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Original Research Article

Clinico-Histopathological Study of Spectrum of Lesions in Nasal and Paranasal Sinus Mass in Patients Coming to Tertiary Health Center

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Abstract

Background: Nasal and paranasal sinus (PNS) masses encompass a diverse group of lesions, ranging from infectious conditions and non-neoplastic inflammatory conditions to benign and malignant neoplasms. Due to overlapping clinical presentations, there can be difficulty in achieving an accurate diagnosis. Histopathological examination remains the gold standard for a definitive diagnosis.

Material and Method: This hospital-based, descriptive and observational study involved 62 cases of nasal and PNS masses, of which 61 cases were analysed after excluding one inadequate sample. Clinical details and radiological reports of all cases were recorded. Histopathological processing and examination were performed on all 61 specimens. Microbiological tests, such as potassium hydroxide (KOH) mount, culture and LPCB mount, were performed in selected cases to determine infectious aetiologies. Lesions were then categorized into a non-neoplastic inflammatory group and a neoplastic group, where the neoplastic group was further sub-classified into benign and malignant neoplasms.

Results: A total of 61 cases were studied, with non-neoplastic lesions constituting the majority (67.74%) of cases. Among these, inflammatory nasal polyps were the most common (88.09%). Among neoplastic lesions (30.64%), benign tumors predominated (89.47%), with capillary haemangioma being the most common benign tumor (47.05%), followed by inverted papilloma (41.17%). Squamous cell carcinoma was the predominant malignant tumors. Microbiological screening in selected cases did not reveal any specific infectious aetiology. Most lesions showed a male predominance and were commonly observed in the age group of 11-20 years. The most common presenting complaint was nasal obstruction.

Conclusion: Nasal and PNS masses show a diverse histopathological spectrum, with non-neoplastic lesions being the most common. Histopathological evaluation plays a crucial role in accurate diagnosis and guiding management. Early detection is essential, particularly for malignant lesions, to improve prognosis.

Keywords: Nasal and Paranasal Sinus Lesions, Histopathology, Nasal Polyps, Squamous Cell Carcinoma.
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Introduction

Nasal and paranasal sinus (PNS) masses encompass a heterogeneous group of lesions, comprising a wide spectrum of pathological entities, ranging from infective lesions and inflammatory conditions to benign neoplasms and aggressive malignant tumors [1]. These lesions arise from the mucosal lining of the nasal cavity and paranasal sinuses.

Clinically, they often present with overlapping symptoms such as nasal obstruction, nasal discharge, epistaxis, facial pain or swelling, headache and anosmia [2]. Due to these similar clinical and radiological features, distinguishing between inflammatory, benign and malignant lesions based only on clinical evaluation can be challenging. Radiological modalities such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) have significantly improved the evaluation of sinonasal masses by providing detailed information regarding their location, extent and nature [3,4]. However, radiological findings are often not definitive, as many lesions share similar imaging characteristics. Therefore, histopathological examination remains the gold standard for definitive diagnosis [5,6].

Sinonasal masses are predominantly non-neoplastic, with inflammatory polyps being the most common [7]. These are frequently associated with chronic inflammation, allergic conditions and,

less commonly, infectious aetiologies, leading to mucosal oedema and polyp formation. Certain infective conditions, such as fungal sinusitis, may contribute to sinonasal masses in specific clinical settings, although their occurrence varies across populations and was not observed in the present study [8]. Benign neoplasms, although less common, are clinically significant because of their potential for local aggressiveness, recurrence and the risk of malignant transformation, especially in cases of inverted papilloma [9]. Malignant tumors of the nasal cavity and paranasal sinuses are relatively uncommon but are associated with significant morbidity and mortality due to delayed diagnosis and aggressive behaviour [10]. Squamous cell carcinoma is the most frequently encountered histological subtype [11], although other malignancies such as adenocarcinoma and sinonasal undifferentiated carcinoma may also occur.

Microbiological evaluation has importance in identifying infectious aetiologies such as fungal infections and rhinosporidiosis, especially in immunocompromised individuals [12]. However, its role remains adjunctive to histopathological diagnosis.

