A REVIEW OF PRESEPTAL AND ORBITAL CELLULITIS

Polisetti Ravi Babu[1], Bhennur Durga Prasad[2], Lanke Sowmya[3], Kota Sesha Brahma Srikrishna Sasanka[4]

[1]Professor, Department of ENT, Santhiram Medical College, Nandyal.
[2]Assistant Professor, Department of ENT, Santhiram Medical College, Nandyal.
[3]Senior Resident, Department of ENT, Santhiram Medical College, Nandyal.
[4]Junior Resident, Department of ENT, Santhiram Medical College, Nandyal.

ABSTRACT

BACKGROUND

Pre-septal cellulitis is the commonest orbital disease, which frequently needs to be differentiated from orbital cellulitis. Prompt diagnosis and treatment with appropriate antibiotics can prevent vision loss and life-threatening complications of orbital cellulitis. The aim of this paper is to describe the clinical profile of cases with pre-septal and orbital cellulitis admitted to Santhiram Medical College, Nandyal and analysis of clinical outcome.

KEYWORDS

Pre-septal Cellulitis, Orbital Cellulitis, Orbital Septum, Panophthalmitis, Ethmoiditis, Cavernous Venous Thrombosis.

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INTRODUCTION

Orbital cellulitis can be classified as pre-septal and post-septal cellulitis based on the anatomic landmark, the orbital septum. The septum forms a barrier, preventing the spread of superficial infection into the deeper orbit. Orbital infection limited anterior to the septum is called pre-septal cellulitis and that posterior to the septum is termed as post-septal or orbital cellulitis. Clinical distinction between the two conditions is important as the ocular morbidity and prognosis differs for each condition.

Pre-septal cellulitis is characterized by lid oedema, warmth, erythema and tenderness. The distinctive features of orbital cellulitis are proptosis and limitation of ocular movements.[1] Additional useful signs are chemosis of bulbar conjunctiva, reduced visual acuity, afferent pupillary defect and toxic systemic symptoms. Prompt diagnosis and treatment of orbital cellulitis is vital, as it is associated with serious complications like cavernous venous thrombosis, visual loss, meningitis, brain abscess and sepsis.[1,2]

Orbital cellulitis is a septic process between the ethmoid and orbitary tissue representing the most frequent cause of unilateral exophthalmos.[3,4] Clinically orbital cellulitis begins with progressive pain at the level of lacrimal bone followed by reddening of skin and subsequent progressive oedema of eyelids. If the infection continues, a general septic condition appears with high fever and acute pain.

Orbital cellulitis is an uncommon infectious process in which patient may present with pain, reduced visual acuity, compromised ocular motility and significant proptosis.[5,6,7] In the modern era of relatively early access to health care facilities, complete loss of vision from orbital cellulitis is rare.

In vast majority of cases a history of upper respiratory tract infection prior to onset is very common, especially in children. Approximately, 90% of orbital cellulitis cases are associated with ethmoiditis.[8,9] which occurs due to dissemination of infection from ethmoid to orbitary tissue due to bone refraction arising from osteitis involving the external wall of ethmoid, which corresponds to internal region of the orbit at the level of the lacrimal bone. The paranasal sinuses are adjacent to the orbits and the walls are crossed by valve-less vascular channels, presumably channels for migration of micro-organisms. Patients with orbital cellulitis present to emergency department occasionally. Symptoms usually develop rapidly with patients being distressed by painful ocular movements. In this study, we reviewed the in-patient records of fourteen patients with preseptal and orbital cellulitis. The clinical findings, management of the cases are illustrated.

