

**PRESEPTAL CELLULITIS. CLINICAL CASE WITH LABORATORY DIAGNOSIS**Cudberto U. Contreras-Pérez<sup>1</sup>, Mónica G. Viveros-Terrazas<sup>1</sup> and José D. Méndez<sup>2\*</sup><sup>1</sup>Institute of Epidemiological Diagnosis and References. Health Secretary. Mexico City, Mexico.<sup>2</sup>Medical Research Unit in Metabolic Diseases. Cardiology Hospital. Mexican Institute of Social Security.**\*Corresponding Author: Dr. José D. Méndez**

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**ABSTRACT**

We present a pediatric case of preseptal cellulitis in a 13-year-old girl with probable hematogenous spread from a primary focus. The diagnosis established by two specialists was acute conjunctivitis. The initial treatment with ampicillin sulbactam did not have a favorable response. Due to the severity of the infection, an empirical treatment was established with lincomycin, an antibiotic that maintains therapeutic plasma concentrations against most Gram<sup>+</sup> microorganisms. The scheme was complemented with clindamycin, based on the results of the antibiogram. The combination of the two lincosamides, one injectable (*i. m.*) and the other oral, showed excellent response and clinical healing was obtained at 12 days. In these patients, an adequate and timely clinical assessment is essential to establish a reliable clinical diagnosis. Laboratory studies are determinant and must be done before starting treatment. The quality of the sample involves a correct microbiological procedure. The culture, identification and antibiogram of the microorganism involved in the lesions, is necessary to continue or modify the treatment. It is important the collaboration between the clinician and the laboratory to keep a good follow-up of these cases, to avoid serious complications and speed up the therapeutic decisions if necessary.

**Key Words:** Preseptal cellulitis, *Staphylococcus aureus*, Clindamycin, Lincomycin, Chloramphenicol.**INTRODUCTION**

Preseptal cellulitis is a pediatric infectious disease, common in children under 5 years of age, predominantly in males and particularly in the cold months. It is characterized by presenting an acute, unilateral inflammatory picture, which can lead to serious complications. The infection is limited to tissues anterior to the orbital septum, there is palpebral edema, erythema and swelling of the subcutaneous tissue, whether or not there is fever. There are no signs of ocular involvement, conserving visual acuity and pupillary reflexes. The differential diagnosis with orbital cellulitis is fundamental, because the treatment and prognosis are different, since the latter appears as a frequent complication of sinusitis.<sup>[1,2]</sup>

The empirical antibiotic treatment is often directed to the most frequent isolated pathogens, which correspond to *Staphylococcus* species, followed by the genus *Streptococcus*. 73% of strains isolated from *S. aureus* are resistant to methicillin.<sup>[3]</sup> It is essential to establish a timely and reliable clinical diagnosis. The performance of imaging tests is subject to the risk of orbital and intracranial complications.<sup>[4,5]</sup>

**Description of the case, diagnosis and treatment**

Female patient of 13 years of age, with acute progressive swelling of the right eye, with 7 days of evolution (Fig.

1). It presents good general condition, there is no fever, no respiratory symptoms. There is edema and redness of both eyelids, with a palpebral opening of 5%. A lesion near the external angle of the palpebral margin is observed, there is involvement of the ocular mucosa and conjunctival exudate with yellowish crusts on both eyelids, without affecting ocular motility, vision, but with permanent pain.

The infection started with erythema and inflammation at the edge of the lower eyelid, pain in the eye and foreign body sensation. On the second day of the course, inflammation occurred in the infraorbital and zygomatic regions, so a dentist was consulted, who ruled out a dental problem and referred them to the ophthalmologist. The diagnosis on the fourth day was acute conjunctivitis, requesting culture of secretion and initiating oral treatment with ampicillin-sulbactam, 1 tablet of 220/147 mg every 12 hours. The infection progressed rapidly in the following 3 days and no response to the treatment was observed.

The cultivation was carried out on the seventh day. The eye was cleaned with sterile gauze dampened with sterile saline, removing secretion and cell debris, until the patient was able to open the eye. The cleaning revealed a lesion on the external eyelid margin that affected the

ocular mucosa and that had probably been derived from an abscess.

Samples of conjunctival exudate and ulcer that was about 1 cm deep were taken. The samples were seeded in blood agar and incubated at 37°C for 24-48 hours. Due to

the severity of the infection, the treatment was changed to lincomycin, 600 mg vials *i. m.* every 24 hours, as well as chloramphenicol ointment, topical application in the lower conjunctival sac, three times a day.

