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Orbital complications of ENT diseases

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ABSTRACT

Background: Orbital complications are fairly common in Otorhinolaryngology practice because of close proximity of orbit to adjacent ENT regions. Orbital complications must be suspected whenever ENT patients present with complaints of proptosis, diplopia, vision loss and epiphora. Early diagnosis and treatment is necessary to prevent morbidity and mortality in these patients.
Methods: This prospective study was conducted in the ENT department for a period of 1 year from August 2016 to July 2017 and comprised of 38 cases. This study was conducted to see the incidence, etiology, clinical, radiological and histopathological profile in relation to ophthalmic complications in ENT diseases.
Results: Male to female ratio was 1.71:1. Patients mean age at presentation in present study was 39.71±19.86 (SD) years and maximum number of cases 10 (26.32%) were between 41-50 years of age. Among 38 patients of our series, most common clinical presentation was proptosis followed by nasal obstruction. Commonest ENT diseases responsible for orbital complications were the different sinonasal tumours comprising 18 cases, in which carcinoma maxilla constituted 6 cases.
Conclusions: In conclusion, correct diagnosis, adequate antibiotic therapy, and surgical intervention are important for management of orbital and ophthalmic complications. Cooperation between Ophthalmologist and the Otolaryngologist is clearly desirable for proper management of these cases.

Keywords: ENT disease, Orbital complications, Orbital cellulitis, Paranasal sinus tumours, Sinusitis

INTRODUCTION

Many ENT diseases have ophthalmic manifestations, as many head and neck structures are related to eyes in many ways. The close proximity of orbit with nose, paranasal sinuses and skull base makes it susceptible to the disease from this area. The orbit shares a common wall with floor of frontal sinus (roof of orbit), lamina papyracea of the ethmoid labyrinth (medial wall of the orbit), roof of maxillary sinus (floor of the orbit) and anterolateral wall of the sphenoid sinus (orbit Apex). There walls are really thin enabling infections and tumors to travel from either direction. These bony walls are perforated by various foramina that transmit nerve and blood vessels all of which provide potential routes of invasion in to the eye. The whole venous system in this area is valve less consequently a two way pathway of infection between orbit nasal cavity and paranasal sinus becomes a reality.

Ocular and orbital symptoms can be presentation of wide variety of infective and neoplastic conditions of nasal cavity, paranasal sinuses and nasopharynx. Infectious agent can be bacterial, viral or fungal. 75% of bacterial infections in the orbit are caused by sinusitis.[1] Rhinosinusitis is a relatively common clinical condition. Although serious complications of rhinosinusitis is less common now a days due to advent of newer antibiotics

but they do occur. Young patients present with orbital complications more commonly.[2] Among rhinosinusitis complications, orbital complications are the most frequent and associated with the ethmoid sinusitis in younger patients. Orbital complications include preseptal cellulitis, orbital cellulitis, subperiosteal abscess, orbital abscess and cavernous sinus thrombosis.[3] Complications involving structures other than the orbit are comparatively rare. These include intracranial complications and bony erosion. Usually they present along with the orbital complications but may in rare cases occur as an isolated complication.

Many epithelial, mesenchymal tumors and tumor like lesions can develop in nose, paranasal sinuses and nasopharyngeal region have potential to extend in to the orbit by mean of bone erosion, extension along neural and vascular pathways and through surface lines bony dehiscence in the orbital walls. Among the benign tumours, inverted papillomas and osteoma may present with proptosis. But usually malignant tumours of the nose and paranasal sinuses erode the orbital walls and present with orbital complications. Ocular symptoms are present in 25% of patients with maxillary sinus carcinoma; however, only 5% of patients report ocular disturbances at initial presentation.[4]

Frontoethmoidal mucoceles can expand and proptosis can be most common presenting symptom.[5] Fungal infection that begins in the nose and paranasal sinuses can spreads rapidly to involve the orbital cavity.[6] Gross polyposis may be associated with significant widening of the intercanthal distance. Facial nerve is damaged in many ENT diseases like CSOM (unsafe), temporal bone malignancies and parotid malignancies causing eye symptoms like inability to close eye, epiphora, dryness, exposure keratitis and corneal ulcers. Petrositis infection of petrous apex very often secondary to otitis media can cause diplopia (VI nerve palsy) and retro orbital pain (V nerve involvement). Endocrinological diseases can have ophthalmic presentations e.g. Thyroid-associated orbitopathy, frequently termed as Graves's ophthalmopathy, causing many ocular symptoms like lid retraction, proptosis, optic nerve compression diplopia, exposure keratopathy, glaucoma severe congestive changes. Pituitary tumours arise in the sella turcica, can expand up into the suprasellar cisterns, compressing the optic chiasma above and resulting in visual failure (Classically a bi-temporal hemianopia). Careful assessment of the visual field, visual acuity and optic fundi is therefore essential. They may also invade laterally into the cavernous sinuses on each side, compressing the third to sixth cranial nerves.

