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Research Article

**FREQUENCY AND OUTCOME OF DYSLIPIDEMIA IN DIABETIC FOOT
PATIENTS WITH TYPE-II DIABETES MELLITUS****Dr. Huma Memon^{1*}, Dr. Abdul Ghani Rahimoon² and Dr. Akbar Yousafani³**¹MBBS, MD (General Medicine), Liaquat University of Medical & Health Sciences, Jamshoro.²MBBS, FCPS (General Medicine), Assistant professor, Liaquat University of Medical & Health Sciences Jamshoro³MBBS, MD (General Medicine), Assistant professor, Liaquat University of Medical & Health Sciences Jamshoro**Abstract:**

Objective: The objective of this study was to determine the frequency and outcome of dyslipidemia in diabetic foot patients with type-2 diabetes mellitus

Material & Methods: This descriptive case series study was carried out in the department of Medicine, Liaquat University Hospital and Jamshoro/Hyderabad, From January 2010 to July 2010. Total 196 patients were included in the study with age range ≥ 40 years, known/diagnosed cases of diabetes mellitus (type 2), patients with clinical and radiographic diagnosis of diabetic foot; either gender or having abnormal lipid profile were included. Patients of known or newly diagnosed cases of type 2 diabetes mellitus (DM) admitted with history of wound in lower limbs, confirmed on physical examination, measuring Ankle to Brachial Pressure Index (ABI) and Doppler ultrasound examination were evaluated for grading of ulcer using Wagner's classification. Patients fulfilling the inclusion criteria were worked up for the dyslipidemia by sending blood sample for fasting lipid profile. The data was collected on pre-designed Performa.

Results: Mean age was found 55.2+4.8 years. Male were found in the majority 65.3%. According to the presenting features in the skin redness was found most common 71.42%, pain during walking found in 57.14% cases, as well as weak pulse was noted in 43.88% of the cases. Majority of the cases were found with abnormal lipid profile 55.11%. Dyslipidemia were found with significant difference in gangrenous diabetic foot as well as grade IV and grade V of Wagner's classification p value 0.001. Mortality was not found because gangrenous diabetic foots was referred to orthopaedic department for imputation.

Conclusion: We concluded that dyslipidemia was 55.11% and it has an important role in development of severity of diabetic foot. Diabetic patients should performed lipid profile for early check of dyslipidemia to reduce the morbidity and mortality.

Key words: Diabetes mellitus, dyslipidemia, diabetic foot

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INTRODUCTION:

Diabetes in adult is associated with a high risk of vascular diseases (2 to 4 fold greater than that of individuals without diabetes [1]. It has been projected that, by 2010, the global diabetic population will be double, compared to that of 1994 (from 110 million to 221 million) [2].

Dyslipidemia is an abnormal amount of Lipid (e.g. cholesterol or fat) in the blood. In developed countries, most dyslipidemias are hyperlipidemias; that is an elevation of lipids in the blood, often due to diet and life style. The prolonged elevation of insulin levels can lead to dyslipidemia and both elevated levels of low density lipoprotein (LDL) cholesterol and low levels of high density level (HDL) cholesterol predispose to premature atherosclerosis which leads to develop peripheral artery disease (PAD) in lower limb causing ulceration ischemia and gangrene of foot [3].

Diabetic dyslipidemia has already been well discussed [1,4]. The lipoprotein abnormalities commonly present in type 2 diabetes, include hypertriglyceridemia and reduced plasma HDL cholesterol. In addition, low density lipoprotein (LDL) are converted to smaller, perhaps more atherogenic, lipoproteins termed small dense LDL. In contrast to type 1 diabetes, this phenotype is not usually fully corrected with glycemic control [3]. Dyslipidemia increase the risk of atherosclerosis in patients with diabetes. It has been reported that patients with (PAD) diabetes experience worse lower extremity function that do those with (PAD) alone [5]. Most common outcome of peripheral artery disease rarely leads to foot ulceration directly. However once ulcerations develop, arterial insufficiency will result in prolonged healing and imparts an elevated risk of amputation [6]. Attempts to resolve any infection will be impaired due to lack of oxygenation and difficulty in delivering antibiotics to the site of infection. Early recognition and aggressive treatment of lower extremity ischemia in diabetes mellitus is therefore vital to lower limb salvage [7]. So one of the commonest outcome of dyslipidemia and PAD lead to non-traumatic lower extremity amputation in United States and whole world separately developing complication. Foot ulcers and infections are major source of morbidity in individual with DM. Approximately 15% of individuals with DM develop foot ulcers (great toe or Metatarso-phalangeal (MTP) areas are most common), and significant subset will ultimately undergo amputation (14-24 with that ulcer or subsequent ulceration) [8].

