

Analysis of Incidence and Profile of Diabetic Foot Ulcers Among Diabetic Patients at a Tertiary Care Hospital

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ABSTRACT

Background: The present study was conducted to evaluate the incidence and profile of diabetic foot ulcer among diabetic patients.

Materials & Methods: A total of 539 patients with presence of type 2 diabetes were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. A Performa was made detailed medical and family history of all the patients was recorded separately. Assessment of incidence of patients with diabetic foot ulcer was done and the foot ulcers were graded according to Wagner's grade as follows: 0 - No ulceration in a high-risk foot, 1 - Superficial ulcer of skin or subcutaneous tissue, 2 - Ulcers extend into tendon, bone, or capsule, 3 - Deep ulcer with osteomyelitis or abscess, 4 - Gangrene of toes or forefoot (localized gangrene), and 5 - Extensive gangrene requiring a major amputation.

Results: A total of 539 patients were analyzed. Among these type 2 diabetic patients, diabetic foot ulcer was found to be present in 9.28 percent of the patients. While comparing the age, HbA1c levels and duration of diabetes among patients with and without diabetic foot ulcer, significant results were obtained. Out of 50 patients with diabetic foot ulcer, 38 percent and 24 percent of the patients with diabetic foot ulcer were of

grade 2 and grade 3 respectively.

Conclusion: Diabetic foot ulcer is the most common complication of diabetes mellitus that usually fail to heal, and leading to lower limb amputation. Early identification of risk factors could help in reducing the incidence and morbidity associated with diabetic foot ulcer.


Key words: Diabetes, Ulcer, Diabetic foot.

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Article History:

Received: 05-02-2020, Revised: 26-02-2020, Accepted: 13-03-2020

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2020.6.2.033	

INTRODUCTION

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels.^{1,2}

Although classification of diabetes is important and has implications for the treatment strategies, this is not an easy task and many patients do not easily fit into a single class especially younger adults and 10% of those initially classified may require revision. The classical classification of diabetes as proposed by the American Diabetes Association (ADA) in 1997 as type 1, type 2, other types, and gestational diabetes mellitus (GDM) is still the most accepted classification and adopted by ADA.^{3,4} Diabetic foot ulcers are common and estimated to affect 15% of all diabetic

individuals during their lifetime. It is now appreciated that 15 – 20% of patients with such foot ulcers go on to need an amputation. In India, it is estimated that approximately 40,000 legs are being amputated every year, of which 75% are neuropathic with secondary infection, which is potentially preventable. Certain factors, such as, barefoot walking, illiteracy, low socioeconomic status, late presentation by patients, ignorance about diabetic foot care among primary care physicians, and belief in the alternative systems of medicine contribute to this high prevalence.⁵⁻⁷ Hence; the present study was conducted for evaluating the incidence and profile of diabetic foot ulcer among diabetic patients.

MATERIALS & METHODS

The present study was conducted in Department of General Medicine, Ayaan Institute of Medical Sciences, Kanakamamidi

Village, Moinabad Mandal, Rangareddy, Telangana (India) for evaluating the incidence and profile of diabetic foot ulcer among diabetic patients. A total of 539 patients with presence of type 2 diabetes were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. A Performa was made detailed medical and family history of all the patients was recorded separately. Assessment of incidence of patients with diabetic foot ulcer was done and the foot ulcers were

graded according to Wagner's grade (Wagner and Meggitt, 1970)⁵ as follows: 0 - No ulceration in a high-risk foot, 1 - Superficial ulcer of skin or subcutaneous tissue, 2 - Ulcers extend into tendon, bone, or capsule, 3 - Deep ulcer with osteomyelitis or abscess, 4 - Gangrene of toes or forefoot (localized gangrene), and 5 - Extensive gangrene requiring a major amputation. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

Table 1: Incidence of diabetic foot ulcer

Diabetic foot ulcer	Present	Absent
Present	50	9.28
Absent	489	90.72
Total	539	100

Table 2: Profile of diabetic patients with and without diabetic foot ulcer

Variable	With diabetic foot ulcer (n=50)	Without diabetic foot ulcer (n=489)	p-value
Mean age (years)	60.8	52.2	0.010*
Gender Male	29	253	0.127
Female	21	236	
Mean HbA1c (%)	9.6	8.1	0.041*
Mean duration of diabetes (years)	10.3	7.5	0.000*

*: Significant

Table 3: Classification of patients with diabetic foot ulcer

Diabetic foot ulcer	Number	Percentage
Grade 1	11	22
Grade 2	19	38
Grade 3	12	24
Grade 4	8	16
Total	50	100

RESULTS

A total of 539 patients were analyzed. Among these type 2 diabetic patients, diabetic foot ulcer was found to be present in 9.28 percent of the patients. Mean age of the diabetic patients with and without diabetic foot ulcer was 60.8 years and 52.2 years respectively. Majority proportion of patients with and without diabetic foot ulcer were males. Mean HbA1c levels among diabetic patients with and without diabetic foot ulcer were 9.6% and 8.1% respectively. Mean duration of diabetes among diabetic patients with and without diabetic foot ulcer was 10.3 years and 7.5 years respectively. While comparing the age, HbA1c levels and duration of diabetes among patients with and without diabetic foot ulcer, significant results were obtained. Out of 50 patients with diabetic foot ulcer, 38 percent and 24 percent of the patients with diabetic foot ulcer were of grade 2 and grade 3 respectively.

