Original Article

DOI: 10.21276/APALM2277

Histo-morphological Spectrum of Paranasal Sinus Tumours - A Three Year Study

Vijay Sathish Kumar. I and Rohini Priya. S*

Dept of Pathology, Stanley Medical College, Chennai, India

ABSTRACT

Background: Maxillary, Ethmoid, Sphenoid and Frontal sinuses constitute the paranasal sinuses. Paranasal sinus tumours are highly diverse and uncommon tumours of all head and neck neoplasms. Large clinical studies, limited to paranasal sinus (PNS) tumours, are lacking. Despite their infrequency, they represent both a diagnostic and therapeutic challenge. Histopathological examination plays a major role in diagnosis of PNS tumours. This is a retrospective study to review the PNS tumours which were reported in an urban tertiary care hospital in South India and to highlight on some of the rare tumours occurring in this site.

Materials and Methods: Histopathological sections from 67 cases of paranasal sinus tumours were studied retrospectively for a period of 3 years from April 2015 to March 2018. The spectrum of paranasal sinus tumours were analyzed in relation with age, sex and site of common occurrence.

Results: The age ranged from 15 to 85 years and male:female ratio was 2:1. Most of the tumours are malignant, with benign-malignant ratio of about 1:4. Squamous cell carcinoma and its variants were predominant among malignant tumours, constituting 66% of total malignancy. Among the benign tumours, inverted papillomas were the commonest, constituting 30% of cases.

Conclusions: In this study, mucoepidermoid carcinoma is the second commonest malignant tumour where as in literature Adenoid cystic carcinoma is the second commonest. The age, sex and site distribution in this study correlates with literature.

Keywords: *Paranasal Sinus Tumours, Benign Tumour, Malignant Tumour, Histopathology.*

Introduction

Malignant tumours arising from the paranasal sinuses are rare, constituting about 3% of all malignancies of the head and neck region. [1] Despite their infrequency, they represent both a diagnostic and therapeutic challenge and clinical presentation of malignant tumours in this site may be indistinguishable from benign or inflammatory disorders. Most of the patients present at very late stage as the signs and symptoms, like nasal congestion, nasal discharge, headache or facial pain, are non specific and they develop only when the air filled cavities are almost infiltrated by tumor cells. The sinuses include the maxillary, ethmoid, frontal, sphenoid, and accessory sinuses and the overlapping accessory sinuses. Exposure to various environmental agents like chemical irritants, microbes and mechanical trauma predispose to various neoplasms. As these sites are anatomically very close to skull base, orbit and the brain, they pose a great challenge in surgical management and hence poor outcomes. [2, 3] As the clinical presentation of benign and malignant neoplasms are indistinguishable, accurate histopathological examination plays a vital role.

The most common histologic types of the malignant tumors of the paranasal sinuses include squamous cell carcinoma, adenocarcinoma, adenoid cystic carcinoma, mucoepidermoid carcinoma, transitional cell carcinoma, undifferentiated carcinoma and verrucous carcinoma. [4]

Materials and Methods:

Histopathological examination of the paranasal sinus neoplasms was done in Department of Pathology in a Medical College Hospital in South India. Totally 67 cases of Paranasal sinus tumours were analysed retrospectively for a period of three years from April 2015 to March 2018. Formalin fixed tissues were processed and stained with Hematoxylin and Eosin. Special stains and Immunohistochemistry were done wherever needed. Clinical and imaging data were retrieved from department records. The spectrum of PNS tumours were studied in relation to age, sex and site of common occurrence.

Results

Total of 67 cases of paranasal sinus tumours were studied. Age group ranged from 15 to 85 years [Graph 1]. Most commonly affected age group was 36 – 65 years (72 %). Male preponderance was seen among the paranasal sinus tumours, whether benign or malignant. Maxillary sinus was the preferred site for the paranasal sinus tumors

[Graph 2]. Malignant tumours (79.1 %) outnumbered the benign tumours (19.4%) [Graph 3].Of the malignant tumors, Squamous cell carcinoma (66 %) was the most common malignant neoplasm and inverted papillomas (38.5 %) are frequent among benign neoplasms. Other rare tumors reported include mucoepidermoid carcinoma (5 cases), Adenoid cystic carcinoma (3 cases), Ameloblastic carcinoma (2 cases), Small cell carcinoma (2 cases), Transitional cell carcinoma, Malignant peripheral nerve sheath tumour (MPNST) and Non Hodgkins Lymphoma (1 case each). [Table 1]. Among benign tumours, inverted papillomas are the commonest constituting 30% of cases. Other rare benign tumors reported include Fibrous Dysplasia (2 cases), ameloblastoma (2 cases), hemangiopericytoma, osteoid osteoma, fibrolipoma and odontogenic myxoma (1 case each). [Table 2].

