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Pediatric Orbital Cellulitis: A Case Report and Management Challenges

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Abstract: ***In this case, the challenge associated with the management of the infant child is a reflection of the difficulties encountered in the treatment of patients in the developing countries and the importance of a good clinical judgment, early diagnosis, and prompt intervention in the management of orbital cellulitis. This is a case report of an 1 - year - old male child. He presented with painful progressive protrusion of the left eye and swelling of the lids of 3 days duration. The left eyeball protruded 2 days with no associated history of altered sensorium. A working diagnosis of orbital cellulitis secondary to rhinosinusitis was made. He was placed on parenteral and topical antibiotics until he recovered. Orbital cellulitis occurring in a conscious child is uncommon. Prompt and specific treatment should be started empirically, especially in developing countries where the facilities for investigation may not be available or the patients may be financially handicapped. This is particularly important to prevent the possible loss of vision and severe life - threatening complications. This study will be of interest particularly to the ophthalmologists, the otorhinolaryngologists, and the pediatricians.***

Keywords: pediatric, management challenges, orbital cellulitis

1. Introduction

Orbital cellulitis is a common life - threatening infection of the postseptal tissues of the orbit and one of the common causes of orbital inflammation. It occurs most commonly in children and young adults. (1, 2) As many as 11% of cases of orbital cellulitis result in visual loss. (3) Orbital cellulitis is an acute inflammatory disorder of the orbit. It is thought to occur as a result of an acute spread of infection from the blood, adjacent sinuses, and facial skin. (2) Periorbital trauma and dental infection are other sources of spread to the orbit. (2)

Most cases seen in the hospital and reported in texts are unilateral, only involving the second eye if the cavernous sinus is involved. Direct spread of the disease through the ophthalmic veins to the cavernous sinus and centrifugally to the contralateral orbit through the dura mater has been postulated as the mechanism of involvement of the orbit resulting in bilateral orbital cellulitis. (4, 5) Until recently, this was the only reported pathway to the development of bilateral orbital cellulitis and thus it influenced the classification of orbital cellulitis with bilateral involvement occurring at the late stages with cavernous sinus infection. (6, 7) There are, however, more recent classifications, most of which are modifications of the classifications by Chandler et al. (6) and Moloney et al. (8) The latest proposal suggested incorporation of radiologic findings to the Moloney classification. (9)

Regarding the management of orbital cellulitis, the standard protocol includes immediate hospitalization with prompt empirical medical intervention targeting the likely causative organisms with respect to the age of the patient and the presenting history. (2, 3) Prior to medical therapy, a computerized tomography scan (CT scan) should be obtained and blood samples taken for full blood count analysis and blood culture. Purulent materials from the nose and eyes are also collected for microscopy, culture, and sensitivity. Magnetic resonance imaging (MRI) is required to make a diagnosis of orbital abscess or determine cavernous sinus involvement.

Treatment is with broad - spectrum antibiotics and surgical drainage of subperiosteal or orbital abscess when required. (2, 3) The patient stays admitted in the hospital and the intravenous medication continued until he/she is fever - free. Secondary complications such as glaucoma are treated as they arise. (3)

2. Case Report

A 1 year old male baby presented with painful progressive protrusion of the left eyeball and swelling of the lids of 3 days duration to our OPD. There was a history of catarrh of less than a week's duration prior to this. There was also associated history of fever, headache, generalized body ache, and diminution of vision.

Examination revealed an acutely ill looking young boy in severe prostration with a left - sided mid - facial (malar) and nasal swelling displacing the alae nasi. There was nasal blockage and mouth breathing. He was febrile with a temperature of 38.5°C, anicteric, not pale but had tenderness over the maxillary, ethmoidal, and frontal sinuses. There was no swelling or tenderness at the mastoid area.

Ocular examination revealed a visual acuity of 6/6 in the right eye and 6/24 in the left eye and left periorbital swelling. There was axial proptosis of the left globe (*as depicted in Figure 1*). Other findings include external ophthalmoplegia involving the 3rd, 4th, and 6th cranial nerves, severe conjunctival chemosis, injection, and purulent discharge in the left eye with sluggishly reacting pupils. Tenderness was elicited over the ethmoidal sinus.

Figure 1: Axial proptosis of left eye with periorbital swelling

The vertical cup disc ratio was 0.4 in the both eyes. Neither disc edema nor engorged retinal veins were seen. The patient was admitted into the eye ward as an emergency without an initial admission deposit as the parents had refused admission of the baby on the grounds of financial constraint. The same reason also accounted for the delay in obtaining results of requested investigations. He was, however, started on antimicrobial treatment bearing in mind the common organisms implicated in childhood orbital cellulitis.

The investigations requested were white blood count (WBC) (total and differentials), skull X - ray, CT scan, blood culture, microscopy, culture, and sensitivity of conjunctival discharge. The investigation results were: packed cell volume: 34%, WBC: 11, 000 mm3 with neutrophil: 78%, lymphocytes: 22%, and others: nil. The culture was sterile.
CT scan showed hyperdense areas in left orbital cavity (*as shown in figure 2*)

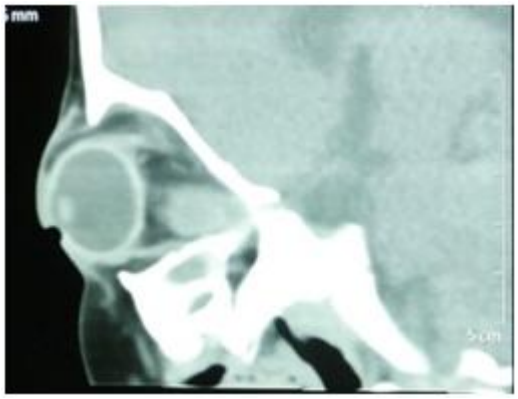

Figure 2: NCCT showing Axial proptosis with hyperdense foci in left orbital cavity. (medial side)

The patient was started empirically on intravenous (IV) ceftriaxone 1 g 12 hourly, IV metronidazole 200 mg 8 hourly, Voltaren eye drop 8 hourly, Lomefloxacin eye drop 12 hourly after an initial loading dose of one drop every 5 min for 25 min, chloramphenicol ointment and oral Diclofenac tablet 25 mg 12 hourly. The drugs for treatment and duration of treatment were subject to review based on clinical findings.

