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Varied orbital manifestations of paranasal sinus disease

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ABSTRACT

Background: Even though sinusitis is a common clinical entity, its complications are seen rarely after the advent of antibiotics. Hence we aimed to analyse varied clinical presentations and manifestations of orbital involvement in paranasal sinus diseases and their outcome.
Methods: Hospital based prospective study done from January 2007 to December 2017. We selected 65 patients in our study based on our inclusion and exclusion criteria. Type of orbital involvement was analysed by computed tomography scan. Immediate aggressive medical management was started and surgery was undertaken if there is no clinical improvement in 48 hours. Endoscopic sinus surgery done along with orbital decompression and drained pus was sent for culture sensitivity. Patients were followed up regularly and suction clearance was done.
Results: Out of 65 patients, 50 were male and 15 were female. 24 patients had bacterial pathology, 40 had fungal pathology and 1 patient had non specific inflammatory disease consistent with mucocoele. Out of 24 bacterial sinusitis, 2 had bilateral disease and 1 patient had scalp and neck extension. Out of 40 fungal sinusitis, 2 patients had 6th cranial nerve palsy with sphenoid disease, 5 patients had palatal extension and 8 patients had intracranial involvement.
Conclusions: All cases of orbital oedema and proptosis should be thoroughly evaluated for sinus disease. Computed tomography aids to know the extent of disease, deciding about the type and mode of intervention. Early diagnosis and immediate intervention reduces significant mortality and morbidity. However regular follow up, counselling the patients and relatives helps in achieving appropriate outcome.

Keywords: Sinusitis, Orbital cellulitis, Orbital decompression, Endoscopic sinus surgery

INTRODUCTION

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.[1] 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. These complications can be dealt either medically, surgically or combined depending on the extent of disease.[2] We took this study for enlightening the importance of orbital manifestations of sinus pathology and their deadly outcomes if timely interventions are not done.

METHODS

Hospital based prospective study done in the department of Otorhinolaryngology at our tertiary care hospital in Belagavi, from January 2007 to December 2017. All the patients having orbital involvement secondary to sinusitis were included in the study. Patients with suspected malignancy and history of trauma were excluded from the

study. All the patients were thoroughly evaluated with complete ear, nose and throat examination along with systemic examination. Immediate aggressive medical management was started with broad spectrum intravenous antibiotics like piperacillin with tazobactum, metronidazole and amphotericin B was given in suspected fungal pathology. Computed tomography was done and analysed. In limited orbital involvement we waited for 48 hours to see the resolution of disease with medical management. Immediate surgical intervention was planned, if the patients are not responding clinically or if there is extensive disease. All patients underwent endoscopic sinus surgery with orbital decompression, along with treatment of other associated complications by neurosurgeons and ophthalmologists. Drained pus was sent for culture sensitivity and antibiotics were given accordingly. Patients were followed up regularly and repeated suction clearance was done.

RESULTS

All patients were South Indians. Out of 65 patients, 50 were male and 15 were female. Age group of patients in the study ranging from 2 to 70 years (Table 1 showing involvement of various sinuses). Ethmoid sinus is the most coomon sinus involved, followed by maxillary and frontal sinuses (Table 2 showing various presentations and outcomes in our patients). Out of 65 cases of orbital involvement, 24 patients had bacterial pathology, 40 had fungal pathology and 1 patient had non specific inflammatory disease which was consistent with mucocoele. Out of 24 bacterial sinusitis patients, 2 had bilateral disease and 1 patient had scalp and neck extension of disease. Out of 40 fungal sinusitis patients, 2 patients had associated 6th cranial nerve palsy with sphenoid disease, 5 patients had palatal extension and 8 patients had intracranial involvement. Pre septal cellulitis was seen in 25 patients of which 5 patients recovered completely with medical management. Orbital cellulitis and sub perisoteal abscess was noted in 19 and 21 patients respectively and they did not respond to medical management. Hence surgery was done. Figure 1 and 2 showing preoperative and postoperative pictures of our patients. Figure 3 showing morbidity of paranasal sinus diseases.

Table 1: Involvement of various sinuses.

Sinus involved	Number of patients (%)
Ethmoid	26 (40)
Maxillary	6 (9.2)
Frontal	6 (9.2)
Ethmoid, frontal and maxillary	12 (18.5)
Ethmoid and frontal	7 (10.8)
Ethmoid and maxillary	6 (9.2)
Sphenoid	2 (3)

Table 2: Various presentations and outcomes in our patients.

