Section: Miscellaneous

Case Report

MULTIDISCIPLINARY APPROACH TO SALVAGING A PRECIOUS DIABETIC LIMB WITH CONTRALATERAL LIMB CONSIDERATIONS: A CASE REPORT

Premkumar E[1], Aravind P[2]

[1]*Senior Consultant, Chennai Diabetic Foot Care Centre, Kilpauk, Chennai, Tamil Nadu, India.*
[2]*Consultant General Surgeon, Consultant, Chennai Diabetic Foot Care Centre, Kilpauk, Chennai, Tamil Nadu, India*

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Corresponding Author:
Dr. Premkumar E,
Senior Consultant, Chennai Diabetic Foot Care Centre, Kilpauk, Chennai, Tamil Nadu, India.
Email: prem.surgeon@gmail.com

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ABSTRACT

Background: Diabetic foot ulcers are a leading cause of non-traumatic lower limb amputations, particularly in patients with poor glycemic control and peripheral vascular disease. Limb preservation becomes critically important when the contralateral limb is already compromised, as further amputation can result in significant functional disability.

Case Presentation: We present the case of a 56-year-old male with long-standing uncontrolled diabetes mellitus who developed an infected ulcer over the right foot. The patient had a prior history of contralateral forefoot amputation, rendering the affected limb functionally critical Clinical evaluation revealed a deep ulcer with surrounding cellulitis, peripheral neuropathy, and reduced distal perfusion. Laboratory investigations showed poor glycemic control and elevated inflammatory markers. Imaging confirmed soft tissue infection without advanced osteomyelitis. A multidisciplinary approach involving diabetology, surgery, vascular assessment, and wound care was implemented. The patient underwent prompt surgical debridement, culture-directed antibiotic therapy, strict glycaemic control, and structured wound care with appropriate offloading strategies.

Conclusion: This case highlights the importance of early multidisciplinary intervention in salvaging a high-risk diabetic limb, especially in the presence of contralateral limb compromise. Coordinated care can effectively prevent major amputation and preserve functional independence.

Keywords: Diabetic foot ulcer; Limb salvage; Multidisciplinary care; Peripheral arterial disease; Wound management.

INTRODUCTION

Diabetic foot ulcers (DFUs) represent one of the most serious and disabling complications of diabetes mellitus, accounting for a significant proportion of hospital admissions and lower extremity amputations worldwide.[1,2] The pathogenesis of DFUs is multifactorial, involving peripheral neuropathy, peripheral arterial disease, and infection, which together contribute to impaired wound healing and progressive tissue destruction.[2,9] It is estimated that up to 25% of patients with diabetes develop a foot ulcer during their lifetime, with a substantial risk of subsequent amputation.[1]

The presence of infection and ischemia markedly increases the likelihood of poor outcomes, including limb loss.[3,5] Early recognition and timely intervention are therefore critical in preventing disease progression. In recent years, multidisciplinary management involving diabetologists, surgeons, vascular specialists, and wound care teams has been shown to significantly reduce amputation rates and improve patient outcomes.[1,12]

Limb preservation assumes even greater importance in patients with contralateral limb compromise, where further amputation may lead to severe functional limitation, loss of ambulation, and diminished quality of life.[1,9] In such scenarios, aggressive yet carefully coordinated management is essential to salvage the affected limb.

We report a case that highlights the effectiveness of a multidisciplinary approach in managing a high-risk diabetic foot ulcer in a patient with prior contralateral

limb amputation, emphasizing the importance of early intervention and comprehensive care in achieving successful limb salvage.

Case Presentation

A 56-year-old male with a 12-year history of poorly controlled type 2 diabetes mellitus presented with a non-healing ulcer over the right foot for a duration of two weeks. The patient reported progressive increase in size of the ulcer associated with pain, swelling, and purulent discharge. There was no history of trauma preceding the lesion. The patient had a significant past history of left forefoot amputation performed two years earlier due to a diabetic foot infection. He was irregular with medications and follow-up, with suboptimal glycemic control.