A maxillofacial CT scan is most useful and should be performed urgently to identify sinus infection and orbital complications.[7,8] Whenever orbital complications of sinusitis are suspected contrast enhanced CT should be initial imaging modality of choice. Additional MRI of the brain is necessary when an orbital or cavernous sinus extension or intracranial or neoplastic mass is suspected and further investigations with angiography of intracranial vessels can exclude thrombophlebitis of the cavernous sinus.[9] Thyroid ophthalmopathy can be evaluated from the level of thyroid stimulating hormones.[10]

Management of complications required both conservative and/or surgical approach. Pre septal cellulitis and orbital cellulitis cases were managed conservatively with broad spectrum antibiotics. Neoplastic conditions of paranasal sinuses and nose were managed surgically. Endoscopic surgery is preferred over external approach. Endoscopic sinus surgery has become an ideal method for treatment of certain orbital diseases and has the advantages of excellent visualization with minimal cosmetic and functional morbidity.[11] The indications for Endoscopic sinus surgery have been rapidly expanding since its introduction in nose and sinus surgery. Endoscopic sinus surgery is indicated any time when we observe acute sinusitis with complications. This procedure is needed to reduce compression of adjacent structures and to restore sinus drainage. Corticosteroid therapy is administered to reduce intracranial or intraorbital edema or when optic nerve damage is suspected.[12]

Aims and objectives

This prospective study was done to see incidence, aetiopathogenesis, clinical, radiological and histopathological profile in relation to ophthalmic complications in ENT diseases.

METHODS

Study design

This prospective study was conducted in the ENT department of Uttar University of Medical Sciences, Saifai, Etawah for a period of 1 year from August 2016 to July 2017 and comprised of 38 cases.

Study population: Inclusion and exclusion criteria

The patients with orbital complications due to any ENT & Head and Neck disease were taken up for study. Cases with allergy, maxillofacial trauma with ophthalmic manifestations were excluded from study. Postoperative facial nerve palsy, complications of endoscopic dacryocystorhinostomy operation and complications of functional endoscopic sinus surgery were also excluded from study.

Methodology

A detailed clinical history was taken and a note was made regarding age, sex, religion, profession, symptoms and duration of symptoms, involved sinus, orbital complications and clinical diagnosis. Careful examination of the ear, nose, throat, nasopharynx and eye was done in

each and every case. Diagnostic nasal endoscopy wherever necessary were also done. Initial clinical examination of orbit was done in ENT department then referred to eye department for further assessment. Routine investigations (TLC, DLC, ESR, Hb%), thyroid function test, radiological investigations like x ray of nose. PNS, skull, orbit, CT SCAN of head and neck, fine needle aspiration cytology and biopsy for histopathology wherever necessary were done. Orbital complications of sinusitis were classified according to standard Chandler's classification, which includes preseptal cellulitis, orbital cellulitis, subperiosteal abscess, orbital abscess and cavernous sinus thrombosis. After making diagnosis the proper management was done. The treatment strategy, both conservative and surgical, was planned and undertaken.

Ethical aspects

The study protocol was approved by Institute Ethical committee.

Statistical study

Data was collected using proforma and data collected included patients demographics. Data obtained underwent standard statistical analysis. Data were shown as mean± standard deviation and number of cases. Because the study included a small number of subjects so no attempt was made by us to reach statistically significant conclusions.

RESULTS

The present study includes 38 patients, both outpatients as well as in patients at the ENT and Ophthalmology department of Uttar Pradesh University of Medical Sciences for a period of one year. In the present study, 38 cases were evaluated for ophthalmic complications of ENT diseases. Most commonly involved sinus was maxillary sinus followed by ethmoid sinus. In majority of cases more than one sinus was involved. Sphenoid sinus was involved in 2 cases of complicated sinus disease. Left side was affected more frequently than the right by the disease.