Type of disease	Number of patients	Various presentations	Outcome
Bacterial	24	- 2 patients had bilateral disease	Improved
		- 1 patient had scalp and neck extension	
Fungal	40	- 25 patients had only orbital involvement	23 improved and 2 patients underwent orbital exenteration
		- 2 patients had isolated sphenoid disease with 6th cranial nerve palsy	Improved
		- 5 patients had palatal involvement	Palatal perforation
		- 8 patients had intracranial involvement	3 death
Non specific (mucocoele)	1		Improved

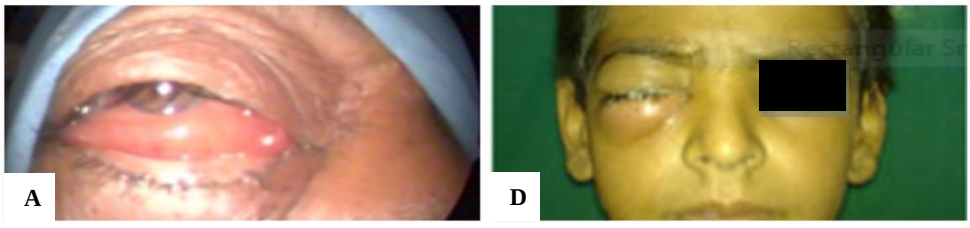

Figure 1: (A and D) Preoperative pictures of orbital cellulitis along with diffuse peri orbital oedema.

Continued.

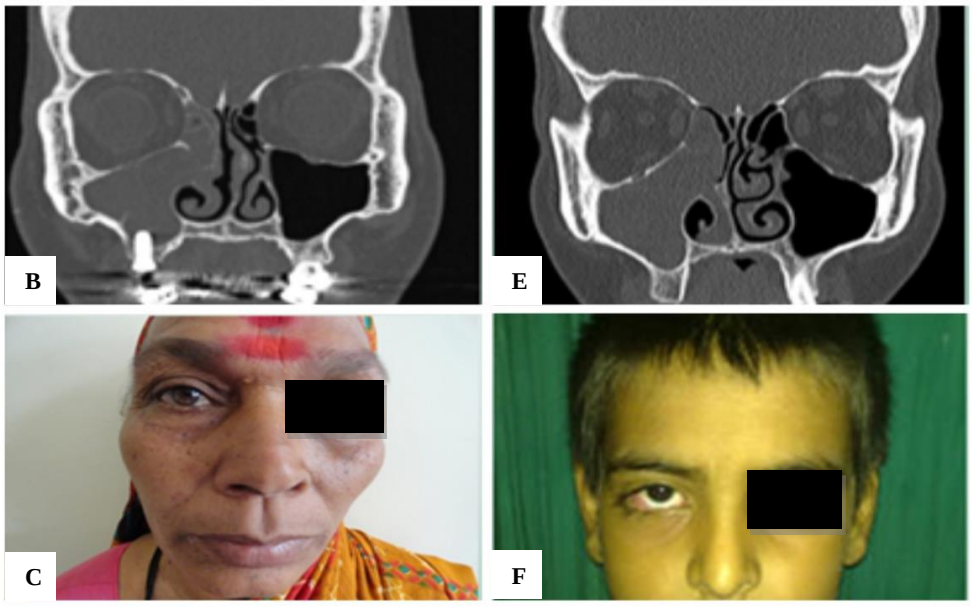

Figure 1: (B and E) CT of the patients showing orbital involvement with maxillary and ethmoid sinusitis; (C and F) Postoperative pictures of complete recovery of disease.

