

Original Research Article

A prospective study of ocular involvement secondary to ear, nose and throat disorders in a tertiary care centre, Telangana

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ABSTRACT

Background: Eye lies in close anatomical relation to ear, nose and throat due to which it is liable to get involved secondary to ENT disorders. Hence ENT disorders can manifest with varied ocular symptoms due to involvement of orbit and its content. Early diagnosis and treatment helps in reducing the mortality associated with it.

Methods: All age group of patients presenting with ocular symptoms secondary to ENT disorders were reported accounting to 171 cases during 2 years of duration (June 2017-June 2019). Data regarding age, gender, clinical profile, etiology and management were collected and statistical analysis was done.

Results: The maximum incidence was in young and middle aged group of patients. Males were most commonly affected. The majority of them were Infective or granulomatous (59, 34%) followed by traumatic (45, 26%) and neoplastic (44, 26%). The most common ocular involvement was proptosis (53) and the most common etiology was neoplastic (32 neoplastic cases caused proptosis) of which sinonasal squamous cell carcinoma (SCC) (8) followed by juvenile nasopharyngeal angiofibroma (JNA) (7) were the most common neoplastic cause for proptosis.

Conclusions: Early recognition and management can pave the path to prevention of mortality and morbidity associated with ocular involvement secondary to ear, nose, throat (ENT) disorders.

Keywords: Maxillo-facial trauma, Fungal granuloma, Fibrous dysplasia, Proptosis, Preseptal cellulitis, Total maxillectomy

INTRODUCTION

As eye lies in close anatomical relation to ear, nose and throat, it is liable to get involved secondary to ear, nose, throat (ENT) disorders, maxilla-facial trauma and post otorhinolaryngological surgical procedures.¹ Eye lids, cornea, conjunctiva, orbit and cranial nerves may be affected due to ENT conditions which may be responsible for varied ophthalmic manifestations.² Anatomical knowledge is essential in understanding the spread of ENT pathology and to prevent complications during surgery.³ Etiopathogenesis and clinical presentation guides in early diagnosis and effective management to

reduce the mortality.⁴ It requires team effort of an otorhinolaryngologist, ophthalmologist and neurologist for limiting further spread of pathology and efficient management.⁵ The aim of present study was to describe the demographic characteristics, evaluate the etiology and clinical profile and to describe the management strategies of ocular involvement due to ENT pathology and ENT surgical procedures.

METHODS

The prospective study was conducted in the Department of ENT, tertiary care centre, Telangana for duration of 2

years (June 2017-June 2019). 171 cases were reported. All age group of patients presenting with ocular symptoms due to ENT pathology and ENT surgical procedures who has given informed consent were included in the present study. Patients with ocular manifestations secondary to allergic rhinitis, primary ocular and central nervous system pathology were excluded in the present study. All patients were subjected to detailed history taking, clinical examination, diagnostic procedures and subjected to management after informed consent. Data regarding age, gender, etiology, ocular manifestations and managements were recorded and statistical analysis was done.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

RESULTS

The youngest age in the present study was 4 months and eldest was 73 years. The maximum incidence was in young and middle aged group of patients 31-50 years of age accounting to 62 (36%) and 15-30 years of age accounting to 61 (35%). Least incidence was seen in 0-15 years of age group (10%).

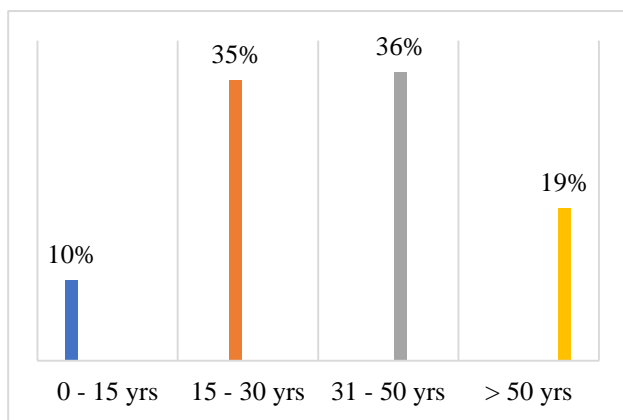


Figure 1: Age distribution of study population.

