

**OTORHINOLARYNGOLOGICAL DISEASES MASQUERADING AS ORBITAL TUMOURS**Sharmistha Behera<sup>1</sup>, Bidisha Mahapatra<sup>2</sup>, Sasmita Sahu<sup>3</sup>, Sonali Sahoo<sup>4</sup><sup>1</sup>Associate Professor, Department of Ophthalmology, VSS Institute of Medical Sciences and Research, Burla.<sup>2</sup>Postgraduate Resident, Department of Ophthalmology, VSS Institute of Medical Sciences and Research, Burla.<sup>3</sup>Assistant Professor, Department of Ophthalmology, VSS Institute of Medical Sciences and Research, Burla.<sup>4</sup>Postgraduate Resident, Department of Ophthalmology, VSS Institute of Medical Sciences and Research, Burla.**ABSTRACT****BACKGROUND**

The close proximity of the orbit and the paranasal sinuses, both of which share more than two-thirds of common walls makes the orbit too susceptible to infections spreading from the paranasal sinuses. In any case of proptosis indicating an orbital tumour, extension from a PNS lesion should be ruled out.

**MATERIALS AND METHODS**

The study was a retrospective descriptive study. Data taken from the patient's medical record during the period of July 2014-June 2017. A total of 32 cases of proptosis were studied all of which were secondary to paranasal sinus pathology. These cases were subject to routine clinical examination and investigations including CT and MRI scan. Histopathological diagnosis was obtained by biopsy in appropriate cases.

**RESULTS**

Out of 32 patients, males were 68.75% (n=22) and females were 31.25% (n=10). The largest age group are in the age range 41-50 years (31.25%, n=10) and in age group 0-10 years (31.25%). Out of the whole, 13 (40.6%) of them were due to sinusitis, 6 (18.75%) due to sinonasal malignancy, all of which were histopathologically confirmed to be squamous cell carcinoma of maxillary sinus, 6 (18.75%) cases were of mucocoeles from frontoethmoidal origin, 4 (12.50%) cases were of fibrous dysplasia of maxillary sinus, 2 (6.25%) case was of schwannoma of frontal sinus origin and 1 (3.12%) case of Langerhans cell histiocytosis of maxillary sinus. In our study, proptosis was commonest presenting complaint in all 32 patients followed by nasal obstruction (62.5%), reduced vision (25%), facial asymmetry (25%), redness of eye (18.75%) and double vision (12.50%). Out of all investigative modalities, biopsy was found to be the most accurate followed by CT scan brain, PNS and orbit.

**CONCLUSION**

Due to close proximity, nasal and PNS diseases through bone erosion or preformed pathways can invade the orbit and cause proptosis. Longstanding optic nerve compression by orbital encroachment of PNS lesion can lead to blindness due to optic atrophy. Therefore, early diagnosis and treatment is essential to prevent grave consequences as blindness.

**KEYWORDS**

Proptosis, Orbital Involvement, PNS Diseases.

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**BACKGROUND**

Orbital tumours can be benign or malignant and arise primarily within the orbit or secondarily from an adjacent source, such as the eyelid, paranasal sinus or intracranial compartment. Orbital tumours can also be metastatic from distant sites.<sup>1</sup> The orbit is an anatomically complex structure containing the globe, extraocular muscles, fat and vascular nerve, glandular and connective tissues. Orbit is related to paranasal sinuses in two ways- 1) Anatomically, by its

location and by; 2) Venous drainage (they both share the same venous drainage). The paranasal sinuses surround the orbit from 11 o'clock position superiorly to 6 o'clock position inferiorly.<sup>2</sup>

Since the orbit is a relatively small anatomical area (30 mL approx.) with little wasted space, space-occupying lesions that increase orbital volume may result in proptosis of the globe and may adversely affect visual and extraocular muscle function. Orbital position adjacent to the nose and paranasal sinuses makes it susceptible to the disease from the area. About 60% to 80% of the osseous eye socket is made up by sinus walls.<sup>3</sup> Orbital wall was related to the superior with frontal sinus floor to the medial with lateral wall of the ethmoid sinus to the inferior with the roof of the maxillary sinus and to the posteromedial with anterolateral wall of the sphenoid sinus. In addition, the frontal sinus floor and the lateral wall of the ethmoid sinus walls were thin, so that it has a weak resistance against a mass or an inflammatory process.<sup>4,5</sup> Management of the disease in the

