



Staphylococemia in Pediatric Patients: Report of two Cases and Review of the Literature.

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Abstract

Staphylococcal scalding skin syndrome (SSSS) is a life-threatening infection caused by certain strains of staphylococcus that release toxins affecting skin adhesion. This results in the cracking and sloughing of the surface layer of the skin. Typical symptoms include scaling lesions, generalized redness and, in rare cases, superficial blisters. It is more common in children under 6 years of age

Treatment for mild cases consists of oral antibiotics such as cephalexin, dicloxacillin, and trimethoprim/sulfamethoxazole. In severe cases, hospitalization and intravenous antibiotics such as oxacillin, nafcillin, or cefazolin are required. If there is resistance to these antibiotics, the use of ampicillin sulbactam or vancomycin, together with a topical antibiotic (fusidic acid), has been shown to be effective with adequate response according to the literature.

Most cases resolve within 2 to 3 weeks with effective treatment. Caregivers should be informed about appropriate hygiene measures to prevent relapses, such as handwashing and cleaning of personal items, as this infection is often the beginning of a generalized infection with a high risk of mortality.

Keywords: *Scalding skin syndrome, Staphylococcus aureus, Sepsis, Children.*

Introduction

Staphylococcal scalded skin syndrome or Ritter's disease is a potentially fatal infection caused by certain strains of staphylococcus, which release toxins A and B, which are involved in the adhesion of keratinocytes, causing fissuring of the stratum granulosum of the epidermis, followed by denudation and facilitating the detachment of this layer, for bacterial colonization. (1). The clinical picture is characterized by scaly skin lesions, generalized erythema with desquamation and, in very rare cases, superficial blisters. (2).

The age of greatest frequency fluctuates in pediatric patients under 6 years of age, with an overall incidence between 0.09 and 0.56 cases per million people, predominantly in preschool and school children, with a mortality rate of less than 5% in children and more than 60% in adults with compromised immunity. (3).

Objective

To describe the clinical presentation, diagnosis, treatment and evolution of these rare or interesting cases in order to contribute to medical knowledge and improve clinical practice.

Case Report 1

Male patient, 1 year 7 months old, with no important perinatal or personal history, who went to the emergency room for presenting generalized cutaneous erythema accompanied by irritability without thermal rise and desquamation in the perioral region that started four days ago, due to apparent consumption of seafood (shrimp), initially it was classified as acute allergic urticaria of food type and he was sent home with antihistamine levocetirizine 2 ml every 12 hours for 5 days and oral prednisone 3 ml for 5 days. 24 hours later the patient's condition worsened, with increased skin erythema, generalized desquamation, bilateral greenish ocular secretion occluding eyelids and fever of 37.8°C. Physical examination revealed bilateral eyelid edema with abundant greenish ocular discharge with eyelid occlusion (Illustration 1), generalized dermatosis consisting of diffuse erythema that paled upon finger pressure (Illustration 2) and presence of scaly plaques in the periorbital and perioral region (Illustration 3) and positive Nikolsky's sign (exfoliation of the epidermis above finger pressure).



Illustration 1 Periocular staphylococemia



Illustration 2 Genital dermatoses

Hospital admission was decided and blood cultures, stool culture and urine culture were taken. Laboratory studies showed: isolated lymphocytosis, negative acute phase reactants and negative procalcitonin. Due to the patient's symptoms and negative tests, it was classified as staphylococemia scalded skin syndrome, which led to start antibiotic therapy based on Ampicillin plus sulbactam at a dose of 150 mg/kg/day intravenously associated with a topical antibiotic (fusidic acid) on desquamative lesions.



Illustration 3 Peribuccal staphylococemia

Blood cultures were negative in the first 72 hours and skin secretion cultures were not considered, because the response to the antibiotic treatment was favorable, which was administered for 5 days, and the patient was discharged with oral and topical antibiotics.

The patient was followed up on the fifth day of hospital discharge for outpatient consultation, where a significant reduction of the desquamative lesions was observed and he remained clinically stable.

Case Report 2:

Female patient, 1 year 2 months old, with a history of atopic dermatitis since she was 3 months old, who came to the emergency room with erythematous, scaly and pruritic plaque lesions of 3 weeks of evolution; with no apparent cause, starting in the neck (Illustration 4) and distributed in a generalized manner throughout the body, accompanied by fever of 38°C and the presence of bleeding in the lumbar lesions (Illustration 5).



Illustration 4 Desquamative plaques on the cervical region



Illustration 5 Desquamative and bleeding lesion in lumbar region

Physical examination revealed scant greenish ocular secretion, in addition to generalized dermatosis consisting of diffuse erythema that paled under acupressure, the presence of scaly plaques in the periorbital and perioral region and crusted lesions on the thorax and retroauricular region (Illustration 5 and 6).



Illustration 6 Crusted lesion in the thorax

Hospital admission was decided, with a diagnosis of staphylococemia scalded skin syndrome, and blood cultures were taken. Laboratory studies showed: leukocytosis with lymphocytes, negative acute phase reactants and negative procalcitonin. Antibiotic therapy with Ampicillin plus sulbactam at a dose of 150 mg/kg/day intravenously, divided into four daily doses and associated with a topical antibiotic (fusidic acid) on desquamative lesions, was started for 3 days. 72 hours later, cultures were negative and discharge was decided with oral antibiotic, sultamicillin 3 ml every 12 hours and fusidic acid on lesions, the same for 3 more days.

The patient was followed up on the third day of hospital discharge for outpatient consultation, where a significant reduction of desquamative lesions was observed, without ocular secretion and clinically stable.

