Original Article

A Study of Risk Factors of Diabetic Foot Ulcers

Risk Factors of Diabetic Foot

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ABSTRACT

Objectives: To determine the risk factors associated with development of diabetic foot ulcers
Study Design: Descriptive / cross-sectional
Place and Duration of Study: This study was conducted at the Department of Internal Medicine, Services Hospital, Lahore from 1st January 2017 to 31st July 2017.
Materials and Methods: One hundred and fifty diabetics aged between 20-75 years presenting to surgical OPD / emergency with diabetic foot ulcers were enrolled. Patients with comorbidities like congestive cardiac failure, chronic renal failure and chronic liver disease were excluded from the study. The complete history was taken regarding duration of diabetes and its management. A detailed general physical examination was performed in each case along with sensory examination and ABI testing using Doppler ultrasound. Blood sample was sent for HbA1c to check for glycemic control. Ulcer debris was sent for culture and sensitivity.
Results: There were 90 males and 60 females. Peripheral neuropathy was present in 53.3% patients, 64% had absent or diminished peripheral pulses, 46.7% had poor glycemic control. Underlying infection was seen in upto 90% of the patients. Footwear trauma was present in 40% of the cases. Thirty (20%) of the patients had to undergo amputation eventually while rest were managed conservatively.
Conclusion: Prolonged diabetes, presence of underlying infection, peripheral vascular disease and peripheral neuropathy are the major risk factors responsible for development of diabetic foot ulcer. There is a dire need to educate diabetic regarding strict glycemic control and meticulous foot care.

Key Words: Diabetes mellitus, Diabetic foot ulcer, Amputation

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INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic illness which can lead to multiple complications in the long run.[1,2] Diabetic foot ulcer is one of the common complications associated with long running poorly controlled DM.[3] It is associated with severely impaired health related quality of life (HRQOL) in both physical and mental health domains.[4] A recent meta-analysis by Zhang et al[5] reported a global prevalence of 6.3% for diabetic foot ulcer. This proportion is much higher in Pakistan. In fact, a recent local study by Khan et al[6] estimated an overall prevalence of 13.9%.

Diabetic foot ulcer presents a major public health challenge.[7] WHO has ranked Pakistan 7th on diabetes prevalence list.[8] Due to lack of awareness regarding diabetes self management techniques, people are at increased risk of developing various complications. Diabetic foot is particularly challenging as its management frequently involves amputation thus limiting the limb functionality.

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Once the gangrene sets in, there is no viable alternative other than to amputate the limb.[9] It has been estimated that diabetic foot is responsible for upto 40,000 amputations yearly in Pakistan.[10]

There are various risk factors associated with an increased risk of developing diabetic foot ulcers. These include diabetes present for more than 10 years, male sex, presence of associated microvascular complications, peripheral neuropathy, peripheral vascular disease and local bone deformity or trauma.[11] It is important to be able to recognize these risk factors early on in the disease so as to limit and delay the complications. A recent local study by Jan et al[12] reported poor glycemic control (HbA1c >8%), peripheral neuropathy and peripheral vascular disease in 65.3%, 40% and 53.3% of the patients respectively. Accidental or footwear trauma was also present as a risk factor in upto 44% of the patient.

These risk factors can be controlled by proper health education of the patients regarding the illness. In addition, there is a dire need to educate the diabetics regarding foot care. In fact a recent survey by Ali et al[13] reported that only 36.7% of doctors told their patients regarding diabetic foot care. A rigorous approach at primary healthcare level is needed to educate the public. Therefore, we decided to conduct this study with the principal aim of elucidating the risk factors associated with development of diabetic foot ulcers.

MATERIALS AND METHODS

This descriptive cross sectional study was carried out from 1st January 2017 to 31st July 2017 at Department of Internal Medicine, Services Hospital, Lahore. One hundred and fifty diabetic patients were included. Consequently, diabetics aged between 20-75 years presenting to surgical OPD / emergency with diabetic foot ulcers were enrolled in the study. Non probability consecutive sampling technique was employed. Patients with comorbidities like congestive cardiac failure, chronic renal failure and chronic liver disease were excluded from the study. A complete history was taken regarding duration of diabetes and its management. A detailed general physical examination was performed in each case along with sensory examination and ABI testing using Doppler ultrasound. Blood sample was sent for HbA1c to check for glycemic control. Ulcer debris was sent for culture and sensitivity. The data was entered and analyzed through SPSS-20.

