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Research Article

Clinical Presentation, Management, and Short-Term Outcomes of Diabetic Foot Ulcers in a Tertiary Care Hospital: A Prospective Observational Study

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Abstract

Background

Diabetic foot ulcer (DFU) is one of the most disabling complications of diabetes mellitus, and has emerged as a leading cause of hospitalization, lower-limb amputation, and disability worldwide. Diabetic foot disease is emerging as a burden in developing countries due to increasing prevalence of diabetes, late presentation, poor glycemic control, peripheral neuropathy, peripheral arterial disease and secondary infections. Early identification of risk factors and prompt multidisciplinary management are key to optimise wound healing, reduce amputations and improve patient outcomes. Objective: The aim of the present study was to evaluate the clinical presentation, management strategies, microbiological profile and short term outcomes of patients with diabetic foot ulcer admitted in a tertiary care hospital.

Materials and Methods

A prospective observational study was carried out in the Department of General Surgery of a tertiary care teaching hospital for a period of 12 months. We included 120 consecutive adult patients with diabetic foot ulcer. Demographic details, duration of diabetes, clinical presentation, Wagner grading, laboratory parameters, microbiological culture reports, treatment modalities and short-term outcomes were noted on a standardized proforma. The statistical analysis was performed using SPSS version 26. Continuous variables are presented as mean ± standard deviation; categorical variables are presented as number and percentages. Statistical significance was defined as p-value <0.05.

Results

The mean age of the study population was 57.2 ± 10.1 years and 70.8% of the patients were male. The common findings were poor glycemic control (mean HbA1c: 9.1 ± 1.8%), peripheral neuropathy (69.2%) and infected ulcers (82.5%). Wagner grade III ulcers were the most common (35.8%). The most common organism isolated from wound cultures was Staphylococcus aureus. Surgical debridement was done in 65.8% of patients, minor amputation in 18.3% and major amputation in 7.5%. - During follow-up, the ulcer healed completely in 73.3% of the patients. Poor glycemic control, osteomyelitis, advanced Wagner grade, and peripheral arterial disease were significantly associated with amputation ($p<0.05$).

Conclusions

Diabetic foot ulcers continue to be an important cause of morbidity in patients with diabetes. Early diagnosis, careful glycaemic control, aggressive treatment of infections, timely surgical intervention and multidisciplinary care achieve better short-term outcomes and reduce the risk of limb loss.

Keywords: Diabetic foot ulcer; Diabetes mellitus; Wagner classification; Surgical debridement; Amputation; Wound infection.

Introduction

Diabetes mellitus is now one of the major challenges to global public health in the twenty-first century. The International Diabetes Federation (IDF) reports that the prevalence of diabetes is rapidly increasing across the world and especially in low and middle income countries with limited healthcare resources. India is often known as the "diabetes capital of the world" and has one of the largest populations of people living with diabetes, thus contributing tremendously to the global disease burden. In addition to the metabolic consequences of diabetes, chronic complications affecting the cardiovascular system, kidneys, nervous system, eyes, and peripheral vasculature have become increasingly common and account for significant morbidity, mortality, and health-care costs. Among these complications, diabetic foot ulcer (DFU) is one of the most devastating complications as it is associated with prolonged hospitalization, recurrent infection, limb amputation, poor quality of life and increased mortality.[1,2]

Diabetic foot ulcer (DFU) is a full thickness wound located below the ankle in a person with diabetes, usually as a result of interaction of peripheral neuropathy, peripheral arterial disease, repetitive trauma and impaired wound healing. It is estimated 15 to 25 percent of people with diabetes will develop a foot ulcer sometime in their lifetime and nearly 85 percent of lower-extremity amputations related to diabetes follow a foot ulcer.[3] These ulcers carry not only a significant physical and psychological burden on patients but also a substantial economic burden on the health care systems due to repeated admissions, prolonged antibiotic therapy, surgical procedures, rehabilitation and long term disability.[4]

Diabetic foot ulcers have a multifactorial pathogenesis. Peripheral sensory neuropathy causes loss of protective sensation so that patients may not sense minor trauma or excessive pressure. Motor neuropathy leads to imbalance of intrinsic muscles and foot deformities, which cause abnormal plantar pressure distribution and repetitive mechanical injury. Decreased sweating from autonomic neuropathy also leads to dry, fissured skin, thus predisposing to bacterial invasion. Additionally, peripheral arterial disease decreases tissue perfusion, oxygen delivery, and wound healing. Hyperglycemia further impairs immune function by decreasing neutrophil chemotaxis, phagocytosis and bactericidal activity, increasing the risk of severe soft tissue infections and osteomyelitis.[5,6]

Diabetic foot ulcers can present with a wide variety of clinical presentations, depending on the degree of tissue destruction and presence of infection or ischemia. Patients often present with non-healing ulcers, purulent discharge, foul smelling wounds, cellulitis, gangrene or deep tissue abscesses. The Wagner classification system is one of the most commonly used grading systems to grade the severity of the ulcers and to guide the choice of treatment. Higher Wagner grades are associated with increased risk of hospitalization, amputation, prolonged recovery and mortality.[7]