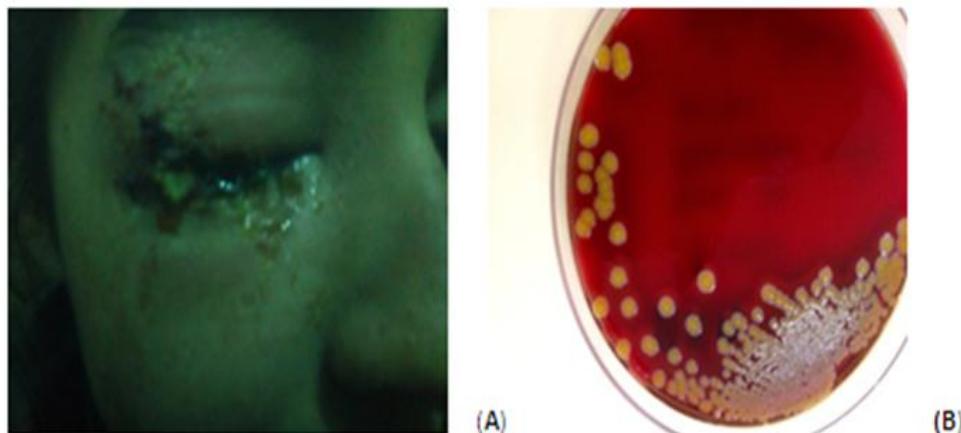


Figure 1. A. Preseptal cellulitis in a 13-year-old girl, with 7 days of evolution. B. *Staphylococcus aureus* cultured in blood gelosa, isolated from conjunctival exudate and ulcer in right external palpebral angle.

The laboratory results in the two clinical samples revealed abundant bacterial growth, observing cream-colored, hemolytic smooth colonies (Fig. 1), which were identified by biochemical tests such as *Staphylococcus aureus*.<sup>[6]</sup> The antibiogram was performed by the disc diffusion method (Kirby Bauer) and the antibiotics evaluated were clindamycin, erythromycin, azithromycin, gentamicin, trimethoprim-sulfamethoxazole, rifampicin, ciprofloxacin, levofloxacin, ofloxacin, tetracycline and chloramphenicol. The results were evaluated according to the CLSI criteria<sup>[7,8]</sup> and the strain was sensitive to all antibiotics (Data not shown).

The production of the  $\beta$ -lactamase enzyme was determined by the commercial method BD BBL Cefinase, 50 (BD BBL Paper discs for the detection of  $\beta$ -lactamase enzymes cefinase discs). The test was positive in the isolated strain (Fig. 2). The detection of methicillin resistance was performed by conventional methods, using the oxacillin screen test, with the Cefoxitin disc of 30  $\mu$ g.<sup>[8]</sup> Additionally, the detection of methicillin resistance was carried out by means of the fast agglutination test with Staph Slidex PlusBiomérieux® latex particles.<sup>[9]</sup> The controls used were strains of *Staphylococcus aureus* ATCC 43300  $\beta$ -lactamase negative, positive *mecA* and negative control *S. aureus* ATCC 25923  $\beta$ -lactamase negative, *mecA* negative. The isolated strain was sensitive to methicillin in both tests.

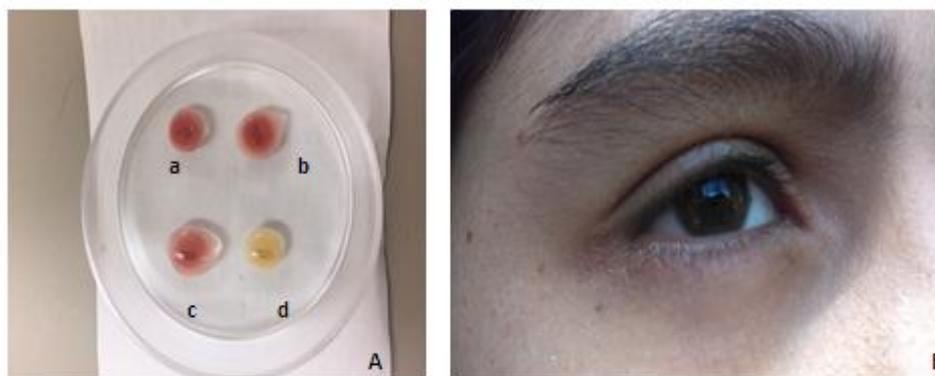


Figure 2. A. Beta lactamase test. Method of the chromogenic cephalosporin. a. Clinical isolation. b. Clinical isolation: positive control DM. c. Positive control: *Staphylococcus aureus* ATCC 29213. d. Negative control: *Haemophilus influenzae* ATCC 10211. B. Preseptal cellulitis in a 13-year-old girl, 67 days after treatment with lincomycin and 7 days with clindamycin: The lesion showed relevant changes from 5 days of treatment.

