

CLINIC-PATHOLOGICAL PROFILE OF SINONASAL MASSES

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ABSTRACT

A wide majority of lesions in the nose and the paranasal sinuses present as polypoidal mass in the nasal cavity. The Inflammatory conditions, infections, chronic rhino sinusitis, benign lesions and even malignancies can also present as nasal polyps. Early stage of malignancies in the nose is often misdiagnosed inadvertently. This is because malignancies too present as mass in the nose that mimics benign lesions and often associated with chronic rhino sinusitis. The present study was undertaken to know the clinic-pathological profile of sinonasal masses. The study group included 102 patients with nasal polypoidal masses, all patients were subjected to detailed history and clinical examination. All necessary investigations were done at greater accuracy. The final diagnosis was made after the histopathological examination of the excised masses. Depending on the final diagnosis, all masses were divided into non-neoplastic and neoplastic groups. Total 102 patients who presented with nasal polypoidal masses, of which 89 turned out to be non-neoplastic lesions and 13 were neoplastic, study showed that non-neoplastic lesions are very more common than neoplastic lesions. The Male patients were more prone to the formation of lesions when compared with non-neoplastic lesions. The nasal polyps were formed eighty-one percent. The study can found that, there is a high chance of discrepancy between the clinical and histopathological diagnosis.

KEYWORDS: Nasal Polypoidal Masses, Polyps, Histopathology, Nasal Mass

INTRODUCTION

Nose, the portal through which air enters has functions like humidification of the air and olfaction and any lesion in it cause symptoms that are most distressful to the patient. Polypoid masses are one of the most common lesions that can arise in the nose which can cause an array of symptoms, the most common of which is nasal obstruction. There are many pathological conditions that can present as polyps in the nose with similar symptoms making it difficult to distinguish them from each other except for the subtle differences in the clinical picture. Histopathological examination is mandatory in these cases to come to the right diagnosis, thus helping th ENT surgeon to decide the right mode of treatment for the same. Early stages of malignancies in the nose are often misdiagnosed inadvertently. This is because malignancies too present as mass in the nose that mimics benign lesions and often associated with chronic rhino sinusitis. Delaying treatment for these patients can be disastrous. Most of the patients coming to the ENT clinic have nasal polypoid masses. Therefore it becomes a subject of interest to find out more about the lesions that present as polypoidal mass in the nose, to study the clinical picture and the subtle differences in each, and the Histopathological picture of the lesions. The prevalence of the different disease that present as nasal polypoidal mass is different in different parts of the world. The trend of a clinical entity changes with time. Tandon et al. and Dasgupta et al. have devoted considerable effort in the study of sinonasal masses in the Indian population. However, to date an analysis of the sinonasal masses in the rural population of India is still inadequate. The current study was undertaken to study the clinic-pathological profile of sinonasal masses in a tertiary care

hospital.

PHYSIOLOGY

The chief functions of nose are respiratory and olfaction. In addition to being the sensory organ of smell, the nose also plays an important role in the cleansing and conditioning of inspired air. It also contributes to the quality of speech, nasal resistance, and nasal ciliary function. Nasal neurovascular reflexes are contribute to its function. The physiological functions of the paranasal sinuses are still unclear. Some believe that sinuses play a role in conditioning of the inspired air, controlling pressure, heat insulation, and voice resonance. Some hold the opinion that it may have no function at all, except keeping the skull light.^[50]

HISTORICAL ASPECTS

Hippocrates is widely recognized as “Father of Rhinology”. “poly-pous” in the greek language means “many-footed”. Billroth (1864) described nasal polyps as dynamotous swellings and considered them to be neoplastic, but Zuckerlkandl considered them to be an inflammatory condition. Virchow in 1863 referred to polyps as myxomata. Even Lack in 1900 supported the theory that polyps are not neoplastic but are inflammatory in origin.^[1] Categorization of nasal polyps into different groups based on the site of origin was started by Killian (1906). He was the first to describe it as “Antrochoanal polyp”. It later came to be known as Killian’s polyp. Subsequently, Fairbanks classified them into two groups as antrochoanal and multiple ethmoidal polyps. Further Berdal (1959), was the first to introduce the practice of differentiating between benign and neoplastic conditions based on the Histopathological classification.^[2]

Samter (1968) then established a variety of other systemic disorders associated with polyps. He described a sub group of patients with aspirin hypersensitivity, asthma and nasal polyps and termed the symptomatology as “Samter’s Triad.”^[3]

By cadaveric studies, Per Larson and Micro Tos evaluated the origin of nasal polyps and found that nasal polyps originated from nasal mucosa, and they are invariably related to the sinus ostia.^[3] Nasal polyposis usually develops in some types of inflammatory airway disease. They originate in the upper part of the nose around the openings of the ethmoidal sinuses. The prevalence rate of nasal polyposis is about 2% and its incidence seems to be increasing with age, the peak being around 50 years.^[4]