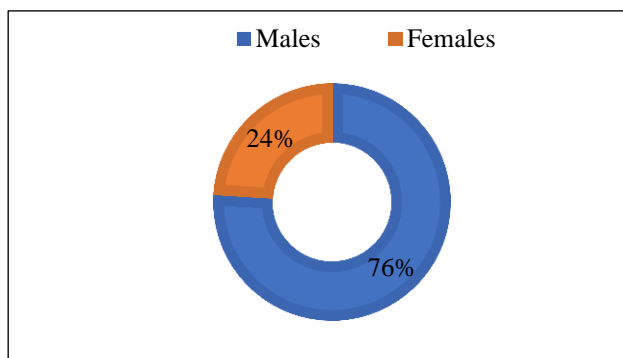


Figure 2: Gender distribution of study population.

The male to female ratio was 3:1. Males were accounting to 76% (130) and females accounting to 24% (41).

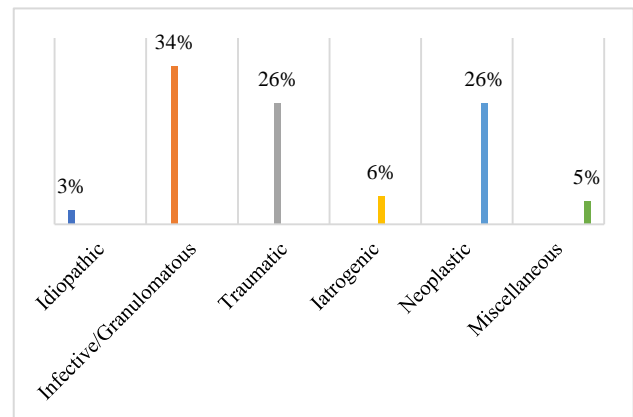


Figure 3: Etiology distribution of study population.

The ENT pathology with eye involvement were categorised into idiopathic (5, 3%), infective or granulomatous (59, 34%), traumatic (45, 26%), iatrogenic (10, 6%), neoplastic (44, 26%) and miscellaneous (8, 5%). The majority of them were infective or granulomatous (59, 34%) followed by traumatic (45, 26%) and neoplastic (44, 26%).

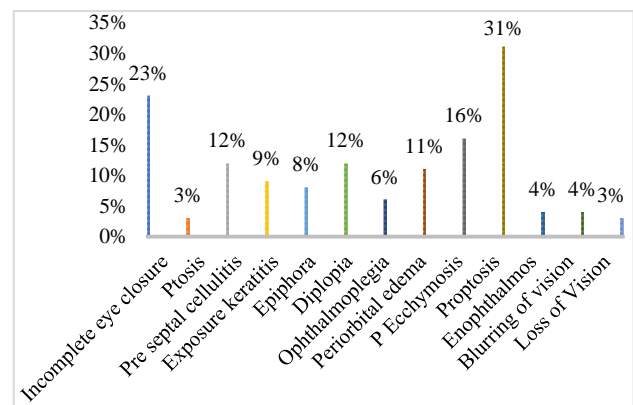


Figure 4: Ocular pathology distribution of study population.

The ocular pathology secondary to ENT disorders included proptosis (53, 31%), incomplete eye closure (40, 23%), periorbital ecchymosis (28, 16%), preseptal cellulitis (20, 12%), diplopia (20, 12%), periorbital edema (19, 11%), exposure keratitis (15, 9%), epiphora (14, 8%), ophthalmoplegia (10, 6%), enophthalmos (7, 4%), blurring of vision (7, 4%), ptosis (5, 3%), loss of vision (5, 3%) in descending order. The most common ocular involvement was proptosis (53).

3% (5) of cases were noted in idiopathic category and Bell's palsy accounted for 100% of cases. Most common age group affected was middle (31-50 years: 2, 40%) and old aged group (>50 years: 2, 40%). Females were most commonly affected in this category (3, 60%). 100% of

cases had incomplete eye closure which got complicated to exposure keratitis (3, 60%) and loss of vision (1, 20%). 100% of cases were treated with oral tapering steroid doses. Early treatment with steroids and providing

protection to eyes by necessary ophthalmologist referral and use of artificial tear drops and eye padding during night can prevent loss of vision.