Microbial infection is involved in the progression of diabetic foot ulcers. Early superficial ulcers are often due to Gram-positive cocci, especially Staphylococcus aureus and β-hemolytic streptococci. Chronic, deep, or previously treated ulcers often contain polymicrobial flora including gram-negative bacilli (eg, Pseudomonas aeruginosa, Klebsiella pneumoniae, Escherichia coli) and anaerobic organisms. The increasing prevalence of multidrug-resistant pathogens such as methicillin-resistant Staphylococcus aureus (MRSA) is another therapeutic challenge highlighting the need for culture-guided antibiotic therapy.[8]

Management of diabetic foot ulcers should be holistic and multidisciplinary, with input from surgeons, endocrinologists, infectious disease specialists, vascular surgeons, podiatrists, physiotherapists, wound care nurses and rehabilitation teams. Successful treatment involves optimizing glycemic control, off-loading pressure, meticulous wound care, regular debridement, targeted antimicrobial therapy, vascular assessment, and prompt surgical intervention when indicated. Advances such as negative-pressure wound therapy, skin substitutes, growth factor therapy, and revascularization techniques have improved healing rates in select patients. However, delayed presentation is common in resource limited settings leading often to advanced disease requiring amputation.[9,10]

Lower-extremity amputation is a feared consequence of diabetic foot disease due to its association with substantial functional impairment, reduced quality of life, psychological distress, and increased long-term mortality. Five-year mortality rates have been found to be significantly increased in patients with major lower-limb amputation compared to the general diabetic population. Importantly, many amputations are considered preventable with patient education, routine foot examination, early identification of high risk feet and timely treatment of minor lesions before deep infection or gangrene occurs.[11]

Diabetic foot ulcers still remain a major clinical challenge in tertiary care hospitals in India despite increasing awareness. Institution-specific data are required to optimise management protocols, as patient demographics, microbial flora, healthcare accessibility, socioeconomic conditions and treatment practices vary. Furthermore, many parts of the country lack prospective data on the clinical profile, treatment patterns, and short-term outcomes of diabetic foot ulcers. Such information is useful to identify predictors of poor outcomes, to guide antibiotic stewardship, to improve decision making and to strengthen preventive strategies.

Therefore, the current prospective observational study was carried out to evaluate the clinical presentation, microbiological features, management approaches and short term results of patients with diabetic foot ulcers presenting to a tertiary care hospital, over a period of 12 months. The study also aimed to identify factors associated with limb amputation and poor clinical outcome thus providing evidence that may help improve patient care and reduce the burden of diabetic foot disease in routine surgical practice.

Material and Methods

Study Design and Setting

This prospective observational study was carried out in the Department of General Surgery of a tertiary care teaching hospital for a period of 12 months. This study was designed to evaluate the clinical presentation, management, microbiological profile and short-term outcome of patients presenting with diabetic foot ulcers.

Study Population

A total of 120 consecutive adult patients (≥18 years of age) diagnosed with diabetic foot ulcers and admitted during the study period were included. We included patients with Type 1 or Type 2 diabetes mellitus presenting with foot ulcers below the malleolar level.

Inclusion Criteria

• Patients >= 18 years of age.

• Patients diagnosed with type 1 or type 2 diabetes mellitus.

• Existence of a diabetic foot ulcer needing hospital admission.

• Patients willing to sign a written informed consent.

Exclusion Criteria

• Ulcers of the foot caused by trauma, burns, malignancy or venous disease.

• Foot ulcers in non-diabetics.

• Patients with incomplete clinical records or with refusal to participate.

• Lost to follow-up prior to assessment of short-term outcomes

Data Collection

Demographic characters, duration of diabetes, smoking history, comorbidities, previous history of foot ulcers and treatment history was recorded using pre-designed case record form. Detailed clinical examination was done which included site, duration, size, depth, presence of cellulitis, gangrene, deformity, peripheral neuropathy and peripheral arterial disease. Ulcers were graded using the Wagner-Meggitt grading system.

Baseline laboratory investigations included complete blood count, fasting and random blood glucose, glycated hemoglobin (HbA1c), renal function tests, serum albumin and inflammatory markers as appropriate. Plain radiographs of the affected foot were obtained to evaluate for underlying osteomyelitis or bony involvement. Wound swabs or tissue specimens were collected aseptically prior to initiation of antibiotic therapy for culture and antimicrobial susceptibility testing.

Treatment Protocol and Outcome Assessment

All patients were given standard treatment as per the institutional protocols which included optimization of glycemic control, empirical antibiotics followed by culture-guided therapy, wound dressing, pressure off-loading, and surgical intervention whenever indicated. Surgical procedures consisted of wound debridement, incision and drainage of abscesses, minor and major amputations, split-thickness skin grafting, and negative-pressure wound therapy in selected cases.

Patients were followed until discharge and then for 30 days to assess short-term outcomes. The primary outcomes were ulcer healing and limb salvage, secondary outcomes were the duration of hospital stay, postoperative complications, need for amputation, reintervention and mortality.

