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COMPARISON OF NEUROPATHIC, ISCHAEMIC, AND NEUROISCHAEMIC DIABETIC FOOT ULCERS: A HOSPITAL-BASED PROSPECTIVE STUDY

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ABSTRACT

Background: Diabetic foot ulcers (DFUs) are a major cause of morbidity, amputation, and hospitalization among individuals with diabetes. Understanding the clinicopathological differences between neuropathic, ischaemic, and neuroischaemic ulcers is essential for targeted interventions and improved outcomes, especially in resource-limited settings like India.

Materials and Methods: A prospective cohort study was conducted at a tertiary care center in India over 18 months, including 96 patients with DFUs classified into neuropathic (n=41), ischaemic (n=32), and neuroischaemic (n=23) groups based on clinical examination and vascular imaging. Data on demographics, comorbidities, ulcer characteristics, vascular assessments, microbiology, interventions, and outcomes were collected and analyzed using appropriate statistical methods, including Kaplan-Meier survival analysis.

Results: Neuroischaemic patients were significantly older (mean age: 61.5 ± 9.6 years, p=0.031) with longer diabetes duration and higher rates of chronic kidney disease (43.5%, p=0.042). Neuroischaemic ulcers had larger area (mean: 4.1 ± 2.0 cm², p=0.002), longer duration (7.4 ± 3.3 weeks, p=0.011), more frequent infection (78.3%, p=0.004), and higher rates of slough/necrosis (65.2%, p=0.001). Healing outcomes were significantly better in neuropathic ulcers, with 68.3% achieving complete healing versus 43.8% and 39.1% in ischaemic and neuroischaemic ulcers, respectively (p=0.011). Time to healing was shortest in neuropathic ulcers (7.2 ± 2.8 weeks, p<0.001). Kaplan-Meier analysis confirmed delayed healing in vascular ulcers (log-rank p<0.001).

Conclusion: Neuropathic ulcers show more favorable healing outcomes, whereas ischaemic and neuroischaemic ulcers are associated with advanced age, comorbidities, higher infection burden, delayed healing, and increased amputation risk. Early vascular assessment, prompt revascularization, and individualized care pathways are essential to improve outcomes in patients with PAD-associated DFUs, particularly in low-resource healthcare systems.

Keywords: Diabetic foot ulcer, Neuropathic ulcer, Ischaemic ulcer, Neuroischaemic ulcer, Peripheral arterial disease, Wound healing.

INTRODUCTION

Diabetic foot ulcers (DFUs) are a frequent and serious complication of diabetes mellitus, affecting nearly 15% of individuals with diabetes during their lifetime and accounting for over 85% of diabetes-related lower limb amputations worldwide.[1] The pathogenesis of DFUs is multifactorial and often involves varying degrees of peripheral neuropathy, peripheral arterial disease (PAD), and infection. Based on the predominant underlying pathology, DFUs are broadly categorized into neuropathic, ischaemic, and neuroischaemic types. Neuropathic ulcers typically occur over weight-bearing areas such as the plantar surface due to loss of protective sensation, motor neuropathy-induced deformities, and autonomic dysfunction leading to dry skin and fissures.[2] Ischaemic ulcers are more common over

the margins of the foot and toes, are often painful, and result from critical limb ischaemia due to PAD. Neuroischaemic ulcers exhibit features of both and are more prone to delayed healing and secondary infection.[3]

India has the second-largest number of people with diabetes globally, with an estimated 101 million adults living with diabetes as of 2023.[4] The prevalence of diabetic foot ulcers in India ranges from 4.6% to 11.6%, with higher incidence reported among patients with poor glycaemic control, long-standing diabetes, smoking history, and pre-existing neuropathy or PAD.[5] It was reported that neuropathic ulcers accounted for 52% of all DFUs, followed by neuroischaemic (32%) and pure ischaemic ulcers (16%), indicating a shifting trend in ulcer patterns possibly due to better neuropathy detection and rising prevalence of atherosclerotic disease.[6] Studies have also highlighted that almost 40% of neuroischaemic ulcers result in major amputations due to delayed presentation, inadequate vascular interventions, and poor wound healing.[7,8]

Accurate classification and characterization of DFUs is crucial for guiding management. While neuropathic ulcers may respond well to pressure offloading and glycaemic control, ischaemic and neuroischaemic ulcers require vascular assessment and possible revascularization to avoid limb loss. The Wagner grading system, although widely used, lacks specificity in differentiating ulcer types, while newer tools such as the University of Texas (UT) classification and SINBAD score have been advocated for a more comprehensive approach.[9,10] However, limited data exists on the specific characteristics and distribution of these ulcer types in Indian diabetic populations, particularly in prospective cohort designs that account for clinical, neurological, and vascular parameters in a systematic manner.