Table 1: Distribution of study population in idiopathic etiology and miscellaneous etiology.

Idiopathic (n=5)		N (%)	
Age (in years)			
0-15	-		
15-30	1 (20)		
31-50	2 (40)		
>50	2 (40)		
Gender			
Males	2 (40)		
Females	3 (60)		
Etiology			
Bell's palsy	5 (100)		
Ocular pathology			
Incomplete eye closure	5 (100)		
Exposure keratitis	3 (60)		
Loss of vision	1 (20)		
Treatment			
Medical steroid	5 (100)		
Miscellaneous (n=8)			
Age (in years)			
0-15	-		
15-30	5 (62.5)		
31-50	3 (37.5)		
>50	-		
Gender			
Males	2 (25)		
Females	6 (75)		
Etiology	N (%)	Ocular pathology N (%)	Management N (%)
Sphenoid mucocele	2 (25)	Diplopia 2 (100)	Endoscopic sinus surgery 2 (100)
		Ophthalmoplegia 2 (100)	
		Blurring of vision 2 (100)	
Grave's disease	6 (75)	Proptosis 6 (100)	Antithyroid drugs 6 (100)
		Diplopia 1 (17)	Orbital decompression 2 (33)
		Blurring of vision 2 (33)	Subtotal thyroidectomy 6 (100)

Table 2: Distribution of study population in infective or granulomatous etiology.

Infective or granulomatous (n=59)			
Age (in years)		N (%)	
0-15	7 (12)		
15-30	14 (24)		
31-50	27 (46)		
>50	11 (18)		
Gender			
Males	46 (78)		
Females	13 (22)		
Etiology	N (%)	Ocular pathology N (%)	Management N (%)
Nasal furunculosis	5 (9)	Preseptal cellulitis 5 (100)	IV antibiotics 5 (100)
			Incision and drainage 2 (40)
Nasal vestibulitis	10 (17)	Preseptal cellulitis 10 (100)	IV antibiotics 10 (100)
			Incision and drainage 5 (50)

Continued.

Infective or granulomatous (n=59)			
Etiology	N (%)	Ocular pathology N (%)	Management N (%)
Acute bacterial rhinosinusitis (pansinusitis)	3 (5)	Proptosis 3 (100)	IV antibiotics 3 (100) FESS 3 (100)
Acute ethmoidal sinusitis	3 (5)	Preseptal cellulitis 3 (100)	IV antibiotics 3 (100) FESS 3 (100)
Allergic fungal rhinosinusitis	6 (10)	Proptosis 6 (100)	Intranasal steroid 6 (100) FESS 6 (100)
Acute invasive fungal sinusitis	3 (5)	Proptosis 1 (33)	IV amphotericin B and oral itraconazole 3 (100) Endoscopic sinus surgery and debridement 3 (100)
		Epiphora 1 (33)	
		Diplopia 2 (66)	
		Ophthalmoplegia 2 (66)	
Fungal granuloma	4 (7)	Ptois 2 (66)	IV amphotericin B and oral itraconazole 4 (100) Endoscopic sinus surgery 4 (100)
		Preseptal cellulitis 1 (25)	
		Epiphora 1 (25)	
Wegener's granulomatosis	2 (3)	Proptosis 4 (100)	Oral steroids and oral cyclosporine 2 (100) Endoscopic sinus surgery 2 (100)
		Preseptal cellulitis 1 (50)	
		Epiphora 1 (50)	
Orogenic: Herpes zoster oticus	2 (3)	Proptosis 1 (50)	Oral steroids and antiviral drugs 2 (100)
		Incomplete eye closure 2 (100)	
Malignant otitis externa	3 (5)	Exposure keratitis 1 (50)	IV antibiotics 3 (100) Surgical debridement of necrotic tissue 3 (100) Local antibiotic drops 3 (100)
		Incomplete eye closure 3 (100)	
		Exposure keratitis 1 (33)	
		Loss of vision 1 (33)	
CSOM with mastoid and zygomatic abscess	2 (3)	Periorbital edema 2 (100)	IV antibiotics 2 (100) Surgical drainage of abscess 2 (100) Modified radical mastoidectomy 2 (100)
		Incomplete eye closure 12 (100)	
		Exposure keratitis 5 (42)	
CSOM with facial paralysis	12 (20)	Loss of vision 1 (8)	Modified radical mastoidectomy with facial nerve decompression 12 (100)
		Diplopia 1 (100)	
		Ophthalmoplegia 1 (100)	
CSOM with temporal lobe abscess	1 (2)	Ptois 1 (100)	Craniotomy and abscess drainage 1 (100) Modified radical mastoidectomy 1 (100)
		Ophthalmoplegia 1 (100)	
		Ptois 1 (100)	
CSOM with meningitis	1 (2)	Blurring of vision 1 (100)	IV antibiotics 1 (100) Modified radical mastoidectomy 1 (100)
CSOM with LST and CST and otitic hydrocephalus	1 (2)	Diplopia 1 (100)	IV antibiotics 1 (100) Modified radical mastoidectomy with sigmoid sinus drainage 1 (100)
		Ophthalmoplegia 1 (100)	
		Ptois 1 (100)	
CSOM with petrous apicitis (Gradenigo's syndrome)	1 (2)	Diplopia 1 (100)	IV antibiotics 1 (100) Modified radical mastoidectomy with petrous apex debridement 1 (100)
		Ophthalmoplegia 1 (100)	

