A CLINICOPATHOLOGICAL STUDY OF MASSES ARISING FROM SINONASAL TRACT AND NASOPHARYNX IN NORTH BENGAL POPULATION WITH SPECIAL REFERENCE TO NEOPLASMS

Objectives: To find the occurrence of various masses arising from the sinonasal tract and nasopharynx and to categorize them into non-specific, non-neoplastic and neoplastic and also to find the correlation between various clinical modes of presentation and histological types of these masses.

Material & Methods: A prospective study was carried out for one year from February 2010 to January 2011 in a tertiary care hospital. Total of 94 masses arising from sinonasal tract and nasopharynx undergoing either incisional biopsy or surgical excision with proper history and imaging were included in this study.

Results: The total percentage of these tumors in the one year period was 3.52%. A total of 4 non-specific lesions, 49 non-neoplastic masses, 17 benign neoplastic masses and 24 malignant neoplastic masses were found.

Conclusion: Non-neoplastic masses were the majority in number (52.12%). Among the neoplastic masses (43.61%) malignant neoplasms constituted 25.53%, a vast majority being nasopharyngeal carcinomas. Immunohistochemistry further helped to differentiate undifferentiated carcinomas into epithelial and lymphoid malignancies.

Keywords: Clinopathological study, Mass, Sinonasal tract, Nasopharynx.

INTRODUCTION: The nasal cavity and paranasal sinuses are collectively referred to as the sinonasal tract which is anatomically and embryologically distinct from the nasopharynx. The sinonasal tract, paranasal sinuses and nasopharynx form a functional unit which is lined by stratified squamous respiratory type pseudostratified columnar and transitional (intermediate) epithelium. The mucous of nasal cavity and paranasal sinuses is referred to as the Schneiderian membrane. Sinonasal tract and nasopharyngeal lesions can be non-neoplastic (polyps, bacterial and fungal infections) and neoplastic (benign and malignant). Rhinosporidiosis is endemic in India, but it has also been reported in other parts of the world. Foreign body type granulomas can develop in nasal mucous membranes. Mucoceles can be cystic and clinically mimic malignant process. Respiratory epithelial adenomatoid hamartomas are grossly similar to polyps but are distinctly classified. Though the sinonasal epithelium is an uncommon neoplasm, it can present an entire range of both epithelial and non-epithelial tumors, epithelial tumors being three times more frequent than the non-epithelial tumors. Inverted papillomas and squamous cell carcinomas are the most frequent neoplasms. Lymphoid tumors involving this area are mainly Non-Hodgkin’s lymphomas. Non-Hodgkin’s lymphomas of the sinonasal tract are heterogeneous diseases that can be clinically aggressive. Nasopharyngeal cancer with a strong correlation with EBV infection, reported to be quite high in Nagaland, is a leading cause of death in south-east Asia. Sminke type of nasopharyngeal carcinoma poses a diagnostic challenge. Though, as a whole sinonasal tumors and malignancies constitute only a very small fraction of solid tumors, with increasing industrialization and with increase in the burning of additional fossil fuels and rising air pollution rates, we are likely to see an increasing incidence of sinonasal tumors. There are hardly any reports in Indian literature on this issue, especially from the population of North Bengal. Therefore this present study is to look for the occurrence of various masses arising from the sinonasal tract and nasopharynx, to categorize them and to correlate between their clinical mode of presentation and histological types.

AIMS AND OBJECTIVES: The aim of the study is to find the occurrence of various masses arising from the sinonasal tract and nasopharynx and to categorize them into non-specific, non-neoplastic and neoplastic (benign and malignant) and also to find the correlation between various clinical modes of presentation and histological types of these masses and aetiological factors in case of non-neoplastic lesions (fungal infections).
rhinorrhea and epistaxis. Out of the total 49 cases of non-neoplastic masses, 36 cases were of different kinds of nasal polyps, 3 cases were of Rhinosporidiosis, 1 case each of Mucormycosis, Candidiasis, Aspergillosis, Histoplasmosis and Fibrous dysplasia; 2 cases of fibromas, 3 cases of cysts (Table 2). Among 17 cases of benign neoplasms, 5 cases each of Inverted papilloma and Lobular capillary hemangioma; 4 cases of Angiofibroma; 2 cases of Pleomorphic adenoma and 1 case of Neurofibroma were found (Table 3). Among the total 24 cases of malignant neoplasms, 1 case each of Nasal Squamous cell carcinoma, Olfactory neuroblastoma and Rhabdomyosarcoma; 2 cases each of Nasal Adenoid cystic carcinoma and Nasopharyngeal Non-Hodgkin’s Lymphoma (NPHNL); 3 cases of Sinonasal Undifferentiated carcinoma (SN-UDC); 4 cases of Non-keratinising Nasopharyngeal carcinoma and 10 cases of Nasopharyngeal Undifferentiated carcinoma (Table 4). 10 cases of NP-UDC, 3 cases of SN-UDC and 2 cases of NPHNL were further subjected to immunohistochemistry by using PAN CK and LCA markers (Table 5). A concordance of 73.33% and a discordance of 26.66% were found between the histopathological diagnosis and final diagnosis after IHC confirmation (Table 6). An association of immunodeficient states with fungal sinonasal masses was found with a P-value of 0.02 (Table 7).

