

Case Report

Ecthyma Gangrenosum and Panniculitis Secondary to Acute *Pseudomonas* Myositis Without Bacteremia

Heather Gosnell,¹ Matthew Burke, MD,² Joseph Shnouda, MD²

Abstract

Introduction

Ecthyma gangrenosum (EG) is a relatively uncommon cutaneous manifestation of an underlying *Pseudomonas aeruginosa* infection and is clinically described as necrotic with gangrenous ulcers surrounded by erythematous halos. Cases of EG may occur in the absence of bacteremia and have been increasingly reported in literature. Here we present a patient with features of both EG and panniculitis, despite the lack of underlying bacteremia.

Clinical Findings

A 57-year-old male presented to the emergency department with unrelenting right-sided lower back pain and an “itchy and painful” rash of four to five day duration. The patient had an extensive history of intravenous drug abuse and had been hospitalized multiple times for *Pseudomonas* bacteremia. Upon examination, there were diffuse, erythematous subcutaneous nodules and several individual necrotic ulcerations on the abdomen, upper and lower extremities, surrounded by erythematous halos. An MRI revealed myositis and edema in the right paraspinal region, and blood cultures were negative for *Pseudomonas*.

Discussion

EG is typically classified as bacteremic or non-bacteremic in nature, and there are limited reports of panniculitis in the absence of bacteremia. This patient’s presentation was unusual for the diffuse presentation of non-bacteremic EG with panniculitis. Due to the patient’s past medical history of deep-seeded *Pseudomonas* infections, bacteria could have been directly inoculated into the skin at various injection sites.

Conclusion

While EG is an uncommon but well-recognized dermatologic feature of *Pseudomonas* bacteremia, panniculitis is reportedly less commonly and likely underrecognized. Physicians should become aware of the cutaneous manifestations of underlying *Pseudomonas* infection so appropriate antibiotic therapy can be initiated.

Keywords

ecthyma gangrenosum; *Pseudomonas aeruginosa*; bacterial infections and mycoses; intravenous substance abuse; panniculitis; myositis

Introduction

Ecthyma gangrenosum (EG) is a relatively uncommon cutaneous manifestation of an underlying *Pseudomonas aeruginosa* infection and is clinically described as necrotic with gangrenous ulcers surrounded by erythematous halos.¹ EG is most often diagnosed in immunocompromised patients with bacteremia.² Cases of EG may occur in the absence of bacteremia and

have been increasingly reported in the literature.³⁻⁵ Furthermore, there have been various reports of subcutaneous nodules and panniculitis associated with *Pseudomonas* infections, with and without septicemia.⁶⁻⁸ Here we present a patient with features of both EG and panniculitis, despite a lack of underlying bacteremia.

Author affiliations are listed at the end of this article.

Correspondence to:

Heather Gosnell

Office of Graduate Medical Education

6000 49th St N.

St. Petersburg, FL 33709

(heather.gosnell@gmail.com)

Case Presentation

A 57-year-old male presented to the emergency department with intractable right-sided lower back pain for five days and an “itchy and painful” rash for four days. He reported the pain was localized to his right lower back and did not radiate. The pain worsened with walking and movement, and it improved with rest. The patient reported the rash appeared one day after the back pain began. He could not identify where the rash began or how it had spread, but he said that lesions were present on his chest, abdomen, dorsal and ventral surfaces of the forearms and shins, and the backs of his hands. This patient had an extensive past medical history of IV drug abuse and recurrent pansensitive *Pseudomonas aeruginosa* bacteremia with various complications and untreated hepatitis B and C. He was hospitalized on multiple occasions for treatment with IV antibiotics three and four months prior due to *Pseudomonas* bacteremia with septic arthritis and cervical discitis with a prevertebral abscess. At that time, he completed a six-week course of IV ciprofloxacin and cefepime before discharge. He was not able to follow-up as an outpatient due to a lack of insurance and non-adherence. Eleven months prior to this admission, he was hospitalized for lumbar osteomyelitis secondary to *Pseudomonas* bacteremia and was treated with meropenem.

A physical exam revealed exquisite tenderness to the right paraspinal region. On the trunk, upper and lower extremities, there were diffuse, erythematous subcutaneous nodules and several individual necrotic ulcerations surrounded by erythematous halos, measuring between 0.5 cm and 2 cm in size. In the emergency department, vital signs were stable. There was mild leukopenia at $4.17 \times 10^3/\mu\text{L}$, neutrophil count at 69.1% and immature granulocyte count at 0.70%. At that time, absolute neutrophil count (ANC) was within normal limits at $2.88 \times 10^3/\mu\text{L}$. The patient was found to have an elevated ESR at 20 mm/hr and CRP at 2.78 mg/dL. Blood cultures were collected in the emergency department prior to treatment. An MRI of the lumbar spine revealed muscle edema and myositis extending from T11 to the sacrum within the erector spinae muscle.

