ECTHYMA GANGRENOSUM IN A CHILD WITH ACUTE MYELOID LEUKEMIA

Presstisa Gifta Axelia[1,2], Nanda Daiva Putra[1,2], Trisiswati Indranarum[1,2], Yuri Widia[1,2], Sawitri[1,2]
[1]Department of Dermatology, Venereology and Aesthetic, Dr. Soetomo General Academic Hospital
[2]Department of Dermatology Venereology and Aesthetic, Faculty of Medicine, Universitas Airlangga Surabaya, Indonesia

Keywords Ecthyma, neutropenia, *Pseudomonas aeruginosa*, acute myeloid leukemia, child.

Abbreviation **EG** = Ecthyma gangrenosum.

Case report. A 4-year-old boy was referred to the Dermatology Department for multiple necrotic skin lesions in both axillary regions. The lesions first appeared two days before the consultation, following an episode of high fever. According to the attending physician, the initial lesions were small erythematous papules that developed after the patient had a fever and was wiped with a damp cloth. These papules subsequently ulcerated and became covered with dark crusts. Pain and itching assessment was challenging due to the patient's irritability. The child had recently been diagnosed with suspected acute myeloid leukemia and was in the stabilization phase prior to starting chemotherapy.

Initial clinical examination revealed a high temperature (40°C) and pallor. Dermatological evaluation showed three well-demarcated black crusted lesions, each measuring 0.5-1 cm on the lip region (Fig. 1), and multiple erythematous lesions, some ulcerated with necrotic black crusts measuring 0.5–3 cm in both axillary regions (Fig. 2). Laboratory tests showed pancytopenia with marked neutropenia.

Microbiological examination revealed mixed flora including Gram-positive cocci, Gram-negative cocci, Gram-negative bacilli, and coccobacilli on Gram staining of lip lesions; Gram-negative bacilli and coccobacilli were also found on the right axillary lesions. Culture of ulcerated lesions showed growth of *Pseudomonas aeruginosa* and *Shigella boydii*. Blood culture revealed growth of coagulase-negative *Staphylococcus*.

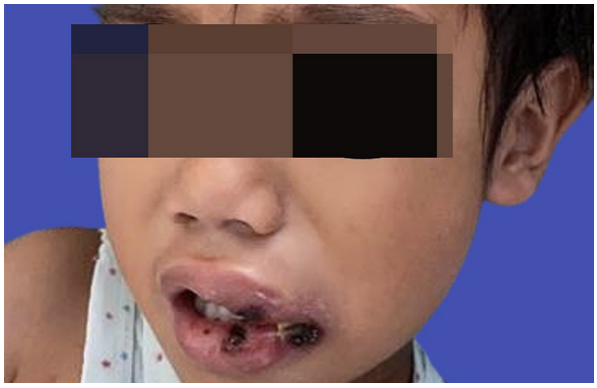

Fig. 1

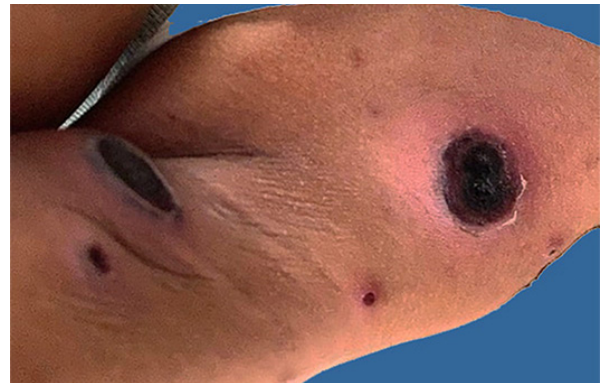

Fig. 2

Fig. 1, 2: Ecthyma gangrenosum in a 4-year-old child with acute myeloid leukemia: gangrenous lesions of the lip (Fig. 1) and axilla (Fig. 2).

Based on the clinical appearance, rapid progression, microbiological findings, and the patient's immunocompromised state, a diagnosis of ecthyma gangrenosum was made. Differential diagnoses such as pyoderma gangrenosum were ruled out due to the confirmed infectious etiology. Under the guidance of a pediatric infectious disease specialist, the patient was treated intravenously with vancomycin 350 mg every 12 hours (starting on hospital day 7), fluconazole 130 mg/day (from day 12), and amikacin 200 mg/day plus ceftazidime 650 mg every 8 hours (from day 18). Topical treatment included 2% fusidic acid for superficial ulcers, silver sulfadiazine, Duoderm® gel, and occlusive dressing with Tegaderm® for necrotic ulcers. Supportive therapy included paracetamol, packed red cell transfusions, and lactulose syrup. Chemotherapy was postponed during the acute infectious phase.

Periodic follow-up showed marked clinical improvement: the lesions displayed granulation tissue with minimal crusting and no signs of superinfection by week 6 of hospitalization. The patient was discharged in stable condition; no recurrence of the lesions was observed.

Discussion. Ecthyma gangrenosum (EG) is a rapidly progressing skin infection most commonly caused by *Pseudomonas aeruginosa*, a Gram-negative opportunistic pathogen. It typically affects immunocompromised patients, particularly those with hematologic malignancies such as acute myeloid leukemia (2, 7).

