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## Evaluation of risk factors for patients suffering from diabetic foot ulcer

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**Abstract**

**Background:** Diabetes is one of the main problems in health systems in the world. The present study was conducted to assess the lesions in patients suffering diabetic foot ulcers.

**Materials & Methods:** 104 patients with diabetic foot ulcers of both genders were included. All the cases were managed following conservative and surgical approach.

**Results:** Out of 104 patients, males were 64 and females were 40. Duration of diabetes was <5 years in 14 patients, 5-10 years in 36 and >10 years in 54 patients. The difference was significant ( $P < 0.05$ ). The lesion was gangrene seen in 28 patients, cellulitis in 12, ulcer in 50 and abscess in 14 patients. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Lesion in diabetic patients were gangrene, cellulitis, ulcer and abscess. Maximum cases occurred in subjects with >10 years of diabetes history.

**Keywords:** diabetes, gangrene, ulcer

**Introduction**

Diabetes is one of the main problems in health systems in the world. The world prevalence of diabetes among adults was 6.4%, and will increase to 7.7% by 2030<sup>[1, 2]</sup>. Patients with diabetes are at greater risk of complications, the most important of them are diabetic neuropathy and peripheral vascular disorders that lead to diabetic foot ulcers<sup>[3]</sup>. Currently the most common cause of neuropathy in western countries is diabetes<sup>[4]</sup>. Diabetic neuropathy will develop in 50% of type 1 and 2 patients with diabetes. Diabetic foot problems are the most common cause of hospitalization in patients with diabetes and it accounts for 2 million patients with diabetes in the United States annually and often need long-term hospital admission. Diabetes is a major factor in half of all lower extremity amputations<sup>[5]</sup>.

Few of the well-known complications of diabetes are Peripheral neuropathy (PN) and peripheral vascular disease (PVD). Patients with PN and PVD lack the conventional symptoms, but are still considered to be at high risk for occurrence of foot complications. PN and PVD are the main causes of non-traumatic lower limb amputation<sup>[6]</sup>. The risk of ulceration and amputation among diabetic patients increases by two to four folds with the progression of age. 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]</sup>. The present study was conducted to assess the lesions in patients suffering diabetic foot ulcers.

**Materials & Methods**

The present study was conducted at Department of Surgery, Barasat District Hospital (A DNB Teaching Hospital), Barasat, West Bengal. It comprised of 104 patients with diabetic foot ulcers of both genders. All were informed regarding the study and their written consent was obtained.

Demographic data such as name, age, gender etc. was recorded. A thorough physical examination was performed. Investigations such as hemoglobin, TLC, DLC, ESR, blood urea, serum creatinine and blood sugar was estimated. 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.

For the management of diabetic foot infection, debridement, drainage, and washing and dressing of wounds were regularly done. Antibiotics used included cefoperazone, linezolid, clindamycin, metronidazole, aminoglycosides, meropenem, and amoxicillin-clavulanic acid. Patients with

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diabetes alone were treated by traditional means mostly by oral anti-diabetic agents but those having very high level of blood-glucose were subjected to take insulin therapy.

Sixteen (15.38 %) patients underwent amputation during the course of this study. One underwent major amputation (amputation above the ankle), the remaining underwent minor amputations (below the ankle), mainly of the ray (n=5), toes (n=8) and 1 Syme amputation.

Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant. P value less than 0.05 was considered significant.

**Results**

**Table 1:** Distribution of patients

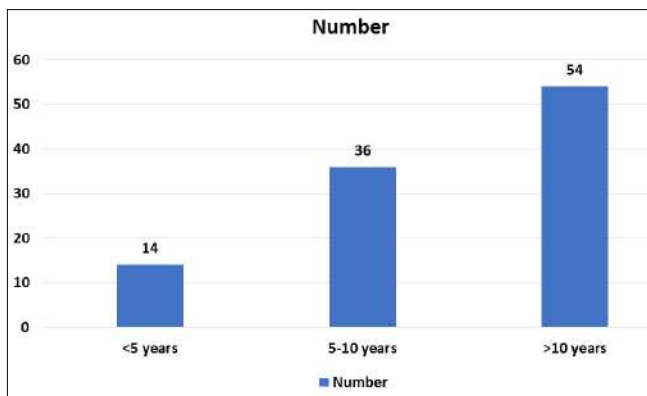
Total- 104		
Gender	Males	Females
Number	64	40

Table I shows that out of 104 patients, males were 64 and females were 40.

**Table 2:** Duration of diabetes

Duration	Number	P value
<5 years	14	0.02
5-10 years	36	
>10 years	54	

Table II, graph I shows that duration of diabetes was <5 years in 14 patients, 5-10 years in 36 and >10 years in 54 patients. The difference was significant (P< 0.05).



**Graph 1:** Duration of diabetes

**Table 3:** Type of lesions

Lesions	Number	P value
Gangrene	28	0.05
Cellulitis	12	
Ulcer	50	
Abscess	14	

Table III shows that lesion was gangrene seen in 28 patients, cellulitis in 12, ulcer in 50 and abscess in 14 patients. The difference was significant (P< 0.05).

**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<sup>[8]</sup>. Diabetic foot is

a serious complication of diabetes mellitus when compared with people without diabetes<sup>[9]</sup>. Foot ulcers are significant complications of diabetes mellitus and often precede lower extremity amputation<sup>[10]</sup>. Recurrence of the foot infection was common among India diabetic patients about 52%. Infection and gangrene of the lower extremities are the most common lesions requiring hospitalization in diabetes and are a major cause of morbidity<sup>[11]</sup>. The present study was conducted to assess the lesions in patients suffering diabetic foot ulcers.

In present study, out of 104 patients, males were 64 and females were 40. Ravichandran *et al.*<sup>[12]</sup> in their study 100 patients admitted to the surgical ward with diagnosis of diabetic foot were selected. The mean age of the subjects was 49.28 + 6.88 years. Out of 100 patients, 23 were females and 77 were males. They 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.

We found that duration of diabetes was <5 years in 14 patients, 5-10 years in 36 and >10 years in 54 patients. We observed that lesion was gangrene seen in 28 patients, cellulitis in 12, ulcer in 50 and abscess in 14 patients. Wu L *et al.*<sup>[13]</sup> 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. 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.

Nyamu PN *et al.*<sup>[14]</sup> 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.

**Conclusion**

Authors found that lesion in diabetic patients were gangrene, cellulitis, ulcer and abscess. Maximum cases occurred in subjects with >10 years of diabetes history.

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