

Original Article

A STUDY OF RISK FACTORS IN DIABETIC FOOT ULCER IN A TERTIARY CARE HOSPITAL AND STRATEGY OF PREVENTION.

Muhammad Imtiaz Rasool,¹ Hunza binte Ather,² Fakiha Wahla,² Madeeha Maqbool,² Majid Khushi²

ABSTRACT:

Objective: To identify common risk factors in diabetic patients who presented with foot ulceration and present a programme for their prevention.

Methodology: This is a hospital based descriptive study. This study was conducted in the department of surgery Unit – I from Jan, 2015 to July, 2017 at Akhtar Saeed Trust Hospital Lahore 150 consecutive patients with a diabetic foot ulcer (DFU) were included in the study. Various risk factors such as age; gender; peripheral arterial disease; peripheral neuropathy; duration, control and type of diabetes; smoking and education about foot care were noted. During their stay at hospital glycemic control was achieved and diabetic ulcer was treated.

Results: The majority of the patients were males with male to female ratio 3:1. The maximum number of patients were in the 6th decade (40%) followed by 5th decade (31%). All the patients except one were suffering from type 2 diabetes. Diabetic control was poor in 98% patients at the time of admission. 50% of the patients were suffering from diabetes for more than 10 years. 52% patients were smokers. Peripheral neuropathy was noted in 82% patients, whereas peripheral pulses were palpable in 82% patients. 56% patients presented in Wagner's grade 3 and 4 Diabetic ulcer. 15% patients ended up with amputation. 80% of the patients were not educated about foot care by the treating physician. 45% patients were not aware of foot care. Screening and education of high risk patients are recommended.

Conclusion: Males, smoking, peripheral neuropathy, long duration, poor control, type 2 diabetes and lack of knowledge about foot care are the main reasons for diabetic foot ulcer. Screening of high risk patients is recommended.

Key Words. Risk factors, Smoking, Type 2 diabetes

INTRODUCTION

Diabetes mellitus is one of the biggest health problems in the modern world. It is estimated that in 2012, 370 million people were suffering from diabetes and by the year 2030 it will affect over 552 million adult population.¹ In Pakistan prevalence of diabetes is reported to be 11%. Among this population incidence of foot ulceration is 10%.² This is a multisystem disease and can affect various organs. Among them foot ulceration is one of the most common complications.

The lesion varies from fissure, cellulitis, abscess to osteomyelitis and gangrene. The higher risk of lower limb amputation in patients with diabetes is noted in comparison with non diabetic patients.³ Foot ulcers and amputations in diabetic patients adversely affect the patient's financial status and the quality of life.

The objective of the study was to identify the risk factors in diabetic patients who presented with foot ulcerations and present a plan for screening and educating the patients.

METHODS

This descriptive study was conducted at the surgical department of Akhtar Saeed Trust Hospital, Lahore from Jan 2015 to- July 2017. All the diabetic patients who reported

¹Professor Surgery, Abwa Medical College, Faisalabad.

²Students AMDC, Lahore.

with foot ulcers were included in the study. History included age, gender, smoking, peripheral arterial disease, neuropathy, duration, control and type of diabetes. Neurological assessment was carried out by checking touch sensation and vibration sensations. Any deformity, dryness, absence of sweating and vascular status of the foot was assessed by noticing skin color changes, temperature difference and palpating pulses of femoral, popliteal, posterior tibial and dorsalispedis arteries. Foot ulcers were classified according to the Wagner's grade. Knowledge about foot care and shoes wear was recorded. The response was divided into 3 categories, poor, fair and good. Any instructions given to them regarding foot care by primary physicians during the management of diabetes was enquired. Baseline investigations were carried out including HBA1C. Radiographs of the feet were taken to rule out osteomyelitis. Pus was sent for culture and sensitivity. Appropriate wound management was done under suitable anesthesia. Glycemic control was achieved by appropriate medication.

RESULTS

150 patients were enrolled in this study. Out of these 112 (74.7%) patients were males and 38 (24.3%) were females. Male to female ratio is 3 to 1. The youngest patient was 30 years and the oldest was 85 years. The maximum number of patients were in the sixth decade (41%) followed by 5th decade (31%). (Table1) The average age was 52 years.

Table 1 Age group of the patients

Table 1. Age Group		
Age	No. of Patients	%Age
30 - 39	10	7
40 -49	47	31
50 – 59	61	41
60 – 69	26	17
70 – 79	4	3
> 80	2	1

Right foot was affected in 91 (62%) patients, left foot in 48 (32 %) patients while both feet were affected in 9 (6%) patients. All the patients except one were suffering from type II diabetes. Diabetic control was poor in 98% patients.

The duration of diabetes varied between less than 1 year to more than 20 years (Table 2) Minimum duration was 9 months and maximum duration was 25 years. 64 % patients were suffering from diabetes for more than 9 years followed by 17% for 5 years.

