Case Report
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Charcot Arthropathy and Osteomyelitis: A Case of Diabetic Foot Syndrome

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Abstract

Diabetes mellitus is a disease that affects millions around the globe. It also comes with a major complication, diabetic foot ulcers. Lower extremities having little to no vascularity in diabetic people leads to wounds that are unable to heal on their own. These wounds later become infected and cause osteomyelitis, a condition in which the infection in soft tissues of the lower extremities spread to the bones of the foot. Charcot arthropathy is one of the more serious foot issues that can arise from diabetic neuropathy. The soft tissues, joints, and bones of the foot or ankle are all impacted by Charcot. The joints in the foot or ankle might dislocate when the bones deteriorate and become brittle. Diabetes patients who have their soft tissues and bones infected might even have to get their extremities amputated if not managed right on time. We describe the case of a 66-year-old man with type 1 diabetes mellitus who presented to the emergency department with increasing pain in the right foot. There was a hyperemic discharge coming out of his wound which increased gradually over time. The patient's been using Lantus and Novorapid and his blood glucose measurement at the time of admission was 466. Our patient said that he was hospitalized in the intensive care unit due to diabetic ketoacidosis 20 days before he applied to our emergency department, and his wounds, discharge, pain, and redness increased after this incident. We requested his anteroposterior and lateral radiographs of the right foot and a lower extremity CT. The scans were examined carefully and at last, amputation was recommended for the patient. The patient did decline our offer and wanted to go home with a dressing. Ampicillin/sulbactam and ciprofloxacin were started. We also recommended he see infectious diseases and plastic surgery consultants in the following days.

Keywords: Charcot arthropathy, Osteomyelitis, Diabetes

Introduction

Diabetes mellitus (DM) affected approximately 382 million people worldwide in 2013 (1). One of the most important complications of diabetes; diabetic foot ulcers (DFU) are associated with significant impairment of quality of life, increased morbidity and mortality, and are a huge drain on health care resources. In Western countries, the annual incidence of foot ulceration in the diabetic population is around 2% (1). Osteomyelitis is one of the most common expressions of diabetic foot infection, being present approximately present in 10%-15% of moderate and 50% of the severe infectious process. Approximately 60% of diabetic foot ulcers (DFUs) are complicated by infection. Diabetic foot osteomyelitis (DFO) is mostly the consequence of a soft tissue infection that spreads into the bone, involving the cortex first and then the marrow. The possible bone involvement should be suspected in all DFUs patients with infection clinical findings, in chronic wounds, and in case of ulcer recurrence (2). Infected wounds usually show purulent secretions or at least two signs of inflammation (swelling, erythema, blood serum secretion or simply blood with or without bone fragments) (2). However, DFO can occur without any local sign of inflammation. Systemic symptoms such as fever and malaise are rare, especially in the case of chronic osteomyelitis. People with diabetes are more susceptible to infection than non-diabetics, particularly when diabetes is poorly controlled, as hyperglycemia impairs the immune response to infection. Despite this, the diagnosis of infection is often delayed or the extent of infection underestimated, providing the opportunity for infection to progress to the bone in a high proportion of foot ulcers in diabetics (3). Diabetic fracture being another important complication of diabetic osteomyelitis is a significant co-morbidity of both type I and type II diabetes and is characterized by microarchitectural changes that decrease bone quality. Charcot foot is a rare but serious complication that can affect persons with peripheral neuropathy, especially those with diabetes mellitus Charcot affects the bones, joints, and soft tissues of the foot or ankle. A deformed foot can cause pressure sores to develop in the foot or ankle. An open wound with foot deformity can lead to an infection and even amputation (3). The abrupt effect of diabetic ketoacidosis on the exacerbation of diabetic foot ulcers or possibly osteomyelitis is not well defined. More

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research is required to clarify the mechanistic pathway mentioned above and the early precautions measures that might prevent the progression of the deformities to some extent that's possible.

Case

A 66-year-old man presented in the emergency department with burning, wound, discharge, and pain in the right foot. There was no history of trauma. The patient, who has been suffering from diabetes for 25 years, was admitted to the intensive care unit outside the city 25 days ago and stayed there for 4 days with the diagnosis of diabetic ketoacidosis. He has hyperemic discharge in his foot that started from that time and gradually increased. The patient said that he was using Lantus and Novorapid and that his home blood glucose measurements were normal. Examination revealed finger stick blood sugar of 477, pulse of 100 per minute (regular), blood pressure of 117/69 mmHg, and respiratory rate was 17 per minute. Oxygen saturation was 97 on air. Chest, cardiovascular, and abdominal examination was normal. At the patient's admission today, his blood sugar was 466 and his CRP was 144. The patient's HbA1c 1 month ago was 12.1 and the corrected Na was 130. Anteroposterior and lateral radiographs of the right foot and non-contrast lower extremity CT were requested from the patient.

