



Unveiling the challenges of diabetic foot infections: diagnosis, pathogenesis, treatment, and rehabilitation

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Diabetic foot infections (DFIs) are complex and debilitating consequences of diabetes mellitus with far-reaching implications for affected individuals. Understanding the diagnosis, pathogenesis, treatment, and rehabilitation of DFIs is not only a medical necessity but also a matter of critical importance for public health.

Diagnosis: the crucial first step

A prompt and accurate diagnosis is the cornerstone of DFI management. Often, patients may not recognize early signs because neuropathy can dull pain sensations. Clinicians must be vigilant and perform regular foot examinations in patients with diabetes, looking for red flags such as ulcers, calluses, and signs of infection [1].

It is important to correctly diagnose osteomyelitis when treating DFIs. The 2020 Guidelines and Recommendations of the International Working Group on the Diabetic Foot distinguish between DFI and diabetic foot osteomyelitis and recommend different treatment approaches. Advanced imaging modalities, including magnetic resonance imaging and nuclear medicine imaging, can help determine the extent of infection and osteomyelitis [2,3].

Woo et al. [4] have summarized the published diagnostic tools for DFI by asking questions and finding answers.

Pathophysiology: understanding the underlying mechanisms

The pathophysiology of DFI is complex. Hyperglycemia leads to nerve damage (neuropathy) and poor circulation (peripheral arterial disease), making the foot susceptible to injury and infection [5,6]. In addition, impaired immune function hinders the body's ability to fight invading pathogens. Understanding the underlying mechanisms is critical for developing effective treatment strategies.

Kim [7] provided an in-depth review of the pathophysiology of diabetic foot ulcers from the perspectives of metabolism, neuropathy, angiopathy, and the immune system.

Treatment: a multidisciplinary endeavor

The management of DFI requires a multidisciplinary approach. Collaboration among orthopedic surgeons, endocrinologists, infectious disease specialists, plastic surgeons, and vascular surgeons is essential to manage the complexity of these cases.

The removal of infected and dead tissue is a fundamental step in preventing the spread of infection. Targeted antibiotic therapies are commonly used to treat bacterial infections. Tailoring antibiotics to the specific pathogens identified by culture is essential to improve efficacy and reduce antibiotic resistance. In cases of compro-

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mised circulation, revascularization procedures, such as angioplasty or bypass surgery, can improve blood flow to the affected area and promote healing. Keeping pressure off the affected foot is critical to prevent further damage and promote healing [8]. Customized orthotics or special shoes may be recommended. In some cases, hyperbaric oxygen therapy may improve wound healing by increasing oxygen delivery to the tissues [9]. Tight glycemic control is paramount for preventing further complications and promoting overall health.

Kim et al. [10] reviewed both conventional and adjuvant DFI treatments, including dressings with placenta-derived products, sucrose octasulfate-impregnated materials, leukocyte- and platelet-rich fibrin patches, hyperbaric oxygen therapy, and negative-pressure wound therapy.

Rehabilitation: restoring function and quality of life

Rehabilitation is often overlooked as a critical aspect of DFI management. It includes physical therapy, patient education, and psychosocial support. Physical therapy helps patients regain mobility and strength, and education empowers them to manage their condition effectively [11]. Psychosocial support addresses the emotional burden of living with a chronic condition and its associated complications, ensuring that patients maintain a positive outlook during their rehabilitation journey [12].

An et al. [13] reviewed the sequential care of patients with DFIs, including preoperative care, surgery, and postoperative rehabilitation, focusing on moderate and severe cases.

In summary, the diagnosis, pathogenesis, treatment, and rehabilitation of DFIs require a holistic approach that combines medical expertise, patient education, and ongoing research. Emphasizing prevention, early intervention, and comprehensive care can reduce the burden of this debilitating condition on individuals and the healthcare system. DFI is a serious and growing problem; however, with collective effort and innovation, the outcomes and quality of life of people with diabetes can be improved.

Notes

Conflicts of interest

Chul Hyun Park has been an editorial board member of *Journal of Yeungnam Medical Science* since 2020. He was not involved in the review process of this manuscript. There is no other conflicts of interest to declare.

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