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Otorhinolaryngological spectrum of diseases leading to Ophthalmological presentation in eye out patient department: An overview

Vibham Gulati¹, Divyanshi Singh^{2,*}, Sakshi Jain³, Sumit Singh Chauhan⁴¹Dept. of Ophthalmology, Regional Hospital, Una, Himachal Pradesh, India²Dept. of Otorhinolaryngology- Head and Neck Surgery, Dr Radhakrishnan Government Medical College, Hamirpur, Himachal Pradesh, India³Dept. of Ophthalmology, Indira Gandhi Medical College, Shimla, Himachal Pradesh, India⁴Regional Hospital, Bilaspur, Himachal Pradesh, India

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ABSTRACT

Introduction: Orbital complications are not so uncommon in ENT diseases. Being an adjacent structure, orbit is commonly involved which can be further complicated by vision loss and intracranial spread of infection and sometimes mortality. In this scenario proper imaging and newer generation antibiotics can be a game changer.

Aim & Objective: The study aims to demonstrate Ophthalmological manifestations in relation to otorhinolaryngological diseases.

Materials and Methods: This was a retrospective observational study conducted in Eye outpatient department of Regional Hospital, Himachal Pradesh for the period of 1 year from July 2022 to June 2023. In a retrospective investigation, 28 cases of ophthalmological symptoms with root cause of various ENT disorders, mostly paranasal tumour expansions, nasopharyngeal tumour, and nasal furunculosis, were examined in connection to their age, gender, clinical, radiological, and histopathological profile. The most dependable investigating tool was considered as CT scan. Accordingly medical and surgical treatment were adopted owing to location and disease nature. A good cooperation and follow up is needed between ophthalmologist and otolaryngologist to overcome this challenge.

Result: A total of 28 patients who met the eligibility criteria were enrolled in the study. Average age of presentation was 36.2 years with 17 males and 11 females. Proptosis was the most common orbital manifestation found in 32.4% cases (n=9). Lagophthalmos was found in 25% cases (n=7) and preseptal cellulitis was found in 14.28% cases (n=4). Orbital cellulitis and cavernous sinus thrombosis was found in 7.14% cases (n=2). Orbital apex syndrome was found in 3.57% cases (n=1).

Conclusion: To save the patient from Ophthalmological morbidity and maybe mortality, a high index of suspicion of early orbital involvement by thorough ENT examination is required. A team effort consisting of ophthalmologist and otorhinolaryngologist, acting jointly is needed in order to identify the underlying disease process and provide the appropriate care.

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1. Introduction

Orbit involvement and ocular manifestations are fairly common in the practice of Otorhinolaryngology as it is an adjacent structure to Ear, Nose and Throat (ENT) region. The "Dangerous Area" of the face can become infected

* Corresponding author.

E-mail address: divyanshi7singh@gmail.com (D. Singh).

due to the pathology of the nose, paranasal sinuses (PNS) and nasopharynx can directly extend into the orbit and thus involving it and the nerves feeding the orbit, and adnexa can also get involved, or there can be a deposition of fat in the retroorbital region, as in goiter leading to exophthalmos.¹ The occurrence of orbital complications from inflammatory sinonasal disorders has reduced recently as a result of the development of efficacious wide range antibiotics, although infection of the nasal vestibule leading to preseptal orbital cellulitis is still a very common issue. Orbital cellulitis, if left untreated because of optic nerve compression may cause blindness and thus is an emergency condition. It is to be noted that this condition should be diagnosed early and managed aggressively. High morbidity and possible mortality associated with spread of infection leading to meningitis or cerebral abscess are caused by cavernous sinus thrombosis and orbital abscess.^{2,3} Hodges et al. observed a high risk of complications in such patients when studying the outcome of orbital cellulitis in a developing nation. They discovered a significant rate of complications, with 52% of patients blind on admission, little improvement after treatment, and a mortality rate of 4% due to cavernous sinus thrombosis.⁴ These findings showed a delay in therapy in this population. Sinonasal and nasopharyngeal tumours that cause orbital involvement are likewise becoming more common.