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*Corresponding Author:*

*Dr. Bidisha Mahapatra,  
Room No. 28, Ladies Hostel 2,*

*VSSIMSAR, P.O. Burla,  
Burla, Sambalpur District, Odisha.*

*E-mail: mahapatrabidisha589@gmail.com*

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orbit that occur secondary to lesions in the paranasal sinuses, thus also requires the role of otorhinolaryngologist other than ophthalmologist.<sup>5-7</sup> The assessment of proptosis in otorhinolaryngology is of paramount importance because it could be an early and sometimes the only manifestation of nasal or paranasal sinus pathology.<sup>8</sup> It can indicate the site of lesion by direction of proptosis and an early prompt correction of the offender prevent further damage to orbital content. Neoplastic diseases of nose and paranasal sinuses followed by inflammatory disease are the common cause of proptosis secondary to nose and paranasal sinus pathology.<sup>9</sup>

**MATERIALS AND METHODS**

The method used in this study was a retrospective descriptive study. Data taken from the patient's medical record during the period of July 2014 to June 2017 and grouped according to age, gender, paranasal sinus disease, sinus involved, orbital involvement and clinical symptoms. A total of 32 cases of proptosis were studied. All these cases were proptosis secondary to paranasal sinus pathology. These cases were subject to routine clinical examination and investigations including CT and MRI scan in order to reach the diagnosis. B-scan was done in 5 children to rule out tumours such as retinoblastoma. Histopathological diagnosis was obtained by biopsy in appropriate cases.

**RESULTS**

In our study, we included 32 patients, out of which, males were 68.75% (n=22) and females were 31.25% (n=10). The largest age group are in the age range 41-50 years (31.25%, n=10) and in age group 0-10 years (31.25%). Out of 32 patients with paranasal sinus disease, 13 (40.6%) of them were due to sinusitis, mostly of maxillary sinus origin (10 cases), 6 (18.75%) cases were of sinonasal malignancy, all of which were histopathologically confirmed to be squamous cell carcinoma of maxillary sinus, 6 (18.75%) cases were of mucoceles from frontoethmoidal origin, 4 (12.50%) cases were of fibrous dysplasia of maxillary sinus, 2 (6.25%) case was of schwannoma of frontal sinus origin and 1 (3.12%) case of Langerhans cell histiocytosis of maxillary sinus. In our study, proptosis being the most common presenting complaint in all 32 patients was followed by nasal obstruction (62.5%), reduced vision (25%), facial asymmetry (25%), redness of eye (18.75%) and double vision (12.50%). The positivity rates of various investigation modalities were assessed and biopsy was found to be the one with highest accuracy followed by CT scan PNS and orbit.

Presenting Complaints	Cases	Percentage
Proptosis	32	100
Nasal obstruction	20	62.5
Reduced vision	8	25
Facial asymmetry	8	25
Redness of eye	6	18.75
Double vision	4	12.5

**Table 1. Incidence of Presenting Complaints**

Clinical Exam Findings	Cases	Percentage
Proptosis	32	100
Restricted eye movements	10	31.25
Facial asymmetry	7	21.87
Reduced vision	7	21.87
Ptosis	2	6.25
Eye congestion	2	6.25

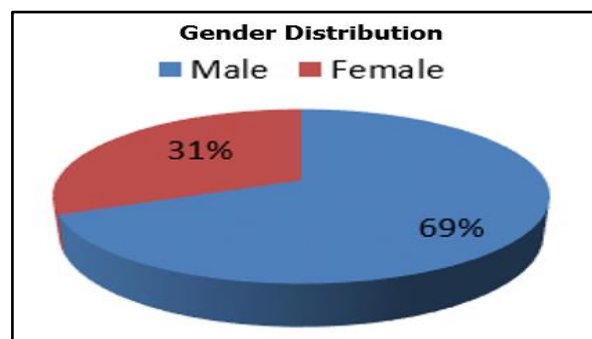
**Table 2. Clinical Exam Findings**

Investigation	Cases	Positive	Percentage
Biopsy	13	13	100
MRI	5	4	80
CT scan brain, orbit and PNS	25	22	88
X-ray PNS	32	26	81.25
X-ray skull and orbit	32	5	15.62

