

## Case Report

**Necrotizing Fasciitis in a Leprosy Patient**

**Nie Nie,<sup>1,2\*</sup> Augustine Natasha,<sup>2</sup> Sweety Pribadi,<sup>2</sup> Yulia R. Saharman,<sup>2</sup>  
Chairunissa T. Rizal,<sup>2</sup> Anis Karuniawati,<sup>2</sup> Pratiwi Sudarmono<sup>2</sup>**

<sup>1</sup>Dr. Sitanala Hospital, Tangerang

<sup>2</sup>Department of Microbiology, Faculty of Medicine Universitas Indonesia, Jakarta

\*corresponding author: nienie2806@gmail.com

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**Abstract**

*Leprosy is an infection caused by Mycobacterium leprae. Disability after the infection is common and necrotizing fasciitis could deteriorate the patient current condition. We present the case of necrotizing fasciitis of the right limb inpatient with tarsal disintegration and plantar ulcer due to previous leprosy infection. The microbiology culture was inadequate in the early stage of management, which delayed the definitive antibiotic for patient and the progressive necrotic infections were uncontrolled. Amputation was done to save the patient's life and the latter microbiology culture was able to determine the definitive antibiotic therapy. This report highlights the needs of disability management and infection control for leprosy patient after the treatment is completed.*

**Keywords:** necrotizing fasciitis, leprosy, microbiology culture.

**Fasciitis Nekrotikans pada Pasien Kusta****Abstrak**

*Kusta adalah infeksi yang disebabkan oleh Mycobacterium leprae. Cacat setelah infeksi sering terjadi dan fasciitis nekrotikans dapat memperburuk kondisi pasien. Kami menyajikan kasus fasciitis nekrotikans ekstremitas kanan pada pasien dengan disintegrasi tarsal dan ulkus plantar akibat infeksi kusta sebelumnya. Kultur mikrobiologi tidak memadai pada tahap awal manajemen, yang menunda antibiotik definitif untuk pasien dan infeksi nekrotik progresif tidak terkontrol. Amputasi dilakukan untuk menyelamatkan nyawa pasien dan kultur mikrobiologi yang terakhir dapat menentukan terapi antibiotik definitif. Laporan ini menyoroti kebutuhan manajemen kecacatan dan pengendalian infeksi pada pasien kusta setelah pengobatan selesai.*

**Kata kunci:** fasciitis nekrotikans, kusta, kultur mikrobiologi.

## Introduction

Necrotizing fasciitis is a progressive inflammation followed by both gas-forming or non-gas forming necrosis of subcutaneous tissue, superficial fascia, and superficial part of the deep fascia with the variable presence of cutaneous gangrene.<sup>1,2</sup> The risk factors related to necrotizing fasciitis are immunocompromised status, diabetes mellitus, peripheral vascular disease, penetrating trauma, surgical incision, and IV drug use.<sup>2,3</sup>

In leprosy, the host inappropriate immune response was suspected as the predisposing factor for the infection.<sup>4</sup> *Mycobacterium leprae* was reported to down-regulate cellular immune response and the susceptibility of leprosy was related to genetic polymorphism in the immune system.<sup>4,5</sup> Although information about necrotizing fasciitis in leprosy is scarce, the existing compromised immune system is a risk factor for necrotizing fasciitis in a leprosy patient.<sup>6</sup>

Necrotizing fasciitis in leprosy is rare and inadequate management could deteriorate the

current condition. This case report was made to highlight the lack of awareness and comprehension in the prevention and management of progressive necrotic tissue infection in a leprosy patient.

## Case Illustration

A 58-year old Indonesian female was admitted to the hospital with progressive swelling and pain on her right foot to her leg (Figure 1). The patient had a history of multibacillary (MB) Leprosy in 2014 with peripheral neuropathy. The patient had muscle atrophy of the second toe on the right foot which led to auto-amputation a few months before admission. The patient also recalled having her right foot wounded which left a chronic plantar ulcer for almost one year. Her habit was working on the field barefooted. Four days before hospital admission, the patient felt pain on her swollen right foot, with fluid oozed from the existing ulcer. She also felt cold, nauseous, and vomited a few times a day.



**Figure 1. Patient's Swollen Right Foot with Mutilated Toe, Chronic Plantar Ulcer and Subcutaneous Hemorrhage-like Skin Rash**

The physical examination result on her arrival was afebrile (37° C), tachycardia (128 bpm), low blood pressure (91/67 mmHg), with edema on her right foot alongside blisters and subcutaneous haemorrhage-like skin rash. Serous fluid was found oozing from the hole on the plantar side. The swollen foot was painful to palpate and the movement was restricted. The haematology test showed leukocytosis (14.200/μl). The bacterial index (BI) and the morphology index (MI) for *M. leprae* was negative. No blood culture was obtained.