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Corresponding Author:
Polisetti Ravi Babu,
Professor, Department of ENT,
Santhiram Medical College,
Nandyal.
E-mail: polisettir@yahoo.com
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MATERIALS AND METHODS

Type of Study: Prospective Study

We present a total of 14 patients with preseptal and orbital cellulitis (Table 2). The clinical details of the patients were noted and analysed. Patients were classified as having preseptal or orbital cellulitis based on the clinical finding. Presence of lid oedema, restricted ocular movements, proptosis, loss of vision and relative afferent pupillary defect were looked for. Orbital cellulitis was diagnosed in the presence of any three of the above five clinical findings. Pre-septal cellulitis was diagnosed when a patient had lid oedema with warmth and tenderness with no additional ocular findings.

The factors reviewed in the study included ocular findings aiding in the distinction of the two clinical conditions, the duration of symptoms at the time of presentation, response to therapy and complication. Computed Tomography (CT) orbit and paranasal sinuses were taken in all cases of or suspected orbital cellulitis. Both clinical improvement and improvement in vision were considered in outcome measures.

RESULTS

A total of fourteen patients of which nine patients with pre-septal cellulitis and five patients with orbital cellulitis were identified.

In pre-septal group five were females and four were males, whereas in orbital cellulitis group three were females

and two were males (Chart 1). In our study, a female preponderance was observed for both pre-septal and orbital cellulitis. It was noted that all cases with suspected orbital cellulitis and cases of pre-septal cellulitis were admitted. The age distribution was between 14 and 45 years respectively (Table 1).

The patients underwent ophthalmological examinations twice a day comprising of visual acuity, ocular motility and pupil reflexes, ENT examinations twice a day comprising of endoscopic exploration of the nasal fossae, orbit and paranasal sinus multi-section helicoidal CT.

One case of orbital cellulitis presented with juvenile diabetes mellitus and remaining four cases of orbital cellulitis presented with sinusitis (Fig. 1). In patients with pre-septal cellulitis, CT was done only in those patients with a suspicion of spreading cellulitis to rule out orbital cellulitis and sinusitis. No abnormality was detected in patients in whom these investigations were performed. Investigations such as CT scan, ultrasonography (USG) orbit were done in patients with orbital cellulitis. CT scan was done in patients with severe proptosis and in patients with suspected panophthalmitis or cavernous venous thrombosis (Fig. 2). CT scan was done in five patients with orbital cellulitis and four patients with preseptal cellulitis. Evidence of haziness of one or more sinuses associated with orbital cellulitis was present in and CT scans of four patients.

All patients were treated with parenteral antibiotics and pharmacological treatment was carried out in accordance with international standards, i.e. ceftriaxone 80 mg/kg once a day, metronidazole 7.5 mg/kg three times a day in both groups of patients. All patients underwent routine blood and urine investigations and informed consent was taken from all patients. Ethical clearance was obtained from the ethical committee. Surgical treatment in the form of incision and drainage of abscess was done in two patients with lid or orbital abscess. Endoscopic orbital decompression was done in one patient with orbital cellulitis associated with juvenile diabetes mellitus (Fig. 3). All the preseptal group showed clinical improvement with medical treatment. At initial presentation, visual acuity remained unaffected in most of these patients. In the orbital group, improved outcome either clinical or visual was seen in three cases. Three cases improved clinically. There were no visual disturbances in orbital cellulitis patients.

Fig. 1: Clinical picture of Orbital Cellulitis

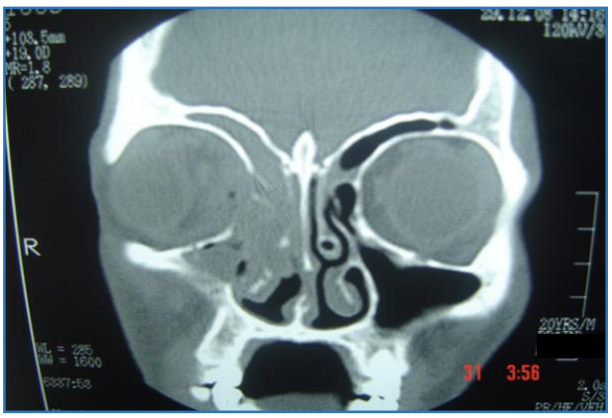

Fig. 2: CT scan showing Haziness of Ethmoids and Maxillary Sinuses involving orbit