Statistical Analysis

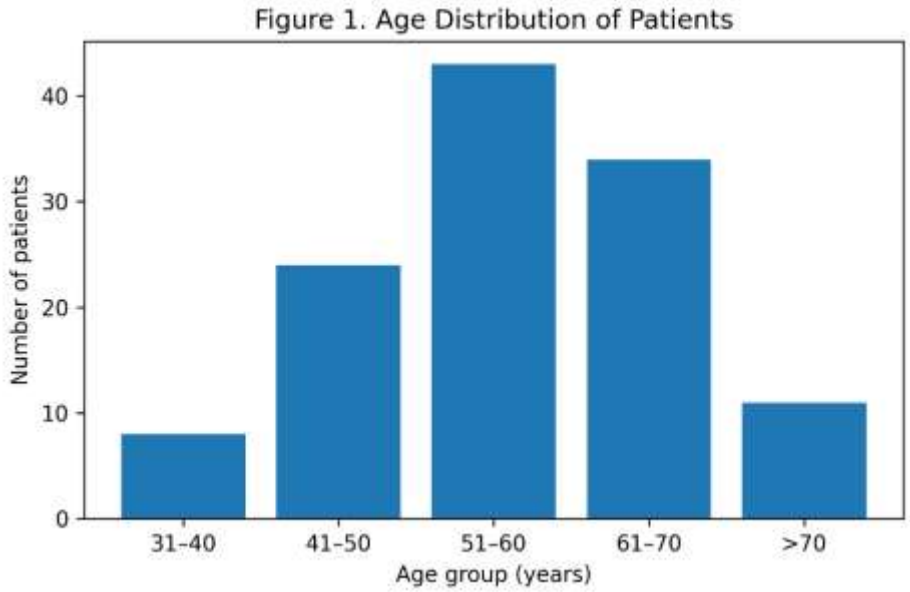
Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, United States). Continuous variables were expressed as mean ± standard deviation (SD) or median (interquartile range), and categorical variables were presented as frequencies and percentages. The associations between categorical variables were tested with the Chi-square or Fisher's exact test. Continuous variables were compared with the independent Student's t-test. Those variables with statistical significance in the univariate analysis were studied by multivariate logistic regression to determine independent predictors of lower-limb amputation. A two-tailed p-value of <0.05 was considered significant.

Results

A total of **120 patients** with diabetic foot ulcers were enrolled during the 12-month study period. All patients completed the study and were included in the final analysis. The mean age of the study population was **57.2 ± 10.1 years** (range: 34–82 years). The majority of patients belonged to the **51–60 years** age group (35.8%), followed by **61–70 years** (28.3%). Males predominated, accounting for **70.8% (n=85)** of the study population, resulting in a male-to-female ratio of approximately **2.4:1**. Most patients (58.3%) resided in rural areas. The mean body mass index (BMI) was **26.4 ± 3.5 kg/m²**, and the median duration of diabetes was **10 years** (interquartile range: 6–15 years). Hypertension was the most common associated comorbidity (56.7%), followed by chronic kidney disease (18.3%) and ischemic heart disease (15.0%). Nearly one-third (31.7%) of patients had a history of tobacco smoking.

Table 1. Baseline demographic and clinical characteristics of the study population (n = 120)

Variable	Frequency (%) / Mean ± SD
Age (years)	57.2 ± 10.1
31–40	8 (6.7)
41–50	24 (20.0)
51–60	43 (35.8)
61–70	34 (28.3)
>70	11 (9.2)
Male	85 (70.8)
Female	35 (29.2)
Rural residence	70 (58.3)
Urban residence	50 (41.7)
BMI (kg/m²)	26.4 ± 3.5
Duration of diabetes (years)	10.4 ± 6.2
Hypertension	68 (56.7)
Chronic kidney disease	22 (18.3)
Ischemic heart disease	18 (15.0)
Smoking history	38 (31.7)



The most common presenting complaint was a **non-healing ulcer (100%)**, followed by purulent discharge (75.8%), pain (63.3%), swelling (58.3%), foul-smelling discharge (45.8%), fever (30.0%), and gangrene (18.3%). Peripheral sensory neuropathy was detected in **69.2%** of patients, while **31.7%** had clinical evidence of peripheral arterial disease. Osteomyelitis was diagnosed radiologically in **28.3%** of patients.

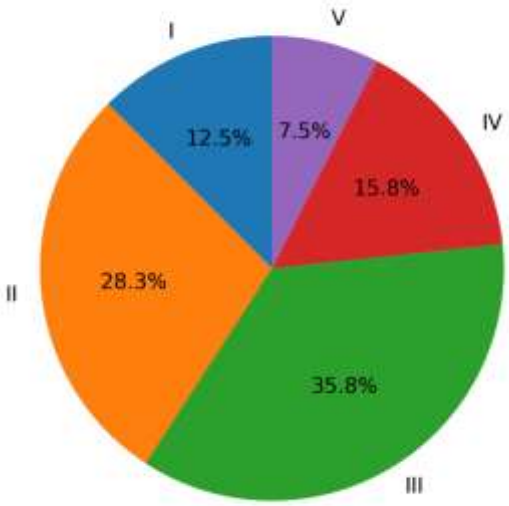
According to the Wagner classification, **Grade III ulcers** were the most frequent (35.8%), followed by Grade II (28.3%), Grade IV (15.8%), Grade I (12.5%), and Grade V (7.5%). The majority of ulcers were located over the plantar surface (40.8%) or toes (34.2%).

