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Necrotizing fasciitis following mild trauma in a patient with mellitus diabetes: a case report

Morteza Dehnokhalaji¹, Mahnaz Abavisani², Zohreh Sarchahi²✉

¹Neyshabur University of Medical Sciences, Neyshabur, Iran

²Medical Surgical Nursing, Department of Nursing, Neyshabur University of Medical Sciences, Neyshabur, Iran

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ABSTRACT

Rationale: Necrotizing fasciitis is a rare infection of fascia tissues. It progresses quickly and has high morbidity and mortality. In this study, we aimed to explore a case of necrotizing fasciitis in a diabetic patient.

Patient concerns: A 46-year-old woman presented with severe pain and inflammation in the left leg, and with fever and chills.

Diagnosis: Necrotizing fasciitis in the left leg.

Intervention: Broad debridement of infectious tissues and broad-spectrum venous antibiotics.

Outcomes: The patient was discharged without pain, inflammation, or fever.

Lesson: This disease is a surgical emergency, therefore, early diagnosis and quick and invasive treatment could significantly decrease morbidity and mortality.

1. Introduction

Necrotizing fasciitis (NF) is a type of soft tissue infection characterized by rapid and wide-spread necrosis of soft tissue[1]. Only in rare conditions, the mortality of NF is high, especially in cases with delayed diagnosis. The reported mortality rate in different studies ranges from 20% to 80%[2]. Therefore, early diagnosis is of high importance especially when an infection spreads quickly or is unresponsive to standard therapies[1]. In this paper, we presented a case of necrotizing fasciitis following mild trauma in a patient with mellitus diabetes.

2. Case report

Written informed consent was obtained from the patient for

publication of this case report and accompanying images. The study was approved by the hospital ethics board (No. 1396-0102).

A 46-year-old woman with severe pain, inflammation in the left leg along with fever and chills presented to the hospital. Symptoms initiated the day before the hospitalization with mild pain in the posterior area of the left leg gradually intensified. At first, there was bruising and ecchymosis which was resolved slowly, and at the same time pain and stiffness were exacerbated in the posterior area of the left leg, in a way that the patient was unable to walk and fever and chills arose shortly after. She visited various physicians but unfortunately, no positive response was achieved. She was finally admitted with hematoma diagnosis based on ultrasonography results.

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✉Corresponding author: Zohreh Sarchahi, Medical Surgical Nursing, Department of Nursing, Neyshabur University of Medical Sciences, Neyshabur, Iran.
E-mail: sarchahiz1@nums.ac.ir

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The patient mentioned an 8-year history of diabetes with the oral administration of metformin and glibenclamide. She also had a history of diabetic retinopathy and eye laser therapy, but she had no history of smoking and alcohol use.

The examined patient had a good cooperation was answered all questions. The left lower limb was in a semi-flexion position and she did not allow for any change in that position. Vital signs were as follows: blood pressure 117/90 mmHg, heart rate 98, respiration rate 18 and oral body temperature 38.8 °C. Normal systemic examinations were recorded and inflammation and redness were observed in the posterior region of the left leg which was rigid and super sensitive on examination. Posterior dorsalis pedis and tibia pulse were normal. Surface sensation in the sole of the foot was reduced and severely painful movements of the ankle, fingers and the knee were documented. Venous Doppler left lower limb ultrasonography showed a hematoma of 33 mm × 16 mm in the upper region of the left leg muscles with 18 mm distance from surface skin. In initial tests, the following results were obtained: Blood sugar (BS): 272 mg/dL [normal range: (70-100) mg/dL], blood urea nitrogen: 15.5 mg/dL [normal range: (7-20) mg/dL], creatinine: 0.7 mg/dL [normal range: (0.6-1.2) mg/dL], sodium: 138 mEq/L [normal range: (135-145) mEq/L], potassium: 4.2 mEq/L [normal range: (3.5-5.0) mEq/L], hemoglobin A_{1c}: 8.4 % (normal range: 4%-5.6%), white blood cells: 16×10⁹/L (normal range: 4.3×10⁹/L-10.8×10⁹/L), neutrophil: 88% (normal range: > 40%), hemoglobin: 10.8 g/dL (normal range: 13.5 g/dL to 17.5 g/dL), haematocrit: 31.6% (normal range: 45% to 52%), platelet: 394 000/mm³ (normal range: 150 000/mm³ to 450 000/mm³).

