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ORBITAL COMPLICATIONS OF RHINOSINUSITIS IN A TERTIARY CARE CENTRE OF WESTERN HIMALAYAS

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ABSTRACT

Introduction : Many varied sinus pathologies can present with orbital involvement and sinusitis is one of the leading causes of orbital complications in developing countries. This study was done to evaluate the spectrum of orbital complications of rhinosinusitis.

Methods : A retrospective study was carried out involving the cases of orbital involvement complicating rhinosunisitis and 17 cases were included in the study.

Result : In our series, patients with male to female ratio of 3.25:1 and higher occurrence was observed in pediatric age group (71%). In the present study, CT scan revealed orbital cellulitis in 7 cases (41%) followed by preseptal cellulitis in 6(35%), orbital abscess in 2(12%) , subperiosteal abscess in 1(6%) and eyelid abscess in 1(6%). The most common pattern of sinus involvement in our series was combination of ethmoid and maxillary sinuses. 14 patients (82%) underwent endoscopic orbital decompression, 2 patients (12%) underwent endoscopic optic nerve decompression in conjunction with orbital decompression and 1 patient (6%) underwent external incision and drainage for eyelid abscess.

Conclusion : Orbital complications of acute rhinosinusitis is a medical as well as surgical emergency. Surgical decompression and drainage in conjunction with aggressive medical management remains the standard of care for this condition to achieve a good prognosis and visual outcome.

KEYWORDS

Complicating, Rhinosunisitis, Preseptal.

INTRODUCTION

Many varied sinus pathologies can present with orbital involvement[1]. One of which is rhinosinusitis, which is the inflammation of the mucosa of the nasal cavity and the paranasal sinuses. It can be classified into acute, subacute, and chronic on the basis of duration of symptoms and any of these classes can give rise to complications.[2] Complications of rhinosinusitis may be categorized as extracranial (orbital complications), intracranial (cavernous sinus thrombosis, meningitis, brain abscess), and those involving the bone of the sinus wall (osteitis, osteomyelitis of the frontal bone or maxilla).

Anatomical proximity of paranasal sinuses to the orbit. The paper thin *lamina papyracea* which is the lateral wall of the ethmoid sinus and also the medial wall of the orbit. This bony plate contains numerous thin blood vessels which allow active and rapid spread of infection to the orbit. Palpebral vessels do not contain valves. These vessels travel parallel to the lamina papyracea. The floor of the orbit forms the roof of the maxillary sinus. The frontal sinus sometimes also extends into the roof of the orbit. These are the reasons why is sinusitis complicated by orbital complications[3].

Orbital complication accounts for 74–85% of complications arising from acute sinusitis and usually this is secondary to inflammation of ethmoid sinus as it is separated from the orbit only by the thin lamina papyracea[4]. In developing countries, sinusitis is usually under treated and that is why it is one of the leading causes of orbital complications. The introduction of newer antibiotics has altered the course of sinusitis and its complication. In the pre-antibiotic era, the morbidity and mortality in patients with orbital complications secondary to sinusitis were 20.5% and 17%, respectively. With the advent of newer antibiotics and introduction of endoscopy and newer surgical modalities, rates of morbidity and mortality have declined to 3–11% and 1–2.5%, respectively[5].

Orbital complications of rhinosinusitis were classified by Chandler into five groups namely: Group I-preseptal cellulitis, Group II-orbital cellulitis, Group III-subperiosteal abscess, Group IV-orbital abscess and Group V-cavernous sinus thrombosis[6].

Management strategy of orbital complications of sinusitis depends on the severity of affection at initial presentation. The management of the complications of rhinosinusitis consists of targeted antimicrobial therapy and surgical drainage[7]. Medical management focuses primarily on aggressive antibiotic therapy while treating underlying predisposing factors such as sinusitis. Sinusitis with orbital complications is an emergency situation. Timely diagnosis and appropriate management are of utmost importance to prevent it from affecting vision and becoming a life threatening condition.