**DISCUSSION:**

The nasal cavity and paranasal sinuses (maxillary, ethmoid, sphenoid and frontal sinuses) are collectively referred to as the sinonasal tract which is anatomically and embryologically distinct from the nasopharynx, although they are adjacent. The nasal cavity, paranasal sinuses and nasopharynx form a functional unit which is lined by stratified squamous, respiratory type pseudostratified columnar and transitional (intermediate) epithelium and the mucosa of nasal cavity in conjunction with that of the paranasal sinuses, is often referred to as the Schneiderian membrane. A variety of non-neoplastic and neoplastic conditions involve the nasal cavity, paranasal sinuses and nasopharynx, and these are very common lesions encountered in clinical practice. A large number of diseases affecting these structures are due, in major part, to many of the specialized tissues, each with its own aberrations that exist in the region. The presenting features and their pathogenesis are largely determined by their histology. The histological workup is essential for a correct diagnosis and timely intervention. Four cases of granulation tissue were found in the nasal cavity and thus were kept in the category of non-specific lesions. It is important to recognize the range of non-neoplastic lesions in this region, and to differentiate them from neoplastic lesions because of different treatment modalities and emotional burden on the patient. Zafar et al. found that among the polypoidal lesions, nasal poly was the commonest, which is very much consistent with our study (36 cases of nasal/nasopharyngeal polyps out of a total of 49 non-neoplastic cases). Zafar et al. Anjali et al. and Tondon et al. found an incidence of 34.74% and 10 cases of non-neoplastic masses per year, respectively over a long and variable study period. The researchers found a total of 49 non-neoplastic masses over a study period of one year. The peak age of presentation, sex ratio, and clinical presentation were similar to that observed by these authors. Rhinosporidiosis is a chronic granulomatous disease caused by Rhinosporidium Seeber. Although a variety of sites may be affected, the most common site of infection is the nasal mucosa, the disease is endemic in India and Sri Lanka. Samadder et al. studied 116 cases of Rhinosporidiosis in the Medical College at Bankura during January 1983 to December 1987 and showed more prevalence in males and in the second decade of life. In our study we found 3 cases of Rhinosporidiosis among which 2 were male and 1 female. 2 cases were in their third decade of life and one in the first decade. Chopra et al. reported 5 cases of invasive fungal sinustis in sphenoid sinus among which 3 cases had Aspergillosis and 2 cases had Mucormycosis. In our study we found 1 case each of Aspergillosis, Mucormycosis, Candidiasis and Histoplasmosis, the first two being in the maxilla and the last two being in the nasal cavity. Challa et al. identified predisposing conditions in 19 patients out of 63 cases of fungal rhinosinusitis with diabetes mellitus as the commonest and Aspergillus as the commonest etiologic agent. In our study we found diabetes to be associated with Mucormycosis, corticosteroid intake being associated with Aspergillosis and HIV infection being associated with Candidiasis and Histoplasmosis. Our study also found an association of immunodeficient states with fungal sinonasal masses (P-value = 0.02). According to Tsal et al. fibrous dysplasia in sinonasal tract is rare. However, we found 1 case involving maxilla which is nearly similar to the study of Zafar et al. who found 2 cases in the study period of 7 years. In our study we found 3 cysts similar to that of Zafar et al. who found 2 of them.

Though the sinonasal epithelium is an uncommon site for neoplastic processes, it can present an entire range of both epithelial and non-epithelial tumors. Epithelial tumors are three times more frequent than the non-epithelial tumors. Panchan et al. studied 120 specimens of sinonasal tumors in ten years in which 69 cases were epithelial tumors (59.2%). Inverted papillomas and squamous cell carcinomas were the most frequent neoplasms. This is in support of our study which has found 23 cases of epithelial neoplasms (56.09%) and 18 cases of non-epithelial neoplasms among a total of 41 neoplasms. A total of 2 cases of sinonasal squamous cell carcinomas and 1 case of sinonasal undifferentiated carcinoma were found in a total of 6 sinonasal carcinomas. Sinonasal undifferentiated carcinoma is a distinctive clinicopathological entity that must be distinguished from other, less aggressive sinonasal neoplasms like olfactory neuroblastoma. Suchwald et al. studied 82 patients with sinonasal...
Ye et al. studied forty-one cases of nasopharyngeal and 13 cases of nasal malignant lymphoma histopathologically and immunohistochemically. All of the cases were non-Hodgkin’s lymphoma and concluded that since the large cell type of lymphoma was predominant, the differential diagnosis from undifferentiated carcinoma is important and is facilitated by the use of immunostaining methods. In our study, we found 1 case of sinonasal NHL which was previously diagnosed as sinonasal undifferentiated carcinoma. We also found 5 cases of NP-NHL among which 3 cases were previously diagnosed as NP-Undifferentiated carcinoma. A concordance of 73.33% and discordance of 26.66% were found between histopathological diagnosis and final diagnosis after immunohistochemical confirmation.