The visual acuity and pupillary reaction were monitored regularly. The ear, nose, throat (ENT) surgeon and the pediatrician were invited to review the patient. A left antral washout was performed on the 3 rd day of admission, and about 20 ml of frank pus was drained.

He responded to treatment and became fever - free by day 4 post - admission. He was discharged home after 8 days in the hospital on tablet metronidazole 200 mg 8 hourly, Augmentin (Amoxycillin/Clavulanate) tablet 325 mg 8 hourly, and Betaxolol eye drop 12 hourly. He was scheduled to return for checkup in 1 week. He was, however, lost to follow - up.

3. Discussion

Infections of the orbit and periorbital tissues are important because they are life - threatening and therefore demand prompt, specific therapeutic management. These infections may spread through the dehiscence of the orbital bony wall or via the venous drainage of the orbit. These veins, which characteristically have no valves, drain into the pterygoid plexus or the cavernous sinus. (10, 11) The spread to the cavernous sinus may result in septic thrombosis and bilateral cavernous sinus infection, meningitis, or brain abscess. The bilateral involvement of the cavernous sinus most frequently results in a contiguous spread to the contralateral orbit. This is the postulated pathway for the development of bilateral orbital cellulitis and it may be associated with altered consciousness if an intracranial abscess develops. (3)

The index child in the report presented 3 days after onset of symptoms and was well oriented in time, place, and person. It did not appear that there was a posterior spread to the cavernous sinus. He, however, had rhinorrhea, nasal congestion, and malar swelling prior to presentation prompting a working diagnosis of orbital cellulitis secondary to rhinosinusitis. The most common complication of rhinosinusitis in children is orbital cellulitis. (6, 12) Others with increasing severity include subperiosteal abscess, intraorbital abscess, and cavernous sinus thrombosis.

The ethmoidal sinus is the most common source of infection in children, as the frontal and sphenoidal sinuses do not develop until age 7.

Radiological investigations, particularly CT scan and MRI, are keys to the diagnosis of orbital disorders and would have shown clearly the changes occurring within the orbit. [4] But due to the financial constraints, MRI ordered were not done and the patient was managed empirically. However, it was assumed that the source of the infection may have been through the ethmoidal sinus. This assumption was based on the increased tenderness noted over the ethmoidal area which was more marked in the left and the fact that anatomically, there are dehiscences in the orbital wall, particularly through the thin wall of the lamina papyracea, neurovascular foramina, and valveless veins which increases the risk of infection of the orbit via the ethmoidal sinus. (13, 14)

Clinically, orbital cellulitis presents with pain, proptosis, globe displacement, double vision and/or vision loss, chemosis, and extraocular motility deficit (ophthalmoplegia). Patients will often have accompanying headache and malaise. In children, fever occurs with equal incidence as in preseptal cellulitis (62%) (15) while it may be absent in adults 66% of the time. (16)

Antecedent and significant past medical history may include a history of headache, rhinitis, sinusitis, nasal discharge, and recent upper respiratory tract infection. Decreased visual acuity, pupillary signs, and vision loss may occur rapidly. Optic neuropathy and optic disc edema may be observed.

A retrospective review of orbital cellulitis complicating sinusitis showed a preferential involvement of the left orbit in 55% of the cases. (17) The author believe that the left eye involvement was as a result of a direct spread to the left orbit through the ipsilateral ethmoidal sinus.

The relatively early presentation of the patient with the timely institution of empirical treatment based on the organisms usually implicated in childhood orbital cellulitis may have limited the effects in the left eye. In children, *Haemophilus influenza*, *Staphylococcus aureus*, *Streptococcus* species, and anaerobic organisms were implicated as the commonest causes of orbital cellulitis in descending order of frequency of bacteria organisms. (18) However, recent studies have shown that *S. aureus* and *Streptococcus* species have been implicated in most cases of preseptal or orbital cellulitis. (17). It is important to note that sino - orbital infections do not always respect the guidelines, and orbital cellulitis with a potpourri of organisms has been reported in case reports and series. (16)

However, it has been reported that blood and skin microscopy, culture, and sensitivity, though important, usually yields no growth; rather, the swabs taken endoscopically from the paranasal sinus yield better results. Twenty milliliters of frank pus was drained from the maxillary sinus by the ENT surgeon but this unfortunately could not be cultured.

4. Conclusion

In summary, orbital complication of rhinosinusitis appears uncommon but requires prompt and timely intervention with or without the necessary investigation tools. This is especially important in developing countries with high level of poverty and very limited healthcare management resources so as to avoid preventable morbidities and mortalities.

Statement of Ethics
Study adhered to the tenets of the Declaration of Helsinki. Written Informed consent was obtained from patient's parents for publication of this case report.

Conflicts of Interest
Author have no conflict of interest in this study.

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