

AN UNUSUAL CASE OF ECTHYMA WITH MULTIPLE LESIONS

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Summary

Pyodermas are frequent bacterial skin infections favored by immunosuppression, malnutrition and poor hygiene. Staphylococcus aureus and Streptococcus pyogenes are most commonly implicated in the pathologic processes. Several clinical forms have been described including impetigo, ecthyma, folliculitis, etc. We present the case of a 43-year-old patient who worked as a shepherd in Italy. He addressed our clinic for a polymorphic eruption including papules, pustules and ulcers, with a 5-month onset. Differential diagnosis included ecthyma, cutaneous anthrax, brucellosis, leishmaniasis, etc. Laboratory tests and bacteriological exams detected the presence of germs of the microbiota, such as Staphylococcus hominis and Staphylococcus epidermidis. Elevated ASLO serum titer suggested the diagnosis of ecthyma caused by Streptococcus pyogenes.

Key words: pyoderma, ecthyma, streptococcus pyogenes.

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Introduction

Pyodermas are bacterial skin infections caused mainly by *Staphylococcus aureus* and *Streptococcus pyogenes*. In the pathogenesis of pyodermas the microbiota plays an important role, on one hand, prevents the adherence of other bacteria on the skin, and on the other hand leads to the release of unsaturated fatty acids that form a chemical barrier (1). Primary pyodermas include conditions such as impetigo, folliculitis, furunculus, ecthyma, etc. Secondary pyodermas occur by overinfection of the preexisting cutaneous lesions such as contact dermatitis, pemphigus vulgaris lesions, etc. (2).

Ecthyma is characterized by the appearance of papules and vesicles which evolve into ulceration and heal with scars. It most commonly

affects the calves and the dorsal side of the legs. The main risk factors are immunosuppression, malnutrition and poor hygiene. *Streptococcus pyogenes* (group A Streptococcus) is the main etiologic agent (3). It is considered a deeper form of impetigo, which reaches the dermis and may evolve as the result of an untreated impetigo. The infection can also be grafted at the site of insect bites, scabies, or scratch injuries. It can associate fever and adenopathy. The diagnosis consists in identifying *Streptococcus pyogenes* in the pathological product (4).

Case report

A 43-year-old patient presented to our clinic for a generalized polymorphic eruption consisting of papules covered with serous-hematic

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crusts, pustules and ulcerations. The history of the current illness has revealed that the patient had gone through a similar episode four years ago, when he presented similar lesions, but limited on the calves. At that time, the lesions regressed under systemic and local antibiotic therapy. Regarding the current episode, it started five months ago. The eruption occurred on the calves, extending to the anterior, posterior thorax and to the upper limbs. The patient was in Italy and he received a local treatment (that he could not specify), without improvement of the lesions. When he returned to Romania, he was admitted to a rural facility where he received systemic antibiotic therapy (clindamycin, ciprofloxacin, doxycycline) and anti-inflammatory drugs. Investigations revealed increased values of inflammation markers (fibrinogen = 768 mg/dl (normally 200–400 mg/dl), reactive C protein = 186 mg/L (normal <5 mg/L) and ESR = 85 mm/h (normal <15 mm/h)). Purulent drainage from the pustules, pharyngeal and nasal exudates were performed for bacterial identification, but the cultures were negative.

Personal physiological and pathological history was insignificant. Regarding living and working conditions, the patient was originally

from Vrancea and at the time of the current episode he was a shepherd in an area in the vicinity of Rome. In addition, the patient stated that he lives in poor hygiene conditions.

The dermatological examination revealed polymorphic lesions, such as papules covered by serous-hematic crusts, pustules and ulcerations, surrounded by an erythema-violaceous halo, some becoming confluent into 2 to 3 cm plaques, located on the trunk and upper limbs. On the lower limbs, the lesions were more ulcerated and larger in size, between 2-3 cm to 10 cm in diameter (Figures 1 and 2).

Lab tests revealed and elevated ESR (80 mm/h) and an increased titer of anti-streptolysin O antibodies (ASLO 1780 IU/ml – normal <200 IU / ml). Bacteriologic examination of the pus collected from the lesions was performed. Polymorphonuclear and epithelial cells were observed on Gram stained smears, but microorganisms (such as bacteria or yeasts) were not identified. No acid-alcohol resistant bacilli were identified on Ziehl-Neelsen staining. Bacterial cultures were negative for *Staphylococcus aureus*, A / B / C / G beta-hemolytic *Streptococcus*, *Enterococcus spp*, *Hemophilus influenzae*, *H.*



Figure 1 – Papules covered by serous-hematic crusts and pustules



Figure 2 – Ulcerations surrounded by an erythematous-violaceous halo

parainfluenzae, *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Enterobacteriaceae*, *Corynebacterium ulcerans*.

We decided to collect a new sample from the lesions and the following microorganisms were observed: *Enterococcus faecium*, *Staphylococcus hominis*, *Staphylococcus epidermidis*. Fungal and mycobacteria cultures were negative. The Leishmania laboratory test was negative.

A skin biopsy was performed from an area with early lesions (pustules) and showed a moderate orthokeratosis with a central sub-cornous pustule containing neutrophils and rare acantholytic cells. The underlying epidermis showed moderate acanthosis, spongiosis and rare intraepidermal leukocytes.

Considering the socio-cultural context of the patient (wearing the same overall at work for a long time) and the fact that poor hygiene is a key factor in the pathogenesis of pyoderma, the clinical aspect, the increased ASLO titer and the result of the histopathological examination, led to the diagnosis of pyoderma.