Various antibiotics including ceftriaxone (2 g) and metronidazole (250 mg) were initiated, and the patient was transferred to the operation room with the diagnosis of soft tissue infection. After prepping and draping, smelly green, purulent exudates were removed from muscles in the posterior compartment of the leg with a posteromedial incision. The incision was extended proximally and distally to the posterior region of the leg and the ankle. The infection was expanded in the whole area of the leg and extended proximally to the popliteal cavity. The gastrocnemius muscle was completely ischemic and necrotic. A complete debridement using GA method including removing the whole gastrocnemius muscle, plantaris and fascia between muscles of the left leg was performed. Soleus muscle and other muscles in the deep compartment of the posterior leg including flexor digitorum longus and flexor hallucis longus and tibialis posterior were examined which were not infectious and necrotic. Therefore, the wound was completely rinsed and the specimen was sent for pathology investigation. Also, muscles in the compartment of the lateral and anterior leg were checked which were not infectious. After homeostasis, the wound was left open and sterile dressing was applied.

Electrolyte test, biochemistry, BS, erythrocyte sedimentation rate and C-reactive protein were ordered and blood culture was

performed. Random BS was 240 mg/dL and biochemical tests were normal. Erythrocyte sedimentation rate was 66 mm/h, C-reactive protein of ++ and negative blood culture were obtained. During the admission, with BS chart of every 6 h and considering the mentioned values for BS, insulin therapy was initiated under the direct supervision of a clinician.

Antibiotic therapy was changed from ceftriaxone and metronidazole to meropenem, clindamycin, and vancomycin under the direct supervision of a clinician. Daily cleansing and debridement were dressed up for one week, and they were carried out every two days for another week in the operation room after infection, and the necrotic tissues were completely removed. Finally, the wound was closed and the patient was discharged in two weeks with the good general condition and without any fever. The results of aerobic and anaerobic bacterial cultures indicated the growth of *Staphylococcus aureus*.

3. Discussion

NF is a spreading and deteriorating infection of the soft tissues which involves fascia and subcutaneous tissue. At first, the upper area of fascia seems intact which may lead to a delayed diagnosis. This infection could cause sepsis, septic shock and ultimately death[3]. In a study by Smusckiewicz *et al.*, diabetes was suggested as a primary predisposing factor for NF[4]. In the present study, severe pain and tenderness were also observed. The left lower limb was kept in a semi-flexion position and the patient refused to change the position and the exudates were abundant and smelly. Lin *et al.* carried out a 12-year research on 47 patients with NF. Localized redness and inflation in 100%, pain in 85%, fever in 55%, dyspnea in 43%, fistula formation in 64%, dysphagia in 34%, leukocytosis in 35% and hyperglycemia in 32% of the study subjects were observed[5].

In the study of Wong *et al.* on 89 NF patients, fever and hypotension were observed in 53% and 18% of the study participants, respectively[6]. These results indicated precise consideration of the patient examination in the present study. An erythematous, edematous and painful lesion with relatively acute onset in a middle-aged patient is an important sign in early diagnosis. It is important to note that the lack of fever does not exclude the likelihood of NF since this finding is less evident in patients with immunodeficiency condition and systemic underlying disease. In this case, early diagnosis is of vital importance since rapid progression and extensive loss can lead to sepsis syndrome and finally to death[7]. Wong and his colleagues used laboratory markers named as Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score to differentiate NF from other soft tissue infections, in which a score of 8 or higher is strongly indicative of NF[8]. In the present study, CRP was not tested quantitatively, so a

score of 8 was not achieved.

However, it should be noted that the LRINEC score could help in diagnosis but strong clinical suspicion is more important than all the aforementioned factors. In case of high clinical suspicion to infection even with a low LRINEC score, no delay is recommended and surgery is highly indicated. That is the reason why the surgery was conducted in the present case considering the patient's history and strong clinical symptoms indicative of soft tissue infection, despite the low LRINEC score. NF is a surgical emergency and treatments include hemodynamic support, broad-spectrum antibiotics, and early and extensive surgical exploration and wide necrotic tissue debridement. There may be a need for several debridements in the operation room[9]. The antibiotic should cover Gram-negative, Gram-positive and anaerobic microorganisms including carbapenem (imipenem or meropenem) or beta-lactamase inhibitor (Piperacillin/tazobactam or ampicillin/sulbactam) along with clindamycin and in case of methicillin-resistant *Staphylococcus aureus* suspicion, vancomycin is used[10].

In this report, a case of left lower limb NF following blunt trauma in a middle-aged woman was explored. Therapy was initiated based on clinical findings and patients' history of mellitus diabetes. Since trauma-associated NF is less prevalent, therefore, clinical findings and patient's histories at admission are important. Because this is a surgical emergency, early diagnosis and quick treatment could prevent morbidity and mortality.

Conflict of interest statement

The authors report no conflict of interest.

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