On general examination, the patient was hemodynamically stable with no evidence of systemic sepsis. Local examination of the right foot revealed a 4 × 5 cm ulcer over the plantar aspect with irregular margins, slough-covered base, and foul-smelling purulent discharge. Surrounding cellulitis, local warmth, and tenderness were noted. Neurological examination demonstrated reduced protective sensation consistent with peripheral neuropathy. Peripheral pulses, including dorsalis pedis and posterior tibial arteries, were diminished, indicating compromised distal perfusion. The contralateral limb showed a healed forefoot amputation with limited functional weight-bearing capacity.

Figure 1: Pre-operative clinical image of infected diabetic heel ulcer

Figure 1 Notes: Pre-operative photograph of the right foot demonstrating a plantar heel ulcer with necrotic slough, surrounding induration, and features suggestive of active infection. Associated callosities and skin changes are consistent with a neuropathic diabetic foot.

Clinical Findings

On presentation, the patient was hemodynamically stable but appeared clinically unwell due to ongoing infection. Local examination of the right foot revealed a deep ulcer measuring approximately 4 × 5 cm over the plantar aspect, with irregular margins and surrounding erythema. The ulcer base contained slough with purulent discharge and a foul odor, suggestive of active infection. There was associated local warmth, tenderness, and induration of the surrounding tissues.

Neurological examination demonstrated features of peripheral neuropathy, including reduced protective sensation to monofilament testing and diminished vibration sense. Vascular assessment revealed weakly palpable dorsalis pedis and posterior tibial pulses, indicating compromised distal perfusion.

No signs of systemic sepsis such as hypotension or altered mental status were noted at presentation. The contralateral limb showed evidence of prior forefoot amputation with healed surgical margins, but functional limitation in weight-bearing was observed. Overall, the clinical findings were consistent with an infected diabetic foot ulcer with associated neuropathic and ischemic components.

Laboratory investigations revealed poor glycemic control with elevated HbA1c levels (>9%), leukocytosis, and raised inflammatory markers including C-reactive protein and erythrocyte sedimentation rate. Plain radiography of the foot did not demonstrate obvious osteomyelitis. Further imaging, where available, suggested soft tissue involvement without significant bone destruction. Doppler ultrasonography indicated reduced arterial flow, suggestive of underlying peripheral arterial disease.

Based on clinical, laboratory, and imaging findings, a diagnosis of an infected diabetic foot ulcer with associated neuropathic and ischemic components (Wagner Grade II–III) was established.

A multidisciplinary management approach was initiated. The patient was started on intensive insulin therapy for glycemic optimization. Empirical broad-spectrum intravenous antibiotics were administered and later tailored according to culture and sensitivity results. Surgical debridement was performed to remove necrotic tissue and reduce the infectious burden. Advanced wound care strategies, including regular sterile dressings and consideration of negative pressure wound therapy, were employed. Vascular status was closely monitored, and medical management of peripheral arterial disease was optimized. Offloading techniques using customized footwear were implemented to reduce pressure on the ulcer site. Physiotherapy and rehabilitation were initiated, taking into account the functional limitation of the contralateral limb.

During follow-up, the patient showed progressive clinical improvement with reduction in infection, formation of healthy granulation tissue, and gradual wound healing. Importantly, major amputation was avoided. At subsequent follow-up visits, the patient was able to ambulate with assistance, demonstrating preservation of functional independence.

Timeline

Time Point	Clinical Event
Day 0	Onset of right foot ulcer
Day 7	Progressive increase in size with discharge and pain
Day 14	Presentation to hospital
Day 15	Clinical evaluation and laboratory investigations performed
Day 15	Imaging (X-ray ± MRI) and vascular assessment (Doppler)
Day 16	Surgical debridement of necrotic tissue
Day 16–17	Initiation of empirical intravenous antibiotics and insulin therapy
Day 18	Culture reports obtained; antibiotics tailored accordingly
Day 17 onwards	Regular wound care and offloading measures
Week 2	Reduction in infection and improvement in local signs
Week 4	Healthy granulation tissue formation and significant wound healing
Follow-up	Limb preserved with assisted ambulation

Diagnostic Assessment

Initial laboratory investigations revealed poor glycemic control, with glycated hemoglobin (HbA1c) levels exceeding 9%. There was evidence of systemic inflammation, as indicated by leukocytosis along with elevated C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). Renal and liver function tests were within acceptable limits.

