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Serratia marcescens-Associated Ecthyma Gangrenosum in an Infant on Extracorporeal Life Support

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Ecthyma gangrenosum (EG) often develops after *Pseudomonas aeruginosa* bacteremia in patients with primary immunodeficiency or immunocompromise due to causes such as chemotherapy, malnutrition, and chronic disease.[1] However, cases of EG have also been reported in healthy individuals or during transient neutropenia associated with recent viral infection.[2]

While *P. aeruginosa* is classically considered the causative agent, other reported causes include *Escherichia coli*, *Aeromonas hydrophila*, *Staphylococcus aureus*, *Fusarium* and *Aspergillus* species, and *Serratia marcescens*.[3]

A 10-month-old patient who underwent congenital heart surgery (ventricular septal defect) was admitted to the pediatric intensive care unit under the support of venoarterial extracorporeal membrane oxygenation (VA-ECMO) and invasive mechanical ventilation (IMV). On day 3 of hospitalization, the patient was extubated and connected to noninvasive mechanical ventilation support. However, the following day the patient was reintubated and returned to IMV, and piperacillin-tazobactam treatment was initiated empirically. Piperacillin-tazobactam therapy was discontinued after 14 days (on day 18 of hospitalization). On the same day, redness was noticed on the patient's left cheek. Suspecting local irritation caused by the adhesive tape used to secure the endotracheal tube, the tape was replaced. Over the course of the day, the lesion developed macular then nodular changes measuring 0.5 × 0.5 cm, surrounded by an erythematous induration. The next day, this nodule ulcerated and turned into a lesion surrounded by a hyperemic halo. The patient's vital signs were normal. A swab sample from the wound was sent for culture together with blood, catheter, and tracheal aspirate samples.

The patient was hemodynamically stable and extracorporeal support was successfully discontinued on day 19 of VA-ECMO. Within 48 hours after the first redness appeared, a 2 × 2 cm dry lesion covered with a black, gangrenous scab and surrounded by a hyperemic halo was observed (Figure 1). The day after sending cultures, a gram-negative bacillus was detected from the swab sample. Ecthyma gangrenosum was suspected based on the rapidly progressive wound changes and characteristics of the skin lesion. As *P. aeruginosa* is the classic pathogen, antibiotherapy with a combination of carbapenem (meropenem) and aminoglycoside (amikacin) was initiated. In addition to systemic treatment, daily wound care was started with 5% chlorhexidine acetate (Bactigras) and bacitracin/neomycin sulfate cream (Thiocilline).

Two days after the wound swab culture was obtained, *Serratia marcescens* was isolated, and antimicrobial treatment was adjusted according to the antibiogram results. The patient had no signs of sepsis, and blood and catheter cultures were negative. A diagnosis of non-bacteremic EG was made. Except for low IgG at the borderline, examinations for underlying immunological disease were normal (IgA: 33.8 mg L (17-69), IgG: 449 mg L (463-1006), IgM: 52.3 mg L (46-159), total IgE 63, 8 IU/mL (0-150), Anti-Hbs: >1000 (≥10), lymphocyte subgroups; It was learned that CD3: 52%, CD4: 25%, CD8: 27%, CD 16+56: 3%, CD19: 37%, CD20: 37%). T-cell receptor excision circles resulted in 52% (normal). Dihydrorhodamine test

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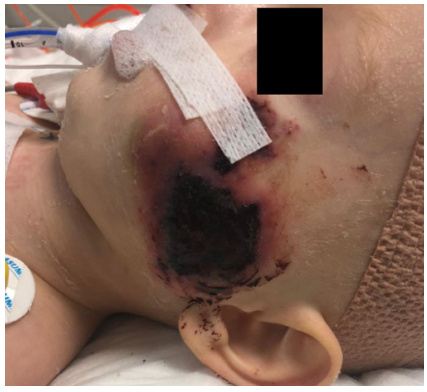

Figure 1. Day 5 after the lesion emerges.

in terms of chronic granulomatous disease was normal. No pathology was found in the blast transformation result too.

We faced a rare case of EG that was not preceded by neutropenia, occurred in the absence of risk factors other than chronic disease, was caused by a nonpseudomonal microorganism (*S. marcescens*), and was not associated with clinical sepsis or bacteremia in blood culture at time of diagnosis. During follow-up, the wound increased in size to 5 × 7 cm (Figure 2). Upon consultation with the plastic surgery department, debridement of the lesion was discouraged and follow-up with antibiotherapy and wound dressing was recommended. The patient received antibacterial therapy with different antibiotic combinations for a total of 36 days, and significant regression of the lesion was observed (Figure 3).

Ecthyma gangrenosum is a necrotizing vasculitis that occurs histologically as a result of bacterial invasion of vessels in the dermis and subcutaneous tissue. As the lesion contains multiple microorganisms, microscopic examination and culturing of lesion fluid may assist in isolating the causative agent.[4] Similarly, *S. marcescens* was isolated from the lesion swab culture obtained in our case and the antibacterial susceptibility results aided in treatment selection.

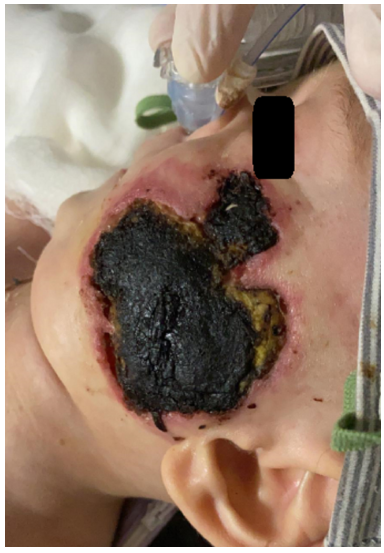

Figure 2. Day 10 after the lesion emerges.

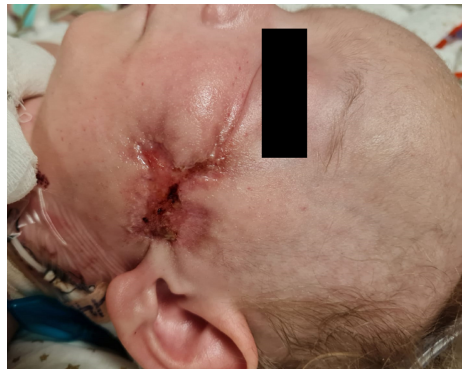

Figure 3. Day 35 after the lesion emerges.

Systemic therapy is the mainstay of treatment in EG. Although local topical antiseptic agents have been recommended for years, there is no evidence of their effectiveness. Once EG is identified, broad-spectrum antibiotherapy including antipseudomonal antibiotics should be started without waiting for lesion culture results.[5]

In conclusion, EG should be considered a sign of serious infection that can be life-threatening regardless of the cause, and appropriate treatment should be initiated without delay. Our aim in presenting this case is to show that EG can occur in patients other than the classical population of immunosuppressed patients and can be associated with *S. marcescens*.

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