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A Rare Case Report of Subperiostal Abscess due to Streptococcus Mitis as a Bacterial Cause of Complicated Periorbital Cellulitis in a Two Year Old Child

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Abstract

Background: Orbital cellulitis is an infectious disease that usually occurs in children between 5 and 12 years old. The most frequently involved microorganisms in 95% of cases are *Staphylococcus Aureus*, *Streptococcus Pneumoniae*, *Haemophilus Influenzae* and *Moraxella Catarrhalis*. The cases of orbital cellulitis occur with a frequency of 6 to 27%, and the incidence of orbital abscesses as a complication of sinusitis is between 1 to 2%. The aim of this case is to report a case of orbital cellulitis complicated by subperiostal abscess caused by *Streptococcus Mitis*, which is rare in pediatric population. Purpose: To report a case of periorbital cellulitis progressing to subperiosteal abscess caused by *Streptococcus Mitis* that was isolated in our laboratory in a two years old, previously healthy boy, with a 3 days history of progressively worsening swelling of the left eye. He was diagnosed with periorbital cellulitis progressing to subperiostal abscess caused by *Streptococcus Mitis*. Early surgical intervention with aggressive medical management was needed. Conclusion: to our knowledge this is the first case of periorbital cellulitis associated with *Streptococcus Mitis* organism in the pediatric age group.

Keywords: Periorbital cellulitis; Orbital cellulitis; Sinusitis; Streptococcus mitis.

1. Introduction

Pediatric preseptal and postseptal cellulitis is an infectious disorder that causes periorbital inflammation [1]. Preseptal cellulitis, a common infection of the eyelid and surrounding soft tissues, is characterized by acute eyelid erythema and edema [2]. Orbital cellulitis can have similar initial presentation; what differs from the preseptal cellulitis is that the latter is only confined to the soft tissue that is anterior to the orbital septum [1]. Upper respiratory infection and sinusitis are the most important predisposing factors for periocular infection [2]. Preseptal and orbital cellulitis can be a continuum. Preseptal cellulitis can spread posterior to the septum, progressing to form sub periosteal and orbital abscesses. Infection in the orbit can spread posteriorly and cause cavernous sinus thrombosis or meningitis [1]. *Streptococcus* species are the predominant causative agents. Clinical examination and diagnostic imaging are useful in determining appropriate management [3]. Preseptal cellulitis is a less severe disease and is usually managed medically. Whereas Orbital cellulitis has a higher morbidity, may require rapid and early surgical intervention associated with aggressive medical treatment [2]. Delineation of the exact location of inflammation is an utmost for proper diagnosis and treatment [3]. Orbital cellulitis is an infectious disease that usually occurs in children between 5 and 12 years old. The most frequently involved microorganisms in 95% of cases are *Staphylococcus Aureus*, *Streptococcus Pneumoniae*, *Haemophilus Influenzae* and *Moraxella Catarrhalis* [4]. The cases of orbital cellulitis occur with a frequency of 6 to 27%, and the incidence of orbital abscesses as a complication of sinusitis is between 1 to 2% [4]. The aim of this case is to report a case of orbital cellulitis complicated by subperiostal abscess caused by *Streptococcus Mitis*, which is rare in pediatric population.

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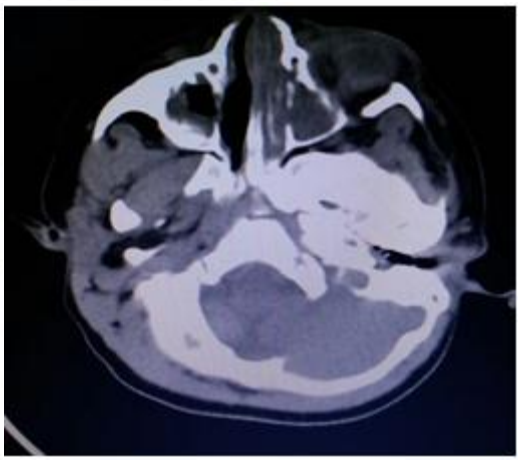
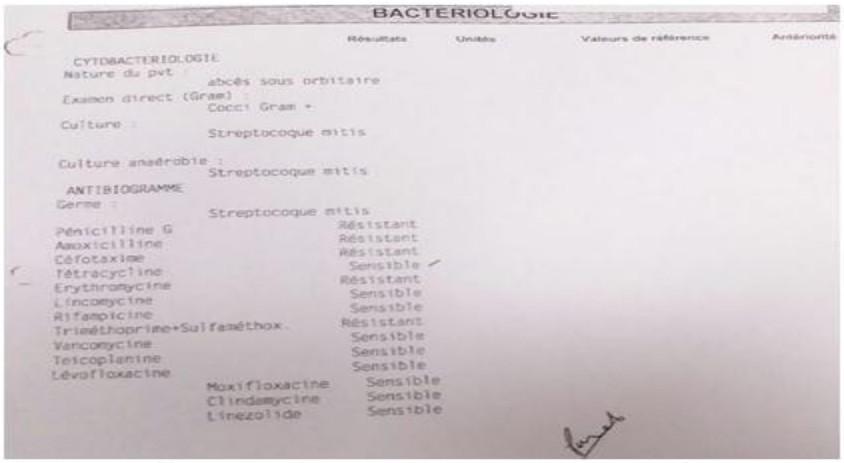
1.1. Case Report