IV: Intravenous; LST: Lateral sinus thrombophlebitis; CST: Cavernous sinus thrombosis.

Miscellaneous cases accounted to 8 cases (5%). Majority were noted in young aged group (15-30 years: 5, 62.5%). Majority were females (6, 75%). The etiology included in this group were Grave's disease (6, 75%), sphenoid mucocele (2, 25%) in descending order. The ocular

pathology included in this were proptosis (6), blurring of vision (4), diplopia (3), ophthalmoplegia (2) in descending order. Majority needed surgical intervention (8), 1 case needed orbital decompression in emergency setup to prevent blindness and 6 cases of Grave's disease needed antithyroid medication.

Table 3: Distribution of study population in traumatic etiology.

Traumatic (n=45)			
Age (in years)	N (%)		
0-15	3 (6)		
15-30	26 (59)		
31-50	13 (29)		
>50	3 (6)		
Gender			
Males	37 (82)		
Females	8 (18)		
Etiology	N (%)	Ocular pathology N (%)	Management N (%)
Le Fort # 2	4 (9)	Periorbital edema 1 (25)	IV antibiotics 4 (100)
		Periorbital ecchymosis 3 (75)	Open reduction and intermaxillary fixation via sublabial incision 4 (100)
		Epiphora 1 (25)	
		Diplopia 2 (50)	
Le Fort # 3	3 (7)	Periorbital edema 1 (33)	IV antibiotics 3 (100)
		Periorbital ecchymosis 2 (66)	Open reduction and intermaxillary fixation via bicoronal incision 3 (100)
		Epiphora 1 (33)	
		Diplopia 1 (33)	
Zygomatic #	9 (20)	Periorbital edema 2 (22)	IV antibiotics 9 (100)
		Periorbital ecchymosis 7 (77)	Open reduction and internal fixation with miniplate via gingivobuccal incision 7 (77)
		Diplopia 5 (55)	
		Enophthalmos 5 (55)	Open reduction and internal fixation with miniplate via subciliary approach 2 (22)
# Nasal bones	23 (51)	Periorbital edema 8 (35)	IV antibiotics 23 (100)
		Periorbital ecchymosis 13 (65)	Closed reduction 16 (70)
Temporal bone #	6 (13)	Incomplete eye closure 6 (100)	IV antibiotics 6 (100)
		Exposure keratitis 3 (50)	Oral steroids 6 (100) Facial nerve decompression 4 (66)

