Original Research Article

A prospective study of orbital manifestations of sinus disease

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Abstract

Introduction: Anatomically, the orbital cavity has an intimate topographical relationship to the surrounding paranasal sinuses. Hence orbit may be involved in majority of expanding or bone eroding lesions originating in the sinuses and in the nasopharynx. The anatomical basis of ophthalmic complications in paranasal sinus disease is that the orbit is nearly completely surrounded by sinuses, except laterally; the separating bones are very thin, with numerous suture lines. **Materials and Methods:** Patients with paranasal sinus disease presenting to ENT OPD at Maheshwara Medical College and Hospital, Chitkul (V), Near Isnapur X Roads, Patancheru, Telangana from October 2019 to October 2020 were screened for orbital manifestations.ENT evaluation, Nasal endoscopy,CT PNS,Culture sensitivity,KOH smear, wherever necessary was undertaken.Out of these, fourteen patients with orbital disease were referred to Opthalmology department of Maheshwar Medical College and Hospital and were thoroughly evaluated. Patients with endocrine ophthalmopathy like thyroid ophthalmopathy were excluded. Extensive history was taken and general examination was done with the collaboration of other departments wherever necessary. Visual acuity was tested using Snellen's chart, anterior segment was evaluated using slit lamp. Posterior segment was evaluated by direct / indirect ophthalmoscopy as appropriate. B-scan ultrasonography / CT scan / MRI were done wherever necessary. Appropriate specimens were sent for culture and sensitivity in suspected infectious conditions. Appropriate antibiotic / anti-fungal treatment was given according to standard protocols. In suspected tumours, complete surgical excision was done at ENT / Neurosurgery departments and specimens were sent for histopathological examination and the diagnosis was confirmed**Results:** Out of the 14 patients 4 were female and 10 were male. Age ranged from 16 years to 70 years. 5 had maxillary sinus disease (3 cases of Invasive Fungal Sinusitis / Mucormycosis and 2 cases of Squamous cell Carcinoma). Frontal sinus disease was seen in two patients, one fibrous dysplasia and one malignancy. Five patients had ethmoidal sinus disease of which three patients were found to have ethmoidal sinus tumour (Malignant melanoma, Squamous cell Carcinoma). More than two sinuses were involved in 2 patients.**Conclusion:** Early screening of patients with sinus disease by an Ophthalmologist can help in preventing severe vision threatening orbital complications.

Key Words: paranasal sinuses, nasopharynx, mucormycosis,

Introduction

Anatomically, the orbital cavity has an intimate topographical relationship to the surrounding paranasal sinuses. Hence orbit may be involved in majority of expanding or bone eroding lesions originating in the sinuses and in the nasopharynx. The anatomic basis of ophthalmic complications in paranasal sinus disease is that the orbit is nearly completely surrounded by sinuses, except laterally; the separating bones are very thin, with numerous suture lines[1].Even though sinusitis is a common clinical entity, its complications are seen rarely after the advent of antibiotics. 3.7 to 20% of the patients can present with complications, of which 60-75% will have orbital complications and others will have local and intracranial involvement [2]. Ethmoid sinus is the most common sinus associated with orbital complications because of its close proximity to the orbit and is separated from the orbit by a weak barrier called lamina papyracea [3]. These complications can be dealt either medically, surgically or combined depending on the extent of disease[4]. We took this study for enlightening the importance of orbital manifestations of sinus pathology and their deadly outcomes if timely interventions are not done.

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Materials and methods

Patients with paranasal sinus disease presenting to OPD at Maheshwar Medical College and Hospital, Chitkul (V), Near Isnapur X Roads, Patancheruvu, Telangana from October 2019 to October 2020 were screened for orbital manifestations. ENT evaluation, Nasal endoscopy, CT PNS,Culture Sensitivity, KOH smear , was carried out as and when required.Out of these, fourteen patients with orbital disease were referred to Maheshwar Medical College and Hospital and were thoroughly evaluated. Patients with endocrine ophthalmopathy like thyroid ophthalmopathy were excluded. Extensive history was taken and general examination was done with the collaboration of other departments wherever necessary. Visual acuity was tested using Snellen's chart, anterior segment was evaluated using slit lamp. Posterior segment was evaluated by direct / indirect ophthalmoscopy as appropriate. B-scan ultrasonography / CT scan / MRI were done wherever necessary. Appropriate specimens were sent for culture and sensitivity in suspected infectious conditions. Appropriate antibiotic / anti-fungal treatment was given according to standard protocols. In suspected tumours, complete surgical excision was done at ENT / Neurosurgery departments and specimens were sent for histopathological examination and the diagnosis was confirmed

Results

Table 1: Classifications of Orbital Infection and Inflammation

Group	Chandler	Maloney
First	Inflammatory oedema	Preseptal cellulitis
Second	Orbital Cellulitis	Subperiosteal abscess
Third	Subperiosteal abscess	Orbital cellulitis
Fourth	Orbital Abscess	Orbital Abscess
Fifth	Cavernous sinus thrombosis	Cavernous sinus thrombosis

