

Case Report

Limb Salvaging Approach to Necrotizing Fasciitis: Recurrent Aggressive Debridement

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Abstract

Necrotizing fasciitis is a soft tissue infection characterized by progressive necrosis of dermis and subcutaneous tissues, which is life threatening and which may have a fulminant course if not treated properly. Seventy six years old diabetic male patient applied to our clinic with rash, swelling and pain starting from his right ankle spreading all over the leg. In the physical examination swelling, rash and hemorrhagic bulla formation and necrosis spreading to leg proximal over right lateral malleolus were observed. Emergent aggressive surgical debridement was performed and broad spectrum antibiotic treatment was administered to the patient who was diagnosed with necrotizing fasciitis. Reconstruction operations were carried out by plastic surgery with dermal grafts on the patient, whose infection parameters were regressed 4 weeks after his hospitalization.

In this article, we aimed to present the case of necrotizing fasciitis in lower extremity that was salvaged by early diagnosis and emergency surgery.

Keywords

Debridement; Extremity; Necrotizing fasciitis

Introduction

Necrotizing fasciitis (NF) is a life threatening, invasive infection characterized by progressive necrosis of dermis, subcutaneous soft tissue and fascia. NF was identified by Baurienne in 1764 for the first time, and then in 1883 the clinical picture of fasciitis of external genitalia and perineum began to be mentioned as "Fournier's gangrene" [1]. This infection must be treated urgently, otherwise it can progress fast and be fatal. In the literature, incidence is stated as 0.4 in 100 thousands of cases [2]. Infection spreads generally along skin and subcutaneous fascia without affecting muscle and bone tissues above. Diabetes mellitus, nutritional deficiency, burn, trauma, surgical operation, poor hygiene, inhibition of immune system is the most important risk factors of NF.

In this article, we aimed to present the importance of limb salvaging approach by fast and regular debridement in the diabetic patient with necrotizing fasciitis in lower extremity case.

Case Report

Seventy six years old male patient had been using oral hypoglycaemic drugs for diabetes mellitus for five years, and he applied to our emergency service because of pain, rash and swelling, on the exterior surface of his right ankle, he had been suffering from for the last 5 days. The complaints started 5 days ago, after he wore his new shoes and no other trauma history was present. In his physical examination his general status was medium-well and his blood pressure, pulse and body temperature values were determined as 100/80 mmHg, 88/min pulse and 37.7°C respectively. In the extremity examination, a wound of about 2 cm in diameter, and in several regions around this wound, erratically bordered necrotic tissues with bulla formation 3x3 cm in size were observed on the right ankle's

lateral malleol. Besides, clinical picture of cellulitis was detected wrapping whole foot and ankle, and extending below the knee (Figure 1).



Figure 1: Wound with entrance opening about 2 cm in diameter on the right ankle's lateral malleolus center (Arrow sign), and erratically bordered necrotic tissues with bulla formation in several regions around the wound.

Foot-ankle circulation and motor-sensory examination were detected as normal. In laboratory investigation 11.2 g/dL (normal-N: 12.3-15.3) Hemoglobin, 26.8/mm³ (N: 4.4-11.3) Leukocyte, 24.4 mm³ (N: 2.0-6.9) Neutrophil, 60mm/h Erythrocyte Sedimentation Rate (ESR) and 25.0 mg/dL C-Reactive Protein (CRP) values were detected. This patient the scoring system called Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) is five. While the liver and kidney function tests resulted normal among biochemical parameters, the patient, whose glucose level was detected as 187 (N: 70-109) mg/dL, was diagnosed with necrotizing fasciitis and taken under operation in urgent circumstances. After obtaining cultures from blood and wound region, antibiotic therapy was started with 1 million units X2 of penicillin, 1g 2x1 of ceftriaxone and 500mg 2X1 of ornidazole. During the operation, edematous, fetid, necrotic tissue was excised starting from right foot lateral dorsa and involving leg lateral derma, until the normal tissue boundary was reached (Figure 2,3).



Figure 2: During the operation: edematous and necrotic tissue starting lateral dorsa of right foot and involving the lateral cruris skin.