A 10 year study of 345 cases of polypoidal masses in nose and paranasal sinuses, with the incidence of neoplastic and non-neoplastic lesions reiterates the fact that a polypoidal mass in nose carries a vast differential diagnosis.^[5] Though nasal polyps can be diagnosed clinically by their characteristic macroscopic appearance like smooth, shiny, pinkish to grey surface, but microscopically the same edematous stroma can be covered by metaplastic squamous epithelium associated with an inflammatory reaction which may range from benign lesions to malignant neoplasms.^[6] The presenting symptomatology of all nasal masses is similar and with investigative techniques like CT and MRI, a presumptive diagnosis can be made. However, a careful Histopathological examination with immunochemistry is necessary to decide the nature of the nasal mass.^[7] According to many clinicopathological studies polypoidal masses are divided into essentially two groups.

- Non-neoplastic
- Neoplastic^[8]

Dasgupta A et al observed an incidence of 50.70% for non-neoplastic and 49.30% for neoplastic lesions.^[5] Tondon PL et al observed an incidence of 74.60% and 25.41%.¹⁶ According to them; non-neoplastic group was predominated by Nasal polyps (62%) and rhinosporidiosis (31.1%) which was an endemic disease mainly in Calcutta. Among the benign neoplasm, Haemangioma (45.7%) had the maximum incidence followed by Angiofibroma and Inverted papilloma at 23.2% and 3.9% respectively. So, as far as malignant neoplasms are concerned, squamous cell carcinoma (36.6%) was the most common.^[5] Tondon PL et al also observed that in non-neoplastic group, Nasal polyps predominated with (64%), while Rhinosporidiosis (24%) at next. In benign neoplasm, Adenoma (36%) was the most common followed by Papilloma (32%) and Haemangioma (8%). Squamous cell carcinoma (67%) had the highest incidence among the malignant group.^[9]

CLASSIFICATION OF POLYPS

According to Site

- **Simple Nasal Polyp:** A polyp arising from the septum or turbinate, occupying the nasal cavity.
- **Antranasal Polyp:** A polyp arising from the maxillary antrum and occupying the nasal cavity.
- **Antrochoanal Polyp:** A polyp arising from the antrum and extending into the choana.
- **Ethmoidal Polyp:** Polyp arising from the ethmoidal air cells usually multiple and bilateral.^[3]

Depending on Size

By comparison with size of the patient's middle and inferior turbinate, polyps are classified into three groups^[10]

Class I: A nasal polyp with in the middle meatus which is smaller than the middle turbinate.

Class II: Polyp size larger than the middle turbinate but smaller than inferior turbinate

Class III: Polyp size was larger than the inferior turbinate

Classification Depending on Obstruction

Here score type classification was done to determine the size easily.

- No polyp
- Mild polyposis – Small polyps not reaching the upper edge of the inferior turbinate, causing slight nasal obstruction.
- Moderate polyposis – Medium sized polyp reaching between the upper and the lower edge of the inferior turbinate and causing troublesome obstruction.
- Severe polyposis: Large polyps reaching below the lower edge of the inferior turbinate and causing total or almost total obstruction.^[11]

Morphological Classification

Morphological characteristics of nasal polyps were classified into three types:

- Edematous type
- Glandular and cystic type

- Fibrous type ^[11]

Histopathological Classification

Histopathologically, nasal polyps were divided into two groups, based on predominant infiltration cell type:

- Eosinophilic – predominant infiltration of eosinophils
- Neutrophilic – predominant presence of other inflammatory cells. ^[12]

ETHMOIDAL POLYPS

This is the most common chronic disease affecting the mucosa of nasal cavity and paranasal sinuses. In ancient India much has been written over these benign growths.

The polyp as an entity was recognized in the era of Hippocrates. ^[13] Ethmoidal polyps are seen in patients of all ages. They present in approximately 2% of the populations. ^[21] Drake Lee AB (1984) found the maximum incidence in 30-39 year age group and Lund VJ (1995) found it to be more in the age group of 40-50 year. ^[22, 13] Male to Female ratio is 2:1 and in those with bronchial asthma, the male to female ratio is 1:1 suggesting that, this is a definite clinical sub group. ^[14]

Many theories have been proposed. Two major schools of thought are Allergy and Infection. ^[14]

MATERIALS AND METHODS

Source of Data

Study group included 102 patients with nasal polypoidal masses, who were treated at Sri Venkateshwara ENT Institute, Victoria Hospital and Bowring and Lady Curzon Hospital attached to Bangalore Medical College and Research Institute, Bangalore.