DISCUSSION

Neuropathy and ischaemia are the principal disorders underlying foot problems. Whenever a patient presents with an active lesion, it is essential to decide at an early stage whether the foot problem is: A combination of ulceration and sepsis in an ischaemic foot carries a higher risk of gangrene, and early arterial assessment and management are key to avoiding major amputation. Patients confined to bed must have their heels elevated to avoid heel blisters and sepsis. Such wounds need weeks or months of treatment and sometimes require major amputation with consequent serious medicolegal implications.^{8,9} Appropriate

patient referral is predicated on a complete history and foot examination. Patients with diabetic foot complications should be referred for preventive services and when acute pathology is identified. Patients at the highest risk for ulceration are those who have a history of ulceration, amputation, peripheral vascular surgery, or Charcot neuroarthropathy. These patients are easy to identify from history alone and have a very high rate of developing ulceration.¹⁰⁻¹³ Hence; the present study was conducted for evaluating the incidence and profile of diabetic foot ulcer among diabetic patients.

A total of 539 patients were analyzed. Among these type 2 diabetic patients, diabetic foot ulcer was found to be present in 9.28 percent of the patients. Mean age of the diabetic patients with and without diabetic foot ulcer was 60.8 years and 52.2 years respectively. Majority proportion of patients with and without diabetic foot ulcer were males. Mean HbA1c levels among diabetic patients with and without diabetic foot ulcer were 9.6% and 8.1% respectively. Pemayun, T. G. D et al determined the disease burden in terms of clinical profile and outcome of diabetic foot ulcer (DFU) admissions at a tertiary care hospital in a developing country. Foot problems accounted for 16.2% of total diabetic admission (n = 1429). All patients had type 2 diabetes with no gender predominance. The mean age was 54.3 ± 8.6 years and diabetes control were very poor. Before admission, the ulcers had already developed for 4.7 ± 2.9 weeks; however, the majority of patients were unaware of the preceding causes. More than 70% of ulcers were in Wagner grade ≥3 with infection event

in nearly all patients. The most common isolates from culture were Gram-negative bacteria. A total of 98 (36.3%) lower extremity amputations (LEAs) at various levels

of the foot were carried out, including major LEA in 24 patients and multiple amputations in seven patients. Mortality rate due to DFU reached 10.7%. Diabetic foot problems constitute a source of morbidity, a reason for LEA surgery as well as being a cause of death among patients with diabetes mellitus.¹⁴

In the present study, mean duration of diabetes among diabetic patients with and without diabetic foot ulcer was 10.3 years and 7.5 years respectively. While comparing the age, HbA1c levels and duration of diabetes among patients with and without diabetic foot ulcer, significant results were obtained. Out of 50 patients with diabetic foot ulcer, 38 percent and 24 percent of the patients with diabetic foot ulcer were of grade 2 and grade 3 respectively. Paras et al determined predisposing factors contributing to these infections at the authors' wound care clinic. Overall, 54 (11%) patients with infected ulcers were found in the present study. Among patients with infected DFUs, the most commonly isolated microorganism was *Pseudomonas aeruginosa*, which infected 35% of patients, followed by *Staphylococcus aureus* in 19% of patients, and methicillin-resistant *S. aureus* in 6% of patients. Additionally, in the multivariable logistic regression model, age > 65 years, ulcer size > 2 cm², and HbA1c > 7% were associated with the occurrence of an infection in DFUs.¹⁵ S. Garrido et al evaluated the 5-year outcome of patients with a first DFU and to analyze variables related with mortality. The study included 248 patients. The median age at presentation was 70 years and the median diabetes duration was 15 years. Ulcers were neuroischemic/ischemic in 62.5%. During the 5-year period, 31.9% (95% CI, 24.1-39.7) of the patients had at least one minor amputation and 23.7% one major amputation. The 5-year all-cause mortality rate was 45.6%. Patients with neuroischemic/ischemic foot had higher mortality rate, as well as older patients and those with longer diabetes duration. Other factors associated with higher mortality were ischemic heart disease, cerebrovascular disease, peripheral arterial disease and hypertension. DFU is associated with high 5-year rates of amputation and mortality, especially among older patients with longer diabetes duration, hypertension and established macrovascular disease.¹⁶

CONCLUSION

Diabetic foot ulcer is the most common complication of diabetes mellitus that usually fails to heal and leading to lower limb amputation. Early identification of risk factors could help in reducing the incidence and morbidity associated with diabetic foot ulcer.

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Source of Support: Nil.

Conflict of Interest: None Declared.

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Cite this article as: E. Shivananda Murgod, Geethika Sai Nutakki. Analysis of Incidence and Profile of Diabetic Foot Ulcers Among Diabetic Patients at a Tertiary Care Hospital. *Int J Med Res Prof*. 2020 Mar; 6(2):141-43. DOI:10.21276/ijmrp.2020.6.2.033