Table – 1

MALIGNANT TUMOURS	NUMBER OF CASES
SQUAMOUS CELL CARCINOMA	35
MUCOEPIDERMOID CARCINOMA	5
ADENOID CYSTIC CARCINOMA	3
UNDIFFERENTIATED CARCINOMA	2
SMALL CELL CARCINOMA	2
AMELOBLASTIC CARCINOMA	2
PNET	1
TRANSISTIONAL CELL CARCINOMA	1
MPNST	1
NON HODGKINS LYMPHOMA	1
TOTAL	**53**

TABLE – 2:

BENIGN TUMOURS	NUMBER OF CASES
INVERTED PAPILLOMA	5
AMELOBLASTOMA	2
FIBROUS DYSPLASIA	2
FIBROANGIOMATOUS LESION	1
SINONASAL MYXOMA	1
OSTEOID OSTEOMA	1
FIBROLIPOMA	1
INTERMEDIATE GRADE TUMOUR	**NUMBER OF CASES**
HEMANGIOPERICYTOMA	1
TOTAL	**14**

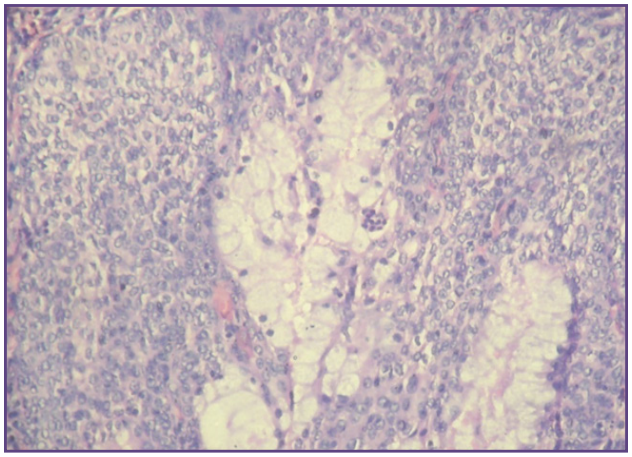


Fig. 1: Mucoepidermoid carcinoma. Higher power magnification (400x) showing sheets of malignant cells with nests of mucous cells, Hematoxylin &Eosin.

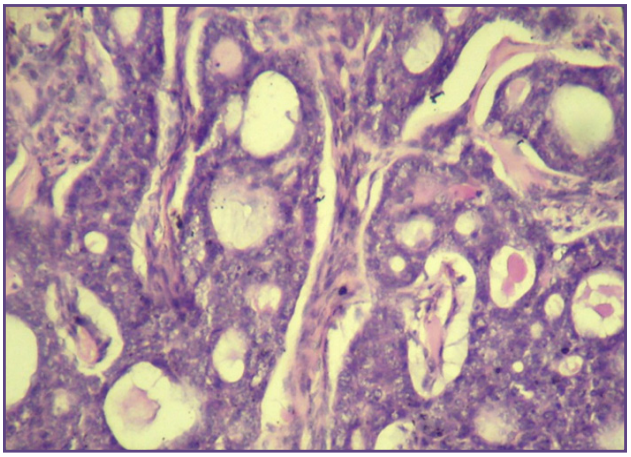


Fig. 2: Adenoid cystic carcinoma.Photomicrograph showing cribriform arrangement of neoplastic cells, Hematoxylin and Eosin, 400x

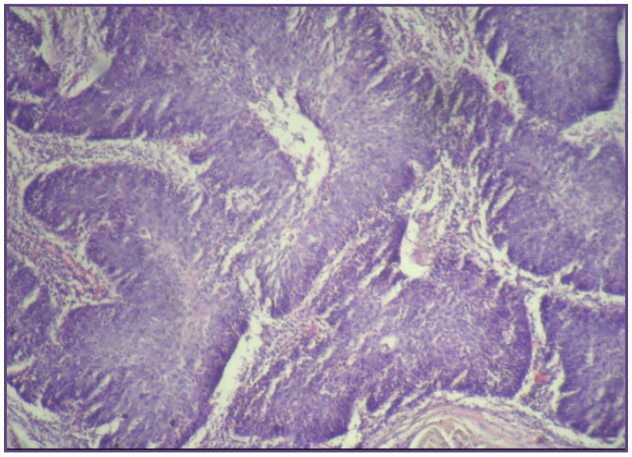


Fig. 3: Basaloid squamous cell carcinoma. Photomicrograph showing solid nests of basaloid epithelial cells with hyperchromatic nuclei and scant cytoplasm, Hematoxylin and Eosin, 400x.