This study aimed to prospectively analyze the demographic, clinical, vascular, and neuropathic features of patients presenting with neuropathic, ischaemic, and neuroischaemic diabetic foot ulcers at a tertiary care center. By delineating the unique profiles and risk factors associated with each ulcer type, this study intends to contribute to early diagnosis, appropriate triage, and targeted intervention strategies in resource-constrained settings.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective cohort study conducted over a 2-year period from January 2021 to January 2023 in the Department of General Surgery a tertiary care center in North India. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants prior to enrollment.

Study Population

Adult patients aged 18 years and above with a confirmed diagnosis of type 1 or type 2 diabetes mellitus and presenting with diabetic foot ulcers (DFUs) of Wagner grade 1 to 3 were eligible for inclusion. Patients were recruited consecutively from outpatient and inpatient services. Exclusion criteria included foot ulcers of non-diabetic etiology (traumatic, venous, or malignant ulcers), active Charcot neuroarthropathy, previous major amputation (above the ankle), and those unwilling or unable to provide informed consent.

Sample Size

Based on previous Indian studies reporting a prevalence of neuroischaemic ulcers at 32%, and considering a confidence level of 95%, absolute precision of 7%, and a dropout rate of 10%, the minimum required sample size was calculated to be 90. To enhance the study's power and allow robust subgroup analysis, 96 patients were ultimately enrolled.

Baseline Assessment and Data Collection

Each patient underwent a detailed evaluation at baseline. Demographic details (age, sex, BMI, education), diabetes history (type, duration, treatment), comorbidities (hypertension, dyslipidemia, cardiovascular disease), lifestyle habits (smoking, alcohol use, barefoot walking), and previous history of foot ulcers or amputations were recorded. Ulcer characteristics such as duration, location, size, and presence of infection or slough were documented.

Ulcers were classified into neuropathic, ischaemic, or neuroischaemic based on clinical findings and objective testing. Neuropathic ulcers were defined by the presence of peripheral neuropathy with palpable pedal pulses and normal ABI. Ischaemic ulcers were diagnosed in the absence of neuropathy and presence of peripheral arterial disease (PAD) as indicated by absent pulses or ABI <0.9. Neuroischaemic ulcers showed features of both peripheral neuropathy and PAD.

Peripheral neuropathy was evaluated using a combination of four methods: 10-g monofilament testing at ten plantar sites, vibration perception threshold (VPT) using a biothesiometer with values >25 volts considered abnormal, ankle reflexes tested with a reflex hammer, and pinprick sensation using a sterile pin. A diagnosis of neuropathy was made if at least two of these modalities were abnormal.

Peripheral arterial disease was assessed by palpation of dorsalis pedis and posterior tibial pulses, followed by measurement of ankle–brachial index (ABI) using a handheld Doppler device. An ABI value <0.9 was considered indicative of PAD. For patients with ABI >1.3 or inconclusive readings, toe–brachial index and color Doppler ultrasonography were used for confirmation.

Ulcers were graded using the Wagner classification system (Grade 1–3 included in this study). Wound dimensions (length, width, depth) were measured using a sterile ruler. Presence of necrotic tissue,

slough, purulent discharge, or exposed bone was noted. In suspected infected ulcers, wound swabs were collected using sterile technique for bacterial culture and antibiotic sensitivity testing.

Laboratory Investigations

All participants underwent baseline biochemical testing including fasting and postprandial blood glucose, HbA1c, serum urea, creatinine, eGFR, lipid profile, and complete blood counts. In patients with clinical evidence of infection, inflammatory markers such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) were assessed.

Interventions

Patients received standard multidisciplinary care tailored to the ulcer type. Wound debridement was performed for slough or necrosis using sharp, enzymatic, or autolytic methods. Empiric antibiotic therapy was initiated in cases of clinically infected ulcers and modified as per culture sensitivity results. Offloading techniques such as total contact casting or customized footwear were provided for neuropathic and neuroischaemic ulcers. Revascularization (endovascular or surgical) was considered in selected cases of ischaemic and neuroischaemic ulcers with critical limb ischemia, based on vascular surgeon evaluation. Glycaemic control was optimized through adjustment of anti-diabetic medications.

