORLD CONGRESS OF CARDIOLOGY (WCC-2012)
PLACE: Dubai - UAE
DATES: April 18 to 21, 2012
DETAILS: www.worldcardiocongress.org