Fig. 3: Endoscopic Drainage of Orbital Abscess

Fig. 4: Post-operative picture showing complete resolution and recovery

Age in Years	Pre-septal Cellulitis	Orbital Cellulitis
10-20	3	1
21-30	5	4
31-40	1	0

Table 1: Showing age distribution

Group	Right Side	Left Side
Preseptal	6	3
Orbital	3	2

Table 2: Showing side of involvement

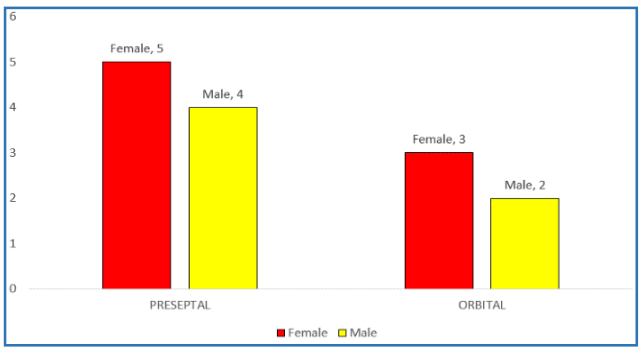

Chart 1: Showing sex distribution in two groups

DISCUSSION

Amongst the cases of orbital cellulitis, preseptal cellulitis constituted 70% and post septal cellulitis 30%.[10,11] In older series, CT scan helped in the diagnosis when clinical features were not yet marked, aided in localizing the pathology to the anatomical spaces in the orbit and ruling out any associated sinusitis.

Patients suspected with orbitary cellulitis must be immediately explored with imaging techniques like CT scan and hospitalized. In the majority of cases (83%) of orbitary cellulitis, the data reported in the literature observed intra-orbitary or subdural abscesses which give rise to sinusitis.[12,13,14]

Accordingly, due to its speed and definition, multi-section helicoidal CT is at present the most indicated method, as it greatly clarifies the condition of the infectious process and possible intra-orbitary complications. Leukocytosis (>15,000 cells/mm^3) and inflammatory marker alterations are generally present and facilitate the differential diagnosis with non-infectious diseases such as juvenile pseudo-tumours.

As a general rule, pharmacological treatment is attempted before surgical procedure with antibiotics active against the pathogens which are potentially responsible for periorbitary complications. The results of microbiological tests have always confirmed the adequacy of the administered pharmacological treatment.[15] The treatment comprises of antibiotics such as amoxicillin, combination of amoxicillin with clavulanic acid or cephalosporin and metronidazole.

The cases which did not exhibit improvements within 48–72hr and exhibited ophthalmological signs such as ocular globe motility loss, paralyzing mydriasis, corneal hypoesthesia or anaesthesia were those who reached the hospital with intraorbitary or periorbitary abscesses. In these cases, surgical drainage of the abscess was performed with endoscopic technique, particularly those exhibiting abundant inflammatory tissue in the meatus.

Endoscopic surgery has demonstrated to be less invasive than traditional orbitotomy.[16,17,18] In the case of extended abscesses, surgical approach can be computer-assisted transethmoidal as it enables a more precise exploration of the orbitary region. Combined transethmoidal and trans-conjunctival surgical approach is rarely necessary to resolve more extensive and complex inflammatory processes.

To conclude, close cooperation between ophthalmologists and otolaryngologists is required both for diagnosis and treatment. The choice of surgery and prognosis is mainly based on the anatomical and functional conditions of the visual system as well as in the CT findings for paranasal sinus and orbit. Endoscopic treatment enables quick resolution of the disease without complications (Fig. 4).

In addition, post-surgery discomfort is very low and facilitates early resumption of daily activities.

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