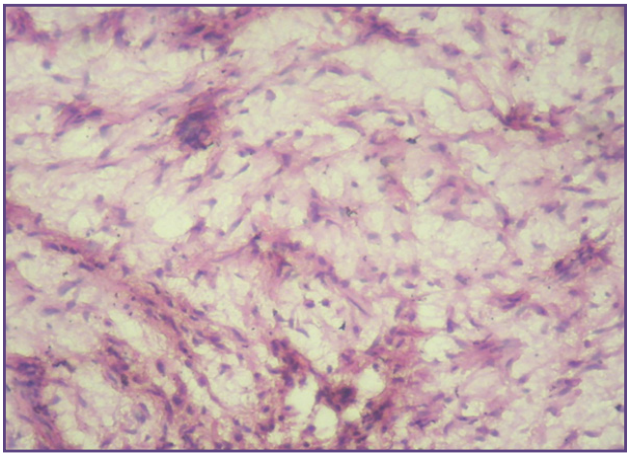
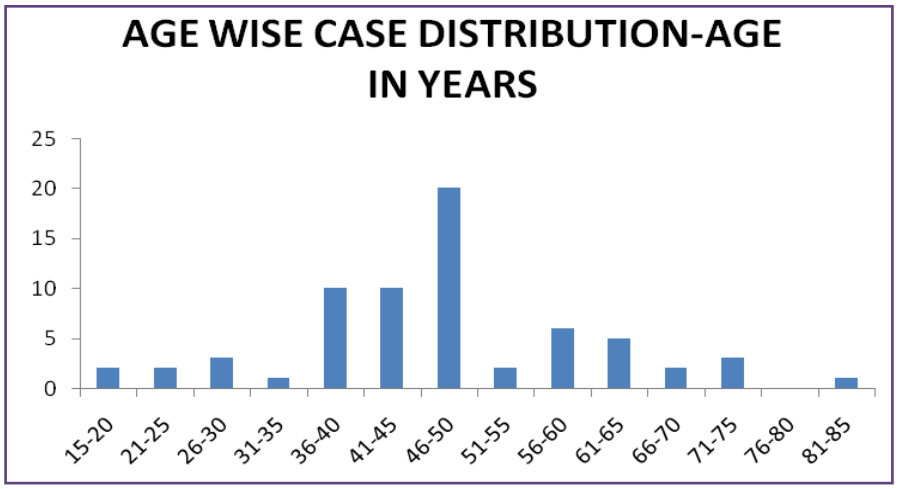
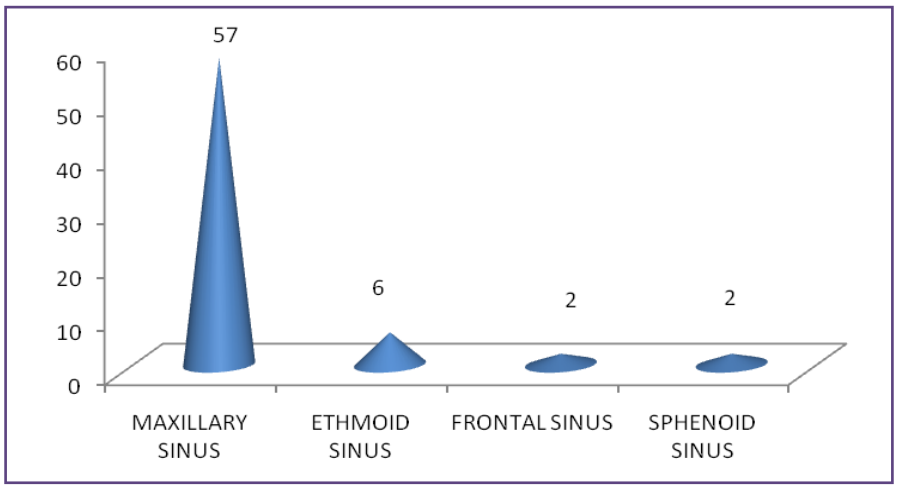