Out of the 38 cases studied, 24 cases were males and 14 cases females. Male to female ratio was 1.71:1. Table 1 shows that males are more often affected than females.

Table 1: Sex distribution of patients.

Gender	No of cases	%
Males	24	63.16
Females	14	36.84

Patients mean age at presentation in present study was 39.71±19.86 (SD) years. In the present study, it was observed that maximum number of cases 10 (26.32%) were between 41-50 years of age. Next common age group involved was between 51-60 years (7 cases 18.42%). Only four cases were found to be above 60 years. Lowest age recorded was 6 years of age and highest 78 years of age. Figure 1 is showing age distribution of patients.

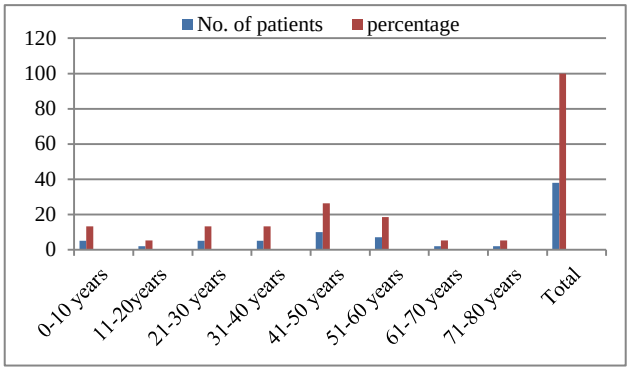

Figure 1: Age distribution of patients.

ENT complaints included nasal obstruction in 16 (42.10%) cases, blood stained discharge in 14 (36.84%) cases, epistaxis and facial swelling in 10 (26.31%) and 8 (21.05%) cases respectively. Table 2 is showing incidence of different ENT complaints.

Table 2: Incidence of different ENT complaints.

ENT Complaints	No. of cases	Percentage (%)
Nasal obstruction	16	42.10
Epistaxis	10	26.31
Blood stained discharge	14	36.84
Facial swelling	8	21.05

Among 38 patients of our series, most common clinical presentation was proptosis caused by orbital extension of squamous cell carcinoma of maxillary sinus, inverted papilloma, nasopharyngeal angiofibroma, nasopharyngeal carcinoma and frontoethmoidal mucocele. Ophthalmic complaints included proptosis in 17 (44.73%) cases, reduced vision in 6 (15.78%) cases, redness of eyes and diplopia in 4 (10.52%) and 2 (5.26%) cases respectively. Table 3 is showing incidence of different ophthalmic complaints. Figure 2 is showing an orbital complication of sinusitis. Figure 3 is showing proptosis in CT scan paranasal sinuses axial view. Figure 4 is showing proptosis in MRI axial view.

Table 3: Incidence of different ophthalmic complaints.

Ophthalmic complaints	No. of cases	Percentage (%)
Proptosis	17	44.73
Reduced vision	6	15.78
Redness of eyes	4	10.52
Diplopia	2	5.26

Figure 2: A child with proptosis a case of orbital abscess.

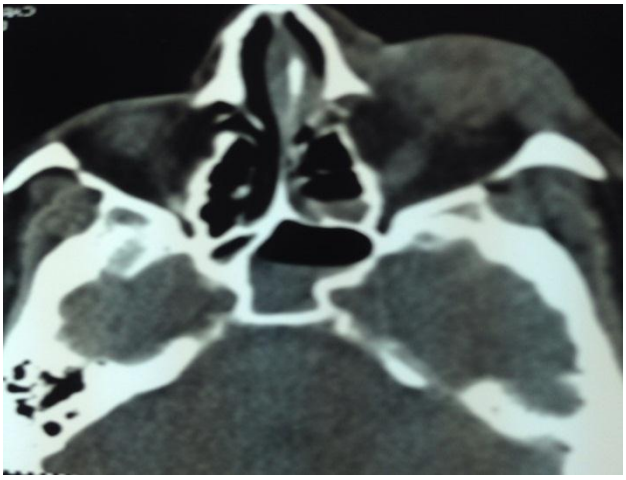

Figure 3: CT scan axial view showing proptosis.