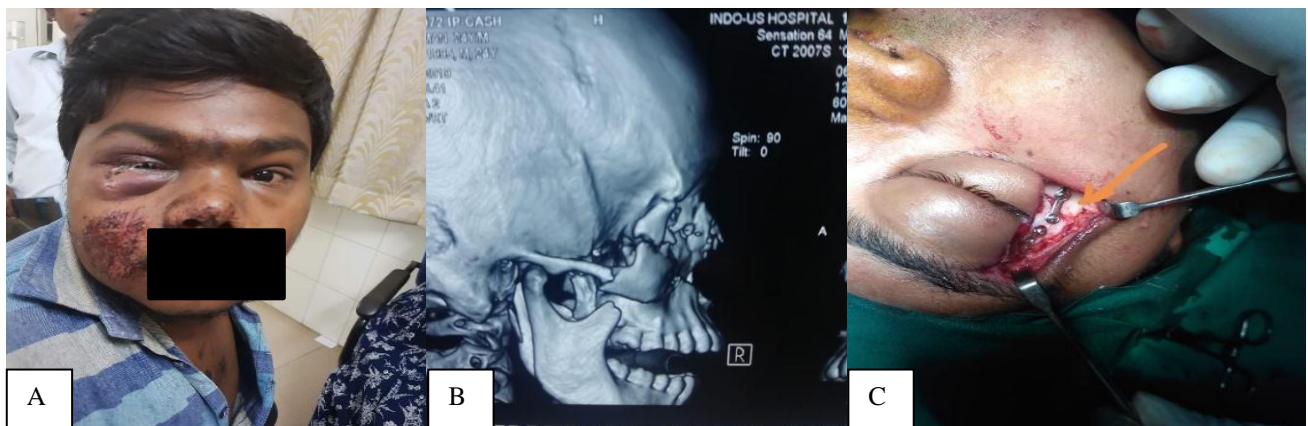


Figure 5: (A): Right periorbital ecchymosis, periorbital edema, diplopia due to right zygomatic fracture (B): 3D CT face image depicting right zygomatic fracture (C): Open reduction and internal fixation via subciliary approach.

There were about 59 cases in infective or granulomatous category accounting to 34%. The majority of cases were noted in middle aged group (31-50 years: 27, 46%). Males were most commonly affected (46, 78%). The etiology in this category included chronic suppurative otitis media (CSOM) with facial paralysis (12, 20%), nasal vestibulitis (10, 17%), allergic fungal rhinosinusitis (6, 10%), furunculosis (5, 9%), fungal granuloma (4,

7%), acute bacterial rhinosinusitis (3, 5%), acute ethmoidal sinusitis (3, 5%), acute invasive fungal sinusitis (3, 5%), malignant otitis externa (3, 5%), Wegener's granulomatosis (2, 3%), Herpes zoster oticus (2, 3%), CSOM with mastoid and zygomatic abscess (2, 3%), CSOM with temporal lobe abscess (1, 2%), CSOM with meningitis (1, 2%), CSOM with lateral sinus thrombophlebitis and cavernous sinus thrombosis and

otitic hydrocephalus (1, 2%), CSOM with petrous apicitis (Gradenigo's syndrome: 1, 2%) in descending order. Ocular pathology due to infective causes included preseptal cellulitis (20), incomplete eye closure (17), proptosis (15), exposure keratitis (7), diplopia (5), ophthalmoplegia (5), ptosis (4), epiphora (3), periorbital edema (2), loss of vision (2), blurring of vision (1) in descending order. Majority of cases required combined

medical and surgical management. 18 cases required MRM whereas 12 cases required functional endoscopic sinus surgery (FESS) in this category. 1 case required craniotomy for which the patient was referred to neurosurgeon. Death was noted in 1 case of acute invasive fungal sinusitis indirectly giving evidence of mortality of infective category.

Table 4: Distribution of study population in iatrogenic etiology.

Iatrogenic (n=10)			
Age (in years)	N (%)		
0-15	1 (10)		
15-30	4 (40)		
31-50	4 (40)		
>50	1 (10)		
Gender			
Males	9 (90)		
Females	1 (10)		
Etiology	N (%)	Ocular pathology N (%)	Management N (%)
FESS	4 (40)	Periorbital edema 3 (75)	Conservative 3 (75)
		Periorbital ecchymosis 1 (25)	Lateral canthotomy 1 (25)
		Diplopia 1 (25)	Orbital decompression 1 (25)
		Blurring of vision 1 (25)	
Lateral rhinotomy	2 (20)	Periorbital edema 2 (100) Epiphora 2 (100)	Conservative 2 (100)
Cortical mastoidectomy	2 (20)	Incomplete eye closure 2 (100)	Facial nerve decompression 2 (100)
Modified radical mastoidectomy	2 (20)	Incomplete eye closure 2 (100)	Facial nerve decompression 2 (100)

Traumatic accounted to 45 cases (26%) majority were due to RTA's giving indirect evidence of rise in accidents. The majority of cases were noted in young age group (15-30 years: 26, 59%). Majority were males (37, 82%).

