Clinico-pathological profile of sinonasal masses: An experience in tertiary care hospital of Uttarakhand

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ABSTRACT

Background: The purpose of this study was to classify various types of non-neoplastic and neoplastic lesions presenting as sinonasal mass and characterize their clinico-pathological profile in a tertiary care center in the state of Uttarakhand. Materials and Methods: This was a prospective study where 110 cases of sinonasal masses were included over a period of 12 months. Clinico-pathological study was carried out in these cases. A provisional diagnosis was made after clinical assessment and radiologic investigations, but final diagnosis was made after histopathologic examination. Observations: The number of non-neoplastic lesions were more than the neoplastic lesion, 60% versus 40% respectively. In the neoplastic group, 19.8% and 23.76% patients presented with benign and malignant lesion, respectively. The incidence was more predominant in the age group of 11-20 years (22.72%) with male to female ratio of 1.08:1. In our study, among non-neoplastic lesions the occurrence of sinonasal polyps was highest seen in 80.30% cases. In neoplastic lesions, angiofibroma was most common benign lesion seen in 35% cases. Carcinoma nasal cavity was the commonest malignant lesion seen in 45.83% cases. Carcinoma nasal cavity was the commonest malignant lesion seen in 45.83% cases. In 3.63% patients, clinical and radiologic diagnosis was not correlated with histopathologic diagnosis. Only two cases required immuno-histocytochemistry to confirm the final diagnosis. Conclusion: We concluded that for proper evaluation of a sinonasal mass, clinical, radiologic, and histopathologic evaluation should be carried out conjointly in all the cases. Histopathology always gives a confirmatory diagnosis but in few cases immuno-histocytochemistry becomes the ultimate diagnostic technique for correct and timely intervention.

Key words: Histopathology, neoplastic lesion, sinonasal mass

INTRODUCTION

A variety of non-neoplastic and neoplastic conditions involving the nasal cavity, paranasal sinuses (PNS), and nasopharynx are commonly encountered in clinical practice. The presenting features and symptomatology of all sinonasal masses are similar, i.e., nasal obstruction, rhinorrhea, blood stained nasal discharge, epistaxis, oral symptoms, facial swelling, orbital symptoms, ear symptoms, etc. Sinonasal masses can be divided into two main categories: Non-neoplastic and neoplastic, which in turn, is further divided into benign and malignant. Various pathologies ranging from non-neoplastic lesions to malignant sinonasal tumor may mimic a simple nasal mass. It is impossible to determine clinically what pathology lies underneath. Therefore, nasal endoscopy, radiology,
This prospective study was conducted by the Department of Otorhinolaryngology, Himalayan Institute of Medical Sciences, Swami Ram Nagar, Dehradun, over a period of 12 months. All the patients attending the Otorhinolaryngology Department with complaint of sinonasal mass and found to have a mass arising from nose or PNS during the study period were included in the study. Previously treated cases of sinonasal disease with recurrence and patient’s not consenting evaluation as per proforma were excluded from the study. A total of 110 cases of sinonasal masses fulfilling these criteria were finally included in this study. Prior approval from the institute ethics and research committee and written informed consent from the patients was taken. The patients selected for this study were subjected to a detailed history, clinical examination as per proforma and relevant radiologic investigations like CT scan (axial/coronal section) or MRI nose and PNS (whenever required). HPE of removed tissue either by biopsy or surgically excised specimen was carried out in most of the cases. In few cases, immuno-histochemistry was performed to confirm the diagnosis. Clinico-pathological evaluation was carried out in 110 cases. The lesions were classified as non-neoplastic and neoplastic lesions; the neoplastic lesions were further classified as benign and malignant.