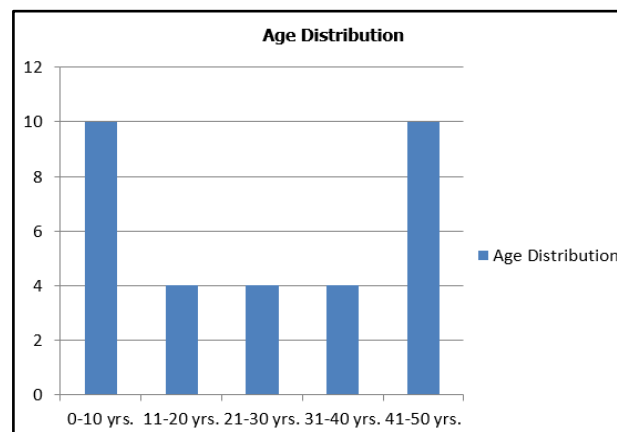
**Table 3. Details of Investigations**

Diagnosis	Cases	Percentage
Sinusitis	13	40.62
Malignant PNS lesions	6	18.75
Mucoceles	6	18.75
Fibrous dysplasia	4	12.50
Schwannoma	2	6.25
Langerhans cell histiocytosis	1	3.12

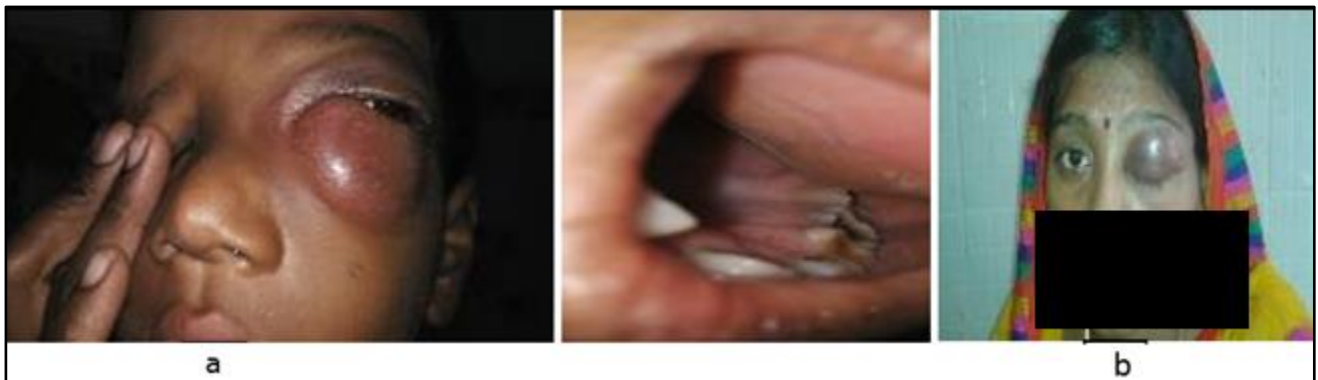
**Table 4. Diagnosis in Patients**



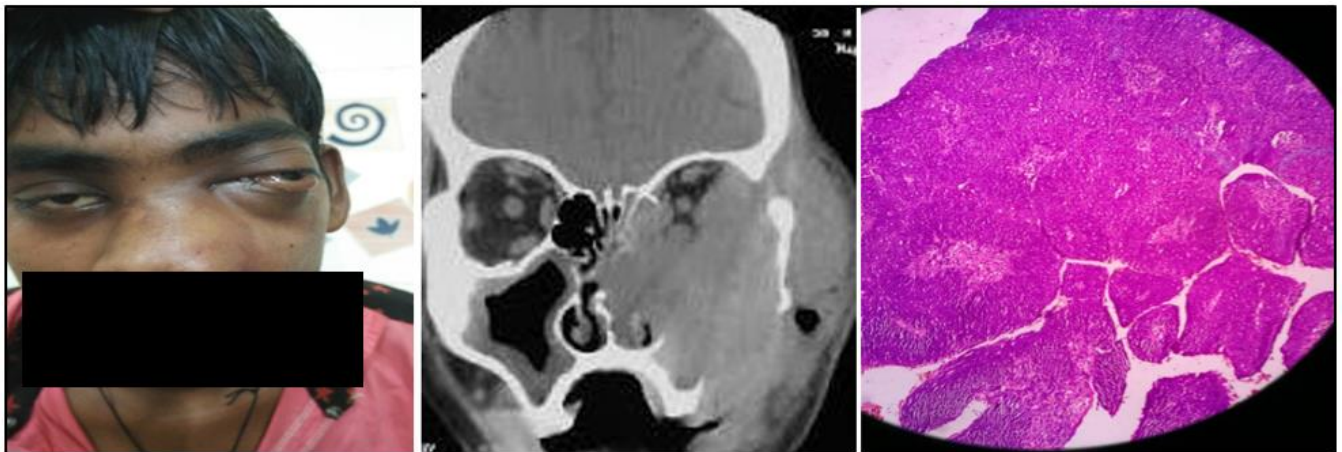
