Case Report

Orbital Subperiosteal Abscess at Pediatric Age

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Abstract

Introduction: The incidence of orbital subperiosteal abscess (OSA) in pediatric population is 15% of the orbital infections, being acute sinusitis the most frequent cause of this complication. The diagnosis of OSA is based on clinical examination and imaging. Treatment usually includes IV antibiotics, nasal decongestants and surgical drainage if necessary. If inadequately treated, orbital cellulitis may progress to intracranial complications, blindness and even death.

Case presentation: A 10 year old child, presented with left palpebral edema with eye proptosis, ocular pain, gaze restriction, diplopia, conjunctival hyperemia and headache following three days of fever and URTI. CT imaging revealed pansinusitis with left OSA of the medial wall, compressing the eye globe with anterior-lateral deviation and exophthalmia. Functional endoscopic sinus surgery (FESS) decompression was performed after 48h of medical treatment without improvement. Ophthalmology examination improved dramatically the day after surgery. Patient was discharged completely asymptomatic after 8 days with a normal visual function after 2 years of follow-up.

Conclusion: When managing OSA, an early diagnosis and adequate infection control is of utmost importance. CT orbital scan is a reliable diagnostic method and initial IV antibiotic therapy may be possible. As demonstrated in this case report, if surgical approach of a medial OSA is necessary, FESS is a valid, adequate and effective solution at short and long term.

ABBREVIATIONS


INTRODUCTION

Orbital cellulitis is frequently used to represent a broad spectrum of orbital infections. In 1970 Chandler created a classification system of the various stages of infection, based on severity, to separate this spectrum in five groups: I) pre-septal cellulitis (inflammatory edema); II) Orbital Cellulitis; III) Orbital Subperiosteal Abscess; IV) Orbital Abscess; V) Cavernous Sinus Thrombosis [1,2].

The incidence of OSA in pediatric population is 15% of the orbital infections, being acute sinusitis of the ethmoid-maxillary complex the most frequent cause of this complication [3].

The most frequently isolated bacterial agents are Streptococcus (viridans, pyogenes and epidermidis), Staphylococcus (aureus and coagulase-negative) and Haemophilus influenza [2-4].

The diagnosis of OSA is based on clinical examination and imaging. Although it may be confirmed by orbital CT scan, it still remains necessary to clinically evaluate the severity of the infection by clinical signs and symptoms [4].

It is important to differentiate pre-septal cellulitis from orbital involvement since management is based on the severity of infection, and therapeutic delay may result in blindness in 10% of OSA patients [3].

Treatment usually includes IV antibiotics, nasal decongestants and surgical drainage if necessary. If inadequately treated, orbital cellulitis may progress to intracranial complications, blindness and even death [2].

CASE PRESENTATION

The authors present a 10 year old child, without relevant previous medical history, presenting left palpebral edema with eye proptosis, ocular pain, gaze restriction, diplopia, conjunctival hyperemia and headache following three days of fever, URTI, prostration and anorexia. There was no history of trauma, ocular foreign body or meningeal signs.
CT imaging revealed pansinusitis with left orbital subperiosteal abscess of the medial wall (9x29mm), compressing the eye globe with anterior-lateral deviation and exophthalmia of 7mm (Figure 2). An abscess volume of 1229mm$^3$ was calculated.

Medical treatment was started with Ceftriaxone (2400mg 24/24h), Clindamycin (400mg 8/8h) and Metronidazole (250mg 8/8h), nasal decongestant (Phenylephrine 8/8h) and anti-inflammatory (Ibuprofen 200mg 8/8h). After 2 days of IV therapy, there was worsening of ophthalmologic examination results with left eye visual acuity decline from 10/10 to 8/10, increased diplopia in Hess Screen Chart, increased palpebral edema and proptosis, and surgical intervention was indicated (Figure 1).

Functional endoscopic sinus surgery orbital decompression with drainage of OSA was conducted with bilateral uncinated process removal, bilateral middle meatus maxillary antrostomy, bilateral anterior ethmoidectomy, left anterior-inferior middle turbinectomy and left orbital decompression with removal of a 2x1cm of lamina orbitaria and incisional drainage of OSA.