Follow-Up and Outcome Assessment

Patients were followed up at 2-week intervals for a period of up to 12 weeks or until ulcer healing, whichever was earlier. At each visit, ulcer dimensions were reassessed, and wound photographs were taken. Healing was defined as complete epithelialization without drainage for two consecutive visits. Ulcers were categorized at 12 weeks into three outcome groups: completely healed, partially healed (>50% reduction in area), and non-healed (<50% reduction or worsening). Any complications such as secondary infection, need for hospitalization, or minor/major amputation were recorded.

Statistical Analysis

All data were compiled in Microsoft Excel and analyzed using IBM SPSS version 20.0. Continuous variables were presented as mean ± standard deviation (SD), and categorical variables were expressed as frequencies and percentages. Intergroup comparisons of ulcer characteristics, healing rates, and complications across the three ulcer types were performed using ANOVA test for continuous data and Chi-square for categorical variables. A p-value of <0.05 was considered statistically significant.

RESULTS

Patients with neuroischaemic ulcers were older (61.5 ± 9.6 years) and had a longer duration of diabetes (13.4 ± 6.2 years) compared to those with neuropathic (56.2 ± 8.7 years; 10.5 ± 4.8 years) and ischaemic ulcers (60.8 ± 9.2 years; 12.6 ± 6.1 years), with both differences being statistically significant (p=0.031 and p=0.042, respectively). Neuropathic patients had a higher BMI (26.1 ± 3.2 kg/m²; p=0.021), while CKD was significantly more common in neuroischaemic ulcers (43.5%; p=0.042). Although HbA1c levels and vascular risk factors like smoking, hypertension, and dyslipidemia were more frequent in the ischaemic and neuroischaemic groups, these differences were not statistically significant. Gender distribution was similar across groups (p=0.823) (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics of Patients with Neuropathic, Ischaemic, and Neuroischaemic Diabetic Foot Ulcers (n = 96)

Variable	Neuropathic (n=41)	Ischaemic (n=32)	Neuroischaemic (n=23)	p-value
	Frequency (%)/ mean ± SD			
Age (years)	56.2 ± 8.7	60.8 ± 9.2	61.5 ± 9.6	0.031*
Gender				
Male	28 (68.3%)	20 (62.5%)	16 (69.6%)	0.823
Female	13 (31.7%)	12 (37.5%)	7 (30.4%)	
Duration of diabetes (years)	10.5 ± 4.8	12.6 ± 6.1	13.4 ± 6.2	0.042*
HbA1c (%)	8.5 ± 1.3	8.9 ± 1.6	9.1 ± 1.7	0.095
BMI (kg/m²)	26.1 ± 3.2	24.3 ± 3.1	24.0 ± 3.7	0.021*
Smoking history	14 (34.1%)	14 (43.8%)	11 (47.8%)	0.452
Hypertension	21 (51.2%)	18 (56.3%)	16 (69.6%)	0.376
Dyslipidemia	17 (41.5%)	16 (50.0%)	14 (60.9%)	0.243
Chronic kidney disease	8 (19.5%)	10 (31.3%)	10 (43.5%)	0.042*

**Significant at p < 0.05.*

Ulcers in neuroischaemic patients were more severe and chronic compared to other groups. Mean ulcer area was significantly larger in neuroischaemic ulcers (4.1 ± 2.0 cm²) than in ischaemic (3.2 ± 1.7 cm²) and neuropathic ulcers (2.4 ± 1.2 cm²) (p=0.002). Similarly, ulcer duration was significantly longer in neuroischaemic patients (7.4 ± 3.3 weeks) versus ischaemic (6.1 ± 2.7 weeks) and neuropathic ulcers (4.6 ± 2.1 weeks) (p=0.011). Infection was more common in neuroischaemic ulcers (78.3%) compared to ischaemic (62.5%) and neuropathic (41.5%) groups (p=0.004). Slough or necrosis was also significantly more prevalent in the neuroischaemic group (65.2%) (p=0.001). Although Wagner grade, ulcer site, and prior ulcer history did not differ significantly across groups (p>0.05), a trend toward higher grades and recurrent ulcers was noted in ischaemic and neuroischaemic types, indicating greater tissue compromise and chronicity (Table 2)