In this regard, only a few anatomical implications are notable. For starters, the ethmoidal sinus is so close to the orbit that it is only separated by a paper-thin lamina papyracea, which is a poor barrier to the transfer of sinus infections to the orbit. Secondly, cavernous sinus is drained either directly or indirectly through valveless communications via veins from nose and PNS, orbit and adjoining facial regions. The distinction between preseptal and orbital cellulitis is that preseptal cellulitis affects just the soft tissues anterior to the orbital septum. The bony orbit's fissures and foramina are also natural channels for pathology to spread to the orbit from the nose, PNS, and nasopharynx. As a result, comprehending the symptoms and transmission of diseases, as well as planning management, the anatomical link of the nose and PNS to the orbit is critical.⁵

2. Materials and Methods

A hospital-based retrospective research was conducted in the Regional Hospital, Una's Eye Outpatient Department (OPD), Himachal Pradesh, India from July 2022 to June 2023. Patients who had some sort of clinical ophthalmological presentation had their ENT health assessed, and their opinion was sought for the study. 28 individuals in all were studied over the time period, with 17 of them being men and 11 of them being women (the male to female ratio was 1.54:1). The average presentation age was 36.2 years old. Otorhinolaryngologists made the

diagnoses for all ENT diseases. A proforma was filled out after a comprehensive clinical history and ENT and head-neck area exams. All cases underwent a diagnostic nasal endoscopy with appropriate local anesthesia and vasoconstriction. In every case, it was ensured that the necessary tests were performed, including X-rays of the nose and PNS, high resolution ultrasound with Doppler analysis, computed tomography (CT) scans, magnetic resonance imaging (MRI) with or without angiography, fine needle aspiration cytology, biopsy, and histopathological examination (HPE) of the suspected mass, as needed. Pure tone audiometry was performed in suspected Bell's palsy and risky chronic otitis media (COM) patients, either with or without impedance audiometry (including reflexometry). In Bell's palsy instances, Schirmer's test was conducted. To determine the prevalence of various ENT illnesses and their varied visual symptoms, data were tabulated. (Table 1) According to the standard CHANDLER'S classification(1970), there are several types of orbital complications of sinusitis, including preseptal cellulitis, orbital cellulitis without abscess, orbital cellulitis with abscess, subperiosteal abscess, orbital cellulitis with intraperiosteal abscess, and cavernous sinus thrombosis.

Table 1: Varied ocular symptoms brought on by ENT and head-neck pathologies

Clinical presentation	Number (n)	Percentage (%)
Periorbital swelling due to nasal myiasis	1	3.57
Orbital cellulitis (furunculosis/rhinosinusitis)	2	7.14
Ptosis associated with neurogenic dysphagia and cranial neuropathy	1	3.57
Orbital apex syndrome	1	3.57
Diplopia due to Cavernous sinus thrombosis (from furuncle)	2	7.14
Lagophthalmos (inadequate eye closure)	7	25
Preseptal cellulitis (furunculosis/facial cellulitis)	4	14.28
Proptosis (orbital extension of sinonasal masses)	9	32.14
Orbital fungation due to PNS malignancy (ethmoid sinus)	1	3.57
Total	28	99.98

2.1. Exclusion criteria

The study excluded cases of maxillofacial trauma with subsequent ocular involvement and epiphora cases hospitalized for endoscopic dacryocystorhinostomy surgery for persistent dacryocystitis. Both ophthalmologic complications of FESS as well as postoperative facial

nerve palsy (temporary facial paresis resulting from local anesthesia infiltration or developing after mastoid, parotid, or stapes operations) causing insufficient eye closure (lagophthalmos) were excluded from our study. As they were often treated on an OPD basis, allergic rhinitis patients that presented with red eyes and lacrimation were also excluded.

Only after ruling out alternative causes were Bell's palsy instances identified, and only then were steroids and an antiviral drug (such as acyclovir) given. We occasionally sought the advice of the neurology department.

An ENT expert assessed the patients and performed surgery on those who had facial palsy owing to cholesteatoma.

Most instances of orbital cellulitis were treated conservatively with antibiotics. Surgical intervention was used to treat PNS and nasal neoplasms. Analysis has been done on the patients' age, sex, clinical presentation, diagnosis, grading of facial nerve paralysis using the traditional House-Brackman (HB) staging approach, and treatment.

