

CASE REPORT

Necrotizing fasciitis caused by *Kocuria rosea* in an immunocompromised patient

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Abstract

This case report describes an immunocompromised patient with a skin boil that progressed to necrotizing fasciitis. The aim of this brief report is to raise awareness regarding necrotizing soft tissue infections caused by an unusual organism, *Kocuria rosea*, a typically non-pathogenic organism, and outline the course of treatment currently considered to be the standard of care.

INTRODUCTION

Necrotizing soft tissue infections (NSTIs) are severe and associated with significant morbidity, including multisystem organ failure, large-scale tissue loss and high mortality [1]. The rapid progression associated with this disease makes quick diagnosis and intervention imperative [2]. Diabetes mellitus, vascular disease and obesity are common risk factors associated with the development of NSTIs [1]. Common causative bacteria include both Gram-negative and Gram-positive species, such as *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Clostridium perfringens*, *Pseudomonas aeruginosa* and various types of streptococci [3]. *Kocuria* is a non-pathogenic bacterium which can colonize the oropharynx, skin and mucosa of humans and other mammals. Unlike other common colonizing flora, such as streptococcus and staphylococcus, *Kocuria* has not previously been associated with NSTIs [3–7]. This case report highlights a patient with a history of uncontrolled diabetes mellitus who developed necrotizing fasciitis from *Kocuria rosea*.

CASE REPORT

A 35-year-old male with a past medical history of diabetes mellitus type 2, hypercholesterolemia and recurrent boils from

methicillin-resistant *Staphylococcus aureus* (MRSA) initially presented with a right axillary boil. The patient reported that 5 days prior he noticed a red, hot area under his right arm which then progressed to a boil that spontaneously ruptured. Over the course of the next several days the boil drained foul smelling fluid and became progressively more painful causing him to seek medical attention. He reported subjective fevers during the first 2 days of his symptoms, but the fevers resolved after the boil ruptured. He denied any other symptoms.

Upon examination the patient was alert and oriented and was noted to have an area of black necrotic skin in his right axilla, with surrounding erythema and associated induration on the right chest wall (Fig. 1). On admission his heart rate was 132 beats per minute, blood pressure 116/80 mmHg, temperature 38.3°C, respirations 30 per minute and oxygen saturation 96% on room air. Laboratory studies revealed a white blood count of 26.2 K cells/dL, hemoglobin of 13.2 g/dL, sodium of 129 mEq/L, glucose of 289 mg/dL, serum creatinine of 0.9 mg/dL, C-reactive protein of 36.8 mg/dL, hemoglobin A1C of 13.5% and lactate of 3.3 mmol/L. The remaining laboratory values were within normal limits. The patient's calculated Laboratory Risk Indicator for Necrotizing Fasciitis score was 10 points,

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Figure 1: Pre-operative right axilla/chest wall.



Figure 2: Post-excision right axilla/chest wall.

supporting the clinical diagnosis of NSTI [8]. A computed tomography scan revealed a moderate amount of subcutaneous gas within the soft tissue of the right axilla and lateral chest wall along with surrounding edema.

The patient was started on linezolid and piperacillin-tazobactam for broad-spectrum coverage. He was taken emergently to the operating room for sharp debridement of skin, subcutaneous tissue, fascia and muscle of the right axilla and lateral chest wall. Intraoperatively a large amount of purulent and necrotic tissue was found. Fluid and tissue cultures were taken. The excised area measured $17 \times 9 \times 6 \text{ cm}^3$ (Fig. 2). The patient underwent a subsequent operation for further debridement and returned to the operating room 3 days after that for delayed primary closure over



Figure 3: Wound closure.

a drain (Fig. 3). On hospital Day 6, the initial operative cultures returned with abundant growth of *Kocuria rosea* and rare growth of coagulase negative *Staphylococcus*. Although susceptibility studies were not performed, literature has shown *Kocuria* to be susceptible to commonly used antibiotics [1]. The patient's antibiotics were narrowed to intravenous ampicillin-sulbactam and linezolid while he remained in the hospital. The patient was discharged on hospital Day 9 on oral amoxicillin-clavulanate and linezolid to complete a 14-day antibiotic course. Although the culture data did not support the use of linezolid, it was continued given his past history of recurrent MRSA boils. He returned to the outpatient clinic 27 days after wound closure for drain and suture removal. The patient had no follow-up complications and was released from the surgical service.

DISCUSSION

Necrotizing fasciitis is a severe soft tissue infection with considerable morbidity and high rates of mortality [1]. NSTIs progress rapidly and this quick evolution requires early diagnosis and treatment, specifically operative debridement and targeted antibiotic therapy [9]. NSTIs are often categorized by microbiological data into two types. Type I infections are typically polymicrobial; Gram-negative, Gram-positive and anaerobic pathogens may be cultured. Type II infections are typically termed monomicrobial and group A streptococcus alone and/or staphylococcus aureus are the usual organisms cultured. The *Kocuria* organism is a Gram-positive cocci from the family Micrococcaceae, order Actinomycetales, class Actinobacteria [3, 7]. While NSTIs caused by *Kocuria* are rare, as previously noted, this species has been reported to cause urinary tract infections, cholecystitis, catheter-associated bacteremia, endocarditis, brain abscess, necrotizing mediastinitis and meningitis [1, 3-7].

In immunocompromised patients, such as the diabetic patient described in this report, unusual organisms may cause significant infection. Therefore, the detection of a non-pathogenic organism such as *Kocuria* species should not always be ignored as a contaminant. The hyperglycemic environment present in patients with diabetes mellitus results in immune dysfunction including derangement of neutrophil adherence and chemotaxis, depression of intracellular oxidative killing and impaired cell-mediated and humoral immunity [9]. Additionally, the presence of vascular insufficiency, peripheral neuropathy and likelihood of colonization with pathogenic bacteria are also causative factors for higher rates of infection in diabetic patients. The immunocompromised patient has both greater morbidity and mortality than an immunocompetent patient when an infection occurs.

This brief report describes an immunocompromised patient with a skin boil that progressed to necrotizing fasciitis. *Kocuria rosea*, a typically non-virulent pathogen, was pathogenic in the presence of hyperglycemia secondary to uncontrolled diabetes mellitus. As noted, *Kocuria* is a rare cause of infections and has not been previously reported to cause NSTIs. This organism, however, may be underreported in culture data due to misidentification as coagulase negative *Staphylococci*. This patient demonstrates the potential pathogenicity of a typically innocuous bacterial species and serves as a reminder to recognize that unusual organisms may be associated with serious infections in an immunocompromised host. Early diagnosis, emergent debridement and appropriate antibiotic therapy continue to be the standard of care in treating NSTIs.

CONFLICT OF INTEREST STATEMENT

None declared.

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