MATERIAL AND METHODS

A retrospective analysis of the clinical case records of patients with orbital complications of rhinosinusitis managed in the department of Otorhinolaryngology, Indira Gandhi Medical College, Shimla, Himachal Pradesh, over a period of four years from January 2014 to December 2017 was carried out.

Data recovered from the case records included: Clinical presentations (eyelid oedema, chemosis, proptosis, impaired vision and restricted mobility). Local examination including Otorhinolaryngological and ophthalmological examination. Contrast enhanced CT scan data. Type of treatment given. Surgical management and their outcomes. The diagnosis was made based on the information gathered from the history, physical examination, x ray and CT scan findings.

Only the patients who presented with orbital complications secondary to sinusitis and not to other orbital pathology based on symptoms, clinical signs and radiological investigation were included in the study.

Patients with periorbital oedema, erythema, and increase in local hyperemia but without proptosis, ophthalmoplegia and visual impairment were defined as having preseptal cellulitis. Patients with proptosis, ophthalmoplegia and visual impairment were defined as having postseptal orbital cellulitis. All such patients also gave history of fever and headache. Majority of them had an episode of upper respiratory tract infection preceding the development of orbital symptoms.

All patients underwent CT scan at the time of initial presentation regardless of the clinical staging of the disease. Sinusitis was defined by the presence of opacification or air fluid level on CT scan. In accordance with the clinical and radiological examinations, patients were classified into five groups according to the Chandler's classification and medical and surgical measures were tailored accordingly.

Medical treatment comprised of intravenous antibiotics (generally a third generation cephalosporin), topical and systemic decongestants, anti inflammatory agents and saline irrigation. The surgical intervention undertaken in our institution was Endoscopic orbital decompression and drainage of orbital suppuration and involved sinuses. Treatment outcome was measured by resolution of the complication or the development of permanent visual loss and/or neurological insult.

RESULTS

A total of 17 patients were reviewed in the study. Age of the patients ranged from 6 years to 48 years. Amongst who 5 (29%) patients were adults (mean age= 37.25 years) and 12 (71%) patients were in paediatric age group (mean age= 8.46 years). Of the 17 cases, 13 (76.4%) were males and 4 (23.5%) were females with male to female ratio of 3.25:1.

Fifteen of the patients (88%) had a history of recent upper respiratory tract infection, out of which 4 had a history of chronic rhinosinusitis. Eyelid erythema and oedema were present in almost all the cases. (Figure 1 & 2) Oedematous and congested nasal mucosa was observed by nasal endoscopy in all patients.

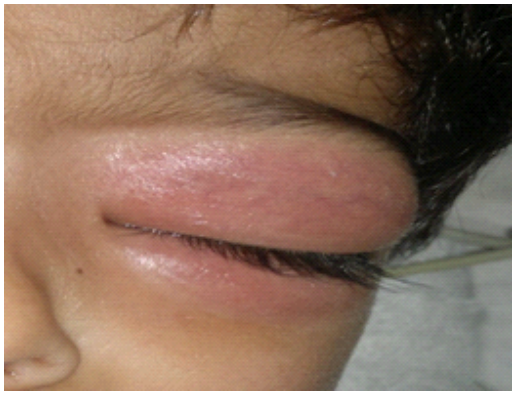

Figure 1: A 6 year old child with orbital abscess

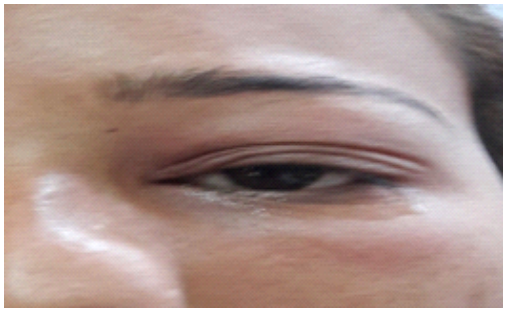

Figure 2 : A 24 years female with preseptal cellulitis

Involvement of the sinuses on CT scan: Only Ethmoids were found to be involved in 3 patients (18%), only Maxillary sinus involvement in 2 patients (12%), ethmoid along with maxillary sinusitis in 7 patients (41%) and pansinusitis in 5 patients (29%). (Table 1 & Figure 3)