Discussion

Staphylococcus aureus is the most common pathogen within the pathology of scalded skin, since the exfoliative toxins it releases are responsible for the clinical manifestations at the skin and soft tissue level; however, since the skin is the entry point for this microorganism, it can easily spread and cause complications. As for the epidemiological profile and according to a retrospective study conducted by Lipový, Brychta and collaborators, in the Czech Republic between January 1994 and December 2009, where 399 cases of children under 1 year old who were hospitalized for this pathology were analyzed, it was found that staphylococcal scalded skin syndrome has an incidence of 25 cases per 100,000 children under one year old, it is more common in males and the occurrence of this syndrome is not sporadic but constant. (4). Similarly, in an observational cohort study conducted by Roca, Baquero-Artigao and collaborators between January 1997 and December 2006 at the Hospital Infantil de la Paz in Madrid, 26 patients with an average age of 29 months

were studied, showing that children under 5 years of age are the most affected and presenting as predominant clinical manifestations flaking in 100% of cases and fissuring with perioral crusts in 54% of cases. (5).

Complementing the clinical picture, the presence of irritability and fever has also been described. The most frequent areas of infection are the conjunctiva, nose, throat, diaper area, umbilical stump, circumcision and other surgical wounds. (6). Clinically, painful erythematous plaques are observed on the face and flexion areas, evolving into blisters that may produce pus. And when they break they cause desquamation, generating a wrinkled appearance known as “sad man facies”. (3).

Diagnosis is clinical, so blister cultures are not useful and blood cultures are usually negative. The differential diagnosis could be with Stevens-Johnson syndrome and toxic epidermal necrolysis, however, these pathologies are mostly related in 80% with the intake of drugs: sulfonamides, allopurinol, tetracyclines, anticonvulsants and NSAIDs, and epidemiologically they are more frequent in school children and adults. (3), if it is possible to consider it, it is recommended to perform a skin biopsy, which will help us to diagnose it.

In relation to treatment, in mild cases, it can be considered with oral antibiotics and on an outpatient basis with the following scheme: it includes cephalexin in a dose of 500 mg divided in four doses, dicloxacillin of 500 mg divided in four doses and trimethoprim/sulfamethoxazole of 160 mg/800 mg in two doses, treatment that should last for 10 days, which can be extended according to the evolution of the patient and considering the resistance of each area. (7).

In severe cases, patients require hospitalization and intravenous antibiotics, with oxacillin or nafcillin as first-line drugs in doses of 100 to 150 mg/kg/day, divided in four doses; the alternative is cefazolin in doses of 50 to 100 mg/kg/day divided in three doses. (3) and if these first instance antibiotics are not available, the use of ampicillin sulbactam at a dose of 150 mg/kg/dose, divided into 4 daily doses, is considered, as in our cases, where it proved to be effective.

The use of vancomycin is recommended when the patient does not respond to initial treatment or there is high resistance to antibiotics by methicillin-resistant *Staphylococcus aureus*, at a dose of 45 mg/kg/day in 3 daily doses. (8).

In an analytical, descriptive and retrospective study, conducted by Zapata, Romero and collaborators, in a clinic in the city of Montería, Córdoba, with a diagnosis of community-acquired *Staphylococcus aureus* infections, during the period from February 01, 2018 to February 28, 2021; 80 clinical records of pediatric patients were analyzed, with a mean age of 44. 2 months, same that were hospitalized with *Staphylococcus aureus* isolation, obtaining a prevalence of methicillin resistant *Staphylococcus aureus* of 37.5%. (9), in

comparison with the multicenter retrospective study conducted by Ferrer et al. in patients who were attended in 8 pediatric emergency departments in Hospitals in Spain, from July 2017 to June 2018, where 403 patients aged 0 and 16 years were included, with isolation of *S. aureus* in any sample, where the prevalence of methicillin resistant *S. aureus* shows a rate of 18.1% ($p>0.05$) (10).

Regarding the clinical management of patients with severe injuries, and because these injuries simulate second-degree burns, it is essential to compensate fluid losses with fresh frozen plasma, in bolus and calculating 10% of the circulating volume, followed by maintenance hydration; and in case plasma is not beneficial, intravenous immunoglobulin could be administered as third-line treatment at a dose of 0.4 g/kg daily, for a maximum of five days, in order to neutralize pathogenic exotoxins. (11).

Regarding pain control and wound care, sterile gauze soaked in saline solution will be applied together with a layer of emollients to reduce skin sensitivity associated with topical antibiotics such as mupirocin or fusidic acid; paracetamol and opiates can be administered, however, NSAIDs are contraindicated because they could affect renal function, so they should be avoided. (3).

Most cases resolve without sequelae within 2 to 3 weeks after effective treatment. and caregivers of patients should be informed about relapses that may be preventable with appropriate hygiene measures using barrier techniques, hand washing and proper cleaning of personal belongings. (3).

Conclusion

Staphylococemia scalded skin syndrome is a potentially fatal infection, if not treated in time and adequately. Therefore, diagnosis is critical and must be immediate and accurate.

Cultures are not useful and if necessary, they should be taken from nasopharyngeal and periocular secretions, however, clinical suspicion will always be much more relevant.

Although the most common treatment, according to the literature reviewed, is the administration of oxacillin or nafcillin intravenously. The use of ampicillin sulbactam as we used in our cases as first line treatment associated with topical antibiotic (fusidic acid) was effective and with adequate response.

It should also be taken into account that the health system should provide constant training to medical personnel to identify these cases in a timely manner and to educate citizens on the prevention measures against the transmission of this infection.

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