CONCLUSION:
Sinonasal and Nasopharyngeal masses, both non-neoplastic and neoplastic, constituted 3.52% of the total surgical pathology specimens during the study period of one year. Nasal obstruction was the presenting symptom in majority of the patients. Non-neoplastic masses were the majority in number (52.12%) and polyps contributed to the bulk. Fungal lesions although small in number had a significant association with immunofluorescence and contributed to the overall study.

REFERENCES:

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Tab. 5: Differentiation & Categorisation of Sinonasal & Nasopharyngeal Undifferentiated Carcinomas by IHC

<table>
<thead>
<tr>
<th>Primary H/P Diagnosis</th>
<th>IHC</th>
<th>Final Diagnosis</th>
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<tbody>
<tr>
<td>SN-UDC</td>
<td>+</td>
<td>SN-SCC</td>
</tr>
<tr>
<td>SN-UDC</td>
<td>+</td>
<td>NP-NHL</td>
</tr>
<tr>
<td>SN-UDC</td>
<td>+</td>
<td>SN-UDC</td>
</tr>
<tr>
<td>NP-UDC</td>
<td>-</td>
<td>NP-UDC</td>
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<td>NP-UDC</td>
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<td>+</td>
<td>NP-NHL</td>
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Tab. 6: Difference Between H/P Diagnosis & Final Diagnosis after IHC Confirmation (n=15)

Concordance 11 | 73.33%

Tab. 7: Association of Immunodeficient States with Fungal Sinonasal Masses among all non-neoplastic Masses

<table>
<thead>
<tr>
<th>Total Non-neoplastic Masses (n=49)</th>
<th>Immunodeficient States (Present)</th>
<th>Immunodeficient States (Absent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungal Sinonasal Masses (n=7)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Others (n=42)</td>
<td>6</td>
<td>36</td>
</tr>
</tbody>
</table>

Risk Ratio=0.5, Odds Ratio=0.125

P Value (By Fisher Exact Probability Test) = 0.02 (Significant)

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With large cell malignant lymphoma, where nuclear morphology and immunohistochemistry plays important roles.

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papillomas diagnosed from 1975 to 1993, histologically showed 58 cases of inverted papillomas including 5 cases of associated carcinoma. In our study we found 5 cases of inverted papillomas among 17 cases of benign neoplasms (29.41%) and no other histopathological types of papillomas were reported. Manning et al.25 studied that salivary-type neoplasms of the nasal cavity and paranasal sinuses are numerically dominated by adenoid cystic carcinomas and pleomorphic adenomas. All others, benign or malignant, are rarely encountered and are usually biologically and histologically low-grade. Our study found 2 cases of pleomorphic adenomas in a total of 17 benign neoplasms (11.76%) and 2 cases of adenoid cystic carcinoma in a total of 6 sinonasal carcinomas (33.33%). Nasopharyngeal angiofibroma, restricted to young aged males, arising from posterosilateral wall of roof of nose, can also grow into nasal cavity, has got definite endocaril influence.26 We got 4 cases of angiofibroma, all of them are males. Studies based on Nasopharyngeal carcinoma (NPC) cases registered in most of the cancer diagnosis and treatment centres in North-Eastern region of India during 1988-89 and computed with the population structure of the region indicated that the incidence of NPC is quite high in Nagaland (about 4.3 per 100,000 people/year). Taking this into consideration and 1981 census figure for the population structure of Nagaland, the incidence of NPC was nearly 6.2 and 2.1/100,000 male and female respectively.26-27 Further, hospital based studies on the pattern of cancer incidence in Nagaland revealed that out of 149 biopsies of suspected cancer cases, 37 were histopathologically positive for malignancies and about two third of them were with cancer of nasopharynx.28 In our study we found a total of 10 biopsies of NP-UDC (41.66%), 4 cases of NK-NPC (15.83%) and 2 cases of NP-NHL (33.33%) out of 24 cases of malignant neoplasms. A total of 12 cases of NPC malignant neoplasms were further subjected to immunohistochemistry and final diagnosis was reached. 5 cases of NPC, 2 cases of NP-UDC and 5 cases of NP-NHL were diagnosed. It is very difficult to locate and random biopsies are needed from fossa of Rosenmullar to get specimen. Schmincke type of nasopharyngeal carcinoma poses a diagnostic problem due to its microscopic similarity with large cell malignant lymphoma, where nuclear morphology and immunohistochemistry plays important roles.

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