Table 2: Aetiology in cases with infectious causes

Disease	No of patients
Orbital inflammation following ethmoiditis	**2 (14.28%)**
Fungal granuloma	**3 (21.42%)**
Total	**5 (35.71%)**

Out of 14 patients examined, 10 (71.42%) were males and 4 (28.58%) were females. Age group ranged from 16 to 70 years. Right eye was affected in 8 (57.14%) patients, while left eye was affected in 6 (42.86%) patients. Orbital manifestations were secondary to frontal sinus disease in 2 (14.28%) patient, ethmoid sinus disease in 5 (35.71%), maxillary sinus disease in 5 (35.71%) patients. In 2 (14.28%) patients, more than 2 sinuses were involved. Distribution of aetiology is shown in chart 1 and 2 and in table 2.Among 9 (64.28%) patients with neoplasms, 3 (21.42%) had ethmoidal sinus tumours, 2 (14.28%) had squamous cell carcinoma of ethmoid sinus, while one patient (7.14%) had malignant melanoma of ethmoidal sinus. 1 patient (7.14%) had frontal sinus carcinoma and 1 patient (7.14%) had dysplasia of frontal sinus. 3 (21.42%) patients had squamous cell carcinoma of maxillary sinus. 1 patient (7.14%) had squamous cell carcinoma that involved maxillary, ethmoid and sphenoid sinuses. The 2 patients with orbital cellulitis presented with fever, pain & redness of the affected eye. Two out of three patients with fungal granuloma had predisposing conditions like severe uncontrolled diabetes mellitus and HIV infection respectively.

Fig 1: Eye problems due to sinus disease

They presented with rapidly increasing proptosis and poor general condition. One female patient with maxillary sinus fungal granuloma (Mucormycosis) had ptosis with limitation of all extra ocular muscle movements along with proptosis. The other two patients with fungal granuloma are male. One of them is HIV positive presenting with rapidly progressing proptosis, swelling of the right cheek and limitation of all extra ocular muscle movements in the right eye.This too was found to be mucormycosis. Among paranasal sinus

neoplasms causing orbital manifestations, 3(21.42%) had ethmoidal sinus tumours, another 3 (21.42%) had maxillary sinus tumours, while 1(7.14%) patient had frontal sinus malignancy. More than two sinuses were involved in 1(7.14%) patient. All these patients presented with proptosis, diplopia, redness and diminished vision. Two patients with orbital cellulitis following ethmoiditis were managed medically with a combination of cephalosporins and aminoglycosides and showed good response. Among the 3 patients with sinus fungal granuloma, one patient was treated with intravenous Amphotericin B and responded well to treatment, while the remaining two underwent functional endoscopic sinus surgery (FESS) along with parenteral anti-fungal therapy and showed good post-operative recovery. One patient with fibrous dysplasia of frontal sinus underwent excision of dysplastic bone and craniofacial reconstruction. Among the remaining 8 patients with tumours, one patient with malignant melanoma of ethmoid sinus was referred to higher centres for further management. Complete tumour excision was done through transcranial / Caldwel-Luc approach in the remaining 7 patients. Radiotherapy and chemotherapy were given wherever necessary.

Discussion

In our study, males were found to be more commonly affected. Age distribution ranged from 16 years to 70 years. It was variable and no specific pattern could be seen. The most common ophthalmic presenting feature was proptosis whereas nasal obstruction and or epistaxis were common presenting features in ENT department[5].In a study by Frazell E. L. and Lewise J. S of 416 cases of malignancy of the nose and PNS, the symptomatology showed high incidence of nasal obstruction, facial swelling and epistaxis as the presenting complaint. These two findings are comparable to that of our study. Inflammatory orbital complications were seen in 2 patients and responded well to standard medical treatment[6].These 2 patients with orbital cellulitis were young males and concur with the findings of Pjerin Radovani et al[7].Among the benign neoplastic lesion, fibrous dysplasia was the only lesion noted when compared to Venugopal et al., who state that angiofibroma was the most common benign tumor causing proptosis followed by inverted papilloma, chondroma of ethmoid, ossifying fibroma and fibrous histiocytoma[8]. Among malignant tumours, squamous cell carcinoma was found to be the most common histological type[9]. This is in agreement with studies by Frazell E. L. et al., Venugopal et al and several other previous studies. All the cases of malignancy underwent total maxillectomy with radiotherapy and chemotherapy wherever indicated[10].

Conclusion

Despite good antibiotic treatment, orbital complications can occur in patients with paranasal sinus disease. A high index of suspicion is needed in these cases to avoid serious complications. Similarly, a thorough ENT evaluation should be done in every patient with proptosis followed by appropriate radiological investigation to ensure early diagnosis and appropriate treatment.

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