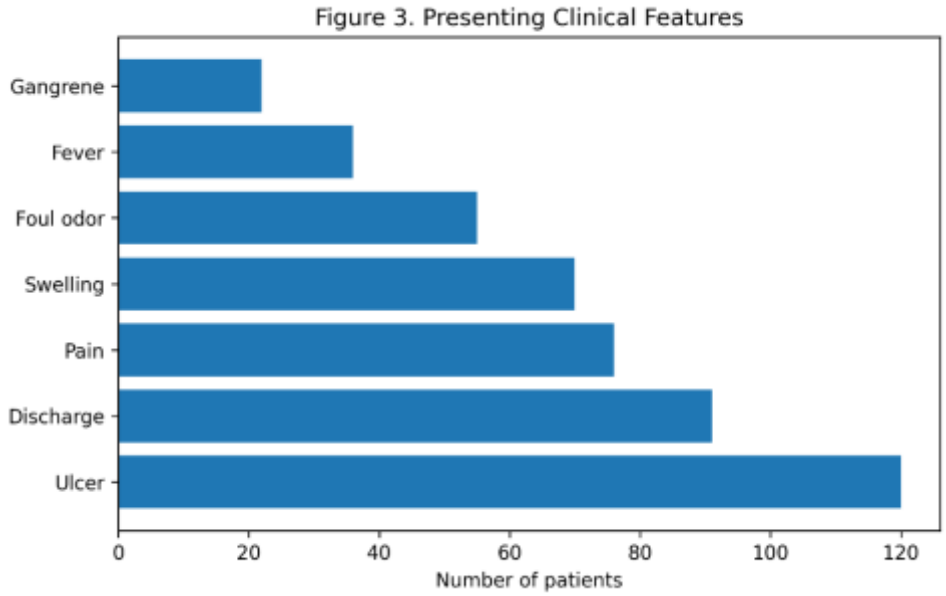
Table 2. Clinical presentation and ulcer characteristics (n = 120)

Variable	Frequency (%)
Non-healing ulcer	120 (100.0)
Purulent discharge	91 (75.8)
Pain	76 (63.3)
Swelling	70 (58.3)
Foul odor	55 (45.8)
Fever	36 (30.0)
Gangrene	22 (18.3)
Peripheral neuropathy	83 (69.2)
Peripheral arterial disease	38 (31.7)

Osteomyelitis	34 (28.3)
Wagner Grade I	15 (12.5)
Grade II	34 (28.3)
Grade III	43 (35.8)
Grade IV	19 (15.8)
Grade V	9 (7.5)

Figure 2. Wagner Grade Distribution





Laboratory investigations revealed poor glycemic control among the study participants. The mean HbA1c was **9.1 ± 1.8%**, while the mean random blood glucose at admission was **248 ± 74 mg/dL**. Anemia (hemoglobin <11 g/dL) was present in **46.7%** of patients, and hypoalbuminemia (<3.5 g/dL) was observed in **37.5%**. Leukocytosis was documented in **58.3%** of patients, indicating active infection.

Table 3. Baseline laboratory parameters

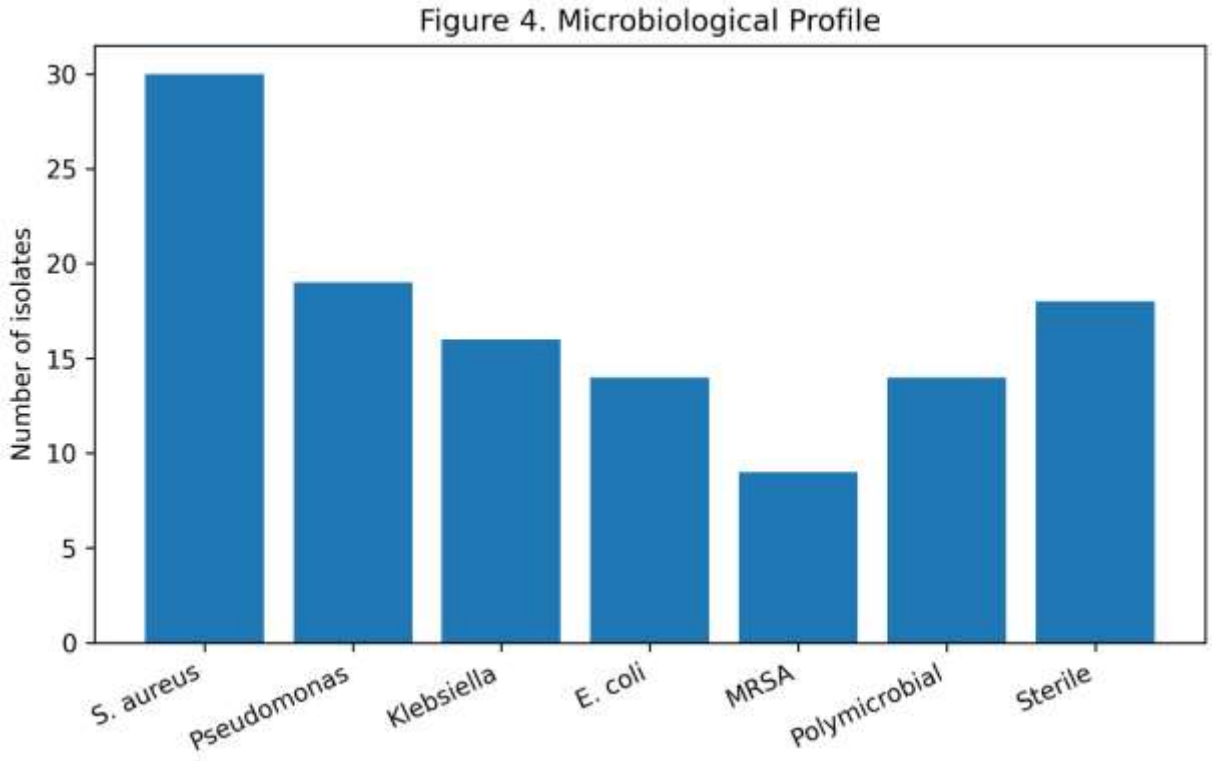
Parameter	**Mean ± SD / Frequency**
Hemoglobin (g/dL)	10.9 ± 1.7
Total leukocyte count (/mm³)	12,980 ± 4,150
Random blood sugar (mg/dL)	248 ± 74
HbA1c (%)	9.1 ± 1.8
Serum creatinine (mg/dL)	1.3 ± 0.6
Serum albumin (g/dL)	3.3 ± 0.5
Patients with HbA1c >8%	84 (70.0%)
Hypoalbuminemia	45 (37.5%)
Leukocytosis	70 (58.3%)