RESULTS

Out of 150 patients, 90 (60%) were males and 60 (40%) were females. Right foot only was involved in 96 (64%) patients, left foot only was involved in 48 (32%) patients, and both feet were involved in just 6 (4%) patients. (Table 1). Mean age of the patients was 55.35±7.12 years. The mean duration of diabetes mellitus was 12.3±3.2 years with upto 96% of the patients having type II diabetes. Mean HbA1c was 9.1±2.9 % (Table 2). No treatment had been received by half of the patients while 40% were on oral anti-diabetics and the remaining 10% patients were on insulin.

Table No.1: Demographic information of the patients

Variable	No.	%
Gender		
Male	90	60.0
Female	60	40.0
Involvement of foot		
Right foot	96	64.0
Left foot	48	32.0
Both feet	6	4.0

Table No.2: Baseline characteristics of the patients

Variable	Mean±SD
Age (years)	55.35±7.12
Duration of diabetes (years)	12.3 ± 3.2
HbA1c	9.1±2.9

Peripheral neuropathy was present in 53.3% patients, 64% had absent or diminished peripheral pulses, 46.7% had poor glycemic control. Underlying infection was seen in upto 90% of the patients; staphylococcus aureus being the most commonly isolated organism. Osteomyelitis was seen in 43.3% patients. Footwear trauma was present in 40% of the cases (Table 3). Thirty (20%) of the patients had to undergo amputation eventually while rest were managed conservatively.

Table No.3: Risk factors for diabetic foot ulcer

Risk factor	No.	%
Poor glycemic control	70	46.7
Peripheral neuropathy	80	53.3
Peripheral vascular disease	97	64.7
Prolong diabetes (>5 years)	140	93.3
Accidental/Footwear trauma	60	40.0
Underlying infection on C/S	135	90.0
Osteomyelitis	65	43.3

DISCUSSION

Diabetic foot ulcer is routinely seen on the surgical floor. Elderly patients are a common victim and the associated morbidity is high amongst them. What is alarming regarding diabetic foot is the fact that its management may require amputation of the affected limb. The number of diabetics is on the rise and poses a serious public health concern. Creating awareness regarding foot care amongst diabetics is of utmost significance.

We conducted this study with aim of elucidating the risk factors associated with development of diabetic foot ulcers. Our study identified prolonged diabetes i.e. diabetes >5 years duration and underlying infection to be commonest prevailing risk factors present in upto 93.3% and 90% of the patients respectively. This was consistent with the findings of Ahmad et al.[7] We reported a mean age of 55.35±7.12 years. The average duration of disease was 12.3±3.2 years. This was in line with the result of Ahmad et al[11] and Jan et al[12] who reported a mean duration of 11.4 years and 11 years respectively. A longer duration is associated with increased risk of developing diabetic foot ulcers. In our study, peripheral vascular disease and peripheral neuropathy was present in 64% and 53.3% of the patients respectively. This was in line with findings of Ahmad et al[11] who reported prevalence of 62.8% and 51% respectively. Our study identified footwear trauma as risk factor present in upto 40% of the patients. This was consistent with results of Jan et al[12] who reported that 44% of the patients showed evidence of footwear trauma. The amputation rate following diabetic foot ulcers is quite high. Ahmad et al[11] reported an amputation rate of 20.9% amongst patients with diabetic foot ulcer. This was in line with our results as we observed an amputation rate of 20%. However Rashid et al[14] reported a much higher amputation rate of a staggering 35.8%.

There is a need to initiate a countrywide health education campaign detailing the patients on the particulars of diabetes and how to ensure strict glycemic control. Only then we can hope of tackling this huge public health challenge.

CONCLUSION

Prolonged diabetes, presence of underlying infection, peripheral vascular disease and peripheral neuropathy are the major risk factors responsible for development of diabetic foot ulcer. There is a dire need to educate diabetic regarding strict glycemic control and meticulous foot care.

Author's Contribution:

Concept & Design of Study:	Anam Shafi
Drafting:	Maaz-Ul-Hassan
Data Analysis:	Sidra Tufail
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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