Table 2 Duration and treatment of illness

Treatment	No. of Patients	%Age
< 1 Year	27	18
> 1 – 5	24	16
6 - 9	24	16
10 – 15	30	20
16 – 20	24	16
> 20	21	14

78 (52 %) patients were smokers. 72 (48 %) patients were non smokers. All the patients except one were males. In 123 (82%) patient's peripheral pulses were either present or feebly palpable. In 27 (18%) patients they were not palpable. 123 (82%) patients were suffering from neuropathy with equal frequency in males and females. 15 % Patients underwent amputation. (Table 3)

Table 3 Type of Treatment.

Treatment	No. of Patients	%Age
Dressing	19	13
Debridement	105	70
Incision and drainage of abscess	4	3
Amputation	22	15

56 % patients fell in category iii and iv of Wagner ulcer classification (Table 4)

Table 4 Wegner's ulcer classification.

Sr. No.	Wagner's Classification	No. of Patient	%Age
1	Superficial Ulcer	34	23
2	Deeper, Full thickness extension of Ulcer	30	20
3	Deep abscess of osteomyelitis associated with Ulcer	60	40
4	Partial forefoot gangrene with ulcer	24	16
5	Extensive foot gangrene with ulcer	2	1

55% patients had poor knowledge of foot care. 25 % patients have fair knowledge while only 20% had good knowledge. The primary physicians examined and gave instructions in 20% patients only.

DISCUSSION

Our study reveals that males are more commonly affected than females. Male predominance has been reported in other studies also.^{4,5} Male preponderance is due to various reasons. The main reason is their outdoor activities as they are the earning members of the family. Therefore they are more exposed to trauma as compared to females. Tobacco smoking among males also increases the risk.^{6,7} In this study all the patients except one were suffering from type 2 diabetes with poor glycemic control. These two factors (Poor glycemic control in type 2 diabetes) increase the risk of DFU.⁸ Peripheral neuropathy and vasculopathy are known predisposing factors for diabetic foot ulcer.⁹ Absence of protective sensations such as touch and pain due to peripheral neuropathy was the reported in 82% patients in our series. The highest incidence is also reported in other series.^{10,11} Poor glycemic control increases the risk of neuropathy, especially during old age.^{12,13} Duration of disease has a direct impact on the incidence of peripheral neuropathy.¹⁴ The chances of

neuropathy are related to type. Gill et al has reported higher %age of peripheral neuropathy in Type II diabetes than type I diabetes.¹⁵ Associated autonomic neuropathy causes anhydrosis leading to dry skin, cracking and fissuring. It acts as a portal of entry for bacteria and invasion of deeper tissues.¹⁶ Motor neuropathy leads to atrophic changes in the foot musculature. It results in foot deformity and limited joint mobility.¹⁷ Vasculopathy especially in older age compromises blood supply.¹⁸ According to this study majority of the patients (76%) are equal or above the age of fifty years. The risk of peripheral arterial disease increases with age. It is twice as common in diabetes than in non diabetics.¹⁹ Peripheral pulses were palpable in 82% patients, but palpable pulsations is not a reliable sign for adequate blood supply. In diabetes, micro-vascular disease compromises local blood supply. Chandrashekar reported that repetitive low pressure trauma due to tight and ill fitting shoes during standing and walking results in local ischemia. The ulcers form on skin at bony prominences.²⁰ Another reason of high risk in older persons is their diminished ability for self care and foot examination. Poor vision in this age group also predisposes to injury. This study reveals that our patients have poor knowledge of foot care, however they are conscious about foot wear. This study also reveals that very few primary physicians inquire about any symptoms of foot disease and routinely examine the patient's feet. Therefore, many patients with neuropathy and vasculo-pathy remain undiagnosed in early stage. Due to delay in diagnosis these patients develop ulcer which otherwise would have been avoided. An opportunity to educate and early diagnosis is lost and many patients end up with ulcers and amputation. In this series 15% patients underwent amputation. This catastrophe can only be avoided by screening of individuals at high risk at least once a year.²¹ On every visit the doctor should rule out distal neuropathy. He should examine the feet for

decreased blood supply by palpating posterior tibial and dorsalis pedis pulses and look for skin changes. They should be educated and trained to protect their feet against adverse effects of pressure, friction or shear²² Moreover, these patients can be advised special footwear to reduce the chances of ulcer formation.²³⁻²⁵

CONCLUSION

Poor glycemic control, neuropathy, prolonged duration of disease, type 2 diabetes, cigarette smoking, older age and male gender are important risk factors. Health providers should not only manage the diabetes, but also screen, educate and train the patients about foot care. Many patients will continue to suffer from foot ulcers due to lack of screening and education programme.

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