The patient was co-operative and followed the systemic antibiotics therapy (ceftriaxone, metronidazole), corticosteroids (dexamethasone), and antibiotic-based topical preparations in combination with poorly acting corticosteroids. In addition, rigorous hygiene of the injuries has been performed. The evolution was slow favorable. The prognosis is favorable, with no vital risk, but aesthetically there is a risk of scarring. Considering the severity of the injuries and the socio-cultural context, a recurrence of the disease or even a chronic course can be possible.

Discussions

An analysis of the infections that people returning from trips carry, has shown the existence of significant skin and soft tissue infections. About 50% of skin infections were impetigo and skin abscesses, with an 18% for ecthyma. In most cases ecthyma was manifested with multiple lesions, secondary to insect bites (5).

The cutaneous infections produced by *Group A Streptococcus* have different skin manifestations with varying degrees of severity. For patients

with a traveling history, streptococcal infections can mimic various zoonotic infections, which makes the diagnosis more difficult and generates a variety of differential diagnoses to be considered (6).

A. Infections that can be transmitted by animal contact

1. *Cutaneous Anthrax*

Cutaneous anthrax is a zoonotic disease caused by the spore-forming bacterium *Bacillus anthracis* that can last for a long time in the soil, the wool or leather objects from infected animals. It can also be cotransmitted by direct contact with a sick animal. From a clinical point of view, it is manifested as an ulceration surrounded by swelling, which develops a black crust. Usually cutaneous anthrax injuries are unique, but there can be multiple and with lymphangitis (7, 8).

2. *Brucellosis*

Another suspicion would be brucellosis. Brucellosis is a zoonosis transmitted through direct contact with an infected animal, by consuming contaminated dairy products or through aerosols. The clinical picture is non-specific and is characterized by fever, sweating, and general malaise. Almost half of the patients have articular manifestations, which are also found in our case (9). Skin lesions are rare, only in 1-14% of cases, and may occur as ulcers (10).

3. *Morva*

Morva is an infection caused by *Burkholderia mallei*, a Gram negative bacillus, which develops intracellularly and is transmitted by air or through direct contact with an infected animal. It frequently affects horses but sheep can also be affected. The disease can be localized, pulmonary, disseminated or can lead to sepsis (11). The localized form is characterized by the appearance of pustules and cutaneous ulcers. The systemic form is characterized by nodules and ulcers in affected organs (12). Palpation exhibits sensitivity in the right and left hypochondrium and the patient has generalized cutaneous ulcers. Gram-negative bacilli were not observed on the smear and the microorganism did not grow in cultures.

B. Infections that can be transmitted through water and soil

With regard to infections that can be transmitted by water or soil, we think about melioidosis and non-tuberculous mycobacteria, especially *Mycobacterium ulcerans*.

1. *Melioidosis*

Melioidosis is a tropical bacterial infection produced by *Burkholderia pseudomallei*, a Gram negative bacillus. Clinically it is manifested by the appearance of some abscesses that can disseminate and in some cases the evolution is serious with sepsis and death. It is transmitted through direct contact with contaminated water and soil (13). Gram-positive bacilli were not observed on the smear and the microorganism did not grow in cultures.

2. *Skin infections with non-tuberculous mycobacteria*

Infections with non-tuberculous mycobacteria particularly affect immunosuppressed individuals. In our case, the infection with *Mycobacterium ulcerans*, the etiologic agent of Buruli ulcer, which is manifested by the appearance of nodules evolving towards painless ulcers, can be considered. The microorganism penetrates the skin through a minor lesion (14). No resistant acid-resistant bacilli were observed, and cultures for mycobacteria were negative.

C. Leishmaniasis

Considering that Italy is an endemic area for Leishmania, we think of diffuse cutaneous leishmaniasis. Cutaneous leishmaniasis is a zoonosis that is transmitted to humans via phlebotomy, and is produced by a parasite. At the site of the sting there is a papule that evolves towards a nodule which ulcerates and heals with atrophic scarring. The skin manifestations of leishmaniasis range from small nodules to extensive destructive tissue (15).

In our patient, the pus cultures from the pustules identified *Enterococcus faecium*, *Staphylococcus epidermidis* and *hominis*. These bacteria are part of the skin microbiota, but under certain

conditions they may be pathogenic. There are certain conditions that may favor the expression of the virulence of these microorganisms, for example, they may graft on pre-existing lesions or intra-arterial urinary catheters. Poor hygiene is also one of the contributing factors.

Although Group A beta-hemolytic streptococcus was not isolated in cultures, the significantly elevated ASLO titer may indicate infection with Group A hemolytic beta streptococci.

Group A streptococci are Gram-positive, optionally aerobic anaerobes, which grow in chains. The microorganism is transmitted by direct contact. They are involved in a variety of skin, superficial or deep manifestations of varying degrees of severity. One of the features of group A streptococci is that they have the ability to invade epithelial tissue. They possess adhesins that allow them to firmly adhere to epithelial tissue. By releasing toxins, they produce cellular lysis facilitating the spread of infection to deep structures. The main virulence factor of group A streptococcus is the M protein. Among the virulence factors streptolysin O is highly immunogenic (16).

The characteristic clinical appearance and lesion evolution is consistent with the diagnosis of ecthyma and the histopathological result strengthens the diagnosis. The high titer of anti-SLO antibodies is directed towards *Streptococcus pyogenes*.

The case has some important particularities. First of all, the epidemiological context has made it necessary to consider several differential diagnoses such as anthrax, brucellosis, cutaneous leishmaniasis and non-tuberculous mycobacterial infection. Secondly, the eruption was widespread, despite the fact that the patient did not experience immunosuppression. Poor hygiene is a key factor in the development of ecthyma; it could explain the extent of the lesions. When it comes to skin infections, it is often difficult to identify the etiological agent, especially when pathogenic conditioned microorganisms, which currently belong to the skin microbiota, are isolated.

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Conflict of interest
NONE DECLARED

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