3. Results and Observations

The most frequent clinical symptom among the 28 patients in our sample was proptosis ($n = 9$), which was most frequently brought on by orbital extension of maxillary sinus squamous cell carcinoma. Other cases included adenoid cystic carcinoma that extended into the orbit, sinonasal hemangioma, mucocele (frontal and ethmoidal), nasopharyngeal cancer, and fibrous dysplasia of the ethmoid affecting the orbit.

Surgery was employed to treat proptosis brought on by sinonasal neoplasms, and the surgical strategy was determined by the mass's position and extent and done by an ENT surgeon. According to exploration, the mass simply had a pushing impact on the orbit rather than invading it, and in the immediate aftermath of surgery, eye edema decreased.

Another frequent clinical manifestation was preseptal orbital cellulitis ($n = 4$), of which 1 case was caused by face cellulitis and 3 instances were caused by furunculosis of the nasal vestibule.

One of the two instances ($n = 2$) of orbital cellulitis was a complication of frontoethmoidal rhinosinusitis, while the other was brought on by nasopharyngeal furunculosis. Another significant clinical symptom of facial nerve paralysis was inadequate eye closure, which was found in 7 cases, of which 1 case was unsafe COM, 2 cases were Bell's palsies, 1 case was mucoepidermoid carcinoma of the parotid gland involving the facial nerve and acute otitis media, and 1 case each was glomus jugulotympanicum and parapharyngeal mass with facial palsy.

A case of unsafe COM who was a male with lagophthalmos had HB grade IV facial paralysis. Due to a weak Bell's phenomenon, preliminary tarsorrhaphy was

performed to prevent corneal ulceration. He underwent a radical mastoidectomy, and during the procedure, a cholesteatoma mass and facial canal erosion were discovered.

Another patient with a parotid tumor who was a male with lagophthalmos was diagnosed as high grade cancer on HPE and another patient with tumor that was fungating through the preauricular skin was found in one instance. Both patients had HB grade IV facial palsy. Out of concern about corneal injury, preliminary tarsorrhaphy was performed. In every case, facial nerve was discovered after surgery to be completely entangled by the tumor and was unable to be adequately detached. In a 2-month follow-up, the grafting's postoperative outcomes were good, and facial paralysis was improved but not totally recovered.

One kid had an acute otitis media with a two-month history of ear drainage and poor eye closure owing to facial palsy (grade III HB), which completely resolved with antibiotics, nasal decongestants, and antihistamines. Ptosis was seen in one instance of neurogenic dysphagia with cranial neuropathy. An orbital mass was found in one case of ethmoid sinus cancer.

Cavernous sinus thrombosis was discovered in two patients which was caused as result of nasal furunculosis. Another instance of ocular apex syndrome caused by cavernous venous thrombosis was discovered, where there were no inflammatory signs. Atrophic rhinitis with nasal myiasis was one instance where reactive periorbital edema was seen.

4. Discussion

In illnesses of the nose and PNS, ophthalmological symptoms are not rare. The primary explanation is because sinus walls make up at least two thirds of the osseous orbital wall.^{6,7} Various valveless venous connections in the orbital wall may be somewhat to blame for it. Between July 2022 and June 2023 a total of 28 patients presented with ophthalmological signs brought on by different ENT disorders. Before making a clinical diagnosis, investigation proforma contained findings relating to the clinical profile and lab tests. Planning and implementing both conservative and surgical treatments were done. Due to the study's tiny patient population, no attempt was made to draw statistically meaningful findings.

The majority of the orbit is affected by squamous cell carcinoma of the maxillary sinus, according to several research on orbital involvement in sinonasal disorders.^{6,8,9} In our study, the most frequent causes of proptosis were determined to be PNS and malignant tumors of the nose. Similar findings were made by Sinha et al.,⁷ who came to the conclusion that proptosis is the most frequent clinical manifestation of neoplastic lesions of the nose and PNS. The majority of similar research have shown results that are similar to ours. 60% of the 465 instances of orbital

tumors in Henderson's collection that originated from the PNS were antral carcinomas.¹⁰ The reported incidence of maxillary sinus cancer and nasopharyngeal angiofibroma involving the orbit in a study by Sabharwal et al. was 6 and 4%, respectively, while we found the incidence to be 7.14 and 3.57%.⁸ This could be because we included all patients with ocular symptoms of ENT and head-neck illnesses in our analysis, whereas they only looked at instances with proptosis.