A 2 year old boy, previously healthy, presented to our emergency department for high grade fever of 3 days duration associated with progressive periorbital edema, erythema and recent difficulty in eye opening on the day of presentation. The patient had no history of upper respiratory tract infection, neither trauma, nor wound or insect bite. Upon presentation, vital sign were for a Temperature of 39°c, respiratory rate 33breaths/min, heart rate 110beats/min and blood pressure 90/45 mmHg. On physical exam, he had left periorbital edema, erythema with inability to open his eye due to pain and severe edema. There was no tenderness over the sinuses, both tympanic membranes were pearly grey, shiny, translucent, with no bulging or retraction, and the oral cavity is moist with clear tonsils. The cardio pulmonary examination was normal. His right eye was completely normal. As for neonatal history, he is a full term baby, well vaccinated, previously healthy, with no previous hospitalization. Patient admitted to the hospital, laboratory studies showed 23000 white blood cells with 65% neutrophils and positive CRP of 25 mg/dl. Computed tomography scan of the brain, orbit and sinuses showed total opacification of the left maxillary and sphenoidal sinuses, pre and retroseptal edema cellulitis with left sub-periostal abscess measuring 4mm of thickness and measuring 14mm anteroposteriorly associated with grade I exophthalmia. The patient was treated with Intravenous Ceftriaxone (100 mg/kg/day), Vancomycin (60mg/kg/day) and Metronidazole (30mg/kg/day). The patient failed to demonstrate adequate improvement after 48 hours of initiation of treatment. Patient was still febrile, mild decrease of the surrounding edema but still unable to open his left eye. Thus the patient underwent left subperiostal drainage of the abscess with left sinusotomy. Dexamethasone was then added to the treatment for its anti-inflammatory effect. Two days post drainage the patient became afebrile with normal eye opening and normal movement. Laboratory results improved with a WBC of 8260, 25 % neutrophils, and a CRP 3 mg/dl and normal immunoglobulin levels. Intraoperative deep cultures of the abscess grew *Streptococcus Mitis*. Finally, the patient was then treated with 10 days of IV antibiotherapy and discharged home on Clindamycin for additional 2 weeks. Later follow up in clinic, the patient is doing well with normal bilateral eye examination.



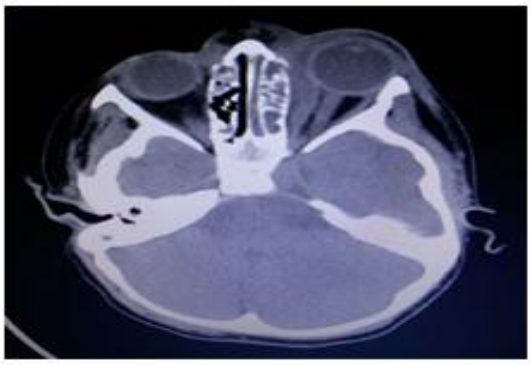

BACTERIOLOGIE

Résultats Unités Valeurs de référence Antériorité

CYTOBACTERIOLOGIE
Nature du pvt : abcès sous orbitaire
Examen direct (Gram) : Cocci Gram +
Culture : Streptocoque mitis
Culture anaérobie : Streptocoque mitis

ANTIBIOGRAMME
Germe : Streptocoque mitis

Pénicilline G	Résistant
Amoxicilline	Résistant
Céfotaxime	Résistant
Tétracycline	Sensible
Erythromycine	Résistant
Lincomycine	Sensible
Rifampicine	Sensible
Triméthoprime+Sulfaméthox.	Résistant
Vancomycine	Sensible
Teicoplanine	Sensible
Lévofloxacine	Sensible
Moxifloxacine	Sensible
Clindamycine	Sensible
Linezolide	Sensible