**Figure 1. Gender Distribution**



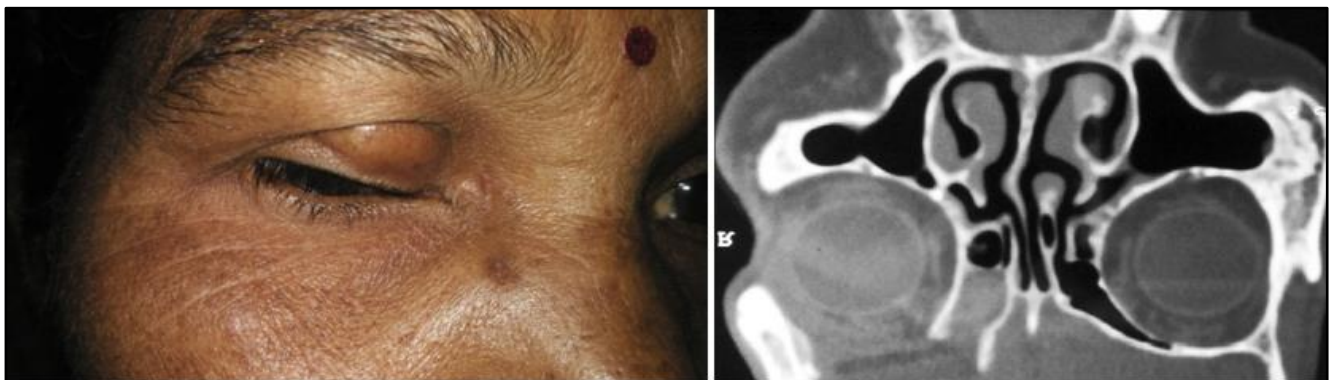
**Figure 2. Age Distribution**



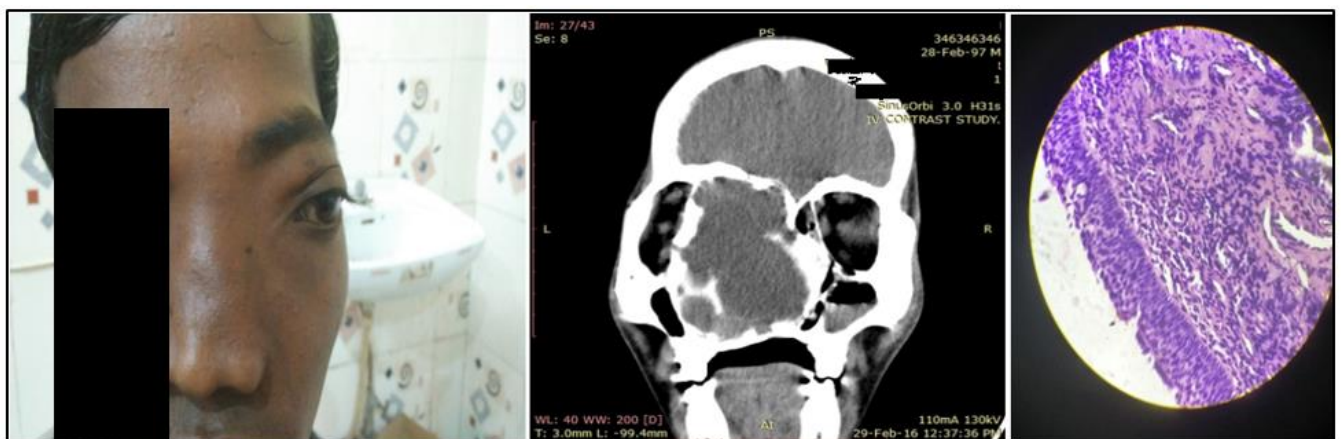
**Figure 3. Cases of Complicated Sinusitis Presenting with Proptosis.**  
 a) Case of Complicated Odontogenic Maxillary Sinusitis. b) Case of Orbital Cellulitis.



