

Understanding and Managing Diabetic Foot Ulcers: A Comprehensive Review

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Abstract

Diabetic foot ulcers (DFUs) represent a formidable challenge in the realm of diabetic complications, posing significant clinical, economic, and public health burdens globally. As one of the most prevalent complications of diabetes mellitus, DFUs contribute to increased morbidity, mortality, and healthcare costs, while severely impairing the quality of life for affected individuals. Despite advancements in medical care and diabetes management strategies, the incidence of DFUs continues to rise, necessitating a deeper understanding of their pathophysiology, risk factors, and management approaches. The pathogenesis of DFUs is multifactorial, involving a complex interplay of metabolic, neuropathic, vascular, and immunological factors. Chronic hyperglycemia, a hallmark of diabetes, underlies the development of microvascular and macrovascular complications, impairing tissue perfusion and wound healing processes. Concurrent peripheral neuropathy further exacerbates the risk of DFUs by causing loss of protective sensation, altered biomechanics, and increased susceptibility to trauma. Moreover, impaired immune function and compromised host defense mechanisms predispose individuals with diabetes to infection, further complicating the management of DFUs [1]. Identifying the risk factors associated with DFUs is paramount for implementing preventive measures and early intervention strategies. Long-standing diabetes, poor glycemic control, peripheral neuropathy, peripheral arterial disease, foot deformities, trauma, and smoking are among the key risk factors implicated in the development of DFUs. A comprehensive understanding of these risk factors allows for targeted interventions aimed at mitigating the occurrence and progression of DFUs. The clinical presentation and diagnosis of DFUs require a systematic approach, encompassing thorough assessment of the wound characteristics, vascular status, presence of infection, and associated comorbidities. Prompt diagnosis and appropriate management strategies are essential to prevent complications such as infection, gangrene, and lower extremity amputation, which are all too common sequelae of untreated DFUs [2]. Management of DFUs necessitates a multidisciplinary approach, involving collaboration among podiatrists, endocrinologists, vascular surgeons, infectious disease specialists, and wound care experts. Treatment strategies aim to optimize glycemic control, alleviate pressure on the affected area, promote wound healing, prevent

Keywords: Diabetic foot ulcers; Diabetes mellitus; Neuropathy; Vascular disease; Wound healing; Prevention; Management

Introduction

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leads to loss of protective sensation, rendering individuals vulnerable to unnoticed trauma and injury. Motor neuropathy alters biomechanics, causing deformities and abnormal pressure distribution on the feet, further predisposing to ulcer formation. Autonomic neuropathy affects sweat gland function and blood flow regulation, impairing wound healing and increasing susceptibility to infection [5,6].

Peripheral arterial disease (PAD) is another significant contributor to the pathophysiology of DFUs. Macrovascular complications associated with diabetes, including atherosclerosis and arterial occlusive disease, compromise blood flow to the lower extremities, impairing tissue oxygenation and nutrient delivery. Ischemia exacerbates tissue damage and delays wound healing, significantly impacting the natural history of DFUs. The diabetic foot represents a unique microenvironment conducive to the development of chronic wounds. Prolonged exposure