Iatrogenic accounted to 10 cases (6%) stressing the importance of anatomical knowledge for limiting surgical damage. The majority of cases were noted in young (4, 40%) and middle aged group (4, 40%). Majority were males (9, 90%).

The etiology in this group included nasal bone fracture (23, 51%), zygomatic fracture (9, 20%), temporal bone fracture (6, 13%), Le fort fracture 2 (4, 9%), Le fort fracture 3 (3, 7%) in descending order. The ocular pathology in this category included periorbital ecchymosis (25), periorbital edema (12), diplopia (8), incomplete eye closure (6), enophthalmos (5), exposure keratitis (3), epiphora (2) in descending order. Zygomatic and Le fort fractures were dealt by open reduction (16) in conjunction with plastic surgeon whereas majority of nasal bone fractures (16) were dealt by closed reduction.

The etiology included in this group was FESS (4, 40%), lateral rhinotomy (2, 20%), cortical mastoidectomy (2, 20%), modified radical mastoidectomy (2, 20%) in descending order. The ocular pathology included in this group were periorbital edema (5), incomplete eye closure (4), epiphora (2), periorbital ecchymosis (1), diplopia (1), blurring of vision (1) in descending order. Mostly managed conservatively. 1 case requiring lateral canthotomy and orbital decompression to prevent loss of vision.

Table 5: Distribution of study population in neoplastic etiology.

Neoplastic (n=44)	
Age (in years)	N (%)
0-15	6 (14)
15-30	11 (25)
31-50	13 (29)
>50	14 (32)
Gender	
Males	34 (77)
Females	10 (23)

Continued.

Neoplastic (n=44)			
Etiology	N (%)	Ocular pathology N (%)	Management N (%)
Fibrous dysplasia of maxilla	3 (7)	Proptosis 3 (100) Epiphora 1 (33)	Lateral rhinotomy and paring 3 (100)
Fibrous dysplasia ethmoid complex	1 (2)	Proptosis 1 (100)	Lynch Howarth external approach and removal 1 (100)
Frontal sinus osteoma	1 (2)	Proptosis 1 (100)	Bicoronal incision and excision 1 (100)
Inverted papilloma	1 (2)	Proptosis 1 (100)	Endoscopic surgical removal 1 (100)
Sinonasal schwannoma	2 (4)	Proptosis 2 (100)	Endoscopic debulking 1 (100)
JNA	7 (18)	Proptosis 7 (100) Diplopia 1 (14) Ophthalmoplegia 1 (14) Ptosis 1 (14)	Endoscopic surgery with coblation 2 (28) Lateral rhinotomy 5 (72)
Glomus jugulare or tympanicum	3 (7)	Incomplete eye closure 3 (100)	Transmastoid extended facial recess approach 1 (33) Infratemporal approach 2 (67)
Sinonasal SCC	10 (23)	Proptosis 8 (80) Diplopia 1 (10) Ophthalmoplegia 1 (10) Epiphora 4 (40) Enophthalmos 1 (10) Blurring of vision 1 (10) Loss of vision 1 (10)	Radiotherapy 8 (80) Total maxillectomy with PORT 2 (20)
Sinonasal adenoid cystic carcinoma	2 (4)	Proptosis 1 (50) Epiphora 2 (100) Enophthalmos 1 (50)	Total maxillectomy and PORT 2 (100)
Sinonasal adenocarcinoma	2 (4)	Proptosis 2 (100)	Total maxillectomy 2 (100)
Olfactory neuroblastoma	1 (2)	Proptosis 1 (100)	Endoscopic resection and PORT 1 (100)
Embryonal rhabdomyosarcoma	1 (2)	Proptosis 1 (100)	Chemotherapy 1 (100)
NPC	5 (13)	Proptosis 4 (80) Diplopia 1 (20) Ophthalmoplegia 1 (20)	Radiotherapy 5 (100)
Adenoid cystic carcinoma of middle ear	2 (4)	Incomplete eye closure 2 (100) Exposure keratitis 1 (50) Loss of vision 1 (50)	Concomitant radiotherapy and chemotherapy 2 (100)
Mucoepidermoid carcinoma of parotid	2 (4)	Incomplete eye closure 2 (100)	Total parotidectomy 2 (100)
Adenoid cystic carcinoma of parotid	1 (2)	Incomplete eye closure 1 (100) Exposure keratitis 1 (100)	Total parotidectomy 1 (100)

PORT: Post-operative radiotherapy.