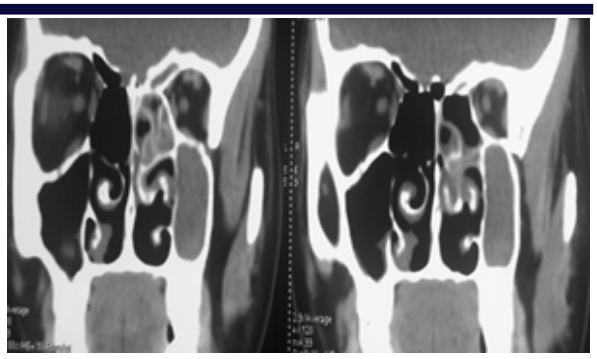

Figure 3: CT scan coronal section showing involvement of Ethmoid and Maxillary sinuses

Table 1 : Involvement of sinuses according to CT scan

Sinus	Number of patients (n=17)
Ethmoid sinus only	3 (18%)
Maxillary sinus only	2 (12%)
Ethmoid + Maxillary	7 (41%)
Pansinusitis	5 (29%)

Based on Chandler's Classification : 6 patients (35%) had preseptal cellulitis (Group I), 7 patients (41%) had orbital cellulitis (Group II), 1 patient (6%) had subperiosteal abscess (Group III), 2 patients (12%) had orbital abscess (Group IV), 0 patients (0%) with cavernous sinus thrombosis (Group V)and 1 patient (6%) had eyelid abscess. (Table 2) We encountered patients who had only unilateral disease.

Table 2 : Distribution according to Chandler's staging

Stage	Number of patients (n=17)
I -Preseptal cellulitis,	6 (35%)
II - Orbital cellulitis,	7 (41%)
III-Subperiosteal abscess,	1 (6%)
IV - Orbital abscess	2 (12%)
V-Cavernous sinus thrombosis	0

***1 case (6%) of eyelid abscess**

All patients were started on wide range of intravenous antibiotics, anti inflammatory drugs, topical and systemic decongestants and saline nasal irrigation to promote sinus drainage. Since most of the cases were referred to our institution from peripheral health care centers due to unresponsiveness to medical treatment, the cases were investigated immediately (CT scan) and were planned for surgical management.

The surgical intervention was endoscopic endonasal drainage using a 0 degree nasal endoscope. 14 patients (82%) underwent endoscopic orbital decompression, 2 patients (12%) underwent endoscopic optic nerve decompression in conjunction with orbital decompression and 1 patient (6%) underwent external incision and drainage for eyelid abscess. (Table 3 & Figure 4)

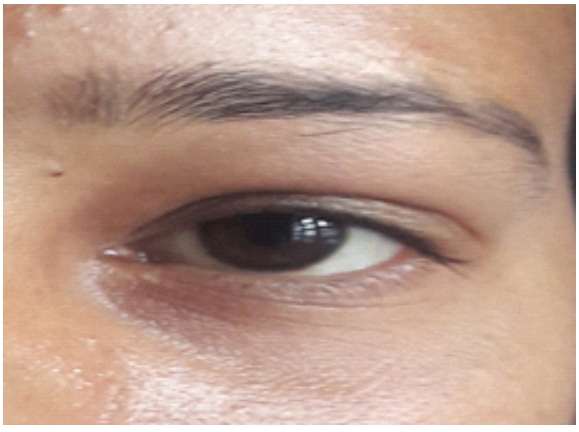

Figure 4 : Post endoscopic orbital decompression for preseptal cellulitis

Surgical procedure	Number of patients (n=17)
Endoscopic orbital decompression	14 (82%)
Endoscopic optic nerve decompression + orbital decompression	2 (12%)
External drainage	1 (6%)

All patients received intravenous antibiotics in post operative period (generally a third generation cephalosporin empirically till culture reports were obtained). Of the 2 cases who had blurring of vision, 1 showed improvement within 48 hrs following surgical intervention while 1 case showed signs of improvement on 5th post operative day. All patients were discharged on an average 4.6 days after the intervention without any residual complication/ morbidity. We did not encounter any visual loss, neurological sequelae or mortality in the course of treatment.