The treatment with lincomycin was strictly supervised for 5 days, obtaining an excellent response (Fig. 2). Based on the results of the antibiogram, the antibiotic was replaced on the sixth day by another lincosamide, oral clindamycin, 300 mg capsules, 1 every 6 hours, for 7 days. The patient continued with the good response, obtaining clinical cure at 12 days. Follow-up at 2 months 7 days after treatment, has not revealed any complication or recurrence (Fig. 2).

## DISCUSSION

In the case described here, there are data of previous skin infections that suggest hematogenous spread from a primary focus. In the years 2016-2017, she had presented five probable cellulite frames, affecting different parts of the body: shoulder, right leg, iliac crest, right buttock, left eye. The lesions were treated with antibiotics, there were no complications, but no diagnosis was established. With some frequency, the patient also had upper respiratory infections. These antecedents are related to *Staphylococcus aureus*, as it was previously reported.<sup>[1,3,5]</sup>

The *in vitro* effect of the antibiotics used correlated with the clinical response. The isolated strain was a producer of  $\beta$ -lactamase and there was no response to treatment with ampicillin-sulbactam. It is of interest that due to the severity of the infection, the patient was assessed on the seventh day by a second ophthalmologist, who diagnosed acute conjunctivitis and indicated empirical treatment with amoxicillin 500 mg capsules, 1 every 8 hours for 7 days and ciprofloxacin drops, two drops every 8 hours for 3 days. This scheme, which included another penicillin, was discarded. Because the studies carried out have not evaluated the efficacy of the treatment schemes, in most cases, the choice of the antibiotic is empirical and the purpose is to cover the most frequent etiological agents that are *Staphylococcus* species, *Streptococcus* and some anaerobes. In this case, it was decided to start empirical treatment with injectable lincomycin, considering that the antibiotic maintains therapeutic

plasma concentrations against most susceptible Gram<sup>+</sup> microorganisms for 17 to 20 hours, and that it has the advantage of accumulating in macrophages, being transported the antibiotic to sites of infection.

The use of antibiotics from the penicillin group is not indicated in the treatment of preseptal cellulitis, due to the probability that the etiological agents involved produce  $\beta$ -lactamases. The treatments indicated by the ophthalmologists have this restriction, besides that the combination of ampicillin sulbactam does not appear in the recommended antibiotics, being more common the use of amoxicillin with clavulanic acid and the combination of cloxacillin with a cephalosporin.<sup>[5]</sup> The detection of  $\beta$ -lactamases in *Staphylococcus aureus* has been described since 1946, registering a 60% resistance in *S. aureus*.<sup>[10]</sup> The mechanisms of resistance: hyperproduction of  $\beta$ -lactamase and modification of PBP's<sup>[11,12]</sup>, give absolute resistance to the whole group of  $\beta$ -lactam antibiotics: penicillins (methicillin, oxacillin), cephalosporins, monobactams and carbapenems (imipenem, meropenem), leaving aside the use of natural penicillins as therapeutic agents of first choice for this microorganism.

In cases of preseptal cellulitis, it is advisable to make a reliable, timely diagnosis and initiate treatment to avoid or prevent serious complications. It is recommended that all patients be hospitalized, when there is data of systemic infection.<sup>[1]</sup> When there is no compromise of the general state, oral therapy is usually sufficient. This case had an excellent response to the combination of two lincosamides, one injectable and one oral. There was a strict follow-up of the evolution of the infection and it was not necessary to perform imaging studies, although this type of infection should not be underestimated and the least doubt should be made to computed tomography to determine if there is involvement of the orbital tissue.<sup>[1,2,4]</sup>

## CONCLUSIONS

In the treatment of preseptal cellulitis is of vital importance the laboratory diagnosis. Here, the culture of the conjunctival exudate and the lesion in the external angle of the palpebral region were decisive. The timely identification of the isolated bacterium and the antibiogram played an important role in evaluating the evolution and treatment of the disease.

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