Microbiological examination demonstrated positive bacterial growth in **102 (85.0%)** wound cultures. *Staphylococcus aureus* was the predominant organism (29.4%), followed by *Pseudomonas aeruginosa*

(18.6%), *Klebsiella pneumoniae* (15.7%), *Escherichia coli* (13.7%), methicillin-resistant *Staphylococcus aureus* (MRSA) (8.8%), polymicrobial growth (7.8%), and sterile cultures (15.0%).

Table 4. Microbiological profile of wound cultures

Organism	Frequency (%)
Staphylococcus aureus	30 (25.0)
Pseudomonas aeruginosa	19 (15.8)
Klebsiella pneumoniae	16 (13.3)
Escherichia coli	14 (11.7)
MRSA	9 (7.5)
Polymicrobial growth	14 (11.7)
Sterile culture	18 (15.0)



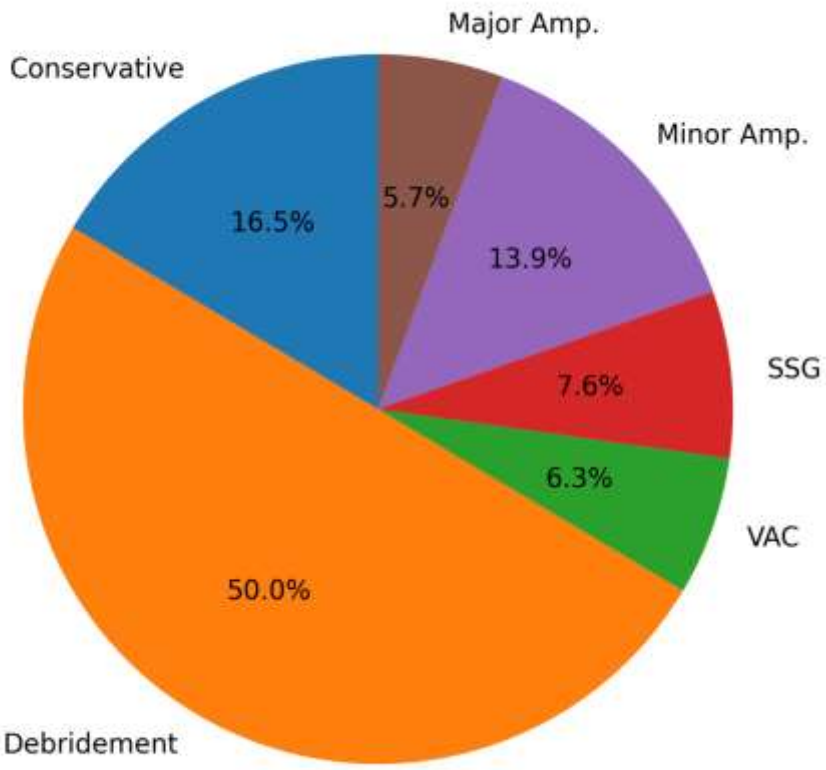
All patients received intensive glycemic control, intravenous antibiotics, and regular wound dressing. Surgical intervention was required in **94 (78.3%)** patients. Surgical debridement was the commonest procedure (65.8%), followed by minor amputation (18.3%), split-thickness skin grafting (10.0%), vacuum-

assisted closure therapy (8.3%), and major amputation (7.5%). Conservative management alone was adequate in 26 patients (21.7%).

