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Clinical Profile and Management Outcomes of Diabetic Foot Ulcers: A Cross-sectional Study

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Abstract

Background: Diabetic foot ulcers (DFUs) are among the most serious complications of diabetes mellitus, often leading to infection, amputation, and increased mortality. Timely diagnosis and intervention are critical in improving patient outcomes.

Objective: This study aimed to assess the clinical profile of patients with diabetic foot ulcers, evaluate the risk factors, and determine outcomes following multidisciplinary management.

Methods: A cross-sectional study was conducted among 120 diabetic patients presenting with foot ulcers at a tertiary care hospital over a period of 12 months. Clinical parameters, ulcer classification, comorbidities, and outcomes of treatment were analyzed.

Results: Of the 120 patients, 60% were male, with a mean age of 58.2 years. Neuropathy was present in 88.3% of cases, peripheral arterial disease in 36.7%, and infection in 79.2%. Wagner grade III and above ulcers were seen in 41.6% of patients. Complete healing was achieved in 56.6% of patients, while 14.1% underwent major amputation. Risk factors significantly associated with poor outcomes included delayed presentation, infection severity, and higher Wagner grades.

Conclusion: Diabetic foot ulcers remain a major healthcare burden, particularly in developing countries. Early detection, patient education, and a multidisciplinary treatment approach can substantially reduce complications and amputations.

Keywords: diabetic foot ulcer, wagner classification, diabetes mellitus, amputation, peripheral neuropathy, wound healing, multidisciplinary care.

Introduction

Diabetes mellitus is a global health epidemic, affecting over 500 million people worldwide. Among its many complications, diabetic foot ulcer (DFU) is one of the most devastating, leading to prolonged hospitalization, reduced quality of life, and significant healthcare costs. DFUs result from a complex interplay of peripheral neuropathy, peripheral vascular disease, and immune dysfunction, making them difficult to treat and prone to recurrence.

The World Health Organization estimates that every 20 seconds, a limb is lost due to diabetic complications.

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Despite the availability of advanced therapies, the burden of diabetic foot remains high, especially in low- and middle-income countries due to limited access to multidisciplinary care. This study aims to describe the clinical characteristics of patients with DFUs and evaluate treatment outcomes in a tertiary care setting.

Materials and Methods

Study Design and Setting:
A cross-sectional observational study was conducted at MedNova University Hospital, a tertiary care center in Mumbai, India, between January 2023 and December 2023.

Inclusion Criteria:

- Adults (>18 years) with a confirmed diagnosis of type 1 or type 2 diabetes mellitus
- Presence of foot ulcer below the ankle joint
- Willingness to provide informed consent

Exclusion Criteria:

- Non-diabetic foot ulcers
- Patients with malignancy or terminal illness
- Incomplete medical records

Data Collection:
A total of 120 consecutive patients meeting the inclusion criteria were enrolled. Data were collected using a structured clinical proforma, including:

- Demographics and diabetes duration
- Glycemic control (HbA1c)
- Ulcer characteristics and Wagner grade
- Neuropathy and vascular assessment
- Microbiological culture results
- Treatment modality and outcomes

Statistical Analysis:
Data were analyzed using SPSS version 24. Descriptive statistics were used for demographic variables. Chi-square test and logistic regression were applied to identify predictors of poor outcome (amputation or non-healing).

Results

Out of 120 patients enrolled, 72 (60%) were male and 48 (40%) were female. The mean age was 58.2 ± 10.4 years, and the average duration of diabetes was 11.6 ± 5.7 years.
Neuropathy was detected in 106 patients (88.3%), while peripheral arterial disease was present in 44 (36.7%). The majority of ulcers were located on the plantar surface of the foot.
Wagner grade distribution was as follows:

- Grade I: 18.3%
- Grade II: 40%
- Grade III: 27.5%
- Grade IV: 12.5%
- Grade V: 1.7%

Infection was confirmed in 79.2% of cases, with *Staphylococcus aureus* being the most common isolate.
Treatment included wound debridement, glycemic optimization, antibiotics, offloading, and surgical intervention when necessary.
Outcomes:

- Complete healing: 56.6%
- Minor amputation: 16.6%
- Major amputation: 14.1%
- Non-healing: 12.5%

Higher Wagner grade, infection, and delayed presentation were significantly associated with poor outcomes ($p < 0.05$).

Discussion

Our findings affirm that diabetic foot ulcers are a multifactorial complication predominantly associated with neuropathy, ischemia, and infection. The high prevalence of Wagner grade II and above ulcers reflects delayed healthcare-seeking behavior, particularly among male patients.
The 14.1% major amputation rate, though consistent with some previous studies, is still alarming. Timely intervention could have prevented progression in a significant number of cases.
Multidisciplinary management—including endocrinology, surgery, infectious disease, and podiatry—was associated with better healing outcomes.
Preventive strategies, including patient education on foot care, routine foot examination, and prompt treatment of minor foot injuries, are crucial in reducing DFU burden.

Conclusion

Diabetic foot ulcers remain a significant clinical challenge. This study highlights the need for early diagnosis, aggressive management, and multidisciplinary collaboration to reduce complications and improve patient quality of life. National health policies must integrate foot care education into diabetes management protocols to mitigate long-term disability

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