Microbiological evaluation of the wound discharge was performed, and culture and sensitivity testing guided subsequent antibiotic therapy. Initial empirical broad-spectrum antibiotics were initiated and later tailored according to culture results.

Plain radiography of the right foot did not demonstrate overt signs of osteomyelitis, such as cortical erosion or periosteal reaction. Where available, magnetic resonance imaging (MRI) provided further assessment, revealing soft tissue infection without significant bone involvement, thereby excluding advanced osteomyelitis.

Vascular assessment using Doppler ultrasonography demonstrated reduced arterial flow in the affected limb, consistent with peripheral arterial disease. These findings correlated clinically with diminished distal pulses.

Based on the clinical presentation, laboratory findings, imaging studies, and vascular assessment, a diagnosis of an infected diabetic foot ulcer with associated neuropathic and ischemic components (Wagner Grade II–III) was established.

Therapeutic Intervention

A multidisciplinary management approach was adopted, involving diabetology, surgical, vascular, and wound care teams, given the high-risk nature of the limb and the presence of contralateral limb compromise.

Glycemic Control:

The patient was initiated on intensive insulin therapy to achieve optimal glycemic control. Blood glucose levels were closely monitored and adjusted to maintain euglycemia, which is critical for infection control and wound healing.

Antibiotic Therapy:

Empirical broad-spectrum intravenous antibiotics were started at admission to cover common gram-positive, gram-negative, and anaerobic organisms. Following microbiological culture and sensitivity results from the wound discharge, antibiotic therapy was tailored accordingly to ensure targeted antimicrobial coverage.

Surgical Management:

Prompt surgical debridement was performed to remove necrotic tissue and reduce the infectious load. The procedure was carried out under strict aseptic conditions, with preservation of viable tissue to facilitate wound healing and prevent progression to deeper infection.

Wound Care:

Post-debridement, the wound was managed with regular sterile dressings using advanced wound care techniques. Where appropriate, negative pressure wound therapy (vacuum-assisted closure) was considered to promote granulation tissue formation and enhance healing.

Vascular Management:

Given the evidence of peripheral arterial disease, the patient underwent vascular assessment and was managed conservatively with optimization of circulation, including antiplatelet therapy and risk factor modification. Revascularization was considered but not deemed immediately necessary based on clinical findings.

Offloading and Pressure Redistribution:

Customized offloading strategies, including specialized footwear and pressure-relieving devices, were implemented to minimize mechanical stress on the ulcer site and facilitate healing.

Rehabilitation:

Physiotherapy and mobility training were initiated early, taking into account the functional limitations of the contralateral limb. The goal was to preserve ambulation and prevent further complications.

Figure 2: Post-debridement clinical image of diabetic heel ulcer

Figure 2 Notes: Post-operative image following surgical debridement demonstrating removal of necrotic tissue and exposure of a clean wound bed with viable tissue and early granulation.

Follow-Up and Outcomes

The patient was closely monitored throughout the hospital stay and during subsequent outpatient follow-up. In the immediate postoperative period, there was a marked reduction in local signs of infection, including decreased erythema, swelling, and purulent discharge. Serial wound assessments demonstrated progressive improvement, with the development of healthy granulation tissue.

Glycemic control improved significantly with insulin therapy, contributing to enhanced wound healing. Inflammatory markers showed a downward trend over the course of treatment. No evidence of systemic infection or further tissue necrosis was observed.

By the second week of follow-up, the wound size had reduced considerably, and the surrounding cellulitis had resolved. Continued wound care and strict offloading measures facilitated further healing. At approximately four weeks, the ulcer demonstrated substantial epithelialization without the need for additional surgical intervention.

Importantly, major amputation was successfully avoided. The patient was able to achieve assisted ambulation, taking into account the functional limitation of the contralateral limb. Ongoing outpatient follow-up was advised for continued wound care, glycemic control, and prevention of recurrence.