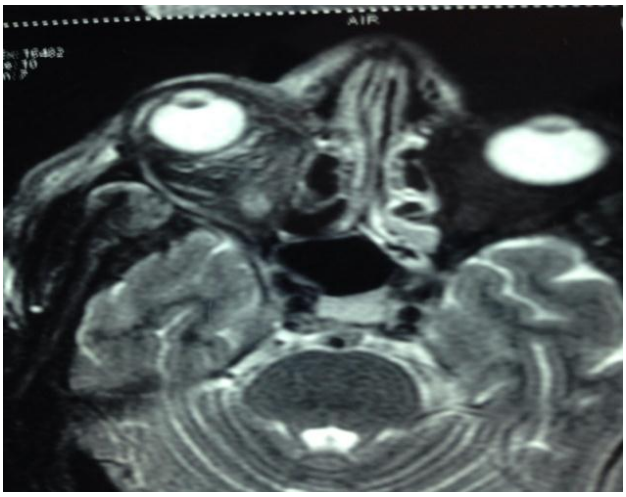

Figure 4: Axial MRI reveals right sided proptosis with heterogeneous densities in the ethmoid and sphenoid sinuses.

Commonest ENT diseases responsible for orbital complications were different sinonasal tumours comprising 18 cases, in which carcinoma maxilla constituted 6 cases, inverted papilloma 5 cases, angiofibroma 4 cases, nasopharyngeal carcinoma 1 case, olfactory neuroblastoma 1 case and fibrous dysplasia 1 case. Sinonasal infections comprising 9 cases, in which bacterial sinonasal infections constituted 7 cases and fungal infections 2 cases. Patients with bacterial infections were presented with variety of complications like preseptal cellulitis, orbital cellulitis, orbital abscess and cavernous sinus thrombosis. Fungal infections constituted a more serious problem. Atrophic rhinitis with nasal myiasis constituted 2 cases. Facial palsies due to various diseases constituted 6 cases. Frontoethmoidal mucocele, Grave's disease and rhinosporidiosis constituted 1 case each. Table 4 is showing Orbital complications due to various ENT diseases. Table 5 is showing various sinonasal tumours causing orbital complications. Figure 5 is a case of maxillary sinus carcinoma with orbital involvement. Figure 6 is showing maxillary sinus pathology with orbital involvement in CT scan axial view. Figure 7 is a case of squamous cell carcinoma of temporal bone with inadequate eye closure.

Figure 5: Maxillary sinus carcinoma involving orbit.

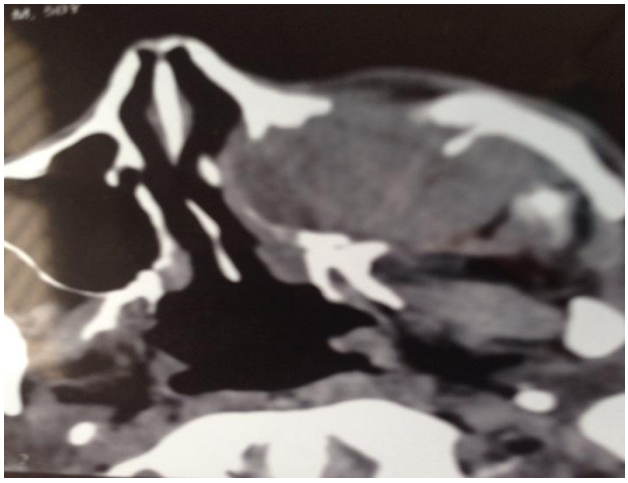

Figure 6: CT scan axial view showing maxillary sinus pathology with orbital involvement.

Figure 7: Squamous cell carcinoma of temporal bone with inadequate eye closure.

Table 4: Orbital complications due to various ENT diseases.

Etiopathogenesis	Number (n)	Percentage (%)
Sinonasal neoplasms	18	47.37
Sinonasal+facial infections	9	23.68
CSOM	4	10.53
Atrophic rhinitis with myiasis	2	5.26
Rhinosporidiosis	1	2.63
Grave's disease	1	2.63
Carcinoma parotid	1	2.63
Carcinoma temporal bone	1	2.63
Frontoethmoidal mucocele	1	2.63
Total	38	100%

Table 5: Various sinonasal tumours causing orbital complications.