Table 5. Management modalities

Treatment	Frequency (%)
Conservative management	26 (21.7)
Surgical debridement	79 (65.8)
VAC dressing	10 (8.3)
Split skin graft	12 (10.0)
Minor amputation	22 (18.3)
Major amputation	9 (7.5)

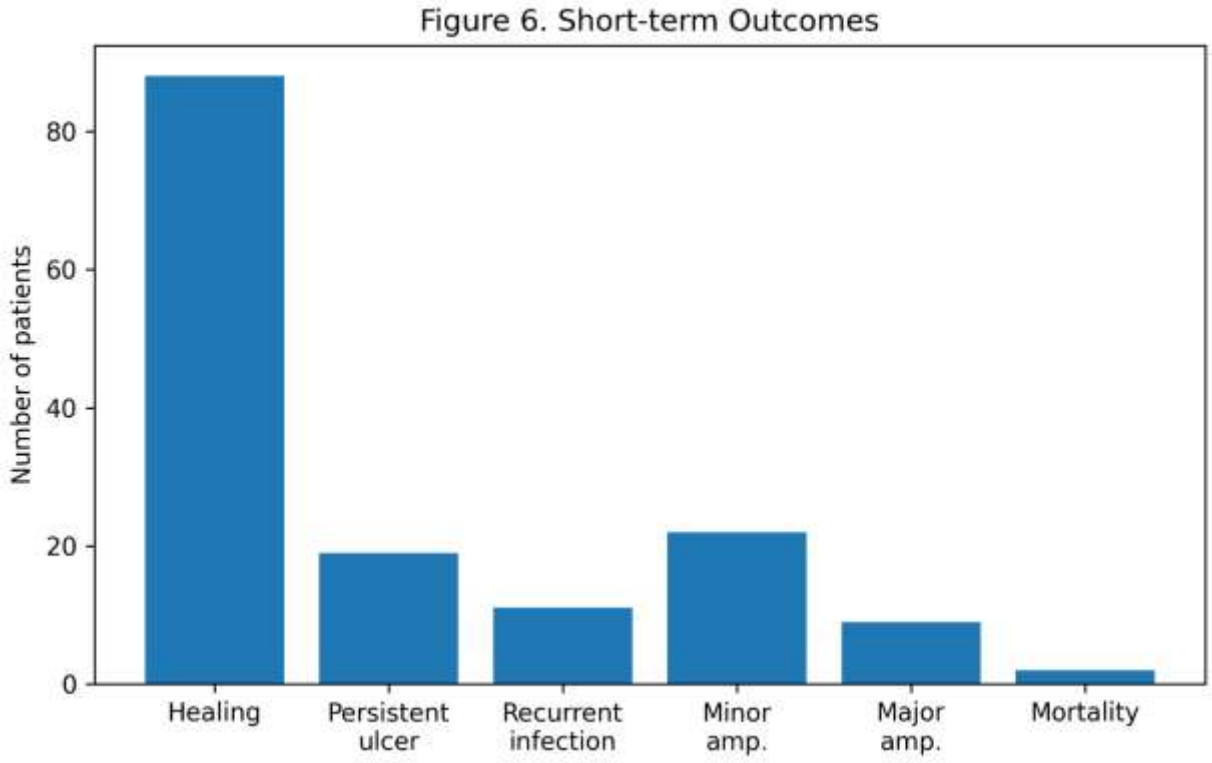
Figure 5. Management Modalities



The mean duration of hospital stay was **11.8 ± 4.6 days**. Complete ulcer healing within 30 days was achieved in **88 (73.3%)** patients. Persistent ulceration requiring continued outpatient wound care was noted in **19 (15.8%)**, while recurrent infection occurred in **11 (9.2%)** patients. Major lower-limb amputation was performed in **9 (7.5%)** patients, whereas mortality occurred in **2 (1.7%)** patients due to overwhelming sepsis and multiorgan dysfunction.

Table 6. Short-term outcomes

Outcome	Frequency (%)
Complete healing	88 (73.3)
Persistent ulcer	19 (15.8)
Recurrent infection	11 (9.2)
Minor amputation	22 (18.3)
Major amputation	9 (7.5)
Mortality	2 (1.7)
Hospital stay (days)	11.8 ± 4.6



To identify factors associated with lower-limb amputation, patients were stratified into amputation (minor or major) and limb-salvage groups. Increasing Wagner grade, peripheral arterial disease, osteomyelitis, poor glycemic control (HbA1c >8%), and hypoalbuminemia were significantly associated with the need for amputation (all $p<0.05$). Age, sex, and smoking history were not independently associated with amputation in univariate analysis.

Table 7. Factors associated with lower-limb amputation

Variable	Amputation n=31	Limb Salvage n=89	p-value
Age >60 years	16 (51.6%)	29 (32.6%)	0.084
Male sex	23 (74.2%)	62 (69.7%)	0.639
HbA1c >8%	28 (90.3%)	56 (62.9%)	**0.006**
Wagner Grade IV–V	20 (64.5%)	8 (9.0%)	**<0.001**
Peripheral arterial disease	18 (58.1%)	20 (22.5%)	**<0.001**
Osteomyelitis	17 (54.8%)	17 (19.1%)	**<0.001**
Hypoalbuminemia	18 (58.1%)	27 (30.3%)	**0.009**
Positive wound culture	29 (93.5%)	73 (82.0%)	0.137

Multivariate logistic regression identified **advanced Wagner grade (Grade IV–V)** as the strongest independent predictor of amputation (adjusted OR: 6.84; 95% CI: 2.68–17.42; $p<0.001$). Peripheral arterial disease (adjusted OR: 3.27; 95% CI: 1.32–8.09; $p=0.010$), osteomyelitis (adjusted OR: 2.91; 95% CI: 1.17–7.22; $p=0.021$), and HbA1c >8% (adjusted OR: 2.63; 95% CI: 1.01–6.82; $p=0.046$) also remained significant independent predictors. Hypoalbuminemia demonstrated a trend toward increased risk but did not retain statistical significance after adjustment.