**Figure 4. Case of Left-Sided Maxillary Sinus Carcinoma (Squamous Cell Variety)**



**Figure 5. Right-Sided Frontoethmoidal Sinus Mucocele Presenting with Proptosis and Ptosis**



**Figure 6. Left-Sided Maxillary Sinus Wall Fibrous Dysplasia with Left Eye Proptosis**



**Figure 7. Right Eye Proptosis Due to Schwannoma of Right Frontal Sinus Origin**

## DISCUSSION

During the period of July 2014 to July 2017, there were 32 patients with proptosis arising from paranasal sinuses. Patients age range are wide enough that from the age of 6 years up to the age of 50 years. In general, the largest age group are in the age range 41-50 years (31.2%, n=10) and in age group 0-10 years (31.2%). In the study by Sajid et al, age range of the patients obtained also broad enough that from the age of 1-75 years with the largest age group is 31-40 years (26.67%).<sup>6</sup> In another study by Venugopal M et al,<sup>10</sup> maximum cases were in the age group of 41-50 years (20.5%). If we observed tendency of age according to each disease, sinusitis are most common in the younger age group 0-20 years, sinonasal tumours in the age group 41-50 years and mucocele group age 0-10 years. Literatures mention that sinusitis is more prevalent in younger patients, while malignancy of the paranasal sinuses tend to occur in patients with old age.<sup>6</sup>

In this study, male patients found more common than women by a ratio of 2.2:1. Another study by Yousry and Malik et al also found the number of male patients were more common than women by a ratio of respectively 3.5:1 and 2:1. Another study by Rahman A et al<sup>3</sup> reported male and female ratio of 1.6:1, while Venugopal M et al<sup>10</sup> had ratio of 1.9:1, but Sajid et al get the opposite result with the ratio of men compared to women is 1:4.<sup>5-7</sup>

From the 32 patients with paranasal sinus disease, 13 (40.6%) of them were due to sinusitis, mostly of maxillary sinus origin (10 cases), 6 (18.75%) cases were of sinonasal malignancy, all of which were histopathologically confirmed to be squamous cell carcinoma of maxillary sinus, 6 (18.75%) cases were of mucoceles from frontoethmoidal origin, 4 (12.50%) cases were of fibrous dysplasia of maxillary sinus, 2 (6.25%) case was of schwannoma of frontal sinus origin and 1 (3.12%) case of Langerhans cell histiocytosis of maxillary sinus.

This is consistent with previous studies where sinusitis is the most common paranasal sinus disease with complications to the orbit with a frequency of 60% to 75% of the total patients.<sup>5-7</sup> According to Williamsons Noble,<sup>8</sup> proptosis is commonly secondary to inflammatory disease in nose and paranasal sinuses. Among the malignant neoplasms, the most common types were squamous cell carcinoma. This can be compared with the study conducted by Conley and Baker,<sup>11</sup> which regarded squamous cell

carcinoma as the most common malignancy causing proptosis.