DISCUSSION

Rhinosinusitis is one of the most common medical problems. Orbital involvement has been the most common complication of sinusitis. Spread of infection to the orbit occurs either by direct extension or defect in the thin lamina papyracea, local thrombosis, and direct extension of preseptal cellulitis through the orbital septum or haematogenous seedlings. It is an ocular emergency that threatens vision as well as life from complications such as meningitis, cavernous sinus thrombosis, and brain abscess.

Apart from physical examination CT scanning assists in diagnostic differentiation and also to determine which patients will benefit from surgical intervention. A contrast enhanced CT scan of orbital abscess will depict ring enhanced lesion or an air-fluid level in the extraconal space, displacement of adjacent rectus muscle, marked proptosis, and in advanced cases osteomyelitis of the orbital wall.

In our series, as in many others, male patients dominated female patients with male to female ratio of 3.25:1. Also higher occurence was observed in paediatric age group (71%) which is in accordance to studies conducted earlier which state that orbital complications of acute rhinosinusitis typically affects children and young adults.

In the present study, CT scan revealed orbital cellulitis in 7 cases (41%) followed by preseptal cellulitis in 6 cases (35%), orbital abscess in 2 cases (12%) , subperiosteal abscess in 1 case (6%) and eyelid abscess in 1 case (6%).

The most common pattern of sinus involvement in our series was combination of ethmoid and maxillary sinuses which is similar to the study conducted by Swift et al[9]. However, a study conducted by Mortimore et al stated that a combination of ethmoid, maxillary and frontal sinuses is more commonly associated with orbital complications of sinusitis[10].

It was also observed that the ethmoid sinus was either involved in solitary in 18% of cases or in conjunction with other sinuses. The involvement of multiple sinuses altogether is probably an indication of the severity of the disease process and the continuous nature of the mucosal lining of the paranasal sinuses.

The decision about the necessity and timing of a surgical intervention is complex and involves the assessment of many factors including response to the antibiotic treatment, age, size and location of the fluid or pus collection. Although preseptal (stage I) and orbital (stage II) cellulitis have been described to be managed conservatively with intravenous antibiotics and observed for response to treatment before deciding upon the surgical management, in our study, such patients were undertaken for surgical intervention as the majority of them have been referred from peripheral health centers and had surpassed the usual period of medical management and observation.

Also, such patients showed dramatic improvement in the symptoms following the surgical decompression. Hence, in our opinion it wise to undertake surgical decompression in such patients rather than allowing time for the disease process to progress.

In this series, 14 cases (82%) underwent endoscopic orbital decompression, 2 cases (12%) underwent endoscopic optic nerve decompression in conjunction with orbital decompression and drainage of pus and 1 case (6%) had external drainage of pus for eyelid abscess. Of the 2 patients who had visual impairment 1 showed improvement within two post operative days and another showed improvement on fifth post operative day, however, dramatic improvement in symptoms were reported in all the patients within 24 hours with no residual morbidity on follow up.

CONCLUSION

Orbital complications of acute rhinosinusitis are common in paediatric age group. Complications of sinusitis, whether acute or chronic, appear to be a severe morbidity, which pose a serious threat to patient's vision and life and can lead to irreversible damage if not treated aggressively. Early diagnosis and aggressive treatment are key to the reduction and prevention of unwanted manifestations. Orbital examination and CT scan are mandatory for staging and choosing the suitable line of treatment. Surgical decompression and drainage in conjunction with aggressive medical management remains the standard of care for this condition to achieve a good prognosis and visual outcome.

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