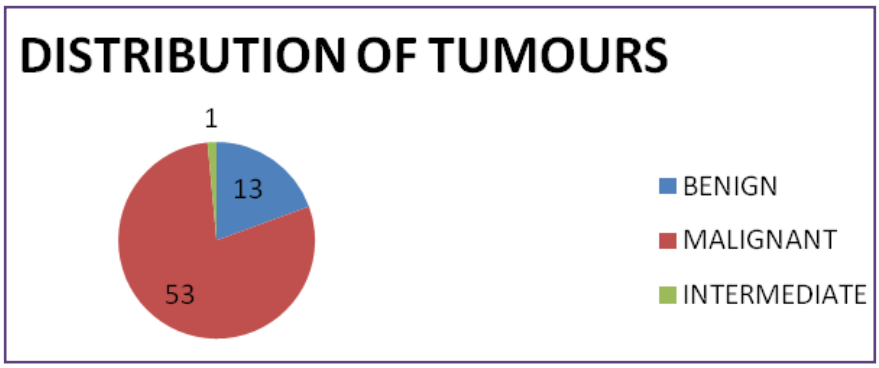
Fig. 4: Myxoma. Photomicrograph showing spindle shaped cells with poorly defined cytoplasm in a myxoid stroma, Hematoxylin and Eosin,400x.



GRAPH- 1:



GRAPH-2 : Distribution of Tumours In Paranasal Sinuses



GRAPH – 3:

Discussion

The age group affected ranged from 15 years to 85 years. The most commonly affected age group is between 36 – 65 years (72% of all cases), with peak incidence occurring between 46–50 years which accounts for 30% of cases. In literature, most common age group was fifth to seventh decade. [5] The Male-Female ratio is 2:1 for malignant lesions and 2.5:1 for benign lesions. Male preponderance was seen in both benign and malignant categories. In PNS, malignant tumours are more prevalent, with benign-malignant ratio of 1:4. [6]

In most studies, 55 – 80% of paranasal sinus tumours occurred in maxillary sinus followed by ethmoid (9 – 20%) and are rare in other sinuses. [7]In this study, 72% of tumors occurred in maxillary antrum, 9% in ethmoid and 6% in spheno-frontal sinuses which correlates with other reports.

The most common PNS tumours are squamous cell carcinoma, accounting for 66% of all malignant tumours, followed by mucoepidermoid (9.4%) (Fig.1) and third by adenoid cystic carcinoma (5.7%) (Fig.2). Literature quotes squamous cell carcinoma as 50 – 80% of all cases followed by adenocarcinoma, with adenoid cystic carcinoma occupying third position. [8]

Basaloid squamous cell carcinoma is a neoplasm having proliferating nests of basaloid cells with scant cytoplasm and hyperchromatic nuclei. We reported a case which arose from ethmoid sinus. (Fig. 3) This variant has poor prognosis. [9]

We had two male patients presenting with transitional cell carcinoma, presenting as a mass arising from maxillary sinus. Alternate terms used to describe this tumour include Ringterz carcinoma, Schneiderian carcinoma, intermediate cell carcinoma and cylindrical or columnar cell carcinoma. Treatment is similar to that of squamous cell carcinoma. [10]

Adenoid cystic carcinomas are malignant neoplasm with poor prognosis. Michel G et al study found that cribriform and tubular subtypes of adenoid cystic carcinoma occurred more frequently. Also they found solid subtype of this tumor had lower survival rate. Stage at diagnosis was a significant prognostic factor. In general, localized diseases had good prognosis. [11]

Ameloblastic carcinoma is a rare type of odontogenic tumour. Histological criteria includes epithelial cells arranged in sheets and islands, presence of cytological atypia, minimal or absent stellate reticulum.[12] We reported one case of Ameloblastic carcinoma in this study.