Other outcome is infections of wound and ischemia of foot and gangrene of foot. The reason for the increased incidence of these disorders in DM involves the interaction of several pathognomic factors, abnormal foot biomechanics, peripheral artery disease (PAD) and poor wound healing. It is thus associated with devastation to patients and their families, both emotionally and economically [9].

The outcome of diabetic foot ulceration is closely related to the severity of disease at presentation. Common risk factors for amputation following ulceration include the presence of peripheral vascular disease, severity of neuropathy, structural foot deformity and concomitant infection [10]. The present study was conducted at Liaquat University Hospital Hyderabad/Jamshoro. The study was concerned with disturbance of lipid profile in patient with type-2 diabetes mellitus. Early reorganization and control of blood sugar can prevent the patient to develop life threatening complications including diabetic foot and amputation, gangrene, ischemia of foot and infection (Sepsis).

MATERIAL AND METHODS:

This descriptive case series was carried out in the department of Medicine, Liaquat University Hospital, and Jamshoro/Hyderabad. From January 2010 to July 2010. Patients of known or newly diagnosed cases of type 2 diabetes mellitus (DM) admitted with history of wound in lower limbs, confirmed on physical examination, measuring Ankle to Brachial Pressure Index (ABI) and Doppler ultrasound examination were evaluated for grading of ulcer using Wagner's classification. All the cases with age range ≥ 40 years, diagnosed cases of diabetes mellitus (type 2), patients with clinical and radiographic diagnosis of diabetic foot, either Gender, patients who agree and ready to give consent for participation in the study, patients having abnormal lipid profile and already one amputated foot presented with other diabetic foot were included. All the cases already on lipid lowering therapy, clinical/electrocardiographic evidence of coronary artery disease, and critically ill patients requiring intensive care treatment and pregnant diabetics were excluded. The patient's detailed history was taken and was asked for leg pain on walking for macro vascular, micro vascular, autonomic complications of diabetes and previous amputation. All the routine lab investigations along with lipid profile were sending to the research diagnostic laboratory of

liaquat University of medical and health science. Results of the lipid profile were assessed according severity of diabetic foot on the basis of the Wagner's classification. The data was collected on pre-designed Proforma. Data was evaluated in statistical program SPSS version 16.0.

RESULTS:

Total 196 patients were selected mean age was found 55.2+4.8 years. Male were found in the majority 65.3% as compare to female. **TABLE:1** According to the presenting features in the skin redness was found most common 71.42%, according to pain majority of the cases were found with pain during walking 57.14%, as well as weak pulse was noted in 43.88% of the cases. **TABLE:2**

Majority of the cases were found with abnormal lipid profile 55.11%, while 44.89% cases were found with normal lipid profile. **TABLE:3**

Outcome was assessed according to the Wagner's classification and majority of the patients were found with Grade I (superficial ulcer) 30.61%, following by **Grade III** (Deep ulcer with abscess), **Grade II** (ulcer extension), **Grade V** (extensive of gangrene foot) and **Grade IV** (gangrene of ore foot) were found with percentage of 21.42%, 19.39%, 12.25% and 16.33% respectively. Mortality was not found, it may because extensive gangrenous foot cases of grade V of this study were referred to orthopaedic department for amputation. **TABLE:4**

TABLE 1: GENDER DISTRIBUTION OF THE PATIENTS WITH DYSLIPIDEMIA (n = 196)

Gender	Frequency	Percentage
Male	128	65.3%
Female	68	34.7%
Total	196	100%

Mean +SD = 55.2+4.8 years Range of age was between 40-80 years.