Table 2: Ulcer-Related Clinical Features across Neuropathic, Ischaemic, and Neuroischaemic Diabetic Foot Ulcers

Ulcer Parameter	Neuropathic (n=41)	Ischaemic (n=32)	Neuroischaemic (n=23)	p-value
	Frequency (%)/ mean ± SD			
Wagner grade				
Grade 1	12 (29.3%)	6 (18.8%)	3 (13.0%)	0.212
Grade 2	20 (48.8%)	16 (50.0%)	12 (52.2%)	
Grade 3	9 (22.0%)	10 (31.3%)	8 (34.8%)	
Ulcer site				
Forefoot	28 (68.3%)	19 (59.4%)	15 (65.2%)	0.733
Midfoot	8 (19.5%)	9 (28.1%)	5 (21.7%)	
Hindfoot	5 (12.2%)	4 (12.5%)	3 (13.1%)	
Mean ulcer area (cm²)	2.4 ± 1.2	3.2 ± 1.7	4.1 ± 2.0	0.002*
Ulcer duration (weeks)	4.6 ± 2.1	6.1 ± 2.7	7.4 ± 3.3	0.011*
Presence of infection	17 (41.5%)	20 (62.5%)	18 (78.3%)	0.004*
Slough/necrosis present	9 (22.0%)	14 (43.8%)	15 (65.2%)	0.001*
Prior ulcer history	10 (24.4%)	11 (34.4%)	11 (47.8%)	0.053

Significant at p < 0.05.

The most commonly isolated organism across all ulcer types was Staphylococcus aureus (both MSSA and MRSA), with MSSA being predominant in neuropathic ulcers (35.3%) and MRSA more frequent in neuroischaemic ulcers (16.7%). Pseudomonas aeruginosa and Klebsiella pneumoniae were consistently isolated across all groups, each accounting for 15–20% of infections, suggesting a significant burden of Gram-negative organisms. Escherichia coli was relatively less common, seen in 11–15% of cases. Polymicrobial infections were present in a notable proportion, especially in neuroischaemic ulcers (16.7%), indicating more complex infections in this group. Overall, neuroischaemic ulcers demonstrated higher frequencies of MRSA and polymicrobial growth, reflecting their greater severity and compromised vascular status, which may predispose to more aggressive and treatment-resistant infections (Table 3).

Table 3: Microbiological Profile of Infected Diabetic Foot Ulcers among Neuropathic, Ischaemic, and Neuroischaemic Types (n = 55)

Organism Isolated*	Neuropathic (n=17)	Ischaemic (n=20)	Neuroischaemic (n=18)
	Frequency (%)		
Staphylococcus aureus (MSSA)	6 (35.3%)	5 (25.0%)	4 (22.2%)
Staphylococcus aureus (MRSA)	1 (5.9%)	2 (10.0%)	3 (16.7%)
Pseudomonas aeruginosa	3 (17.6%)	4 (20.0%)	3 (16.7%)
Klebsiella pneumoniae	3 (17.6%)	3 (15.0%)	3 (16.7%)
Escherichia coli	2 (11.8%)	3 (15.0%)	2 (11.1%)
Polymicrobial growth	2 (11.8%)	3 (15.0%)	3 (16.7%)

Swabs were taken only from clinically infected wounds using aseptic technique before antibiotic initiation.

Surgical debridement was the most common intervention across all groups, performed in over 75% of cases, with slightly higher rates in ischaemic (81.3%) and neuroischaemic (87.0%) ulcers. Antibiotic therapy was significantly more frequent in neuroischaemic ulcers (78.3%) compared to neuropathic (41.5%) and ischaemic ulcers (62.5%) (p=0.004), aligning with the higher infection burden observed in these patients. Offloading was provided in most cases, though its usage was slightly lower in ischaemic ulcers (68.8%). Vascular imaging and revascularization procedures were notably more common in ischaemic and neuroischaemic groups, with all patients in these groups undergoing vascular evaluation (100%) and around 20% requiring revascularization, which was statistically significant (p<0.001 and p=0.002 respectively). Glycemic optimization was uniformly implemented across all groups, reflecting standard diabetic foot care protocols. These patterns underscore the greater need for vascular interventions and infection management in ischaemic and neuroischaemic ulcers (Table 4).