2. Discussion

Pediatric preseptal and orbital cellulitis is infectious disorders that cause periorbital inflammation and subsequent abscess formation [3]. Preseptal cellulitis, a common infection of the eyelid and surrounding soft tissues, is characterized by acute eyelid erythema and edema [1]. Orbital cellulitis can have similar initial presentation; the key to differentiate among those two diseases is the awareness of the orbital septum [2]. The preseptal cellulitis is only confined to the soft tissue that is anterior to the orbital septum. But orbital cellulitis is an infection posterior to the orbital septum [5]. However Preseptal and orbital cellulitis can be a continuum [1]. Preseptal cellulitis if treated inadequately can spread posterior to the septum, progressing to form subperiostal and orbital abscesses [1]. Infection in the orbit can spread posteriorly and cause cavernous sinus thrombosis or meningitis [1]. Orbital cellulitis has a higher morbidity and requires aggressive treatment thus delineation of the exact location of inflammation is an utmost for proper diagnosis and management [1]. Pediatric preseptal and orbital cellulitis may develop from a contagious extension of an adjacent tissue infection such as rhinosinusits, or from a breach in the skin barrier such as local trauma or insect bite [3]. The most common bacterial cause is *Staphylococcus Aureus* [1]. The remaining cases are mainly due to *Streptococcus Pneumonia*, *Streptococcus Pyogenes* and *Anaerobes* [5]. *Hemophilus Influenza* related periorbital cellulitis has dramatically decreased with widespread use of vaccination [1] [5]. Clinical manifestations include periorbital erythema, edema, eyelid swelling associated with fever headache diplopia exophthalmos [6]. The complaints are usually unilateral confined to one eye [5]. It is important to distinguish clinically orbital and periorbital cellulitis in order to prevent complication and allow an appropriate treatment. Symptoms such as proptosis limited extraoccular movement ophtalmoplegia and decrease vision should prompt diagnosis toward orbital cellulitis [5]. Periorbital cellulitis and orbital cellulitis are usually diagnosed clinically and radiological with the help of a computed tomography of the orbits and sinuses [3]. The mainstay of treatment of periorbital cellulitis and orbital cellulitis is and empiric antibiotic with activity against *Staphylococcus* and *Streptococcus Species* [5]. Commonly used antibiotics may include Vancomycin, Ampicilin-Sulbactam or Pipercellin-Tazobactam [3]. Responses to antibiotic are usually rapid and complete [5]. Most cases of PC resolve after five to seven days with adequate antibiotics. However OC may require surgical drainage such incision and drainage [1]. *Streptococcus Mitis* is a member of the viridians group of *Streptococci*, genetically heterogeneous group of bacteria, and is a part of the flora of oropharynx, skin, and both the gastrointestinal and genitourinary tracts [7, 8]. VGS cause a wide range of infections in humans, including bacteremia in patients with neutropenia (23%), infective endocarditis (17%), and orbital cellulitis [9, 10]. Very little is known about the physiology and virulence of *Streptococcus Mitis* [9]. The transition from commensalism to pathogenesis is likely related to the acquisition of virulence genes [6]. Upper respiratory tract infections including sinusitis are commonly encountered in pediatric clinical practice. In the literature, Sandhya Nagarakanti et al. described a case of elderly women with cavernous sinus thrombosis associated with *Streptococcus Mitis* infection [6] and another case reported in a 22 year old male with balanoposthitis caused by *Streptococcus Mitis* [11]. The case described herein is unique. *Viridans Streptococcus* is increasingly recognized as the cause of a variety of human diseases and to our knowledge *Streptococcus Mitis* have not been previously reported as a cause of periorbital abscess in the pediatric age group [10]. Thus it is important when suspecting PC and OC to consider VGS in the differential.

3. Conclusion

Distinguishing preseptal from orbital cellulitis is critical to appropriate management, since pediatric bacterial OC is associated with significant morbidity and mortality. Although *Staphylococcus Aerius* and strep species are the most common pathogens it is important to obtain intra operative cultures to guide and taper the appropriate antibiotics. We herein report the case of subperiostal abscess caused by *Streptococcus Mitis* that was isolated from intraoperative pus samples.

3.1. Ethical Disclosures

The authors declare that no experiments were performed on humans or animals for this study. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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