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Necrotizing Fasciitis Caused By *Staphylococcus Haemolyticus* and *Escherichia Coli*: A Rare Case Report

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ABSTRACT

ABSTRACT: Necrotizing fasciitis (NF) is a severe, life-threatening, and rapidly progressive soft tissue infection. It is characterized by myonecrosis and necrotizing cellulitis, which requires expeditious surgical debridement. We report a rare case of necrotizing fasciitis caused by *Staphylococcus haemolyticus* and *Escherichia coli* in 21-years-old male patient with history of surgery and using a traditional medication at the right thigh. The patient is underwent an extensive debridement, OREF, and treated with prompt antibiotics in the intensive care unit.

KEYWORDS: Necrotizing Fasciitis, *Staphylococcus haemolyticus, Escherichia coli*

ARTICLE DETAILS

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INTRODUCTION AND IMPORTANCE:

Necrotizing fasciitis (NF) is a severe, life-threatening, and rapidly progressive soft tissue infection. It is characterized by myonecrosis and necrotizing cellulitis, which requires expeditious surgical debridement.[1,2] NF is a rare disease, with 500 to 1500 cases per year, but associated with a case fatality rate between 15-30%. In conjunction with timely surgical debridement [2], advanced antimicrobial therapy is pivotal in abbreviating the mortality risk associated with NF. [1,3]

A 21-years-old patient who suffer from necritizing fasciitis is described in this case report. because of progressive skin lesions indicative of necriotizing fasciitis on the right thigh, the patient was rushed into surgery and was treated at the intensive care unit. A blood culture sample shows *Staphylococcus haemolyticus* and *Escherichia coli* infections. *Staphylococcus haemolyticus* is one of the coagulase-nagative staphylococci (CoNS) that inhabit the skin as a commensal. It is increasingly implicated in opportunistic infection in hospitalized patients and those with medical implants worldwide. [4]

E. coli is a versatile pathogen and may cause diverse extraintestinal disease. The particular capability is associated with the acquisition of virulence attribute not present in commensal strains. In a study of 102 *E. coli* strains isolated from skin and soft tissue infections, Petkovˇsek et al. [5] showed that the toxin genes *cnf1* and *hlyA* were present in 32 and 30% of the isolates, respectively, and that only 4% of the strains harbored eight or more virulence factors.

CASE PRESENTATION

The author described as Male, 21 years old, with vital signs examination results, BP: 92/68 mmHg, HR112x/minute, T: 38.9^{o}C weight: 60 kg, and height: 165 cm was brought to the emergency departement of Margono Soekarjo Hospital for fever, fatigue and pain on left thigh pain and swelling of the right leg accompanied by extensive black spot on the skin, purpuric erythema, and suppuration of the right thigh.

Figure 1. Pre-Operation

There were histories of surgery a month before and used traditional medication on post operative wound. The laboratory examination shows:

Lab Test	Result
Hemoglobin	7.6 g/dL
White Blood Cell	22860 / mm^3
Hematocrit	23.9%
Thrombocyte	278.000
Neutrophils	81.9%
Sodium	131 mEq/L
Blood Glucose	81 mg/dL
Creatinine	0.65 mg/dL
Ureum	46.40 mg/dL
C-Reactive protein	15 mg/L

All bacteriological samples (blood cultures, bullae, and surgical tissue) revealed a *Staphylococcus haemolyticus* and *Escherichia coli* infections.

TREATMENT

The patient is rushed into surgery and a through debridement with complete removal of necrotic fascia was performed on the right thigh through incision medially and laterally. After extensive debridement, we performed the OREF in the right femur.

Figure 2. During Operation

Despite surgical intervention the patient showed progressive signs of septic shock.

Physical examination findings are blood pressure is 72/29 mmHg, heart rate is 133x/minute, the patient is in altered conciousness with 7 score of Glasgow Coma Score, and hemodynamically unstable. we did a rapid operative wound closure and the patient is run to intensive care unit.

Figure 3. Post OREF and Debridement

A broad spectrum antibiotic treatment was continued (ceftriaxone and meropenem).

DISCUSSION

NF can be defined as infections of any of the layers within soft tissue compartment (dermis, subcutaneous tissue, superficial fascia or muscle); they are rare, with about 500 to 1500 cases per year, but are associated with high mortality mortality—between 15% and 30%. [1]

In most cases, NF develops in the upper or lower extremities (about 57.8% as reviewed by [6]), but cases of cervical or abdominal NF have also been described. [7]

Several countries have reported an increase of NF in the past 20 years, an alarming trend, especially considering the high mortality rate. [8]

Depending on the isolated microorganisms, NFs are classified in 4 categories : type 1 is a polymicrobial infection, type 2 is due to *Streptococcus pyogenes* or *Staphylococcus aureus*, sometimes in association[9], and type 3 is caused by vibrio species, this type shows fulminant course of the disease with multiorgan failure within 24 hours if not treated.[10] type IV is caused If Escherichia coli is frequently isolated from type I NFs or Fournier gangrene, it has been rarely reported in monomicrobial NFs.

Fever (>38°C) is seldom present (44%), although tachycardia (>100 beats/min) is common (59%), and hypotension (<100 mm Hg) (21%) and tachypnea (>20/min) (26%) are occasionally present. These three aberrant vital signs point to NF rather than NSTI [11]. Although NF can affect any part of the body, it is most frequent in the extremities (36-55%), trunk (18-64%), and perineum (up to 36%) [12]. Erythema (80%), induration (66%), soreness (54%), fluctuation (35%), skin necrosis (23%), and bullae (11%) are all seen in infected areas [11]. When comparing NF to NSTI, the positive probability ratio for the presence of bullae is 3.5. In another study [13], NF patients had more tense edema, purple skin coloring, and sensory or motor loss than NSTI patients. Skin necrosis was found in 6% of NF patients compared to 2% of NSTI patients. The first physical signs of NF are often erythematous and ecchymotic skin lesions, but these can quickly progress to hemorrhagic bullae, which signal the obstruction of deep blood vessels in the fascia or muscle compartments; consequently, the presence of bullae is a critical diagnostic clue. There are currently no laboratory parameters specific to NF. A so-called Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score has been proposed to classify the average risk of NF [14]. Patients with an LRINEC score of six or above need to have a detailed examination to rule out necrotizing fasciitis [15]. In our case described above, the LRINEC score at admission was 9 (CRP 15 mg/L, white cell count 22,860 per microliter, hemoglobin 7.6 g/dL, sodium 131 mEq/L, creatinine 0.65 mg/dL, glucose 80 mg/dL) which is highly indicative of NF.

Patient with NF should be sent to the OR as soon as possible for “search and destroy’ mission of vigorous and comprehensive devridement. Tissue that have been infected should be carefully resected until there is no more sign of infection. The most essential factor in determining survival is the initial operation, and the wound must thoroughly examined following the initial debridement.

CONCLUSION

NF is a rare bacterial infection that can destroy the skin and underlying tissue (connective tissue, subcutaneous fat, muscle, and muscle membranes). The disease can be very dramatic, with shock and damage to internal organs. In this case report, extensive debridement with blood transfusion and adequate antibiotherapy followed by reconstructive surgery were made. An early diagnosis remains challenging and crucial for salvaging the affected area.

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