Sinonasal tumours constitute 1% of all malignant tumours and 3% of the otolaryngology tumour. The common sinus lesions to invade the orbit in this country are malignant neoplasms (Mohan, Sen and Gupta).<sup>12</sup> Literature mentions that squamous cell carcinoma is the most common malignant sinonasal tumours (80%) and generally comes from the maxillary sinus. These tumours are generally found in middle or advanced age. Sajid et al in his research also found squamous cell carcinoma as the most sinonasal tumours with a frequency of 75% of the entire tumour.<sup>5-7</sup> Venugopal M et al<sup>10</sup> also reported sinonasal malignancy constituting 27.3% of their cases with 58.4% cases being squamous cell carcinoma. Rahman A et al<sup>3</sup> also reported squamous cell carcinoma to be most common histopathological type of sinonasal malignancy with orbital involvement (44.4%).

Mucocele of paranasal sinuses with 4.5-5% expanding into the orbit is also a cause for proptosis. In this study, there were 6 patients (18.75%) with mucocele, 4 patients were with frontal sinus and 2 patients with ethmoid sinus involvement. Malik et al just get the case of mucocele in 1 patient (1.85%) involving the ethmoid sinuses, while Yousry get 2 patients (7%) with mucocele of the frontal and ethmoid sinuses.<sup>5-7</sup>

Benign tumours of the nose and paranasal sinuses like juvenile nasopharyngeal angiofibroma<sup>13</sup> and inverted papilloma also caused proptosis. In study by Venugopal M et al,<sup>10</sup> the most common benign tumours presenting as proptosis were juvenile nasopharyngeal angiofibromas compared with study by Sinha et al<sup>9</sup> followed by inverted papilloma. But, in our study, we could not find any such type of benign PNS tumour leading to proptosis.

Proptosis was the presenting symptom in patients with frontoethmoid mucocele. Bacterial sinusitis secondary to odontogenic infections leading to orbital cellulitis and proptosis was seen in children in our study. The incidence of proptosis due to bacterial sinusitis is high in children in literature, but our study had 8 cases in young adults and 3 cases in children. Moore et al<sup>14</sup> had reported 16 cases of fibrous dysplasia with proptosis. In our series, there was 4 cases of fibrous dysplasia presenting with proptosis.

In our study, proptosis being the most common presenting complaint in all 32 patients was followed by nasal obstruction (62.5%), reduced vision (25%), facial

asymmetry (25%), redness of eye (18.75%) and double vision (12.50%).

In study by Venugopal M et al apart from proptosis, the most common symptoms were nasal obstruction (65.9%) followed by watering from eyes (59.1%). A study by Frazell et al<sup>15</sup> of 416 cases of malignancies of nose and paranasal sinuses showed nasal obstruction (35%), facial swelling (25%) and epistaxis (12.5%) as the presenting complaints. Sajid et al also found proptosis (66.66%) as the largest clinical manifestations followed by a decrease in visual acuity (25.9%) and ophthalmoplegia (11.11%). Sinha V et al reported that besides the obvious complaints of proptosis, common complaints included nasal obstruction in 21 (42%) cases, reduced vision in 14 (28%) cases and facial swelling and double vision in 6 (12%) and 1 (2%), respectively.<sup>9</sup>

The rates of positivity of different investigative modalities employed in the diagnosis of our patients were as shown in (Table 3). Whereas, the routine x-rays of skull and PNS didn't give much accurate results, biopsy of suspicious tissue was taken in 13 cases, all of which gave a positive diagnosis about the nature of lesion. CT scan of PNS and brain was the next most conclusive investigation with about 88% positivity. Sinha V et al in their study reported similar results with biopsy being most accurate diagnosis (100%) followed by CT scan of PNS and brain (80%). Since biopsy cannot suggest in all cases as primary diagnostic modality, therefore, CT scan evaluation is the best diagnostic modality to assess the disease process as also shown by Mahsud and Bano.<sup>16</sup>

## CONCLUSION

The protrusion of the eyeball can be regarded as a protective mechanism against a raised intraorbital pressure. Proptosis in nasal and PNS disease indicates the encroachment of lesion into orbit through bone erosion or preformed pathways. Early identification of disease origin can combat further complications like optic atrophy from longstanding optic nerve compression by orbital encroachment of PNS lesion. Best diagnostic method tailored according to the lesion can help in early detection and management.

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