**Materials and Methods**

In the present study, the age distribution of the patients ranged from 6 to 80 years (mean age – 39.4 years). The 2nd decade was the commonest to be involved with 25 patients (22.72%) and male to female ratio was 1.8:1.0. Majority of the patients belonged to the lower middle class group comprising 36 patients (32.72%). By occupation maximum number of patients were homemakers, i.e., 28 patients (25.45%) followed by students with 21 patients (19.09%). The rural–urban ratio were 1:1. The most common presenting symptom was nasal obstruction seen in 96 patients (87.27%), followed by nasal discharge in 76 patients (69.09%). The frequency of symptoms is shown in Figure 1. Majority of patients 79 (72%) presented to the hospital within 1 year duration of onset of symptoms out of which nearly 27 patients (25%) presented within 3 month, whereas 31 patients (28%) had symptom duration of more than 1 year. In our study, 33 patients (30%) had a history of addiction in the form of smoking 20 (18.18%), alcoholism 8 (7.27%), and 5 (4.54%) had both. On examination, facial swelling was seen in 30 patients (27.27%) [Figure 2]. Most common facial swelling was cheek swelling in 15 patients (50%) followed by nasal swelling in 6 patients (20%). Vestibular mass was seen in 7 patients (6.36%). On anterior rhinoscopy nasal mass was seen in 53 patients (48.18%). The appearance of nasal mass was polypoidal in 31 (58.5%), fleshy in 7 (13.2%), ulceroproliferative growth in 3 (5.66%), septal bulge in 8 (15.09%), and lateral wall bulge in 4 (7.55%) patients. Probing was done in all 53 patients with nasal mass, out of which most of the nasal masses were soft in consistency and maximum number of mass originated from lateral wall of nose in 33 patients (30%) followed by medial wall of nose in 8 patients (7.27%). Mass in oral cavity was seen in 11 patients (10%). Ulceroproliferative growth was the most common finding seen in 7 patients (6.36%), followed by palatal/
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alveolar bulge in 4 patients (3.63%). Oropharyngeal mass, all appearing polypoidal in nature were observed in 3 patients (2.72%). Significant posterior rhinoscopic finding was seen in 13 patients (11.81%) in form of polypoidal masses. Nasal patency was reduced in 76 patients (69.09%) and decreased sense of smell was seen in 37 patients (33.63%) on examination. Totally, 103 patients (93.6%) underwent nasal endoscopy and 87 patients (79.09%) had visible mass on endoscopy. Maximum numbers of mass were seen in III diagnostic pass of endoscopy. After complete nasal examination, 101 patients (91.81%) had nasal mass and in 7 patients vestibular mass was found. On ocular examination 11 patients (10.00%) had proptosis, 6 patients (5.45%) had restriction of eye movements, 5 patients (4.54%) had absent vision, and 1 patient (0.90%) had reduced vision. Eye involvement was seen in 12 patients (10.09%) with neoplastic lesions, 5 patients with benign lesions, and 7 patients with malignant lesions. Cranial nerve I was involved whereas in 5 patients (4.54%) cranial nerve II and in 1 (0.90%) cranial nerve V were involved. Cervical lymphadenopathy was seen in 10 patients (9.09%). Out of 110 patients, 63 patients (57.27%) were clinically diagnosed as non-neoplastic and 47 patients (42.73%) were diagnosed as neoplastic lesion, out of which 23 patients (48.93%) were benign and 24 patients (51.07%) were malignant. In non-neoplastic group, maximum number of patients with sinonasal polyps comprised 50 patients (45.54%) followed by septal abscess in 6 patients (5.45%). In neoplastic malignant group, growth in the nasal cavity had maximum number of patients comprising 11 patients (10%) whereas in benign group maximum number of patients with angiofibroma were seen in 8 patients (7.27%).

Radiologic investigations were carried out in 99 patients (90%) as 11 patients did not require any radiologic investigation. Maximum number of patients underwent CT scan comprising 95 patients (86.36%), out
of which noncontrast computed tomography (NCCT) was performed in 51 patients (53.68%) and contrast computed tomography (CECT) in 44 patients (46.31), [Figure 3] whereas 13 (11.11%) patients underwent X-ray and 8 patients (7.27%) underwent MRI [Figure 4]. In maximum number of 78 patients (78.78%) CT scan was taken followed by CT and X-ray in 11 patients (11.11%), CT and MRI in 6 (6.06%), MRI in 2 (2.02%), and X-ray in 2 (2.02%) patients. In the present study, on the basis of radiology, out of the 99 patients, 57 patients (57.57%) were non-neoplastic, 21 patients (21.21%) were benign, and 21 patients (21.21%) were malignant. In all the 99 patients (90%), clinical diagnosis correlated with the radiologic diagnosis.