Table 8. Multivariate logistic regression analysis for predictors of amputation

Variable	Adjusted OR	95% CI	p-value
Wagner Grade IV–V	6.84	2.68–17.42	**<0.001**
Peripheral arterial disease	3.27	1.32–8.09	**0.010**
Osteomyelitis	2.91	1.17–7.22	**0.021**
HbA1c >8%	2.63	1.01–6.82	**0.046**
Hypoalbuminemia	1.92	0.82–4.53	0.131

Discussion

Diabetic foot ulcer (DFU) remains one of the most serious and economically burdensome complications of diabetes mellitus, accounting for a large share of diabetes-related hospital admissions and non-traumatic lower-limb amputations globally. This prospective observational study was designed to assess the clinical presentation, management strategies, microbiological profile and short term outcomes of 120 patients admitted with diabetic foot ulcers over a period of 12 months. Our results point out that delayed presentation, poor glycemic control, peripheral neuropathy, peripheral arterial disease and advanced ulcer grade are still the main determinants of morbidity and loss of limb.

The average age of the patients in the present study was 57.2 ± 10.1 years, most of them were in the age group of 51 to 60 years. This finding is consistent with the findings of Amin and Doupis and Alexiadou and Doupis, who reported that diabetic foot ulcers mainly affect middle-aged and elderly individuals due to the long-term exposure to hyperglycemia and the accumulation of microvascular and macrovascular complications.[1,2] Long standing diabetes predisposes patients to neuropathy, vascular insufficiency and impaired immune responses thus predisposing to chronic foot ulceration. The predominance of older adults in the present study highlights the need for routine foot surveillance in patients with long-standing diabetes.

There was a significant male preponderance (70.8%) which is similar to the findings reported by Pendsey and Boulton et al.[3,4] Men are more prone to outdoor occupations where repetitive trauma, prolonged walking and barefoot exposure increase the risk of foot injuries. In addition, delayed healthcare-seeking behaviors and increased smoking prevalence in men may promote disease progression before medical consultation.

This study demonstrated poor glycaemic control with a mean HbA1c of 9.1 ± 1.8% and 70% of patients had HbA1c >8%. Chronic hyperglycemia adversely affects leukocyte chemotaxis, phagocytosis, angiogenesis, collagen synthesis, and fibroblast proliferation, thus delaying wound healing and increasing susceptibility to infection.[5] These findings are consistent with those of previous studies that have demonstrated that high HbA1c is associated with prolonged healing time, recurrent infection, and increased risk of amputation.[6] These findings further underscore the significance of tight glycemic control in preventing diabetic foot complications and improving treatment outcomes.

Peripheral neuropathy was the most common predisposing factor for ulcer formation, found in 69.2 % of the patients. Neuropathy results in loss of protective sensation, allowing repetitive unnoticed trauma that leads to ulceration. Motor neuropathy results in foot deformities and abnormal plantar pressure distribution, while autonomic neuropathy results in dry, fissured skin that facilitates bacterial invasion.[4] The high prevalence of neuropathy noted in this study is comparable to the rates reported in prior Indian and international studies and highlights the need for annual neurological assessment and patient education on foot care.

Peripheral arterial disease (PAD) was present in approximately one-third of the patients and was identified as an independent predictor of lower-limb amputation. Decreased arterial perfusion impairs perfusion of oxygen and nutrients to the affected tissue, impairing wound healing and promoting tissue necrosis. Our findings are consistent with Hingorani et al. (14), who demonstrated that patients with concomitant ischemia have a significantly higher incidence of major amputation and a longer hospital stay.[7] Ankle-brachial index and Doppler ultrasonography should hence be part of routine evaluation of diabetic foot ulcers in terms of early vascular assessment.

In the present study, most of the ulcers were classified as Wagner Grade III (deep infection with abscess formation or osteomyelitis). Higher Wagner grades were significantly associated with amputation and multivariate analysis identified Grade IV-V ulcers as the strongest independent predictor of limb loss (adjusted OR 6.84; $p<0.001$). This is consistent with several published reports which have shown that increasing the severity of the ulcer is associated with poorer healing rates, longer hospital stay and higher risk of amputation.[8] The Wagner classification remains a simple and reliable clinical tool to predict outcomes and guide treatment decisions.

