

Diabetic Charcot Neuroarthropathy of the Foot and Ankle with Osteomyelitis



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KEYWORDS

• Diabetic neuropathy • Ulceration • Charcot foot • Osteomyelitis • External fixation

KEY POINTS

- Diabetic Charcot neuroarthropathy (CN) of the foot and ankle can lead to major pedal complications, including a severe deformity, ulceration, and potential amputation.
- Concomitant osteomyelitis in the presence of a diabetic CN of the foot and ankle can pose a significant challenge in the diagnosis and treatment of the 2 entities.
- Combined medical and surgical treatment strategies through a multidisciplinary team effort may improve long-term outcomes in this population.

INTRODUCTION

Although osteomyelitis is known as one of the oldest diseases, its presence in the diabetic Charcot neuroarthropathy (CN) of the foot and ankle remains challenging in diagnosis, medical management and surgical reconstruction. The most significant risk factor for diabetic CN and osteomyelitis is the presence of a pre-existing ulceration in a patient with dense peripheral neuropathy,¹ which has been shown to drastically increase the amputation risk.² Furthermore, a severely dislocated and unstable diabetic CN of the foot and/or ankle might also be a predisposing factor to development of osteomyelitis. Osteomyelitis among patients with diabetic CN of the foot and ankle is most commonly caused by direct contiguous spread of infection from a local area of ulceration. Hematogenous osteomyelitis, although rare, may also be encountered with both acute and/or chronic diabetic CN.

Acute CN, which clinically manifests as a warm, edematous, and often erythematous foot and/or ankle, can often be mistaken for infection. A high index of suspicion

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is needed to accurately diagnose this stage of CN and provide adequate immobilization that can help prevent further periarticular lower extremity subluxations and/or dislocations, which often lead to severe deformities and bony prominences in the later stages of CN. In addition, the overuse of oral or systemic antibiotics for an acute CN event is evident, as it is commonly mistaken for cellulitis. Close patient observation while holding the antibiotic therapy may be required to adequately make the diagnosis of acute CN versus infection. This clinical case scenario creates challenges when the osseous deformity of CN eventually ulcerates and does become infected. Antibiotic administration needs to be considered, particularly when cultures reveal drug-resistant pathogens or when patients have a history of kidney or liver disease.

Patients with chronic diabetic CN of the foot and/or ankle are most commonly encountered in the clinical setting, because these patients often do not notice a deformity until an ulceration develops or deformity impedes their ability to ambulate or wear regular shoe gear. The midfoot, particularly the tarsometatarsal (Lisfranc) joint complex, is the most frequent location for joint collapse and disorganization; however, the hindfoot and ankle are becoming increasingly prevalent locations for CN (Fig. 1). Excessive pressure at these areas in the diabetic insensate foot and in the absence of proper off-loading can lead to extensive neuropathic ulcerations and subsequent bone infections. The underlying bone at the ulceration site is exposed to bacteria that invade vascular channels and subsequently increase intraosseous pressure that impedes blood flow and finally leads to ischemic bone necrosis. Impaired immune response, often encountered in diabetic patients along with common comorbidities, has also been implicated in allowing these infections to worsen and further increasing the risk of limb loss.³ It is also important to mention that osteomyelitis itself can trigger the development of neuropathic osteoarthropathy.⁴

The differentiation between diabetic CN and osteomyelitis often poses a significant problem, because both of these entities present with similar clinical and radiographic findings. Plain radiographs are the first diagnostic imaging tool that health care

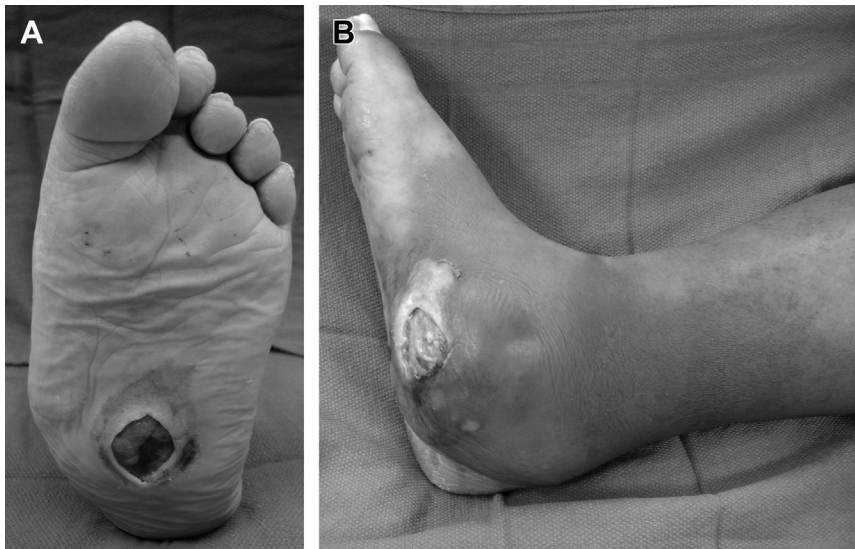


Fig. 1. Clinical presentations of a diabetic CN of the foot (A) and ankle (B) in the presence of a neuropathic ulceration and concomitant osteomyelitis.

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