CASE REPORT

Diabetic Foot Syndrome in a Middle Aged Male with Complicated Type II Diabetes

Jeffrey M. Landreville (Meds 2014)
Faculty Reviewer: Dr. Heather Percival MD, CCFP (Department of Family Medicine, Seaforth Community Hospital)

Diabetes mellitus (Diabetes) represents a group of metabolic disorders characterized by elevated plasma glucose levels and abnormal insulin activity within the body. Diabetes can be further classified into Type 1 (T1DM) and Type 2 (T2DM). T1DM is caused by an autoimmune failure of the beta cells in the pancreas leading to the complete absence of insulin in the body. In T2DM, hyperglycemia stems from a combination of insulin resistance, insulin deficiency and abnormal glucagon synthesis.1

The number of individuals with diabetes has been increasing at an alarming rate. In 2000, the worldwide prevalence of diabetes was estimated to be over 150 million. It is projected that in 2025 this number will reach 380 million.2 Within Canada, it is projected that 2.4 million Canadians will have diabetes by the year 2016.3

Diabetes is a serious condition that can lead to a wide variety of life threatening macrovascular (coronary artery disease, peripheral arterial disease, stroke) and microvascular (nephropathy, neuropathy, retinopathy) complications.4 The constellation of lower limb complications associated with diabetes such as ulcers and infections can be referred to as a diabetic foot syndrome (DFS).5 The following case will highlight the management of DFS with particular attention to diabetic foot infection.

CASE

Mr. D is a 41-year old resident of Southwestern Ontario who presented to a rural emergency department (ER) following a penetrating injury to the plantar surface of his left foot. The patient reported that he inadvertently stepped on a nail several days prior but failed to notice his foot had been injured. Mr. D denied any pain and disclosed that he has been diagnosed with T2DM for many years. In addition to the wound on the left foot, physical examination revealed the patient to be obese (BMI 44) with retinopathy, neuropathy, and a diabetic ulcer on the right foot. His current medications are: Metformin 1000 mg bid; Atacand 4 mg od; Losec 20 mg od; Lasix 40 mg od; Gabapentin 300 mg tid; Ditropan 5 mg bid; Vitamin D 1000iu od; Lantus insulin 51u hs; and Humalog 30u tid (adjusted +/- 2u). The ER physician cleaned the wound, confirmed a recent tetanus vaccination and prescribed Ciprofloxacin 500 mg bid with the explicit instructions for the patient to rest his foot.

One week following discharge, Mr. D re-presented to the ER, reporting that his left foot appeared worse. Physical examination revealed a grossly swollen, erythematous foot that felt warm to touch. The ER physician diagnosed Mr. D with an infected diabetic foot and performed an incision and drainage. A tissue specimen wound culture was obtained and grew mixed flora. The patient was admitted to hospital for IV antibiotics (Ciprofloxacin 500 mg bid and Clindamycin 600 mg tid) and strict bed rest. On admission the patient was afebrile with a WBC of 5.4 x10^9/L (normal 4-10). Following two days of treatment, the inflammation in Mr. D’s foot appeared markedly decreased and he was discharged from hospital on the third day. A follow-up physical exam by his primary care physician revealed the left foot to be completely absent of any signs of infection.

DISCUSSION

Foot infections are very common in patients with diabetes. Together with foot ulceration, foot infections have been identified as a major cause of morbidity and mortality in the diabetic patient as well as a major expense to health care systems.6,7 The propensity for diabetic patients to develop foot infections can be attributed to three pathological processes: neuropathy, vascular insufficiency and diminished neutrophil function.8 Patients displaying symptomatic peripheral neuropathy lose ability to sense pain in their lower extremities and thus fail to notice the presence of an abrasion, blister or penetrating trauma.9 In addition, the vascular insufficiency and diminished neutrophil function impairs the immune response.10 Together, these factors promote colonization of the wound by pathogenic organisms and the spread of infection from the surface to deeper tissue.8

The diagnosis of diabetic foot infection is made clinically based on the presence of pus or at least two cardinal manifestations of inflammation (erythema, warmth, swelling or induration, and pain or tenderness). It is important to note that the presentation will vary from patient to patient. If peripheral neuropathy is present, the patient may report diminished or absent pain at the site of infection. Furthermore, 50% of diabetic patients with a significant foot infection will not have systemic signs of fever or leukocytosis due to a blunted cellular response to the infection.11

Aggressive management of diabetic foot infections is crucial. Left untreated, these infections progress to gangrene and eventually require amputation of the limb. The wound should be cleaned, debrided and probed to identify sinus tracts, abscesses and the presence of osteomyelitis.9 Tissue specimens for wound culture should be obtained by scraping the base of the ulcer with a scalpel blade and processed for a Gram stained smear and aerobic/anaerobic cultures.12 Initial antibiotic therapy is empiric, broad spectrum and based on the severity of the infection. Severe infections require agents with coverage against Gram positive (including MRSA if necessary), Gram negative and anaerobic organisms. The patient should be evaluated for response to therapy in 1-3 days. If indicated by early culture results a modification to their antibiotic regimen can
Severe diabetic foot infections often require surgical management including incision and drainage, surgical debridement, revascularization and amputation. Following treatment, appropriate wound care is essential. Removing pressure from the wound, minimizing leg edema and maintaining a moist wound environment are all important factors that promote wound healing.

Of all the diabetes related hospital admissions in North America, DFS accounts for 20%. A focus on the prevention of DFS in diabetic patients will not only improve the quality of life of those patients but also help reduce the burden diabetic patients place on health care systems. It is recommended that diabetic patients engage in regular foot examinations.

Those who develop foot ulcers require management by multidisciplinary teams involving individuals specialized in diabetic foot care.

REFERENCES