Thus, a combined approach incorporating clinical evaluation, radiological findings, histopathological examination and microbiological assessment is essential for accurate diagnosis and appropriate management. In this context, the present study aims to analyse the clinico-histopathological spectrum of nasal and PNS masses in patients presenting to a tertiary health centre.

Objectives

1. To study the pathology of various non-neoplastic and neoplastic lesions in the nasal and PNS region.
2. To study the age and sex-wise distribution of various lesions in the nasal and PNS region.
3. To correlate clinico-histological features of various lesions of nasal and PNS masses.

Materials and Methods

Study Design: This was a hospital-based descriptive and observational study conducted in the Departments of Pathology at a tertiary health centre. The study was designed to evaluate the clinicopathological spectrum of PNS masses.

Study Population: Patients presenting to the outpatient and inpatient departments of E.N.T, diagnosed with nasal and PNS masses and undergoing nasal excision surgery.

Sample Size: A total of 62 cases were included during the study period.

Inclusion Criteria:

- All age groups and both genders are included.
- Cases diagnosed with nasal and PNS mass.
- All primary lesions of the nasal cavity and PNS; confirmed with diagnostic imaging.
- Secondary invasion (metastasis) of the nasal cavity and PNS mass.

Exclusion Criteria:

- Any lesion of nasal skin.
- Lesion of the vestibule of the nose.
- Insufficient material received while collecting or handling the specimen

Data Collection: Detailed clinical data, including age, sex and presenting complaints such as nasal obstruction, epistaxis, nasal discharge and facial swelling, were recorded. Radiological findings such as X-ray and CT scans were documented to assess the location, extent and characteristics of the lesions.

Histopathological Examination: All biopsy and resection specimens were fixed in 10% neutral buffered formalin. Tissue processing was carried out using standard paraffin embedding techniques. Thin sections were cut using a microtome and stained with routine Haematoxylin and Eosin (H&E). Based on histomorphological features, lesions were categorized into non-neoplastic, benign neoplastic and malignant groups.

Microbiological Analysis:

In selected cases with clinical suspicion of infectious aetiology, microbiological evaluation was performed. Samples, including nasal swabs and tissue specimens, were collected under sterile conditions and subjected to KOH mount, culture on SDA and LPCB mount for the detection of fungal organisms.

However, no specific infectious aetiology was identified in the studied cases. Microbiological findings were correlated with histopathological features wherever applicable.

Statistical Analysis: Data were analysed using descriptive statistics. Results were expressed as frequencies and percentages and presented in tabular form.

Results:

A total of 62 cases of nasal and PNS masses were included in the study. One case was excluded due to an inadequate sample and the remaining 61 cases were analyzed.

Distribution of Lesions

Table 1: Overall Distribution of Lesions

Lesion Type	Number of Cases	Percentage (%)
Non-neoplastic	42	67.74%
Neoplastic	19	30.64%
Inadequate sample	1	1.61%
Total	**62**	**100%**

Non-neoplastic lesions constituted the majority (67.74%), while neoplastic lesions accounted for 30.64% of cases.

Non-Neoplastic Lesions

Table 2: Distribution of Non-Neoplastic Lesions

Lesion Type	Cases	Percentage (%)
Inflammatory polyp	37	88.09%
Allergic polyp	4	9.52%
Haemangiomatous polyp	1	2.38%

Inflammatory polyps were the most common non-neoplastic lesions, accounting for 88.09% of cases.

Neoplastic Lesions Benign Neoplasms (n = 17)

Table 3: Distribution of Benign Neoplastic Lesions

Lesion Type	Cases	Percentage (%)
Capillary haemangioma	8	47.05%
Inverted papilloma	7	41.17%
Angiofibroma	1	5.88%
Pleomorphic adenoma	1	5.88%

Capillary haemangioma was the most common benign tumor, followed by inverted papilloma.
Malignant Neoplasms (n = 2) both malignant cases (100%) were poorly differentiated squamous cell carcinoma.

Age Distribution: The most commonly affected age group was 11–20 years (34.42%).

