

# Assessment of Risk Factors for Patients Suffering from Diabetic Foot Ulcer

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## ABSTRACT

**Introduction:** PN and PVD are the main causes of non-traumatic lower limb amputation. The risk of ulceration and amputation among diabetic patients increases by two to four folds with the progression of age and duration of diabetes regardless of the type of diabetes. It has also been proven by many longitudinal epidemiological studies that among diabetic patients, the life time foot ulcer risk is about 25%, thereby accounting for two thirds of all non-traumatic amputations. Clinical guidelines recommend that all patients with diabetes should be screened annually to establish their risk of foot ulceration. Study aimed to assess the risk factors for patients suffering diabetic foot ulcer.

**Material and methods:** The present study was conducted in the Department of General Surgery of our Medical college. For the study, 100 patients admitted to the surgical ward with diagnosis of diabetic foot were selected. History of diabetic status of patient, whether patient was a undetected case or a known diabetic, if known the duration of the disease, whether patient was on regular or irregular treatment (diet/oral/drugs/insulin) was recorded. Lab tests of each patient were conducted for hemoglobin, TLC, DLC, ESR, blood uream, serum creatinine and blood sugar. All the cases were managed following conservative and surgical approach.

**Results:** A total of 100 subjects were present in the study group. The mean age of the subjects was  $49.28 \pm 6.88$  years. Out of 100 patients, 23 were females and 77 were males. We observed that 27 patients were undetected at the time of admission at hospital. Majority of patients (n=46) had duration of diabetes from 5-10 years. 19 patients had duration of diabetes less than 4 years, 5 patients had duration of diabetes from 11-15 years. Most of the patients present with more than one lesion. Only major lesion is considered here. Ulcer was the major lesion seen in present series being present in 72 patients.

**Conclusion:** Within the limitations of present study, we conclude that Routine foot care should be available to every patient with diabetes ideally, but the reality of most healthcare facilities in India lack resources resulting in the absence of such care.

**Keywords:** Diabetes, Diabetic Ulcer, Amputation, Foot Ulcer

## INTRODUCTION

Few of the well-known complications of diabetes are Peripheral neuropathy (PN) and peripheral vascular disease (PVD).<sup>1</sup> Patients with PN and PVVD lack the conventional symptoms, but are still considered to be at high risk for occurrence of foot complications.<sup>2-4</sup> PN and PVD are the main causes of non-traumatic lower limb amputation.<sup>5</sup> The risk of ulceration and amputation among diabetic patients increases by two to four folds with the progression of age

and duration of diabetes regardless of the type of diabetes.<sup>6</sup> It has also been proven by many longitudinal epidemiological studies that among diabetic patients, the life time foot ulcer risk is about 25%,<sup>7,8</sup> thereby accounting for two thirds of all non-traumatic amputations. Clinical guidelines recommend that all patients with diabetes should be screened annually to establish their risk of foot ulceration.<sup>8</sup> Diagnostic tests and physical signs that detect peripheral neuropathy (biothesiometry, monofilaments and absent ankle reflexes), and those that detect excessive plantar pressure (peak plantar pressure and joint deformity) were all significantly associated with future diabetic foot ulceration.<sup>9,10</sup> Hence the present study was planned to assess the risk factors for patients suffering diabetic foot ulcer.

## MATERIAL AND METHODS

The present study was conducted in the Department of General Surgery of Sree Narayana institute of medical sciences, Chalakka, Ernakulam. The Period of study was from August 2014 - Feb 2015. The ethical clearance for the protocol of study was obtained from the ethical committee of the institute. For the study we selected 100 patients admitted to the surgical ward with diagnosis of diabetic foot. The diagnosis was confirmed by detailed history and clinical examination. An informed written consent was obtained from each patient after explaining to them the procedure of the study. History of diabetic status of patient, whether patient was a undetected case or a known diabetic, if known the duration of the disease, whether patient was on regular or irregular treatment (diet/oral/drugs/insulin) was recorded. Lab tests of each patient were conducted for hemoglobin, TLC, DLC, ESR, blood uream, serum creatinine and blood sugar. Whenever vascular insufficiency was detected in lower limbs, serum cholesterol ECG and Doppler was done. In all the diabetic foot patient's pus was sent for culture and sensitivity examination before starting antibiotics. All the cases were managed following conservative and surgical approach. Antibiotics and analgesics were prescribed for

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infection and inflammation.

## STATISTICAL ANALYSIS

The statistical analysis of the data was done using SPSS software for windows. The significance of the data was checked using Chi-square test and Student's t-test. A p-value < 0.05 was predetermined to be statistical significant.