After Grave's orbitopathy and pseudotumors of the orbit, secondary PNS tumors are the third most frequent cause of proptosis in adults, according to a research by Sayed.⁶ Johnson et al. examined a collection of paranasal sinus tumors and discovered that orbital involvement was the first presentation in 70% of cases, with clinical, radiological, or surgical evidence of involvement in 59.49% of the cases.⁹ This is somewhat different from our work, as in our study proptosis was the ocular presenting symptom and orbit was already involved in all instances.

Out of 28 patients, we discovered two cases of mucocoele (7.14%), one of which was an ethmoidal mucocoele and the other a frontal sinus mucocoele. Proptosis was the primary presenting characteristic of both PNS mucocoeles in our investigation, which was consistent with Sayed's findings that proptosis was present in 98% of patients with frontoethmoidal mucocoeles.⁶ As the swelling was in the superolateral quadrant of the orbit, the ethmoidal mucocoele was removed under nasal endoscopic guidance, and the frontal cyst was removed by an external incision. According to Zeyad et al.¹¹, orbital cellulitis after furunculosis of the nose is a rare occurrence, and early diagnosis and prompt treatment of furunculosis of the nose may reduce the incidence of orbital cellulitis. However, our study was different from theirs in that both cases of orbital cellulitis were brought on by furunculosis of the nose. According to authors of several studies, orbital involvement accounts for 30% of suspected preseptal cellulitis and can only be found by a CT scan.⁶ However, we relied on clinical presentation in all patients of preseptal cellulitis, and CT was recommended when vision started to deteriorate or the illness continued to worsen after therapy. According to a research by Sayed (1995), paranasal sinusitis causes 60% to 80% of ocular infections.⁶ Another research on orbital difficulties brought on by sinusitis by Elango S. and K. Reddy TN (1990) indicated that the incidence of these complications ranged from 0.5% to 3.9% and that the ethmoid sinus was more frequently impacted than the maxillary sinus.¹² All instances of preseptal or frank orbital cellulitis were treated cautiously. It's possible that thorough examination, including a CT scan, aided in the early detection of our patients, and that using broad-spectrum antibiotics significantly reduced the occurrence of orbital problems.

During the course of our research, we came across two cases of cavernous sinus thrombosis that were either caused

by furunculosis of dangerous area of face or furunculosis of the nose. A superior ophthalmic venous thrombosis was present. Diminished vision, chemosis, proptosis, redness, enlargement of the eyeball, diplopia, and ophthalmoplegia were the orbital symptoms. One patient in our research had a unilateral cavernous sinus thrombosis, and a CT scan helped to identify bilateral cavernous sinus involvement. This patient also had a unilateral lower motor neuron type of facial palsy (grade IV HB). 7th nerve palsy in cavernous sinus thrombosis has not been documented in the literature, according to Ramanand et al.¹³ Facial nerve palsy in cavernous sinus thrombosis is extremely uncommon, and nothing is known about its etiology, claim Straub et al.¹⁴ Numerous studies have claimed that sphenoid or ethmoid illness is the cause of cavernous sinus thrombosis,¹⁵ whereas in our investigation, skin infection was the primary culprit.

5. Conclusion

Although orbital consequences from inflammatory sinonasal disorders have diminished to a greater extent as a result of improved diagnostic methods and the introduction of newer generations of antibiotics, early detection is still essential to preserve the patient's vision. High index of suspicion of early orbital involvement by thorough ENT examination, particularly examination of middle meatus of nose, using preferably nasoendoscope, and a team effort consisting of an ophthalmologist and an otorhinolaryngologist to identify the underlying disease process and provide the appropriate care to reduce morbidity and mortality that are related to it are key components to early diagnosis.

6. Ethical Review

Institutional ethics committee exempted the study as it was an observational study, written informed consent was obtained and the identity of the patient was not disclosed.

7. Source of Funding

None.

8. Conflict of Interest

None.

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Author biography

Vibham Gulati, Medical Officer Specialist  <https://orcid.org/0009-0005-3480-2962>

Divyanshi Singh, Medical Officer Specialist  <https://orcid.org/0000-0002-7762-0510>

Sakshi Jain, Assistant Professor

Sumit Singh Chauhan, Medical Officer Specialist

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