Foot amputation in a diabetic patient who did not follow-up for 5 years

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Received - 20 September 2022 Initial Review - 15 October 2022 Accepted - 01 November 2022

ABSTRACT

Diabetes foot ulcers (DFUs), a vascular endothelial complication, are linked to higher morbidity and mortality. DFUs are caused by a complex mix of neuropathy, peripheral arterial disease, foot deformities, and infections. Foot ulcers are a leading cause of morbidity in diabetics, and they are usually preceded by peripheral arterial disease, neuropathy, or a combination of the three, as well as other factors. We review the case of a 46 years old man who was evaluated with a small oozing wound. He did not see his doctor about his glucose level for 5 years. When he was presented with the oozing, his X-ray of the left leg and magnetic resonance imaging of the left lower leg without contrast revealed osteomyelitis. After 3 days of Clindamycin administration, the patient was taken to the operating room for a left partial ray amputation as well as a left leg incision and drainage. His wound improved from scant serosanguinous drainage to peri skin dry and peeling skin underneath after continuous dressing in his post-amputation partial ray, an overall area greatly improving and healing wound. This case report summarizes the consequences of not visiting a doctor's office if you have diabetes symptoms.

Key words: *Diabetic foot, Amputation, Osteomyelitis, Diabetic foot infection*

One of the biggest issues facing healthcare systems is diabetes mellitus (DM), a threat to public health that has grown significantly over the past 20 years. Multiple problems, such as diabetic foot ulcers (DFU), can occur in DM patients. DFU is a frequent DM complication that has been rising over the past few decades. DFU is currently regarded as a significant cause of morbidity and a key reason for hospitalization in diabetic patients. DFU is thought to be the cause of 20% or so of hospital admissions among DM patients [1]. In fact, if the proper care is not given, DFU can result in infection, gangrene, amputation, and even death.

Once DFU has formed, there is a higher chance of ulcer advancement, which could eventually result in amputation. Overall, people with DM had a 15 times higher rate of the lower limb amputation than patients without the disease. DFU is thought to be the cause of 50–70% of all lower limb amputations. In addition, DFU and subsequent foot amputations cause significant physical, mental, and financial losses that diminish quality of life in addition to productivity and emotional suffering [1].

The current case report focuses on one such DFU case that ultimately resulted in foot amputation and also describes the negative effects of ignoring diabetes symptoms.

CASE REPORT

A 46-year-old male with a history of hypertension and morbid obesity (body mass index of 44.1 kg/m^2) presented with bilateral leg pain and swelling for 1 month. He first noticed a small wound on his left foot that began to ooze. The wound healed after a while, but it began oozing 1 week before he went to the emergency room. He bandaged the wound along his left lower leg at home. He stated that he was on antihypertensive medication until 5 years ago and had not seen the doctor since. The patient did not present any other symptoms such as chest pain, fever, chills, headache, blurry vision, dizziness, lightheadedness, sore throat, loss of smell or taste, nausea, abdominal pain, dysuria, or diarrhea.

The patient was awake and oriented. Eyes, ear, and throat were normal on examination. His heart sounds were normal with faint digital pulse on palpation and the lungs' auscultation was clear. On musculoskeletal examination, he had discolored bilateral swelling and tenderness on the left leg. In addition, there were deep lesions of around 1.5 cm diameter on the lateral digital aspect of the left leg with malodorous purulent discharge. The patient also had a swollen toe with limited range of motion. On examining the skin, it was found to be warm and dry. He had a purulent lesion on the left lower anterior proximal aspect after removing bandages.

The blood investigations revealed that the patient had hyponatremia, hyperglycemia (364 mg/dL and HbA1c value of 12.2), low albumin (2 g/dL), and high non-glycosylated enzymes. The electrolyte levels were as follows: Na-132 mmol/L and K-3.8 mmol/L. His hemoglobin was 3.29 g/dl, mean corpuscular volume was –85.6 pg. Red blood cell distribution width was 16.2%. The red blood cells, white blood cells, and platelet values were within the normal range. Urinalysis showed 2+ glucose,

negative for ketones, 1+ protein, and specific gravity of 1.054. Wound culture was positive for *Enterococcus faecium* and *Streptococcus agalactiae*.

The X-ray of the patient's left foot revealed acute osteomyelitis of the fifth metatarsal head and proximal phalanx, as well as soft tissue swelling and gas. An magnetic resonance imaging (MRI) without contrast of the left foot revealed osteomyelitis in the fifth metatarsal and proximal phalanx, as well as a possible abscess up to 3.5 cm toward the dorsum of the foot. There was no evidence of deep vein thrombosis in the lower bilateral extremities on ultrasound Doppler. Bilateral lower extremity arteries revealed a right lower extremity arterial system except for the right posterior tibial and dorsalis pedis arteries due to overlying sores, and a left lower extremity arterial system to the level of the left popliteal artery. The left anterior and posterior tibial, and dorsalis pedis arteries were not visualized due to overlying sores and superficial soft tissue edema.