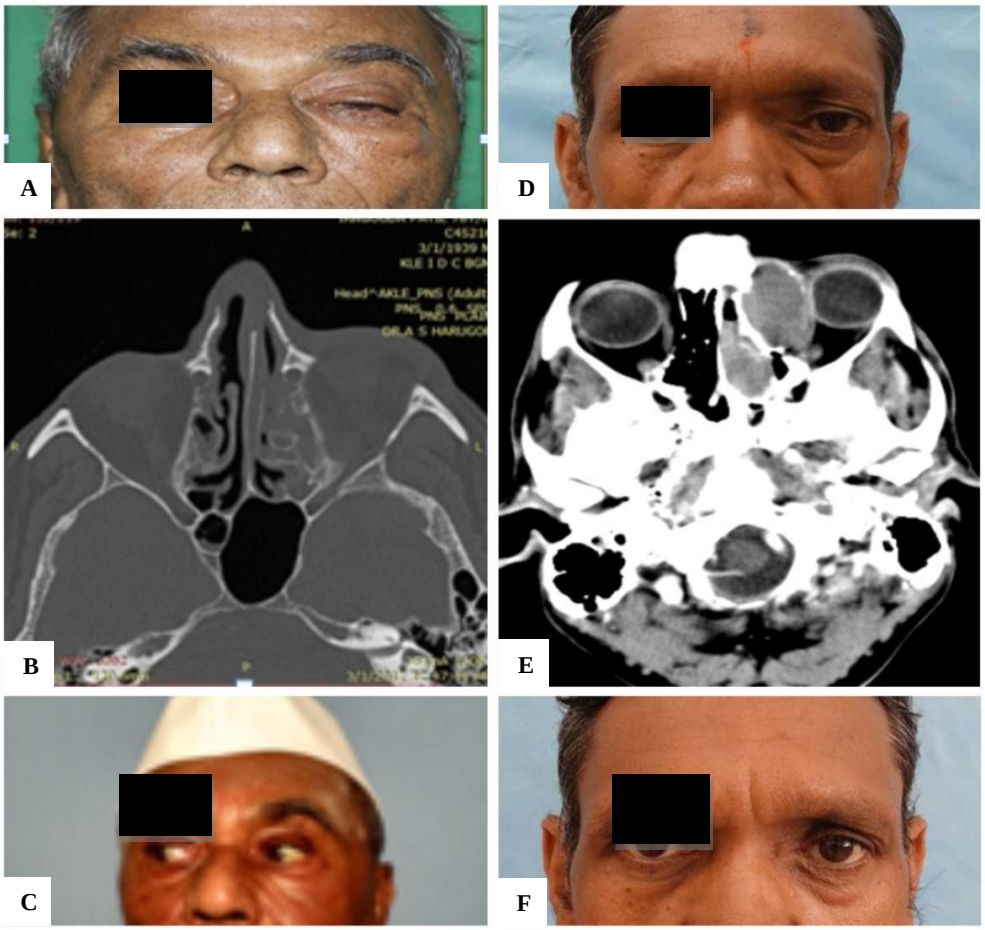

Figure 2: (A) Preoperative picture of a fungal sinusitis patient who presented with proptosis and eyelid oedema; (B) CT picture of ethmoid sinusitis with orbital involvement; (C) Postoperative picture of complete recovery; (D) Preoperative picture of a patient of mucocoele who presented with headache and proptosis; (E) Contrast enhanced CT showing mucocoele with diffuse extension in to orbit; (F) Postoperative picture after endoscopic surgery along with marsupilisation of cyst wall. Patient had immediate recovery.

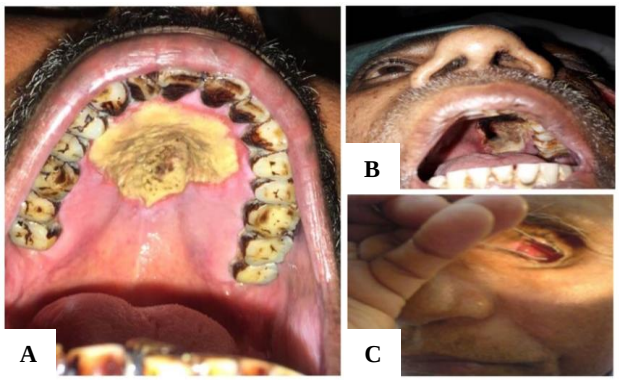

Figure 3: Morbidity of paranasal sinus diseases; (A) Palatal involvement, (B) Palatal perforation, (C) Orbital exenteration.

DISCUSSION

Acute and chronic complications of sinusitis continued to occur even after the advent of various antibiotics. Orbit is closely in relation with paranasal sinuses anatomically. Few predisposing factors include thin lamina papyracea separating orbit from ethmoid sinus, multiple valveless veins and associated immunodeficiency conditions.[3] Males are most commonly involved in our study, which is similar to the available literature.[3] Staphylococcus and streptococcus were the most commonly associated bacteria and mucormycosis was the most common fungi isolated in our study which is similar to the literature. Study done by Pena et al revealed high prevalence of streptococcus pneumoniae and staphylococcus aureus.[4]

Chandler classified orbital involvement in to several groups: inflammatory oedema/pre septal cellulitis, orbital cellulitis, sub periosteal abscess, orbital abscess and cavernous sinus thrombosis. Clinical presentation differentiates different subgroups.[2] Patients with preseptal cellulitis will have only periorbital swelling and the extra ocular eye movements along with vision are normal, while in orbital cellulitis there will be extra ocular palsy and vision loss along with proptosis.[5] There can be isolated or pan sinus involvement with these complications. Ethmoid sinus is the most common isolated sinus involved and pan sinus involvement indicates continuous mucosal inflammation and chronic disease.[2]

Surgical management can be done by either endoscopic approach or external approach. When the endoscopic approach is difficult to locate the abscess (like in superior abscess), the external approach is indicated. Sub periosteal abscess and orbital abscess are treated with immediate surgical drainage to prevent permanent vision loss.[2] Vision loss is secondary to optic neuropathy or by occlusion of optic vessels due to primary infiltration of disease process or secondary to increased intra ocular pressure.[6] It can even progress to meningitis and death.[5]

Prognosis of the disease depends on appropriate intervention done, general health condition of the patient and extension of disease.[7]

CONCLUSION

All cases of orbital oedema and proptosis should be thoroughly evaluated for sinus disease. Computed tomography aids to know the extent of disease, deciding about the type and mode of intervention. Histopathological examination and culture sensitivity of tissue are equally important. Early diagnosis and immediate intervention by multidisciplinary approach, reduces the significant mortality and morbidity of the patient. However regular follow up, counselling the patients and relatives helps in achieving appropriate outcome.

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