Figure 3: Follow-up clinical image showing healing diabetic heel ulcer

Figure 3 Note: Follow-up photograph of the right heel ulcer demonstrating significant wound healing with healthy granulation tissue, reduction in ulcer size, and areas of epithelialization.

DISCUSSION

Diabetic foot ulcers (DFUs) are a major cause of morbidity and remain one of the leading indications for non-traumatic lower limb amputations worldwide.[1,2] The pathogenesis is multifactorial, involving peripheral neuropathy, ischemia due to peripheral arterial disease, and superimposed infection.[2,9] These factors collectively impair wound healing and predispose to progressive tissue destruction if not managed promptly and effectively.

The present case highlights several important clinical challenges, particularly the management of a high-risk diabetic limb in the setting of contralateral limb compromise. In such patients, limb preservation becomes critically important, as further amputation may lead to significant disability, loss of ambulation, and reduced quality of life.[1,9] Therefore, aggressive yet carefully coordinated management is essential.

One of the key factors contributing to successful limb salvage in this case was early and thorough surgical debridement. Removal of necrotic tissue reduces bacterial load and facilitates the formation of healthy granulation tissue, which is crucial for wound healing.[8,11] Delayed or inadequate debridement has been associated with poorer outcomes and increased risk of amputation.[4]

Glycemic control is another cornerstone in the management of diabetic foot infections. Hyperglycemia impairs leukocyte function, delays wound healing, and increases susceptibility to infection.[3,4] In this patient, intensive insulin therapy resulted in improved metabolic control, which likely contributed to the favorable outcome.

The role of multidisciplinary care cannot be overemphasized. Studies have demonstrated that coordinated care involving diabetologists, surgeons, vascular specialists, and wound care teams significantly reduces amputation rates.[1,12] Each specialty addresses a critical component of the disease process—metabolic control, infection management, vascular status, and wound healing—thereby improving overall outcomes.

Peripheral arterial disease is a significant predictor of poor healing in diabetic foot ulcers.[5,6] In this case, vascular assessment allowed timely identification of compromised perfusion, enabling appropriate optimization of circulation. Although revascularization was not immediately required, its consideration is essential in similar cases where critical limb ischemia is present.[5]

Offloading strategies also played a crucial role in promoting wound healing by reducing mechanical stress on the ulcer site.[10] Without adequate offloading, even well-managed wounds are prone to delayed healing and recurrence.

The uniqueness of this case lies in the functional importance of the affected limb due to prior contralateral amputation. This added complexity necessitated a more aggressive and comprehensive treatment approach. Preservation of even partial limb function in such patients has a profound impact on mobility, independence, and overall quality of life.[1]

Despite the favorable outcome, this case has certain limitations. Long-term follow-up data regarding recurrence and functional outcomes are limited. Additionally, as a single case report, the findings may not be generalizable but nonetheless provide valuable clinical insights.

CONCLUSION

This case underscores the critical importance of a multidisciplinary approach in the management of complex diabetic foot ulcers, particularly in patients with contralateral limb compromise. Early diagnosis, prompt surgical intervention, strict glycemic control, and coordinated care can effectively prevent major amputations and preserve functional independence. Limb salvage in such high-risk cases not only improves clinical outcomes but also has a significant impact on the patient's quality of life.

Patient Perspective

The patient expressed satisfaction with the treatment and was relieved to have avoided further amputation, especially given the prior loss of part of the contralateral limb. He reported a significant improvement in mobility and confidence in performing daily activities following wound healing. The patient acknowledged the importance of maintaining strict glycemic control and adhering to medical advice to prevent recurrence. He also expressed appreciation for the coordinated care provided by the multidisciplinary team.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. The patient was assured that all personal identifiers would be kept confidential, and anonymity has been maintained.

Ethical Approval

Ethical approval was obtained from the institutional ethics committee in accordance with local regulations and guidelines. The study was conducted in compliance with the principles of the Declaration of Helsinki.

Conflict of Interest: The authors declare that they have no conflicts of interest regarding the publication of this case report.

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