Diabetic Foot Ulcer Complicated with Fracture and Osteomyelitis: X-ray Findings

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Abstract
Diabetic foot ulcer is one of the complications of patients who have diabetes mellitus which is not well controlled. It is resulted from poor glycemic control, underlying neuropathy, peripheral vascular disease, and poor foot care. It could lead to osteomyelitis of the foot and amputation of lower extremities. Detailed history taking should be done in order to get a holistic view of disease progression and risk factors. Clinical presentations such as the presence of callus, loss of hair, muscle atrophy, ulcer, paresthesia, hypo- or hyperesthesia, anhydrosis could be present. Ulcers are most common in the weight-bearing areas such as plantar metatarsal head, heel, tips of hammer toes, and other prominent areas. Radiological investigations including plain x-rays should be done in order to look for any underlying osteomyelitis, the presence of air in the subcutaneous tissue, any signs of underlying fractures, and presence of a foreign body. In this case study, we presented X-ray finding of a diabetic foot ulcer case that complicated with fracture and osteomyelitis.

Keywords: Diabetes, Foot, Fracture, Osteomyelitis, Ulcer

Background
A diabetic foot ulcer is an open sore or wound that occurs in approximately 15% of patients with diabetes, and is commonly located on the bottom of the foot. About 6% of patients with diabetic foot ulcer will be hospitalized due to infection or other ulcer-related complication. Diabetes is the leading cause of non-traumatic lower extremity amputations in the United States, and approximately 14% to 24% of patients with diabetes who develop a foot ulcer have an amputation. Research, however, has shown that the development of a foot ulcer is preventable.¹

Risk factors for foot ulcer in patients with diabetes including previous lower extremity amputation, history of a foot ulcer, anatomic foot deformity, peripheral vascular disease, diabetic neuropathy, poor glycemic control, and smoking.² The pathophysiology of diabetic foot ulcer has neuropathic, vascular, and immune system components. Hyperglycemia produces oxidative stress on nerve cells and leads to neuropathy.²

Damage to motor neurons of the foot musculature may lead to an imbalance of flexors and extensors, anatomic deformities, and eventual skin ulceration. Damage to autonomic nerves impairs sweat gland function, thus alter the ability to moisturize skin, leading to epidermal cracks and skin breakdown. Decreased peripheral sensation will make patients not noticing any foot wounds. Because the blood supply is decreasing in diabetic patients, ischemia happens and increasing the risk of ulceration. Immune changes including reduced healing response in diabetic foot ulcers also play a key role in patients developing foot ulcers.²

Osteomyelitis is very common in patients with diabetic foot ulcer but it is frequently missed and underdiagnosed in patients with diabetic foot problems. A prompt diagnosis and treatment of osteomyelitis is needed to lower the risk for amputation and sepsis. Plain radiography as one of the simplest modality is useful to visualize the changes

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Discussion
We present a case of 59-year-old man came to the emergency department of Unggul Karsa Medika Hospital with complaints of wound and right leg pain since 1 month ago, the wound suddenly appeared with size as big as a coin. Complaints were accompanied by nausea but not vomiting, numbness in both legs, and difficulty in walking. Complaints are not accompanied by fever, shortness of breath, defecation, and urination, there are no complaints. He has a history of diabetes mellitus since 10 years ago and rarely takes medication. Complete blood count revealed hemoglobin levels in this patient 9.7 g/dL, hematocrit 28%, leukocytes 21,400 /mm³, platelets 640,000/mm³, and blood glucose of 821 mg/dL. The results of the radiological examination of the Antero-Posterior and lateral right food plain photo revealed subcutaneous emphysema in the soft tissue of the right foot, fracture of the medial and distal phalanx bones of the right foot, and suspected osteomyelitis of the right metatarsal bones. These findings were in line with other results that usually characterized by osteopenia, erosion, cortical lysis, osteolysis, periosteal thickening, and bone sequestration. Subcutaneous emphysema that presented in our case was pathognomonic for emphysematous osteomyelitis. Mortality from emphysematous osteomyelitis can be as high as 32%, therefore should be managed aggressively. If not, complications including gangrene of the foot, permanent deformity due to amputation, and the risk of sepsis could follow. In our case, wound debridement was done, followed by antibiotics which were Ceftriaxone, Azithromycin, Fluconazole. The patient was also given Aspart Insulin continuously drip with dosage 3 IU/hour and then titrated according to his blood glucose. Patient then was given Glargine Insulin 1x16 IU and Aspart Insulin 3x10 IU subcutaneously before discharged. The patient was discharged without any other complaints.

Declarations
Ethics approval and consent to participate
Informed consent from the patient has been obtained before the study.

Consent for publication
Consent for publication regarding patient data has been obtained before the study. All the patient identity has been kept secret.

Availability of data and materials
Not Applicable

Competing interests
The authors declare that they have no competing interests.

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