Patient was evaluated with a multi-disciplinary approach. Clindamycin was initially administered to the patient for 3 days. For left foot osteomyelitis and left lower extremity abscess, a left partial ray amputation and left leg incision and drainage were performed. A 1 cm linear incision in the anterior tibia was made, and 5 cc of purulence was expressed. Purulence culture was found to be positive for *E. faecium* and *S. agalactiae*. The metatarsal head was found to be very soft so it was disarticulated at the metatarsophalangeal joint. Due to skin tension, the incision was reapproximated with nylon, but it was not completely closed. Wound vacuum assisted closure was placed to the left fifth metatarsal incision site and the incision was dressed with Xeroform. Patient was placed on Piperacillin and vancomycin for 6 weeks. However, they were changed to merrem and zyvox after 10 days of treatment because the patient was noted to develop diffuse maculopapular rash on abdomen. He was also started on lisinopril, Lantus and Insulin per sliding scale to control newly onset DM and hypertension.

Patient wound vac was discontinued after 2 weeks post amputation. On examination, there was 100% pink granulation and scant serosanguinous drainage and the suture was left intact. Dressing continued with Xeroform. On the 5th post-amputation week, there was small serosanguinous drainage, peri skin dry, and peeling skin underneath. Overall, the amputated wound was greatly improving and the healing was uneventful. Sutures were removed and the patient was suggested to follow-up with wound care.

DISCUSSION

DFUs are linked to an increase in morbidity and mortality due to microvascular complication. DFUs are a complex combination of neuropathy, peripheral arterial disease, foot deformities, and infections [2,3]. Foot ulcers are one of the leading causes of morbidity in diabetics, and they are usually preceded by peripheral arterial disease, neuropathy, or a combination of all three, as well as other factors. Considering that 12% of diabetes require amputation, nearly a quarter of the diabetic population develops a foot ulcer at some point in their lives, making it a serious and unavoidable health and socioeconomic problem. Diabetics with foot ulcers are 8 times more likely to have a lower extremity amputation than non-diabetics, and approximately half of diabetics who have amputations die within 5 years [4]. Diabetes patients frequently develop serious foot infections. Because they usually start in an open wound in the skin or soft tissue, these infections frequently spread to the underlying bone. Diabetic foot osteomyelitis (DFO) is most commonly associated with advanced peripheral neuropathy, as well as peripheral arterial disease, foot disfigurements, and insufficient patient compliance with foot care recommendations. Lower extremity amputation is the most serious and feared complication of DFO [5].

The epidemiology of osteomyelitis is parallel to that of soft-tissue infections; it is seldom mono-microbial and more often poly-microbial. *Staphylococcus aureus* (about 50% of cases), *Staphylococcus epidermidis* (about 25%), *Streptococci* (about 30%), and *Enterobacteriaceae* (up to 40%) are the most frequently encountered bacteria in DFO. *Escherichia coli*, *Klebsiella pneumoniae*, and Proteus are the most prevalent gram-negative microorganisms, followed by *Pseudomonas aeruginosa*. Anaerobes are usually rare. DFO also shows an increase in multi-drug resistant organisms, primarily methicillin-resistant *S aureus* or extended-spectrum beta-lactamase-producing bacteria [6]. Six factors appeared to be effective in predicting amputations in the laboratory results category. High white cell count, erythrocyte sedimentation rate, and C-reactive protein levels as infection and inflammation markers are strong predictors of amputation; high levels were found to be associated with treatment failure in diabetic foot ulcers. Furthermore, low albumin and Hb levels indicate poor nutritional status and delayed wound healing, which increases the risk of amputation [2]. To reduce the burden of diabetic foot complications, proper guidelines must be implemented and people must be educated. According to John's quantitative research study, 33% of diabetes patients had average knowledge, 1.66% had poor knowledge, and the rest had good knowledge about foot care [7]. Surgical debridement, dressings to facilitate a moist wound environment and exudate control, wound off-loading, vascular assessment, infection, and glycemic control are all the standard practices in DFU management. A multidisciplinary diabetic foot wound clinic is the best place to coordinate these practices. Several adjuvant therapies have been investigated to shorten DFU healing period and amputation rates. Non-surgical debridement agents, dressings and topical agents, oxygen therapies, negative pressure wound therapy, acellular bioproducts, human growth factors, energy-based therapies, and systemic therapies are examples of adjuvant therapies [8]. Transmetatarsal amputation (TMA) is the last hope for partial foot salvage for many patients with infection or distal foot gangrene. It is preferable to keep a sensitive heel to maintain ambulatory function. TMA wound healing, on the other hand, is frequently a major challenge [9]. Furthermore, in the event of infection, selecting the most appropriate antibiotic therapy improves the wound management in the post-amputation period and prevents TMA failures [10-12].

CONCLUSION

Diabetes patients typically develop foot ulcers, which frequently result in lower limb amputations unless a quick, logical, and multidisciplinary approach to care is implemented. In the present article's patient, oozing was coming from his left lower leg when he entered the emergency room. He developed osteomyelitis, which was confirmed by clinical and radiographic tests such as an X-ray of the left lower foot and an MRI without contrast of the left foot. Following rigorous investigations and tests, the patient's suggested course of treatment included a left partial ray amputation, as well as a left leg incision and drainage. Five weeks following the amputation, the area was significantly improving and the wounds were healing. There was a little amount of serosanguinous discharge, peri dermal dryness, and peeling skin beneath. The necessity of prompt doctor appointments, taking drugs as prescribed, and informing the doctor of any symptoms is thus highlighted by the current example.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Maharjan R, Le K. Foot amputation in a diabetic patient who didn't follow-up for 5 years. Eastern J Med Sci. 2022;7(4):78-80.

DOI: 10.32677/ejms.v7i4.3641