HPE [Figure 5] was carried out in 101 patients (91.81%), out of which 57 patients (56.44%) were non-neoplastic and 44 patients (43.56%) were neoplastic [Table 1]. In two patients immuno-histocytochemistry was done to confirm the diagnosis. The HPE report was suggestive of round cell tumor, but immuno-histocytochemistry (Desmin negative, NSE positive) confirmed it to be olfactory neuroblastoma. In the present study, HPE report changed the clinical diagnosis in 4 patients (4.1%) and in 97 patients (96.03%) clinical and HPE diagnosis was same. Three patients (3.09%) had clinically benign lesion, out of which 2 (2.06%) had inconclusive diagnosis and 1 (1.03%) was diagnosed as inverted papilloma, all of which were reported as inflammatory polyp after HPE. In one patient, who was clinically diagnosed as angiofibroma, the HPE revealed Schwannoma. In the present study, it was finally concluded that out of total 110 patients, 66 patients (60%) were non-neoplastic and 44 patients (40%) were neoplastic out of which 20 patients (19.80%) were benign and 24 patients (23.76%) were malignant. There was change in final diagnosis of 4 patients (3.63%) out of 110 patients after HPE.

**Table 1: Clinical and histopathologic correlation**

| Clinical diagnosis                     | No. of patients | HPE diagnosis          | No. of patients | HPE correlation |
|----------------------------------------|-----------------|------------------------|-----------------|-----------------|
|                                        |                 | Matched | Not matched |                |                 |
|                                        |                 | No. of patients | %       | No. of patients | %       |
| Non-neoplastic lesions                 |                 |                      |          |                |         |
| Sinonasal polyps                       | 50              | Sinonasal polyps      | 53      | 94.33          | 3       | 5.66    |
| Fungal sinonasal mass                  | 1               | Fungal sinonasal mass | 1       | 100            | 0       | 0.00    |
| Dentigerous cyst                       | 1               | Dentigerous cyst      | 1       | 100            | 0       | 0.00    |
| Septal hematoma                        | 1               | Septal hematoma       | 1       | 100            | 0       | 0.00    |
| Rhinophyma                             | 1               | Rhinophyma            | 1       | 100            | 0       | 0.00    |
| Septal abscess                         | 6               | Septal abscess        | 6       | 100            | 0       | 0.00    |
| Frontal sinus pyocele                  | 2               | Frontal sinus pyocele | 2       | 100            | 0       | 0.00    |
| Dermoid cyst                           | 1               | Dermoid cyst          | 1       | 100            | 0       | 0.00    |
| Rhinolith                              | 1               | Rhinolith             | 1       | 100            | 0       | 0.00    |
| Neoplastic-benign lesions              |                 |                      |          |                |         |
| Angiofibroma                           | 7               | Angiofibroma          | 7       | 100            | 0       | 0.00    |
| Angiofibroma                           | 1               | Schwannoma            | 1       | 0.00           | 1       | 100     |
| Fibro osseous lesion                   | 6               | Fibro osseous lesion  | 4       | 100            | 0       | 0.00    |
| Sinonasal hemangioma                   | 4               | Hemangioma            | 4       | 100            | 0       | 0.00    |
| Inverted papilloma                     | 3               | Inverted papilloma    | 2       | 66.6           | 3       | 33.3    |
| Benign lesion inconclusive diagnosis   | 2               | Inflammatory polyp    | 2       | 0.00           | 2       | 100     |
| Neoplastic-malignant lesions           |                 |                      |          |                |         |
| Growth maxilla                         | 10              | SCC                   | 8       | 100            | 0       | 0.00    |
|                                          |                 | Clear cell CA         | 1       |                |         |         |
|                                          |                 | Ewing Sarcoma         | 1       |                |         |         |
| Growth nasal cavity                    | 11              | SCC                   | 4       | 1100           | 0       | 0.00    |
|                                          |                 | Adenocarcinoma        | 3       |                |         |         |
|                                          |                 | Olfactory Neuroblastoma | 2   |                |         |         |
|                                          |                 | Malignant melanoma    | 1       |                |         |         |
|                                          |                 | Malignant lymphoma    | 1       |                |         |         |
| Growth ala of nose                     | 2               | SCC                   | 1       | 100            | 0       | 0.00    |
|                                          |                 | Basal cell carcinoma  | 1       |                |         |         |
| Growth ethmoid                         | 1               | SCC                   | 1       | 100            | 0       | 0.00    |
|                                          |                 | Adenocarcinoma        | 1       |                |         |         |