We reported a case of myxoma arising from maxillary sinus.(Fig. 4)These tumours arise from connective tissue mesenchyme. Recurrence rate for this tumour is high after removal although benign. [13]

Among rare tumours reported, we had a case of Non Hodgkins Lymphoma. Extra nodal lymphomas are most commonly seen in gastrointestinal tract. But primary nasal or paranasal lymphomas has been reported among Asian population. These lymphomas were more commonly found to be of B cell origin. [14] This must be differentiated from undifferentiated carcinomas, Immunohistochemistry will be helpful in differentiating these tumors. [15]

Conclusion

Paranasal sinus tumours are heterogenous group of uncommon tumours. In this study, the peak incidence of age was between 46-50 years. Males were affected more than females. Maxillary sinus was most commonly involved of all the sinuses. Squamous cell carcinoma was the most common malignant tumour. Mucoepidermoid carcinoma was the second common malignant tumour seen in our study. The age, sex and site distribution of the tumours in this study correlates well with the literature. The complex proximity to vital structures and the non-specific clinical presentation makes histopathological diagnosis mandatory for effective management of these tumours.

References

1. Ansa B, Goodman M, Ward K, Kono SA, Owanikoko TK etal, Paranasal sinus squamous cell carcinoma incidence and survival based on Surveillance, Epidemiology, and End Results data, 1973 to 2009. Cancer 2013 Jul; 119(14):2602–10.
2. Rahman.A. Orbital complications of the paranasal sinuses disease. Transl Biomed 2015; 6:3 .doi:21767/2172-0479.100027.
3. Dulguerov P, Jacobsen MS, Allal AS, Lehmann W, Calcaterra T. Nasal and paranasal sinus carcinoma: are we making progress? A series of 220 patients and a systematic review. Cancer 2001 Dec; 92(12):3012–29.
4. Katz TS, Mendenhall WM, Morris CG, Amdur RJ, Hinerman RW, Villaret DB. Malignant tumours of the nasal cavity and paranasal sinuses. Head Neck 2002 Sep; 24(9):821-9.
5. Kumar A, Sood N, Gautam R, Ahalwat S, Nausaran K. Histopathological Analysis of Lesion of Nasal cavity, Paranasal Sinus and Nasaopharynx-A Clinical study. J Adv Med Dent Scie Res 2017; 5(11):90-2.
6. Uma R, Mehraj Banu OA. Histopathological study of nasal mass –A study of 110 cases. IJSciAndTech2016; 19(1):98-102.
7. Satarkar, Srikanth S. Tumour and tumour like conditions of the nasal cavity, paranasal sinuses and nasopharynx: A study of 206 cases .Indian J Cancer 2016; 53:478-82.
8. Maru AM , Patel UV , Shrivatsav A, Lakum NR, Choksi TS , Agnihotri AS. Histopathology study of nasal masses in patients coming to tertiary care hospital:A study of 70 cases. Med J DY Patil Univ 2015;8:468-73.
9. Gangwar N, Balakrishnan R, Nayak DR, Mahesh SG. Transitional cell carcinoma of Paranasal sinuses-Significance. Indian JAppl Res 2014 April; IV(IV):426-28.
10. Jhonson CD et al. Malignant lymphoma of the maxillary sinus. J Am Osteopath Assoc 1993 Feb; 93(2):252-8.
11. Michel G et al Adenoid cystic carcinoma of the paranasal sinuses: retrospective series and review of the literature. Eur Ann Otorhinolaryngol Head Neck Dis2013; 130(5):257-62.
12. Angiero F, Borloni R, Macchi M, Stefani M. Ameloblastic Carcinoma of the Maxillary Sinus .Anticancer Res 2008; 28:3847-54.
13. Hunchaisri N. Myxoma of the nasal cavity and paranasal sinuses: report of a case. N J Med Assoc Thai 2002; 85(1):120-4.
14. Azarpira N, Ashraf MJ, Monabati A, Alireza Makrempour, Bijan Khademi, Elham Abedi et al. Primary Lymphoma of Nasal cavity and paranasal sinuses Lab Medicine 2012; 43(6):294-9.
15. Bhattacharya J, Goswami BK, Banerjee A, Bhattachayya Ranjan , Chakrabarthi I, GiriA. Clinico-pathological study of masses arising from sinonasal tract and nasopharynx in north Bengal population with special reference to neoplasm. Egypt JOtolaryngol2015; 31: 98-04.

***Corresponding author:**
Dr. S. Rohini Priya, MD No;29 First Cross Street, Ashtalakshmi Nagar, Varadharajapuram, Chennai -48 India
Email: rohinipriyais@gmail.com

Financial or other Competing Interests: None.