Our patient, a 4-year-old boy with suspected acute myeloid leukemia and febrile neutropenia, presented with typical EG lesions in the axillae and perioral region. Culture findings revealed a rare polymicrobial infection with *P. aeruginosa* and *Shigella boydii*, along with coagulase-negative *Staphylococcus* in the blood culture. While *P. aeruginosa* is the classical cause of EG, infections due to other organisms have been reported, including *Aeromonas hydrophila*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Klebsiella pneumoniae*, and even fungi such as *Aspergillus spp*., particularly in immunocompromised hosts (2).

EG can be classified into bacteremic and non-bacteremic forms. The bacteremic form is more common and results from hematogenous spread of the pathogen, leading to perivascular invasion of the tunica media and adventitia of arteries and veins. This invasion causes thrombosis, vascular destruction, and subsequent ischemic necrosis of the surrounding skin (1). In contrast, the non-bacteremic form arises from direct inoculation of the pathogen into compromised skin or mucosa. *P. aeruginosa* virulence factors – such as exotoxin A, elastase, and phospholipase C – contribute to both cutaneous and vascular damage (1, 8). In patients with prolonged hospitalization, such as those with hematologic malignancies, colonization by *P. aeruginosa* is more frequent, and even small skin breaks can act as entry points (5, 9).

Diagnosis of EG is primarily clinical, supported by cultures from ulcerated lesions and occasionally by skin biopsy (3). Distinguishing EG from other necrotic skin conditions – such as pyoderma gangrenosum, cutaneous aspergillosis, or necrotizing fasciitis – is critical, as treatment strategies differ significantly. In our case, pyoderma gangrenosum was excluded both clinically and due to the presence of pathogens in cultures (10).

Management involves early initiation of broad-spectrum antibiotics with anti-*Pseudomonas* activity. Surgical debridement is often considered, especially for larger lesions with extensive necrosis or more aggressive disease, to remove infected necrotic tissue and promote wound healing (1). Our patient was treated with vancomycin, ceftazidime, amikacin, and fluconazole, along with supportive therapy and topical antimicrobial wound care with occlusive dressings. The patient showed clinical improvement by the sixth week, evidenced by lesion reepithelialization and decreased inflammation.

The prognosis of EG is closely related to the presence of bacteremia and the degree of immunosuppression. Mortality can reach 38-77% in septic patients, while non-septic patients have a better prognosis, with mortality rates around 15% (11).

Conclusion. This successfully managed case underscores the importance of early recognition, appropriate antimicrobial therapy, and multidisciplinary collaboration in the management of ecthyma gangrenosum in children.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Address to:
Trisiswati Indranarum, dr., Sp.DVE
Department of Dermatology Venereology and Aesthetic, Dr. Soetomo General Academic Hospital / Department of Dermatology Venereology and Aesthetic, Faculty of Medicine, Universitas Airlangga
Jalan Prof. Dr. Moestopo No. 6-8, Surabaya, Indonesia 60286
e-mail: tris.indranarum@gmail.com

References

1) Muggeo P, Zama D, Decembrino N, et al. 2022. Ecthyma gangrenosum in children with cancer: diagnosis at a glance. A retrospective study from the infection working group of Italian Pediatric Hematology Oncology Association. *Pediatr Infect Dis J*. 2022;41(3):238-42.
2) Martínez-Longoria CA, Rosales-Solis GM, Ocampo-Garza J, et al. Ecthyma gangrenosum: a report of eight cases. Case reports. *An Bras Dermatol*. 2017;92(5):698-700.
3) Vestita M, Filoni A, Santoro N, et al. A single black ulcer in a child with acute lymphocytic leukemia. Case reports. *An. Bras. Dermatol*. 2016;91(6):815-6.
4) Lama IY, Cheung LK, James A, et al. Ecthyma gangrenosum: a case report in a child with acute lymphoblastic leukaemia. *JPRAS Open*. 2024;40:215-21.
5) Galazka P, Kaczor P, Kaluzni K, Leis K. Ecthyma gangrenosum as a serious complication of *Pseudomonas aeruginosa* infection in Departments of Paediatric Oncology—Case report and review of the literature. *Postepy Dermatol Alergol*. 2021;38(4):537-43.
6) Davis K, Wilson S. Febrile neutropenia in paediatric oncology. *Paediatr Child Health* (Oxford). 2020;30(3):93-97.
7) Kryeziu E, Kryeziu K, Bajraktari G, et al. Ecthyma gangrenosum in a patient with acute leukemia. *Med Arh*. 2010;64(6):373-4.
8) Persano G, Pinzauti E, Pancani S, Incerti F. Successful use of negative-pressure wound therapy and dermal substitute in the treatment of gluteal ecthyma gangrenosum in a 2-year-old girl. Case reports. *Plast Reconstr Surg Glob Open*. 2018;6(10):e1953.
9) Sluga R, Tersmette M, Sohne M. Hairy cell leukemia presenting with ecthyma gangrenosum: a case report. Case Reports. *BMC Infect Dis*. 2019;19(1):85.
10) Ahronowitz I, Harp J, Shinkai K. Etiology and management of pyoderma gangrenosum. *Am J Clin Dermatol*. 2012;13(3):191-211.
11) Tatara AM, Mikos AG, Kontoyiannis DP. Factors affecting patient outcome in primary cutaneous aspergillosis. *Medicine* (Baltimore). 2016;95(26):e3747.