Neoplastic accounted to 44 cases (26%). The majority of cases were noted in old aged (14, 32%) and middle aged group (13, 29%).

Majority were males (34, 77%). The etiology included into this category were sinonasal SCC (10,23%), juvenile nasopharyngeal angiofibroma (7, 18%), nasopharyngeal carcinoma (5, 13%), fibrous dysplasia of maxilla (3, 7%), glomus tumours (3, 7%), sinonasal schwannoma (2, 4%), sinonasal adenocarcinoma (2,4%), sinonasal adenoid cystic carcinoma (2,4%), adenoid cystic carcinoma of middle ear (2, 4%), mucoepidermoid carcinoma parotid (2, 4%), adenoid cystic carcinoma parotid (1, 2%),

olfactory neuroblastoma (1, 2%), embryonal rhabdomyosarcoma (1, 2%), frontal sinus osteoma (1, 2%), fibrous dysplasia ethmoid (1, 2%), inverted papilloma (1, 2%) in descending order.

The ocular pathology included in this category were proptosis (32), incomplete eye closure (8), epiphora (7), diplopia (3), ophthalmoplegia (3), enophthalmos (2), exposure keratitis (2), loss of vision (2), ptosis (1), blurring of vision (1) in descending order. Majority were managed by surgical removal (27) followed by radiotherapy (20) and chemotherapy (3).

DISCUSSION

In the present study 171 patients reported to hospital with eye involvement secondary to ENT pathology.

The maximum incidence was in young and middle aged group of patients. (31-50 years of age accounting to 62 (36%). This is similar to Kumar et al according to which most common age group was 41-50 years of age.⁴

The male to female ratio was 3:1. This is in accordance to Malik et al in which male predominance was noted.⁶

The most common etiology was infective or granulomatous (59, 34%) followed by traumatic (45, 26%) and neoplastic (44, 26%). This is similar to Goodwin et al study according to which 75% of orbit involvement is secondary to infections.⁷ In Sayed et al most common orbital involvement was due to infective etiology.⁸ In the present study the highest incidence of preseptal cellulitis was noted in nasal vestibulitis. According to Jubina et al study the infection in dangerous area of face can spread to orbit and intracranial due valveless nature of facial veins.⁹ Most common of infective etiology was CSOM with facial paralysis (12, 20%), nasal vestibulitis (10,17%). Most common of traumatic etiology was of nasal bone fractures. According to Balasubramanian et al study nose being the most prominent structure on face gets easily injured.¹⁰ The most common of Iatrogenic etiology was FESS (4 of 10). According to Bhatti et al orbital complications post FESS are well known.¹¹ In neoplastic etiology, sinonasal malignancy showed highest incidence of ocular involvement similar to Conley et al study.¹² In the present study 6 cases of Grave's disease presented with proptosis. According to Leonard et al the one of the cardinal features of dysthyroid eye disease is proptosis.¹³

The most common ocular involvement was proptosis (53) and the most common etiology was neoplastic (32 neoplastic cases caused proptosis) of which sinonasal SCC (8) followed by JNA (7) were the most common neoplastic cause for proptosis. This is in accordance to Sinha et al who concluded that proptosis is the commonest clinical presentation in neoplastic lesions of nose and paranasal sinuses.¹⁴

CONCLUSION

Thorough history taking, clinical examination, endoscopic examination, radiological investigations, anatomical knowledge and collaboration of otorhinolaryngologist, plastic surgeon, pathologist, radiologist, neurophysician, neurosurgeon, ophthalmologist for early recognition and management can pave the path to prevention of mortality and morbidity associated with ocular involvement secondary to ENT disorders.

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Conflict of interest: None declared

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

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