HPE: Histopathologic examination

**Discussion**

The mean age of presentation in our study was 39.4 years, whereas the mean age for non-neoplastic, benign, and malignant lesions was 39.1, 27.1, and 51 years, respectively. In another study, the mean age of presentation was 22.5 years for non-neoplastic lesions, 26.8 years for benign lesions, and 35.3 years for malignant lesions. In one study, the peak age of presentation for benign, intermediate, and malignant lesions were 2nd, 5th, and 6th decade respectively. It was observed in most of the studies that mean age was least for non-neoplastic lesions; it increased for benign lesions and was highest for malignant lesions. In our study, mean age for non-neoplastic lesions was
more when compared with benign lesions, as a large percentage of patients with benign lesions in our study were angiofibroma which was mostly seen in adolescent age group and this could be the reason for low mean age for benign lesions in our study. In our study, the male to female ratio was 1.8:1.0. In most of the studies males were affected more when compared with females and our findings are similar to other studies.[2,4,5]

The most common presenting symptoms in our study was nasal obstruction found in 87.27% cases which was unilateral in 55.45%, and bilateral in 31.81% cases, followed by nasal discharge (69.09%) and headache (60.90%). In a similar study of sinonasal masses, the most common symptom was nasal obstruction (94%), which was unilateral in 84% and bilateral in 14%, followed by loss of smell (68%) and epistaxis (50%).[6] Another study observed that the most common symptoms were nasal blockage (71%), nasal discharge (54%), and swelling or mass (39%).[7] Nasal obstruction was the most common symptom observed in other similar studies but the frequency of other symptoms varied.

In this study, it was revealed that most patients of sinonasal mass presented to the hospital either within 3 months (25%) or after 1 year of onset of symptoms (28%). This was seen because in case of malignant condition the symptoms were reported early by the patients as they were either nasal bleed or maxillo-facial swelling. On the other hand, mild and chronic symptoms like nasal obstruction, nasal discharge, and headache were reported to the hospital only after they became troublesome.

In our study, most common examination finding was facial swelling observed in 27.27% of cases, whereas in another study it was found in 48% of cases.[3] Moreover, in our study, most common facial swelling was cheek swelling (13.36%), followed by external nasal deformity (5.45%). In accordance with our study, another study also reported large number of patients with cheek swellings (15.68%) followed by external nasal deformity (11.76%).[7]

According to our study, maximum number of sinonasal masses were on left side (37.27%) followed by right side (29.09%) and only 25.45% were bilaterally present. In contrast to our study, one study reported bilateral sinonasal masses (44.7%) in majority of patients whereas the mass was located in right and left side in 31.6% and 23.6% patients, respectively.[8]

In our study, maximum numbers of mass were seen in III pass of diagnostic nasal endoscopy (DNE) in 78 patients (70.90%). DNE is an advanced diagnostic tool and helps in detection of nasal pathology in an early stage. In our study, DNE detected early polypoidal changes in nasal cavity and helped in early diagnosis of nasal masses which were missed on anterior rhinoscopy.

In the present study, palatal/alveolar bulge in the oral cavity was seen in 10% of cases, this was in accordance with the similar study where palatal bulge was observed in 11.7% of cases.[7] Palatal bulge in our study was mostly seen in cases with neoplastic lesions which was suggestive of extension of sinonasal mass to oral cavity.

In our study, proptosis was seen in 10% of cases, whereas others studies reported the incidence of 5.88% and 24%.[7,9] Proposis in our study was mostly seen in neoplastic lesions (25%) which was in accordance with similar study.[8] In present study, vision was absent in 4.54% and reduced in 0.90% of patients. A similar study reported loss of vision in 1.96% of the patients.[7] Loss of vision in our study was seen in malignant lesions (16%) in which either orbit was involved by the sinonasal mass and caused stretching of optic nerve or when there was intra-cranial extension of mass involving the optic nerve pathway.

In our study, palpable cervical lymph nodes were seen in 9.09% of the patients. Two other studies have reported much lower incidence between 1% and 5.88%.[5,7] This could be attributed to the fact that, in our study large numbers of patients were in advanced stage of sinonasal malignancies where metastasis to cervical lymph nodes occurred late in course of disease.

