Chapter 55
Multiple Ulcers on the Scalp in an Immunocompromised Patient

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A 20-year-old female patient was admitted to the Department of Hematology with acute lymphocytic leukemia, febrile neutropenia and pancytopenia. She was treated with vincristine and methylprednisolone. The patient was consulted in the Department of Dermatology and Venereology because of multiple nodules on the scalp. The nodules discharged yellowish fluid after being scratched by the patient. The nodules rapidly multiply, ulcerated, and then covered with brown-black crusts. The patient also complained of itching and pain.

A physical examination revealed multiple ulcerations with elevated and erythematous borders covered by black crusts (Fig. 55.1). Lymph nodes on the neck were enlarged, firm, mobile and painless. Laboratory tests showed a decreased level of hemoglobin (8.9), low platelet (23,000) and leukocyte count (1860). Moreover, low number of eosinophils (0%) and neutrophils (4.3%) as well as a high number of lymphocytes (65.6%) and monocytes (30.1%) were detected. There were also prolonged prothrombin time 16.7 (9.8–12.5), prolonged activated partial thromboplastin time 63.1 (31–47), and a high level of C-reactive protein (182.8) and procalcitonin (104.9).

Based on the case description and the photographs, what is your diagnosis?

Differential Diagnoses

1. Ecthyma gangrenosum caused by *Pseudomonas aeruginosa*.
2. Ecthyma gangrenosum caused by other Gram-negative or Gram-positive bacteria or fungi.

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Fig. 55.1 Multiple ulcerations with overlying crusts in scalp of a 20-year-old leukemic patient (**a**) before treatment (**b**) day 10 after treatment

3. Pyoderma gangrenosum.
4. Cutaneous aspergillosis.
5. Calciphylaxis.
6. Acute meningococcemia.

Diagnosis
Ecthyma gangrenosum caused by *Pseudomonas aeruginosa*.

Culture of the patient's blood showed *Pseudomonas aeruginosa* which was sensitive to ciprofloxacin and cefepime. Culture of the ulcer showed similar organisms. Histopathological examination was not performed because the patient had thrombocytopenia and prolonged prothrombin and activated partial thromboplastin time. The patient was diagnosed with ecthyma gangrenosum caused by *Pseudomonas aeruginosa.*

The patient was given intravenous cefepime 2 g three times a day, intravenous ciprofloxacin 400 mg twice a day, fusidic acid cream twice a day, and wet compress with sodium chloride solution for 10 days. On the day 11, cefepime was switched to piperacillin with tazobactam 4.5 g four times a day. The ulcer improved, and seemed to be clean and dry. On day 13, the patient died due to an increased intracranial pressure.

Discussion

Ecthyma gangrenosum (EG) is a skin and soft tissue infection (SSTI) which is commonly found in immunocompromised patients. From a study in 2017, skin disorders e.g., ulcerations and subcutaneous diseases, contributed to 1.79% of global burden of diseases so they should be taken into account [1]. EG is diagnosed based on clinical and laboratory findings. EG commonly occurs due to bacteremia caused by Gram-negative bacteria infection, particularly *P. aeruginosa* [2]. The cause of bacteremia has not yet been elucidated but the patients are often hospitalized with immunocompromised conditions.

Establishing the diagnosis of SSTI is challenging because the result of microbiology examination from the blood takes time and it is not always the definitive cause of the skin manifestations. Similarly with the results of culture from superficial lesion; it can be misleading because it is more likely to be colonization, not the causative agent of the infection [3]. In this patient, despite no histopathological examination, the culture of blood and skin lesion showed same pathogen, which was *P. aeruginosa.* Therefore, it is suitable with the clinical finding, which was characteristic findings of EG, ulceration with overlying black crusts.

An increased number of Gram-negative bacilli infections is correlated with an increased number of other multidrug-resistant bacteria (MDR) infections. In *P. aeruginosa* infections, there were reports of MDR infections against carbapenem and other drugs; however, only 4% of the cases were resistant against piperacillin—tazobactam [4–6]. This patient showed improvement following switching of antibiotics to piperacillin—tazobactam which was shown to be sensitive from the drug susceptibility test.

This presented patient had multiple lesions on the scalp with a history of neutropenia. The management of EG resulted in improvement of the patient's condition. However, the patient died due to her comorbidities. The prognosis of EG depends on several factors, which are the number of lesions, prolonged neutropenia, and delayed treatment [7]. Therefore, the management should be comprehensive and interdisciplinary collaboration is needed.

Key Points

- Ecthyma gangrenosum is a common skin and soft tissue infection in immunocompromised patients.
- Establishing the diagnosis of ecthyma gangrenosum and other skin and soft tissue infections is challenging and we should consider the correlation of clinical and microbiological findings.
- The management of skin and soft tissue infections should be comprehensive and involve multidiscipline.

References

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