Sino–nasal tumours	No. of cases	Percentage (%)
Carcinoma maxilla	6	33.33
Inverted papilloma	5	27.77
Angiofibroma	4	22.22
Nasopharyngeal carcinoma	1	5.56
Olfactory neuroblastoma	1	5.56
Fibrous dysplasia	1	5.56
Total	18	100

Sinonasal neoplasms were treated surgically and surgical approach depends on the location and extension of the mass. Lateral rhinotomy approach, endoscopic approach and Caldwell-Luc approach was mostly applied. Maxillectomy with postoperative radiotherapy was given in 5 out of 6 cases of carcinoma maxilla. In remaining 1 case of carcinoma maxilla radiotherapy with chemotherapy was given. Out of 5 cases of inverted papilloma 3 were treated surgically with lateral rhinotomy and 2 were treated surgically by endoscopic approach. Four cases of nasopharyngeal angiofibroma were treated successfully with surgery. One case of frontoethmoidal mucocele was addressed through endoscope sinus surgery. One case of nasopharyngeal carcinoma was in advanced stage and treated by radiotherapy. One case of fibrous dysplasia of maxilla was lost to follow up before any surgical intervention could be done. Single case of rhinosporidiosis was treated surgically by excision and thermocautery. Two cases of atrophic rhinitis with nasal and/or orbital myiasis were treated conservatively by manual removal of maggots and local and systemic antibiotics and analgesics. Patients with sinusitis complications such as preseptal cellulitis and orbital cellulitis were treated with intravenous antibiotics. One case with orbital abscess underwent external drainage of abscesses and administration of intravenous antibiotics. 1 case of bilateral proptosis was diagnosed as cavernous sinus thrombosis and treated with intravenous antibiotics and steroid. Two cases of fungal sinusitis treated surgically with FESS and systemic antifungals, patient responded very well with return of ocular movements and vision. All four unsafe CSOM cases were underwent modified radical mastoidectomy with postoperative steroid therapy. Two of them responded well with return of eye closure. 1 case of carcinoma temporal bone treated with palliative radiotherapy. Total radical parotidectomy was done in one case of mucoepidermoid carcinoma of parotid gland.

DISCUSSION

38 subjects were recruited for this study; 24 males and 14 females, with a male to female ratio of 1.7:1. These results are similar to other published studies. Malik et al found the similar results with number of men were more common than women by a ratio of 2: 1.[13] Sinha et al in their study showed higher incidence in males (35 males: 15 females).[14] A study conducted by Sayed showed higher incidence in males, 19 males to 9 females.[15] In contrast to this study, Sajid et al found the opposite result with male to female ratio of 1: 4.[16]

Patients mean age at presentation in present study was 39.71±19.86 (SD) years. In the present study, it was observed that maximum number of cases 10 (26.32%) were between 41-50 years of age. Next common age group involved was between 51-60 years (7 cases 18.42%). Only four cases were found to be above 60 years. The youngest patient in the study group was 6 year old female which was case of orbital abscess and oldest patient was 78 year old which had been a case of cavernous sinus thrombosis. In this study it is observed that infections are most prevalent in younger age group and sinonasal tumors in the age group 51-60 years. These results are similar to other published report. In a study done by Shina et al, youngest patient was 13 year old and oldest patient was 70 years old with average age, 35 years

Common ENT complaints in patients of ENT diseases with orbital complications were nasal obstruction in 16 (42.10%) cases, blood stained discharge in 14 (36.84%) cases, epistaxis and facial swelling in 10 (26.31%) and 8 (21.05%) cases respectively. Most common ENT finding in these patients was nasal mass. Frazell and Lewise studied 416 cases of malignancy of the nose and paranasal sinuses, the symptomatology showed high incidence of nasal obstruction (35%), facial swelling (25%) and epistaxis (12.5%) as the presenting complaint.[17] In a study done by Sinha et al, ENT complaints included nasal obstruction in 42% cases, epistaxis in 28% cases and facial swelling and blood stained discharge in 12% and 6% cases respectively.

Among 38 patients of our series, most common clinical presentation was proptosis caused by orbital extension of squamous cell carcinoma of maxillary sinus, inverted papilloma, nasopharyngeal angiofibroma, nasopharyngeal carcinoma and frontoethmoidal mucocele. Ophthalmic complaints included proptosis in 17 (44.73%) cases, reduced vision in 6 (15.78%) cases, redness of eyes and diplopia in 4 (10.52%) and 2 (5.26%) cases respectively. Sinha et al, found proptosis in100% cases, reduced vision in 14% cases red eye in 6% cases and double vision in 2% cases.[14] Sinha et al concluded that proptosis is the commonest clinical presentation in neoplastic lesions of nose and paranasal sinuses.