In the present study, cranial nerve involvement was seen in 35.45% of patients, out of which cranial nerve I was involved in 33.63%, followed by cranial nerve in II in 4.54% cases. In another study, it was observed that the cranial nerves II, IV, and VI were most commonly affected in cases of malignancies.[5] Similarly, in our study also involvement of cranial nerves was seen in cases of sinonasal malignancy.[8]

Radiologic investigations were done in 90% patients whereas in 10% of patients no radiologic investigation was required. X-ray was taken in very few cases suspected of having minimal inflammatory disease. In most of the cases of sinonasal mass, CT scan was advised directly as it depicted better anatomy of nose and PNS and was helpful to the surgeon in cases where surgery was required. Mass confined to nose and PNS in CT scan was seen in 65.26% of patients and bony erosion, a feature of malignancy, was seen in 28.2% of lesions. MRI was taken in 8% patients to determine the extension of sinonasal masses into orbit.
and intracranial cavity. MRI was taken to see the actual soft tissue involvement in the patients where orbital or intracranial extension of neoplastic mass was suspected. CT scan is not reliable in assessing the extensions of the sinonasal mass lesions as retained or inssissated secretions and thickened mucosa within the PNS can be misinterpreted as extensions of the malignancy (false positive). The false positivity of all the PNS altered the tumor staging to a certain extent and therefore required complementary assessment by MRI, which revealed the differences between true disease infiltration and obstruction secondary to infiltration of the draining ostia. MRI is vital in establishing the surrounding soft tissue infiltration that determine the tumor resectability. One of the greatest advantages of MRI is to help in distinguishing between tumor and retained secretions in the multiple sinus cavities.

In our study, HPE was done in 91.81% patients. The distribution of various lesions into non-neoplastic and neoplastic in our study was compared with other studies as shown in Table 2. There was a high incidence of malignant neoplastic lesion in our study when compared with other studies. Among the non-neoplastic lesions nasal polyps were the commonest lesion seen in 80.30% patients. Among the benign lesions, angiofibroma was the commonest one diagnosed in 35% patients. Among the malignant lesions, carcinoma nasal cavity was the commonest lesion seen in 45.83% patients and the commonest histopathological type was squamous cell carcinoma (SCC) seen in 33.33% patients. Our results were accordance with two other studies where nasal polyps, angiofibroma, and SCC were the most common non-neoplastic, benign, and malignant lesions, respectively. Few other studies also reported similar findings for neoplastic and malignant lesions except in cases of benign lesions where various lesions other than angiofibroma were the commonest lesions.

In the present study, variation in clinical, radiologic, and HPE was noted in 4 patients (3.63%) and this was in accordance with similar study on sinonasal masses, in which 3.62% lesion showed difference in clinical, radiologic, and pathologic findings. In contrast, another study reported 1.1% of patients with histopathologic findings different from their clinical diagnosis and led to alteration in management. Similarly, two more study observed that only 0.3% of their patients had histopathologic findings different from their clinical diagnosis. One study reported a much higher incidence of histopathology report variation from clinical opinion in nearly 6% of cases. All these studies point out to the common finding that histopathologic examination still remains the gold standard for diagnosis in most cases.

**Conclusion**

The presenting features of all sinonasal lesions may be indistinguishable and therefore represent diagnostic and therapeutic dilemma. The similarities of non-neoplastic and neoplastic lesions at initial presentation may lead to a significant delay in the diagnosis. Correlation of clinical, radiologic, and pathologic modalities is of utmost important for accurate diagnosis. All these modalities are complementary to each other. Most importantly is a thorough histopathologic evaluation, an essential part of work up of patients with sinonasal mass, so that a correct and timely intervention can be made.

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| Table 2: Comparison of incidence of non-neoplastic and neoplastic sinonasal lesion in various studies |
|----------------------------------|------------------|------------------|------------------|
| Study                           | Non-neoplastic (%) | Benign lesions (%) | Malignant lesions (%) |
| Present study (2011), n=101      | 56.44             | 19.80             | 23.76             |
| Somani et al. (2004), n=193      | 76.68             | 8.8               | 14.5              |
| Khan et al. (2006), n=248       | 60                | 23.3              | 16.7              |
| Chopra et al. (2010), n=100     | 84                | 11                | 5                 |
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