Medical treatment was continued unaltered in the postoperative period, and the day after surgery, a dramatic improvement of ophthalmologic examination was observed, with normalization of visual acuity to 10/10, without diplopia in Hess Screen Chart, ocular pain, gaze restriction or conjunctival hyperemia (Figure 3). Patient was discharged after 8 days completely asymptomatic with normal visual function. The patient remained asymptomatic in 2 years of follow-up.

**DISCUSSION**

Orbital infections may have various etiologies such as septicemia, penetrating injuries, cutaneous infections, but sinusitis remains the most prevalent cause accounting for 76% of the cases [2,3].

It may affect any age group but it is most prevalent in the pediatric population, due to the thinness of the lamina orbitaria, predisposing to contiguous infection, local thrombophlebitis or infected thromboemboli [2-4].

Patients with medial abscess usually present unilateral periorbital erythema and edema, chemosis, proptosis, ocular movement restriction, fever and ocular pain [5]. Ophthalmological examination objective data such as intraocular pressure and visual acuity have been proposed to assist OSA management, but cooperation of younger children may be difficult, so clinical factors from physical exam are usually favored in OSA management [4]. Treatment of OSA remains controversial. Some authors preconize an initial IV antibiotic cycle, while others believe to be an absolute indication for surgical drainage of abscess and infected paranasal sinus [3,4]. This controversy has motivated the search for predictive factors that could early identify the cases most likely to require surgical intervention: fever, ophthalmoplegia, exophthalmos>4mm, abscess width >10mm and abscess volume >500mm$^3$ have been pointed out as such factors in literature [4,6,7]. These findings are in accordance with our
case progression. In patients with normal vision and small medial abscesses, it seems reasonable to start IV antibiotic therapy, if frequent ophthalmological reevaluation is available [2,3,6]. The most frequently used IV antibiotics are third-generation cephalosporins, Ampicillin-Sulbactam and Clindamycin, because empirical antibiotic therapy should cover pathogens associated with acute sinusitis and anaerobes [2-4]. If there is worsening of visual examination results, ocular movement limitation, systemic complications or failure to improve in 24-48 hours, surgical approach should be considered [3,6,8]. In immunocompromised patients, or where regular visual reevaluation isn’t available, surgical drainage may be recommended [3]. Some authors describe more complex infections with need for surgical drainage in children older than 9 years old [5,9]. In our case, initial IV antibiotic therapy was chosen because of absence of visual acuity compromise and possibility of close monitoring besides the presence of a significant medial abscess. The combination of Ceftriaxone, Clindamycin and Metronidazole was used in order to cover the spectrum of most frequent infectious agents such as gram negative *Haemophilus influenza* and gram positive *Streptococcus* and *Staphylococcus*. Anaerobial and polymicrobial infections coverage was also assured given the greater prevalent of these infections in children older than 9 years old [2,4].

Pre-operatory CT scan is advised to demonstrate the presence of purulent collection and to evaluate its true extension, in order to correctly choose and plan the most adequate surgical approach [11].

External surgical drainage and ethmoidectomy through Lynch incision has been the traditional approach, but the transnasal functional endoscopic approach has been gaining popularity, reducing the need of external incisions, allowing an easier PNS drainage and shorter post-surgical stays [3,4,10]. We believe it should be the mainstream nowadays.

Patients with medial or inferior OSA, may be transnasal endoscopically approached, superior-lateral OSA usually need an external approach, and a combined technique may be used in cases other cases [4, 11]. According to published series, there are no significant differences in therapeutic failures when comparing endoscopic, external or combined approaches [9,12].

Even with adequate treatment, there are visual sequelae in 15-30% of cases, probably due to increased intraorbital pressure caused by abscess compression, leading to retinal ischemia or optic neuritis by infection extension [3].

Retrograde extension of infection may lead to endophthalmitis, cavernous sinus thrombosis, meningitis and even death [3,4].

**CONCLUSION**

When managing OSA, an early diagnosis and adequate infection control is of upmost importance, in order to avoid potential visual and deadly complications, especially in pediatric population.

Clinical factors from physical examination are essential and CT orbital scan is a reliable diagnostic method. Initial IV antibiotic therapy is possible in patients with normal vision and small medial abscesses, if frequent ophthalmological reevaluation is available. As demonstrated in this case report, if surgical approach of a medial OSA is necessary, FESS is a valid, adequate and effective solution at short and long term.

**REFERENCES**