Table 4: Interventions Administered for Management of Neuropathic, Ischaemic, and Neuroischaemic Diabetic Foot Ulcers (n = 96)

Intervention	Neuropathic (n=41)	Ischaemic (n=32)	Neuroischaemic (n=23)	p-value
	Frequency (%)			
Surgical debridement	31 (75.6%)	26 (81.3%)	20 (87.0%)	0.523
Antibiotic therapy	17 (41.5%)	20 (62.5%)	18 (78.3%)	0.004*
Offloading provided	35 (85.4%)	22 (68.8%)	18 (78.3%)	0.138
Vascular imaging done	12 (29.3%)	32 (100%)	23 (100%)	<0.001*
Revascularization procedure	0 (0%)	6 (18.8%)	5 (21.7%)	0.002*
Glycemic optimization done	39 (95.1%)	31 (96.9%)	22 (95.7%)	0.944

Significant at p < 0.05. Revascularization included endovascular (angioplasty) and surgical bypass.

Neuropathic ulcers showed the highest complete healing rate (68.3%) and the shortest time to healing (7.2 ± 2.8 weeks), significantly better than ischaemic and neuroischaemic ulcers ($p<0.05$). Neuroischaemic ulcers had the highest rates of minor (21.7%) and major amputations (13.0%) and hospitalizations (26.1%) ($p<0.05$), indicating poorer prognosis with vascular involvement (Table 5). The Kaplan-Meier analysis showed significantly faster and higher healing probability in neuropathic ulcers, while neuroischaemic ulcers had the slowest healing curve (log-rank $p<0.001$), highlighting the adverse impact of vascular compromise on ulcer healing (Figure 1).

Table 5: Ulcer Healing and Clinical Outcomes at 12-Week Follow-up by Ulcer Type (n = 96)

Outcome	Neuropathic (n=41)	Ischaemic (n=32)	Neuroischaemic (n=23)	p-value
	Frequency (%)/ mean ± SD			
Completely healed	28 (68.3%)	14 (43.8%)	9 (39.1%)	0.011*
Partially healed (>50% area ↓)	10 (24.4%)	12 (37.5%)	10 (43.5%)	0.139
Non-healed/worsened	3 (7.3%)	6 (18.8%)	4 (17.4%)	0.138
Time to healing (weeks)	7.2 ± 2.8	9.6 ± 3.1	10.1 ± 3.5	<0.001*
Minor amputation	2 (4.9%)	4 (12.5%)	5 (21.7%)	0.043*
Major amputation	0 (0%)	2 (6.3%)	3 (13.0%)	0.031*
Ulcer-related hospitalization	3 (7.3%)	5 (15.6%)	6 (26.1%)	0.032*

**Significant at p < 0.05. Follow-up done at regular 2-week intervals up to 12 weeks or until healing/amputation.*

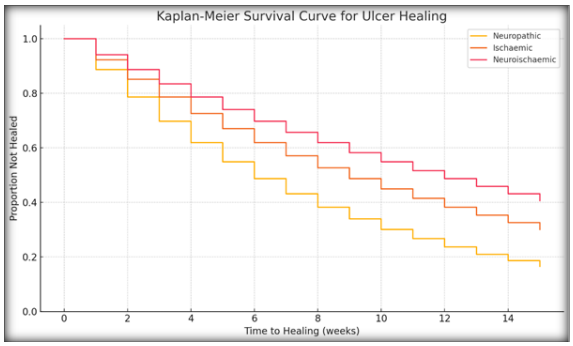

Figure 1: Kaplan-Meier Survival Curve Illustrating Time to Ulcer Healing Among Neuropathic, Ischaemic, and Neuroischaemic Diabetic Foot Ulcers

DISCUSSION

In this prospective cohort study involving 96 patients with diabetic foot ulcers (DFUs), we classified patients into neuropathic, ischaemic, and neuroischaemic groups and systematically analyzed clinical characteristics, microbiological profiles, therapeutic interventions, and outcomes over a 12-week period. Our findings demonstrate significant clinical and prognostic differences among the three ulcer types, highlighting the multifactorial pathophysiology underlying diabetic foot complications.