- Non-neoplastic lesions were most frequent in the 11–20 years age group (38.10%).
- Neoplastic lesions were more common in the 41–50 years age group.
- Malignant lesions were observed in patients above 40 years of age.

Gender Distribution

Table 4: Gender Distribution

Gender	Cases	Percentage (%)
Male	38	62.30%
Female	23	37.70%

There was a male predominance with a male-to-female ratio of approximately 1.65:1.

Clinical Features

Table 5: Clinical Presentation

Symptom	Cases	Percentage (%)
Nasal obstruction	61	100%
Nasal mass	53	88.9%
Nasal discharge	38	62.3%
Epistaxis	21	34.4%
Lymphadenopathy	2	3.27%

Nasal obstruction was the most common presenting complaint (100%), followed by nasal mass and nasal discharge. Epistaxis was less frequent and was more commonly associated with vascular or advanced lesions.

Site Distribution

Table 6: Site Distribution

Site	Cases	Percentage (%)
Nasal cavity	55	90.16%
Maxillary sinus	6	9.84%

The nasal cavity was the most commonly involved site.

Discussion

Pattern of Lesions: The present study demonstrated a predominance of non-neoplastic lesions (67.74%) over neoplastic lesions, which is consistent with findings from previous studies, Anusree et al [13]. Similar observations have been reported in the literature, where inflammatory and non-neoplastic conditions constitute the majority of sinonasal masses. This pattern may be attributed to the high prevalence of chronic inflammatory conditions of the nasal mucosa, particularly in developing countries where environmental and socioeconomic factors play a significant role. The findings of the present study reinforce the concept that most sinonasal masses are benign and primarily inflammatory in origin. No infectious aetiology was identified in the present study, suggesting that inflammatory and non-neoplastic processes were the predominant contributors in this population.

Most Common Lesion: An inflammatory polyp was the most common lesion in the present study, accounting for the majority of non-neoplastic cases. This finding is in concordance with previous studies, Neb et al [14], which have also reported inflammatory and allergic polyps as the most frequent sinonasal lesions. The development of inflammatory polyps is closely associated with chronic irritations, allergic conditions and environmental exposures. The higher incidence observed in younger age groups in this study further supports the role of immunological and environmental factors in their pathogenesis.

Neoplastic and Malignancy Pattern: Among neoplastic lesions, benign tumors were more common than malignant tumors, which is consistent with earlier studies, Swain [15]. Capillary haemangioma and inverted papilloma were the most frequently encountered benign neoplasms in the present study. Malignant tumors were relatively rare, with all cases being poorly differentiated squamous cell carcinoma. This observation is consistent with existing literature, which identifies squamous cell carcinoma as the most common malignancy of the nasal cavity and PNS. The predominance of malignancies in patients above 40 years of age in this study is also in line with previously reported data.

Clinical Correlation: The clinical presentation of sinonasal masses in the present study was largely non-specific. Nasal obstruction was the most common presenting complaint, followed by nasal mass, nasal discharge and epistaxis. These findings are comparable with previous studies, which have demonstrated that both benign and malignant lesions may present with similar clinical features, making clinical differentiation difficult without histopathological confirmation.

Conclusion

Due to overlapping clinical presentations of nasal and PNS masses, there can be difficulty in achieving an accurate diagnosis. Histopathological examination remains the gold standard for definitive diagnosis, as clinical and radiological findings alone are often insufficient.

Thus, histopathological examination remains the cornerstone for the diagnosis and classification of sinonasal lesions, as it provides definitive information regarding tissue architecture and cellular morphology. A combined clinico-histopathological approach enhances diagnostic accuracy and contributes to appropriate patient management.

Limitations

The present study is a single-centre study conducted in a tertiary care hospital, which may limit the generalizability of the findings to the broader population. The relatively small sample size may also affect the statistical strength of the observations.

Recommendations

Based on the findings of the present study, a multidisciplinary approach involving otorhinolaryngologists, pathologists and microbiologists is recommended for the evaluation of sinonasal masses to improve diagnostic accuracy and guide appropriate management.

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