The patient was presumably diagnosed with ecthyma gangrenosum secondary to suspected

pseudomonal myositis. Empiric treatment with IV vancomycin and ciprofloxacin was started for broad-spectrum coverage while blood cultures were pending. Patient was provided limited pain medication due to his history of narcotic abuse. Blood cultures were positive only for *Staphylococcus epidermidis* and *Staphylococcus hominis* in one of four vials and were thought to be a contaminant from the skin flora.

On the second and third day of admission, the patient’s white blood cell count continued to downtrend to 2.46 and $1.50 \times 10^3/\mu\text{L}$ respectively. The absolute neutrophil count decreased to $0.92 \times 10^3/\mu\text{L}$, reflective of neutropenia. It was suspected the transient leukopenia was secondary to bone marrow suppression from the vancomycin and ciprofloxacin. Infectious disease was consulted and recommended discontinuation of the vancomycin and ciprofloxacin. The patient was started on a two-week course of IV cefepime. His white blood cell count slowly increased over the next few days of admission. The patient reported daily improvement in his back pain throughout the course of his stay. With continued antibiotic treatment over the next two weeks, the myositis and neutropenia continued to improve, and the nodules and ulcers slowly resolved without evidence of scarring.

Upon discharge, he was provided with a two-week course of ciprofloxacin. The patient was counseled on the importance of completing the course of antibiotics and was in agreement with the treatment plan. Case management provided him with information on local free health clinics for follow-up appointments to aid in treatment adherence.

Discussion

Two types of EG have been described in the literature: bacteremic or nonbacteremic EG. Bacteremic or classic EG is due to a hematogenous spread of bacteria with positive blood cultures. Nonbacteremic or localized EG is secondary to direct inoculation with negative blood cultures. Patients with the nonbacteremic form tend to have a better prognosis than those with bacteremia, but secondary bacteremia may occur in the setting of delayed treatment.⁹

While *Pseudomonas* is the most common

culprit behind EG lesions in up to 74% of cases,¹⁰ many other organisms have been found to produce EG-like lesions in septic states. Bacterial causes include methicillin-resistant *Staphylococcus aureus* (MRSA), *Streptococcus pyogenes*, *Citrobacter freundii*, *Escherichia coli*, *Aeromonas hydrophila*, *Serratia marcescens*, *Klebsiella pneumoniae*, *Corynebacterium diphtheriae*, *Neisseria gonorrhoea*, *Yersinia pestis* and *Proteus mirabilis*.⁹⁻¹³ One study found 9% of EG cases are fungal in origin,¹⁰ and additional case reports have identified *Candida*,¹⁴ *Mucor*,¹⁵ *Aspergillus* and other species in such lesions.

EG tends to occur in the setting of an underlying immunodeficiency such as neutropenia, HIV/AIDS, leukemias or in patients undergoing systemic chemotherapy or immunosuppression.^{16,17} However, it can infrequently occur in those who are immunocompetent and previously healthy.¹⁰ Overall, it is rare to observe EG secondary to *Pseudomonas* in the absence of bacteremia.

Lesions in EG typically begin as painless, round erythematous macules that subsequently indurate and progress to hemorrhagic bullae. Perivascular invasion and production of virulence enzymes like exotoxin A, elastase and phospholipase C subsequently leads to surrounding ischemic necrosis and formation of the necrotic ulcer.^{16,18} Lesions are most often seen in the groin, axillary and perianal areas but can be seen in other areas,¹⁰ as demonstrated by this patient. While the lesions do not initially present as ulcers, the delayed presentation of this patient demonstrated the downstream manifestations of EG and raised clinical suspicion of an underlying *Pseudomonas* infection.

Panniculitis also typically presents in patients with underlying septicemia and immunosuppression.¹⁹ However, to our knowledge, very limited literature exists on panniculitis in the context of *Pseudomonas* infection without bacteremia.⁶⁻⁸ One study found that in cases of panniculitis without septicemia, all patients had local skin injuries, and *Pseudomonas* could be cultured from half of the patients' lesions. This outcome may suggest long-term wound colonization favors skin infection,⁹ which is consistent with this patient's presentation and infection history.

In this patient, the lesions were not localized, and the EG was presumed to be the non-bacteremic type based on the results of the blood culture, though an unusual presentation. Due to the patient's past medical history of deep-seeded *Pseudomonas* infections, it is possible bacteria could have been directly introduced into the skin at various injection sites and potentially achieved local spread via the lymphatics, as proposed in previous case reports.^{6,8}

Conclusion

While EG is an uncommon but well-recognized dermatologic feature of *Pseudomonas* bacteremia, panniculitis is reportedly less common and likely underrecognized. Both of these skin conditions typically present in the context of immunosuppression and bacteremia, which were notably absent in this patient. This case exemplifies the importance of a thorough physical exam in critically ill patients who present with skin lesions and have a recent history of bacteremia. Physicians should be aware of the various cutaneous manifestations of underlying *Pseudomonas* infections, especially when the patient lacks the classic signs of sepsis and bacteremia, such that antibiotic therapy may be initiated as quickly as possible.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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Author Affiliations

1. Lake Erie College of Osteopathic Medicine Education, Erie, PA
2. Northside Hospital, St. Petersburg, FL

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