Patients with ischaemic and neuroischaemic ulcers were significantly older than those with neuropathic ulcers (60.8 ± 9.2 and 61.5 ± 9.6 years vs. 56.2 ± 8.7 years; $p=0.031$), a trend consistent with studies from Khan et al., and Mayrovitz et al., that associate increasing age with peripheral arterial disease (PAD) and compromised tissue perfusion.[11,12] Similarly, the duration of diabetes was significantly longer in the ischaemic and neuroischaemic groups (12.6 ± 6.1 and 13.4 ± 6.2 years, respectively) compared to the neuropathic group (10.5 ± 4.8 years; $p=0.042$), supporting the hypothesis that chronic hyperglycemia progressively impairs both neuronal and vascular integrity.[13,14] While HbA1c levels were not statistically different among groups, patients with neuroischaemic ulcers had the highest mean values (9.1 ± 1.7%), aligning with global findings that associate poor glycemic control with poor wound healing and infection risk.[15]

Ulcer characteristics varied markedly by type. Neuroischaemic ulcers had the largest area (4.1 ± 2.0 cm²), longest duration (7.4 ± 3.3 weeks), and the highest incidence of infection (78.3%) and slough/necrosis (65.2%) compared to other groups, all statistically significant. These findings reflect the cumulative effects of impaired vascular perfusion and neuropathy, which synergistically delay healing and promote tissue breakdown.[16] Our findings parallel those of Gong et al., who reported that neuroischaemic ulcers in Chinese cohorts had lower healing rates, higher infection rates, and significantly more tissue loss compared to other DFU types.[17] Similar trends have been reported in Indian populations, including by Viswanathan et al., who noted greater severity and complexity in neuroischaemic ulcers among South Indian patients.[18]

Microbiologically, Staphylococcus aureus (MSSA) remained the most commonly isolated pathogen across all groups. However, MRSA and polymicrobial infections were more prevalent in neuroischaemic ulcers (16.7%), suggesting more aggressive or recurrent infections in this subgroup. These findings are consistent with Indian studies by Selvarajan et al., and Sekhar et al., which reported a higher prevalence of multidrug-resistant organisms and polymicrobial infections in patients with chronic or advanced ulcers, especially those with vascular insufficiency.[19,20]

Therapeutically, vascular imaging and revascularization procedures were performed exclusively in patients with ischaemic and neuroischaemic ulcers, reflecting the clinical need for perfusion assessment and restoration in these groups ($p<0.001$ and $p=0.002$, respectively). These findings are consistent with recommendations from the International Working Group on the Diabetic Foot (IWGDF), which emphasizes the role of

revascularization in ischaemic and neuroischaemic ulcers.[21] Antibiotic therapy was significantly more common in neuroischaemic patients (78.3%) compared to neuropathic patients (41.5%) (p=0.004), supporting previous literature by Lu et al., that links vascular insufficiency to poor host immune response and deeper, more complicated infections.[22]

Follow-up data demonstrated stark contrasts in healing outcomes. Complete healing was achieved in 68.3% of neuropathic ulcers, but in only 43.8% and 39.1% of ischaemic and neuroischaemic ulcers, respectively (p=0.011). The average time to healing was significantly shorter in neuropathic ulcers (7.2 ± 2.8 weeks) than in ischaemic (9.6 ± 3.1 weeks) and neuroischaemic ulcers (10.1 ± 3.5 weeks; p<0.001), corroborating the findings of Smith-Strøm et al., who reported that neuroischaemic ulcers require longer healing times and are more likely to result in amputation if left untreated.[23] The Kaplan-Meier survival curve clearly illustrated this disparity, with neuropathic ulcers demonstrating a faster and higher healing probability over time, while neuroischaemic ulcers had the lowest survival (healing) probability (log-rank p<0.001), consistent with findings from the EURODIALE and UK National Diabetes Foot Audit.[24,25]

Amputation rates were also higher in neuroischaemic ulcers, with major amputations occurring in 13.0% and minor in 21.7% of cases (p=0.031 and p=0.043, respectively). This aligns with the global observation by Lu et al., that combined vascular and neurological impairment dramatically increases the risk of limb loss.[26] Ulcer-related hospitalizations followed a similar trend, being significantly more common in the neuroischaemic group (26.1%, p=0.032), further emphasizing the burden of care and cost implications associated with this subgroup.[27,28,29]

CONCLUSION

Overall, our study reinforces that neuroischaemic ulcers represent the most severe DFU phenotype, with delayed healing, high infection risk, and increased rates of amputation and hospitalization. The findings underscore the importance of early classification of ulcer type, prompt vascular assessment, aggressive infection control, and a multidisciplinary approach to diabetic foot care. In resource-limited settings like India, stratifying patients by ulcer type may help optimize treatment pathways and allocate resources more efficiently.

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