



Diabetic Foot Ulcers: Pathophysiology, Risk Factors, and Clinical Management

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DESCRIPTION

Diabetic foot ulcers are one of the most serious and common complications associated with diabetes mellitus, often leading to significant morbidity and reduced quality of life. These chronic wounds typically develop on the feet of individuals with long-standing diabetes and are the result of a combination of factors, including peripheral neuropathy, poor circulation, and impaired immune response. If not managed appropriately, they can progress to severe infections and may ultimately require amputation.

The development of diabetic foot ulcers is closely linked to peripheral neuropathy, a condition characterized by damage to the nerves of the lower extremities. This nerve damage reduces sensation in the feet, making individuals less aware of minor injuries such as cuts, blisters, or pressure sores. Without the protective sensation of pain, these small injuries often go unnoticed and untreated, allowing them to worsen over time. Repeated mechanical stress, especially in areas subjected to high pressure, further contributes to tissue breakdown and ulcer formation. Peripheral arterial disease also plays a critical role in the progression of diabetic foot ulcers. Reduced blood flow to the lower limbs limits the delivery of oxygen and essential nutrients required for tissue repair. This impaired circulation slows the healing process and increases the risk of infection. In individuals with diabetes, blood vessels may become narrowed or damaged due to prolonged exposure to high glucose levels, further compromising vascular function.

Infection is a major concern in diabetic foot ulcers and significantly complicates their management. Elevated blood glucose levels create an environment that supports bacterial growth, while impaired immune function reduces the body's ability to fight infection. Once an ulcer becomes infected, it can rapidly spread to deeper tissues, including muscles and bones, leading to conditions such as osteomyelitis. Early identification and treatment of infection are essential to prevent serious complications.

Several risk factors increase the likelihood of developing diabetic foot ulcers. Poor glycemic control is one of the most significant contributors, as sustained hyperglycemia accelerates nerve damage and vascular impairment. Other risk factors include long duration of diabetes, smoking, obesity, improper footwear, and a history of previous foot ulcers or amputations. Structural foot abnormalities, such as deformities or callus formation, can also increase pressure points and predispose individuals to ulceration.

Clinical assessment of diabetic foot ulcers involves a comprehensive evaluation of the wound, including its size, depth, and presence of infection. Healthcare providers also assess vascular status and neurological function to determine underlying causes and guide treatment decisions. Classification systems are often used to categorize ulcers based on severity, which helps in planning appropriate management strategies.

Management of diabetic foot ulcers requires a multidisciplinary approach that addresses both the wound and the underlying conditions. Wound care is a central component and includes regular cleaning, debridement of dead tissue, and the use of appropriate dressings to maintain a moist healing environment. Offloading, which involves reducing pressure on the affected area through specialized footwear or devices, is essential to prevent further tissue damage and promote healing.

CONCLUSION

Diabetic foot ulcers are a serious complication of diabetes that arise from a combination of neuropathy, vascular impairment, and infection. Their management requires a comprehensive approach that includes effective wound care, infection control, and addressing underlying risk factors. Preventive strategies and patient education are essential in reducing the burden of this condition. Early detection and timely intervention can significantly improve outcomes and help preserve limb function. In cases where infection is present, antibiotic therapy is necessary to control bacterial growth.

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