TABLE 2: PRESENTING FEATURES OF DIABETIC FOOT (n = 196)

Gender	Frequency	Percentage
SKIN		
Red	140	71.42%
Pallor	70	41.41%
Blue	40	20.40%
Cold/hot	110	56.12%
PAIN		
During rest	55	28.07%
During walk	112	57.14%
No pain	29	14.79%
PULSE	90	45.92%
Present	20	10.20%
Absent	86	43.88%
Weak		

TABLE 3: FREQUENCY OF DYSLIPIDEMIA (n = 196)

Lipid profile	Frequency	Percentage
Dyslipidemia	108	55.11%
Normolipidemia	88	44.89%

TABLE 4: DIABETIC FOOT PATIENTS OUTCOME ACCORDING WAGNER'S GRADE (n = 196)

Lipid profile	Frequency	%
Grade I (superficial ulcer)	60	30.61%
Grade II (ulcer extension)	38	19.39%
Grade III (Deep ulcer with abscess)	42	21.42%
Grade IV (gangrene of ore foot)	32	16.33%
Grade V (extensive of gangrene foot)	24	12.25%
Total	196	100%

DISCUSSION:

Diabetes mellitus increases the risk for atherosclerotic vascular disease. The risk is greatest in people who have other known risk factors, such as, dyslipidemia, hypertension, smoking and obesity. Patients with diabetes are at risk of developing multiple complications making their feet vulnerable to damage. This includes triad of neuropathy, ischemia and infection which interact to cause tissue damage which leads to amputation if neglected [11].

Mean age in this series was found as mean±SD 55.2±4.8 years, This is similar to most studies which have shown diabetic foot to be a problem of the middle aged and the elderly [12,13] Moreover male were found in the majority 65.3% with diabetic foot as compare to female 34.7%. Similarly Shah SF et al [14] reported that males were more affected than females (1.12:1).

In this study cases were found with abnormal lipid profile 55.11%. In an African study, 45% of the patients had their lipid profile assessed at least once in a year with only 13% on lipid lowering therapy [15]. In the Diabcare Nigeria study, 48% of the patients were screened for dyslipidemia with low high density lipoprotein cholesterol and hypertriglyceridemia being the most prevalent lipid abnormalities [16]. Similarly, a low frequency of screening for dyslipidemia and use of lipid lowering drugs of 4.9% and 2.7% respectively was reported in one study done in Ethiopia [17]. However, in another study performed in Northern Ethiopia, no cases of hyperlipidemia were found among 105 adult diabetic patients [18]. As well as in this study dyslipidemia had found TG, TC, HDL-C, LDL-C, VLDL-C, Non HDL-C and TG/H with mean

SD as TG/H 165 ± 109 , 185 ± 32 , 39 ± 8 , 112 ± 30 , 33 ± 22 , 4.55 ± 3.51 and 145 ± 30 respectively.

Outcome, according to the Wagner's classification majority of the patients were found with Grade I (superficial ulcer) 30.61%. While gangrenous foot ulcers were found 16.33% and 12.25% as grade VI and V respectively. These findings are not very different from those reported by Doumi E. A et al [19] in Sudan who reported 74.1% having Wagner Grade >3. The results were also similar to those by Abbas et al in MNH [20]. In contrast, in the Seattle Diabetic Foot Study in the US, [21] most patients had Grade 1 and 2 Ulcers (66.4%). This reflects most of our patients present late, with advanced disease. It could also indicate better foot care and greater awareness on diabetic complications among patients in the developed world. As well as 12.25% extensive gangrenous foot cases of grade V of this study were referred to orthopaedic department for amputation. Abbas et al reported that 33% of patients in their study (i.e. 15.2%) underwent a major amputation [20]. Similarly, Muthuuri et al [22] and Bushra et al [19] reported amputation rates of 28% and 24.7% respectively. In the UK and the Netherlands, the amputation rates were found to be 15.5% and 16.0% respectively [23,24]. Therefore the amputation rate in this study was high. This could be due to the late presentation to hospital among our patients. In their study at MNH, Abbas et al [20] documented that the reported amputation rate was lower than it should be since most patient didn't give consent for amputation or requested discharge against medical advice. Mortality had not found in this study.

CONCLUSION:

We concluded that dyslipidemia was 55.11% and it has an important role in development of severity of diabetic foot. Diabetic patients should performed lipid profile for early check of dyslipidemia to reduce the morbidity and mortality.

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