Commonest ENT diseases responsible for orbital complications were different sinonasal tumours comprising 18 cases, in which carcinoma maxilla constituted 6 cases, inverted papilloma 5 cases, angiofibroma 4 cases, nasopharyngeal carcinoma 1 case, olfactory neuroblastoma 1 case and fibrous dysplasia 1 case. Sino nasal infections comprising 9 cases, in which bacterial sino nasal infections constituted 7 cases and fungal infections 2 cases. Patients with bacterial infections were presented with variety of complications like preseptal cellulitis, orbital cellulitis, orbital abscess and cavernous sinus thrombosis. Fungal infections constituted a more serious problem. Atrophic rhinitis with nasal myiasis constituted 2 cases. Facial palsies due to various diseases constituted 6 cases. Frontoethmoidal mucocele, Grave's disease and rhinosporidiosis constituted 1 case each.

Henderson's series of 465 cases of orbital tumours, 7% originated from sinonasal region and 60% of these were antral carcinomas this finding is comparable to that of my study in which major case of orbital involvement was sinonasal tumours (47.37%).[18] A study conducted by Sayed, showed sinonasal infections both bacterial and fungal a major case of orbital involvement (17 cases) followed by sinonasal tumours (11 cases), in sin nasal tumours commonest cause was carcinoma maxilla which is similar to our study.[15] Present study constituted 6 cases of carcinoma maxilla comprising 33.33% of total sinonasal tumours. Sinonasal tumours were the commonest cause of proptosis in study done by Sinha et al.[14] In our study we found 9 cases of sinonasal infections complicating orbit, 7 were bacterial and 2 were fungal, few years back sinonasal infections were considered to be most common cause of orbital complications, the incidence of these complications has been decreasing since the advent of antibiotics, and they are now rare. In our study we found only 1 (2.63%) case of Grave's disease due to endocrinal origin. Endocrinological causes contributed 12% in Sinha et al study.

Sinonasal neoplasms were treated surgically and surgical approach depends on the location and extension of the mass. Lateral rhinotomy approach, endoscopic approach and Caldwell-Luc approach was mostly applied. Maxillectomy with postoperative radiotherapy was given in 5 out of 6 cases of carcinoma maxilla. In remaining 1 case of carcinoma maxilla radiotherapy with chemotherapy was given. Out of 5 cases of inverted papilloma 3 were treated surgically with lateral rhinotomy and 2 were treated surgically by endoscopic approach. Four cases of nasopharyngeal angiofibroma were treated successfully with surgery. One case of frontoethmoidal mucocele was addressed through endoscope sinus surgery. One case of nasopharyngeal carcinoma was in advanced stage and treated by radiotherapy. One case of fibrous dysplasia of maxilla was lost to follow up before any surgical intervention could be done. Single case of rhinosporidiosis was treated surgically by excision and thermocautery. Two cases of atrophic rhinitis with nasal and/or orbital myiasis were treated conservatively by manual removal of maggots and local and systemic antibiotics and analgesics. Patients with sinusitis complications such as preseptal cellulitis and orbital cellulitis were treated with intravenous antibiotics. One case with orbital abscess underwent external drainage of abscesses and administration of intravenous antibiotics. 1 case of bilateral proptosis was diagnosed as cavernous sinus thrombosis and treated with intravenous antibiotics and steroid. Two cases of fungal sinusitis treated surgically underwent FESS with optic nerve decompression and systemic antifungals were administered. Patient responded very well with return of ocular movements and vision. All four unsafe CSOM cases were underwent modified radical mastoidectomy with postoperative steroid therapy. Two of them responded well with return of eye closure. 1 case of carcinoma temporal bone treated with palliative radiotherapy. Total radical parotidectomy was done in one case of mucoepidermoid carcinoma of parotid gland.

CONCLUSION

A variety of ENT diseases can present with orbital complications due to close anatomical relation of orbit with the surrounding ENT and head and neck structures. Sino-nasal infections were the commonest cause of orbital complications in ENT patients previously but sinonasal neoplasms are the most common cause of orbital complications now a day. Orbital complications due to sinonasal inflammatory diseases have decreased

because of improved diagnostic techniques and advent of newer antibiotics. Orbital complications must be suspected whenever any ENT patients present with complaints of proptosis, diplopia, vision loss and epiphora etc. Early diagnosis and treatment is crucial for preserving vision and life of these patients. Close cooperation and team work among ophthalmologist, otorhinolaryngologists, radiologist and neurologist is required for the proper management of these patients.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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