Infection was a major clinical problem, with positive bacterial cultures in 85% of patients . The most frequently isolated organism was Staphylococcus aureus followed by Pseudomonas aeruginosa, Klebsiella pneumoniae and Escherichia coli. Similar microbiological patterns have been observed in South Asian studies where Gram-positive cocci predominate in acute infections and Gram-negative bacilli become more prevalent in chronic ulcers.[9] The presence of MRSA and polymicrobial infections in some patients underscores the importance of obtaining culture specimens prior to the initiation of antibiotics when possible. Culture-guided antimicrobial therapy not only enhances treatment efficacy, but also promotes antimicrobial stewardship by reducing unnecessary broad-spectrum antibiotic use.

Regarding management, surgical debridement was the most common procedure performed, emphasizing its key role in the removal of necrotic tissue, reduction of bacterial burden, and stimulation of granulation tissue formation. Some 20% of patients needed minor amputations and only 7.5% needed major amputations. These rates compare favorably with the published literature from tertiary care centers suggesting that timely surgical intervention with aggressive infection control and optimization of the glycemic status can substantially reduce the major limb loss.[10] In patients selected appropriately, the use of vacuum-assisted closure therapy selectively and split-thickness skin grafting also helped achieve successful wound closure.

The overall 30-day healing rate of 73.3% observed in the present study suggests that multidisciplinary management can result in favorable short-term outcomes even in patients with advanced disease. Mortality was relatively low (1.7%) but patients requiring major amputation had prolonged hospitalization and increased postoperative morbidity. Many studies have emphasised the importance of multidisciplinary or coordinated care with surgeons, endocrinologists, microbiologists, vascular specialists, wound care nurses, physiotherapists and diabetes educators and this is increasingly viewed as the standard of care for diabetic foot management.[4,7]

Multivariate logistic regression showed that advanced Wagner grade, peripheral arterial disease, osteomyelitis and poor glycemic control were independent predictors for amputation. These results are biologically plausible and have been consistently reported in previous studies. [6–8] Identification of these high-risk characteristics at the time of admission allows clinicians to prioritize aggressive treatment, closer monitoring, and early surgical intervention. Patients with advanced ulcers also deserve prompt vascular evaluation to determine if revascularization may improve limb salvage.

The results of this study have significant clinical implications for healthcare systems, especially in resource-constrained settings. Early screening of high-risk diabetic patients, structured foot-care education, regular examination by trained health professionals, smoking cessation and optimization of metabolic control have the potential to reduce the incidence of ulceration and prevent avoidable amputations. Further improvements in patient outcomes can be achieved by establishing dedicated

multidisciplinary diabetic foot clinics with standardized assessment, early referral and evidence-based management protocols.

Strengths

Strengths of this study include its prospective design, standardized data collection, comprehensive evaluation of clinical and microbiological characteristics, and assessment of multiple management strategies and short-term outcomes. The use of multivariate regression analysis enabled identification of independent predictors of lower-limb amputation, providing clinically relevant information for risk stratification.

Restrictions

The present study has several limitations. First, it was conducted at a single tertiary care center, which may limit the ability to generalize the findings to other healthcare settings. Second, the sample size was relatively modest although it was adequate for the study objectives. Third, the follow-up period was limited to short-term outcomes, which did not allow us to assess the recurrence of ulcers, long-term limb salvage, functional recovery and quality of life. Finally, vascular imaging and advanced wound-healing modalities were not universally available for all patients, which may have impacted treatment results.

However, the study provides important prospective data on the clinical profile, management practices and predictors of short term outcomes among patients with diabetic foot ulcers in a tertiary care hospital despite these limitations. The results support the need for multidisciplinary management and emphasize the importance of early diagnosis and comprehensive care in reducing diabetes-related morbidity and preventing lower-limb amputation.

Conclusion

Diabetic foot ulcer is still one of the most serious and preventable complications of diabetes mellitus, contributing significantly to patient morbidity, prolonged hospitalization, lower-limb amputation, and healthcare costs. In the present prospective observational study, diabetic foot ulcers were found to be more common in middle-aged and elderly individuals with a long duration of diabetes and poor glycemic control. Peripheral neuropathy, peripheral arterial disease, and wound infection were frequent clinical observations, whereas advanced Wagner grade and osteomyelitis were strongly correlated with poor outcomes.

Most of the patients needed surgery, the most common operation being debridement of the wound. A multidisciplinary treatment strategy including stringent glycemic control, culture-directed antibiotic therapy, meticulous wound care, and timely surgical management yielded satisfactory short-term outcomes, with complete ulcer healing in almost three-fourths of the patients. However, about one-fourth of patients underwent minor or major amputations, underlining the ongoing burden of advanced diabetic foot disease.

Advanced Wagner grade, peripheral arterial disease, osteomyelitis, and poor glycemic control were identified as independent predictors of lower-limb amputation by multivariate analysis. These results highlight the critical need for early detection of high-risk patients and aggressive therapy to improve limb salvage.

Structured diabetic foot screening programmes, patient education related to foot care, regular clinical examination, optimisation of metabolic control and the establishment of multidisciplinary diabetic foot care teams can dramatically reduce ulcer-related complications and prevent avoidable amputations. Larger multicenter studies with longer follow-up are needed to evaluate long-term functional outcomes, recurrence rates, quality of life, and cost-effectiveness of various treatment strategies.

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Conflict of Interest

The authors declare that they have no competing interests.

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