After the examination, the patient was treated with intravenous fluid, but several punctures on the

hand and left foot were done because of difficulties in obtaining a patent IV line. The patient underwent an emergency radical debridement surgery. During the surgery, the surgeon noticed a gas came out from the site during the incision with the gangrenous smell. Due to limited resources in the hospital's microbiology laboratory, the initial microbiology culture was not performed. After surgery, the patient was admitted to ICU, then treated with intravenous ceftriaxone (1 g, twice a day) and oral metronidazole (500 mg, three times a day) as the empirical therapy.

On day one after surgery, several blisters and

subcutaneous hemorrhage-like skin rash appeared on the site of failed IV-line punctures from the previous day (figure 2) and on the right thigh (figure 3). Watchful waiting was performed while continuing the antibiotics regimens. The patient's condition stabilized on day 4 and was transferred to a regular room. On day 6 of treatment, a microbiology culture was requested using a specimen from swabbing the infected tissue. The swab culture result was *Staphylococcus aureus* with the indeterminate status of methicillin resistance *Staphylococcus aureus* (MRSA) due to the laboratory's inability to perform a cefoxitin screening. However, it was reported resistant towards piperacillin, benzylpenicillin, tetracycline, gentamicin, and amoxicillin.



**Figure 2. Subcutaneous Hemorrhage-like Skin Rash on the Right Hand After failed IV-line puncture**



**Figure 3. Subcutaneous Hemorrhage-like Skin Rash and Blisters on the Right Thigh**

Antibiotics were continued until day 8 but the necrotic tissue kept on progressing despite the daily debridement. The patient's general condition was

stable and the other lesion from the infected IV-line punctures subsided, although the leukocytosis had not abated. The clinical team decided to amputate the right limb above the knee and planned to do a proper microbiology culture before switching the antibiotics. Multiple tissues and blood specimens were then sent to a referral microbiology laboratory for aerobic and anaerobic culture. The patient screened for MRSA and the intravenous ceftriaxone was continued while waiting for the culture result.

On day 12, the tissue culture resulted MRSA and *Acinetobacter baumannii*; both were resistant to ceftriaxone. The blood culture resulted methicillin resistant *Staphylococcus hominis*. The patient's MRSA screening resulted negative. On day 13, the antibiotic switched to a combination of meropenem and levofloxacin based on the susceptibility result of the isolates. The progressive necrotic process was contained and the leukocyte count decreased continuously. The patient was treated for another 8 days before being discharged. She will be observed annually for her leprosy status. The total patient's hospitalization was 21 days.

### Discussion

Necrotizing fasciitis has been divided into groups based on its microbiological culture, polymicrobial and monomicrobial.<sup>1,2</sup> MRSA was the most common gram-positive organism isolated from patients with necrotizing fasciitis and *Acinetobacter* sp. was the least detected isolate.<sup>1</sup> Both microbes are usually found in hospital-acquired infections.<sup>7</sup> In this patient, negative screening result implied the MRSA was obtained during invasive procedure to the tissue. Due to lack of resources, the hospital did not have a proper infection control program and no surveillance on MRSA was ever issued. The absence of enforcement on standard precautions resulted from poor handling of the patient's exposed tissue and nosocomial microbe's invasion enhanced the necrotic progression. In low- and middle-income countries, the lack of laboratory support was one of the problems causing poor infection control in the hospital.<sup>8</sup> In this case, the lack of laboratory support also caused the delay of appropriate definitive antibiotics.

Previously, tissue infection with gas-forming necrosis was associated with *Clostridium perfringens* and known as gas gangrene.<sup>2</sup> *C. perfringens* is an anaerobic environmental bacterium and known as a causative agent for tissue infection in a soil-contaminated wound. With the patient's history, anaerobic bacteria were

suspected in the initial diagnosis and metronidazole was administered after surgery. Unfortunately, no anaerobic culture was done before initial antibiotic treatment and the suspicion couldn't be confirmed.

Indonesia is the third biggest country in leprosy burden according to WHO.<sup>9</sup> Tarsal disintegration and plantar ulcer are common in leprosy patients as part of complications from peripheral neuropathy.<sup>10,12</sup> The patient in the presented case also had MB type of leprosy previously, which was a risk factor for physical disability.<sup>13</sup> Due to the nature of the impaired immune system in leprosy, the patient was prone to necrotizing fasciitis and other infection, which might lead to another serious problem.<sup>5</sup> In Indonesia, leprosy management is one of the national public health's programs. Although the reports of the new case were declining, the complication and physical disability due to leprosy were poorly documented, suggesting insufficient awareness in leprosy management after they finished the treatment.

### Conclusion

Although the first-line antibiotic regimen failed to stop the progressing necrotic tissue, the follow-up tissue culture wasn't performed early enough and proper antimicrobial therapy wasn't achieved. This condition is typical in a hospital with a shortage of microbiology laboratories. The implication of this practice was the inevitable loss of the patient's limb and the increased cost of treatment. This case also emphasized the need for government attention on enhancing public health's program for disability prevention of leprosy patients in Indonesia.

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