## RESULTS

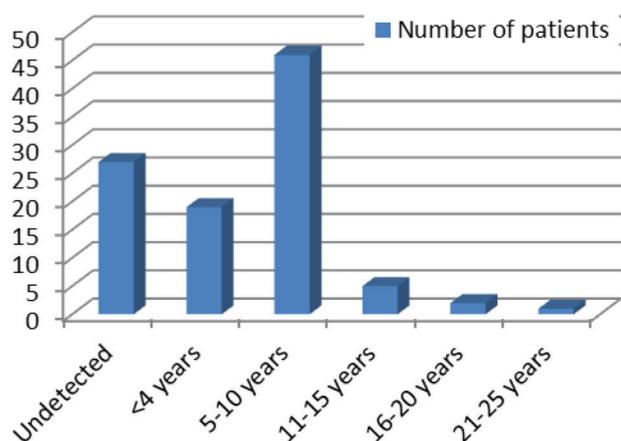
A total of 100 subjects were present in the study group. The mean of the subjects was  $49.28 \pm 6.88$  years. Out of 100 patients, 23 were females and 77 were males. Table 1 shows the frequency of patients with different duration of diabetes. We observed that 27 patients were undetected at the time of admission at hospital. Majority of patients (n=46) had duration of diabetes from 5-10 years. 19 patients had duration of diabetes less than 4 years, 5 patients had duration of diabetes from 11-15 years. Only 1 patient in the group had duration of diabetes from 21-25 years [Fig 1]. Table 2 shows the incidence of different type of lesions in study group. The different types of lesions included cellulitis, abscess, ulcer and gangrene. Most of the patients present with more than one lesion. Only major lesion is considered here. Ulcer was the major lesion seen in present series being present in 72

Duration of diabetes	Number of patients
Undetected	27
<4 years	19
5-10 years	46
11-15 years	5
16-20 years	2
21-25 years	1
Total	100

**Table-1:** Frequency of patients with different duration of diabetes

Type of lesion on foot	No. of cases
Gangrene	29
Cellulitis	47
Abscess	16
Ulcer	72

**Table-2:** Incidence of different type of lesions in study group



**Figure-1:** Incidence of different type of lesions in study group

patients. While abscess seen in 16 patients, was the least common lesion.

## DISCUSSION

Diabetic mellitus has reached epidemic properties worldwide as we enter the new millennium. The world health organization has commented there is "an apparent epidemic over the next decade the projected number will exceed 200 million. Diabetic foot is a serious complication of diabetes mellitus when compared with people without diabetes. Foot ulcers are significant complications of diabetes mellitus and often precede lower extremity amputation. Recurrence of the foot infection was common among India diabetic patients about 52%.<sup>6</sup> Infection and gangrene of the lower extremities are the most common lesions requiring hospitalization in diabetes and are a major cause of morbidity.<sup>4</sup>

In the present study we observed that diabetic foot ulcer was most common in the patients having diabetes since 8-10 years. Also, the diabetic foot ulcer was most common lesion observed in patients. The results were compared with previous studies and were found to be consistent. Shahbazian H et al assessed diabetic foot ulcer risk factors according to International Working Group on the Diabetic Foot (IWGDF) consensus. Based on the IWGDF criteria, they divided all the referral patients into four study groups; patients without neuropathy, patients with neuropathy, patients with vascular disease associated neuropathy and patients with foot ulcer. 53.8 years was the mean age of the patients in their study group. They analyzed a total of 400 patients out of which 269 were females, while the remaining 161 were males. Disturbance in the sense of vibration was observed in 23 percent of the patients in their study, while fall in sensitivity to monofilaments was seen in 26 percent of the patients. In 17 percent of the patients, they observed a decrease in pain sensation. In 6 percent of the patients, they observed abnormality in ankle brachial index (ABI). Past history of prior ulcer was seen in 7 percent of the patients of their study. From the results, they concluded that advancing age along with diabetes duration and diabetic retinopathy increases the risk for the development of diabetic ulcer. In another study conducted by Wu L et al, the authors determined the prevalence of various risk factors responsible for occurrence of diabetic foot in patients with diabetes. They retrospectively evaluated a total of 296 patients who were admitted to the tertiary hospital because of diabetes. A questionnaire was framed and was made to be filled by all the patients. They also assessed their foot along with presence of absence of peripheral sensory neuropathy (PSN) and peripheral arterial disease (PVD). They observed foot deformity in 124 patients with the most prevalent abnormality being hallux valgus, which was observed in 65 percent of the patients of their study. From the results, they concluded that risk factors for foot ulceration and lack of foot care knowledge was rather common in a hospital-based diabetic population, emphasizing the importance of implementing simple and affordable screening tools and methods to identify high-risk patients and providing foot care education for them.<sup>11,12</sup>

In another study conducted by Sarinnapakorn V et al, the authors evaluated the overall prevalence of diabetic foot ulcers. From the results, they concluded that diabetic patients are at intermediate for the development of diabetic foot ulcer. They also stressed that for the classification of the diabetic patients on the basis of risk factors, it is necessary to classify patients. Nyamu PN et al, in another study, evaluated the prevalence rate of patients with diabetic foot ulcers and the risk factors. They evaluated a total of 1788 diabetic patients and observed that in approximately four to five percent of the patients had diabetic foot ulcer. They observed presence of diabetic foot ulcer in patients with comparatively longer duration of diabetes. From the results, they concluded that the risk factors of diabetic foot ulcers were poor glycemic control, diastolic hypertension, dyslipidaemia, infection and poor self-care.<sup>13,14</sup>

## CONCLUSION

Within the limitations of present study, we conclude that Routine foot care should be available to every patient with diabetes ideally, but the reality of most healthcare facilities in India lack resources resulting in the absence of such care.

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