Discussion

Diabetes mellitus is a chronic systemic disorder that can cause vascular, infectious, and neuropathic problems as well as bone and joint problems. Foot ulcers develop in about 15 % of patients with diabetes and foot disorders are the leading cause of hospitalization for patients with diabetes. It typically results from poor glycemic control, underlying neuropathy, peripheral vascular disease, or poor foot care and it is associated with an increased risk of lower limb fractures (4). Untreated and severe wound infections are likely to cause osteomyelitis which increases the rate of diabetes-related amputations. To be able to prevent serious outcomes, early diagnosis and usage of antibiotics should be considered in the first place. Osteomyelitis is one of the most common complications of diabetic foot ulcers which happens to be present in approximately %10-15 of moderate and %50 of severe wound infections. DFO is more likely to be present when the foot ulcer is deeper than 3 mm, compared with a shallower ulcer (82% vs. 33%, respectively) (5). The wound seen is important in this respect. The bone infection may also progress to necrosis, secondary abscess and extension into soft tissue, and eventually extremity amputation. %15 of patients with diabetic foot ulcers complicated with osteomyelitis will require amputation. Radiologic imaging may reveal osteomyelitis in a manner similar to that of a fracture. While a fracture is typically accompanied by prior trauma, the absence of trauma may indicate osteomyelitis more clearly. Our patient had no history of trauma. Complications were explained to the patient and amputation was recommended. The patient stated that he wanted to continue care with dressing and antibiotic treatment. Charcot neuro-osteoarthropathy (CN) is an infrequent but severe complication of diabetic peripheral neuropathy that is estimated to affect 0.8%–8% of the diabetic population. The use of immunosuppressive agents such as corticosteroids for kidney and/or pancreas transplantation appears to be a probable cause of the high rate of Charcot's foot in the diabetic patient population. Our patient had no history of transplantation or steroid use. Diabetic ketoacidosis (DKA), on the other hand, is a well-recognized emergency of inadequately controlled diabetes mellitus that causes high mortality and morbidity. DKA is traditionally defined by the triad of hyperglycemia (>250 mg/dL [>13.9 mmol/L]), anion-gap acidosis, and increased plasma ketones (6). Diabetic ketoacidosis (DKA) occurs commonly in people who have type 1 diabetes. However, people who have type 2 diabetes may also develop diabetic ketoacidosis. Our patient said that he was hospitalized in the intensive care unit due to diabetic ketoacidosis 20 days before he applied to our emergency department, and his wounds, discharge, pain, and redness increased after this incident (7). To our knowledge, there has been no evidence presented, regarding the effect of diabetic ketoacidosis on

Figure 1: Anteroposterior radiograph demonstrates diffuse degenerative changes and subluxation were observed in all metatarsal bones. Distal metatarsals were not observed in the 2nd 4th and 5th fingers. Destructed appearance secondary to widespread degeneration in the distal metatarsal of the third finger. A subluxation to the dorsum of the foot in the medial cuneiform near the first toe and a fistulous appearance to the skin were observed at this level.

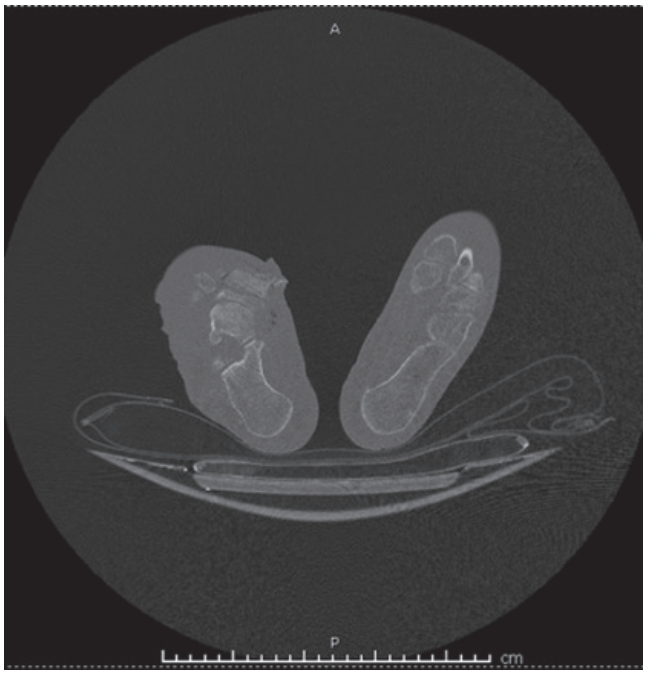

Figure 2: Non-contrast lower extremity CT was consistent with Charcot foot, diffuse soft tissue infection, osteomyelitis. It was not evaluated in favor of necrotizing fasciitis, emergency surgery was not considered.

the exacerbation of diabetic foot ulcer wounds and infection. The common causes of DKA are missed doses of insulin, illness or infection, and undiagnosed or untreated diabetes. We believe that our patient's DKA attack may have been triggered by the recent infection.

Figure 3: Bone protruding beyond the skin on the medial side of the right foot.

Conclusion

Due to the lack of symptoms and the clinician's low level of suspicion, neuropathy-related foot damage is commonly detected later than it should be. When assessing for a foot infection or osteomyelitis, clinicians should take into account the risk factors (such as the existence of foot ulcers larger than 2 cm, uncontrolled diabetes mellitus, poor vascular perfusion, and concomitant disease). Erythema, induration, soreness, warmth, and drainage are signs of infection. These signs arouse suspicion and call for a constellation of further investigations. Imaging techniques, including X-rays, are one of them and are frequently used to map the diagnosis, progression, and course of treatment for osteomyelitis.

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