The lesion in subcutaneous fascia and soft tissues was detected as it was larger than the pathology noticed on skin and extending to proximal. In the pathological investigation polymorphonuclear leukocyte infiltration, thrombosed



Figure 3: Necrotic tissue was excised until the normal tissue border was reached.

vascular structures and necrotic regions were observed, and the necrotizing fasciitis diagnosis was confirmed. No growth was detected in cultures. In the third week Vacuum Assisted Closure (VAC) therapy was started to the patient whose wound had been dressed 2 times a day, and the infarctions had been removed every other day by debriding of the extremity in operating room environment for two weeks. One week after the operation of the patient, whose blood glucose regulation was provided by insulin therapy, the blood levels were detected in normal ranges: 10.2/mm³ leukocyte, 4.2/mm³ neutrophil, 10 mm/h erythrocyte sedimentation rate (ESR) and 4.0 mg/dL C-Reactive Protein (CRP). After VAC therapy, the base and edges of patient's wound started to heal with granulation tissue formation and he was transferred to plastic surgery for dermal grafts (Figure 4), and after dermal graft implementation the patient was mobilized independently (Figure 5).



Figure 4: The tissue color and blood build up appears to have come to normal limits after the last debridement of the patient whose wound base and edges began to recover with granulation tissue.



Figure 5: Patient's healed extremity after dermal graft implementation.

Discussion

Necrotizing fasciitis is a rarely seen, but progressing rapidly infection, with high mortality [2]. Thrombosis in subcutaneous veins and necrosis in dermal and subcutaneous fascia are observed. As it may be caused by a single type of microorganism, many cases are polymicrobial [3]. Mostly Gram-positive aerobes such as *Staphylococcus* and *Streptococcus species*, Gram-negative aerobes such as *Escherichia coli*, *Pseudomonas aeruginosa*, and anaerobes such as *Peptostreptococcus* and *Bacteroides species* were reported in literature [4,5]. No organism was detected in our case. 31% of the cases in the literature, it is mentioned that no active pathogen was isolated and the progress was more fulminant in cases involving more than one organisms (polymicrobial) [1,6].

Edema, rash, temperature elevation and severe pain are observed in the clinically held region in most of the cases. Rapid progression of the infection, formation of hemorrhagic bulla and changes in disseminated necrotized region must bring necrotizing fasciitis diagnosis to mind. In delayed progressive cases, septicemia symptoms such as fever, tachycardia, hypotension and anomaly in general status may be observed [7]. Drawing the boundaries of the skin lesions and to recheck within hours would be convenient in suspected cases. Laboratory examination reveals significant leukocytosis and left shift, increased CRP and ESR [8].

Although it is prevalent in the lower limbs, it can be seen in all anatomical regions [2]. Other regions where the disease occurs are abdominal wall, the perianal region and postoperative wound region [9]. Most of patients have trauma history except for the cases developing after surgery after surgery. The infection usually begins after minor injuries [3]. Diabetes mellitus is seen in more than 70% of NF cases in literature. Patients using long-term corticosteroids and nonsteroidal anti-inflammatory drugs are considered at risk [4].

Although necrotizing fasciitis can be seen in both sexes and age groups, it is often observed in elderly and men. Mostly the situations in which immune system suppressed, diabetes mellitus and other chronic diseases, malignancies, burns, trauma and previous surgery can be listed as risk factors [10].

In our patient whose clinical and laboratory values are compatible with NF, old age, diabetes mellitus along with the history of irritated extremity by use of shoe, suggested that all these would provide a suitable basis for infection.

In necrotizing fasciitis treatment of the extremity; along with early diagnosis, extensive surgical debridement as no infected and necrotic tissue is left behind, and broad-spectrum antibiotic usage, VAC implementations are also important procedures in the recovery of limb [11]. Regulation of the patient's blood sugar, wound care two or three times a day, surgical redebridement when necessary, and closure of fluid-electrolyte deficit are essential for the success of the treatment [6].

As a result, necrotizing fasciitis in extremities is a rarely seen, but serious infection that ends up with high mortality and amputation when not treated properly. We think that the extremity and life of the patient can be saved by early diagnosis, explicit surgical debridement and multidisciplinary approach.

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