Inclusion Criteria

The patients of all age groups of both sexes presenting with nasal symptoms and who on anterior rhinoscopy revealed polypoidal mass in either or both nasal cavities. A polypoidal mass is defined as a mass of tissue bulging or projecting outwards from the mucosal surface, with a broad base (sessile) or a slender stalk (pedunculated).

Exclusion Criteria

- Patients presenting with congenital masses.
- Patients presenting with nasal mass of intracranial origin.

Method of Collection of Data

Patients treated between October 2010 and September 2012, were subjected to a comprehensive history and clinical evaluation and Histopathological examination as per the proforma designed for this study.

Investigations

- Hematological investigations like Hb%, Total leukocyte count, Differential count, Absolute eosinophil count, Bleeding time, Clotting time, Blood grouping and typing and urine routine examinations were done.

- Radiological investigations included.
- Plain para nasal sinus x-rays (Water's view / Caldwell's view / lateral view)
- Computerized tomographic scan of nose and paranasal sinuses (coronal and axial with or without contrast enhancement) was done wherever indicated.

Surgical Intervention

Excision of the polypoidal mass with prior consent of the patient by transnasal, lateral rhinotomy, endoscopic approach or a radical surgery as indicated and confirming to well recognized, practiced and established modalities of treatment.

Histopathological Examination

All surgically excised polypoidal masses were subjected to Histopathological examinations. Haematoxylin and eosin stains were used for all section for Histopathological examination. Other special stains were used as and when required and natures of polypoidal masses were ascertained.

Study Pattern

Depending on the clinical features, radiological and Histopathological findings all polypoidal masses are classified into various groups.

Congenital Antrochoanal

Non-Neoplastic Nasal polyps

Ethmoidal polyps

Chronic specific granulomas

Epithelial

Benign

Neoplastic

Malignant Epithelial

Mesenchymal

Collected data was analyzed by using SAS-16.50 version, Univariate analysis was employed to test the hypothesis.

RESULTS

A total of 102 patients with nasal polypoidal masses were studied for the period of three years. The mean age was 35 years with IQR 25-85 Years. Of all the polypoidal masses, 89 were non-neoplastic while 13 were neoplastic. Majority of the nasal polypoidal masses were non-neoplastic (87%) only 13% were neoplastic.

Table 1: Age Distribution for Non-Neoplastic Group

Age (In Years)	Non-Neoplastic	Neoplastic
0-10	6 (7%)	0
11-20	20 (22%)	2 (15%)
21-30	25 (28%)	0
31-40	18 (20%)	3 (23%)
41-50	10 (11%)	3 (23%)
51-60	6 (7%)	4 (31%)
61-70	3 (3%)	1 (8%)
71-85	1 (1%)	0

Majority of the non-neoplastic lesions were found in patients between the ages of 21-30 years (28%), while neoplastic lesions were more among those aged between 51-60 years (31%).

Table 2: Sex Distribution in Non-Neoplastic and Neoplastic Lesions

Group	Males	Females
Non-Neoplastic	60 (67%)	29 (33%)
Neoplastic	10 (77%)	3 (23%)

There was male preponderance in both groups.

Table 3: The Distribution of Symptoms in Non-Neoplastic Lesions

Symptoms	Non-Neoplastic	Percentage
Nasal obstruction	86	97%
Rhinorrhoea	86	97%
Post nasal discharge	82	92%
Sneezing	54	61%
Headache	83	93%
Smell disturbances	60	67%
Nasal Mass	1	1%
Epistaxis	1	1%

In this study it was observed that majority of the patients with non-neoplastic masses had nasal obstruction (97%), rhinorrhoea (97%), post nasal discharge (92%), sneezing (61%), headache (93%) and smell disturbances (67%) as their main symptoms

Table 4: Distribution of Non-Neoplastic Polypoidal Masses

Type	No. of cases	Percentage
Nasal polyps	84	94%
Rhinosporidiosis	2	2%
Granuloma	1	1%
Fungal sinusitis	2	2%

Nasal polyps constituted the major part of non-neoplastic masses (94%).

Table 5: Age Distribution of Nasal Polyps

Age Group	Ethmoidal Polyps	Percentage	Antrochoanal Polyp	Percentage	Sphenoidal Polyp
0-10	1	2%	5	17%	0
11-20	4	7%	20	69%	0
21-30	14	26%	3	10%	0
31-40	17	31%	1	3%	0
41-50	8	15%	0	0%	1 (1%)
51-60	6	11%	0	0%	0
61-70	3	6%	0	0%	0
71-80	1	2%	0	0%	0

It was observed that antro-choanal polyps occurred maximally in the age group 11-20 years (69%), followed by those aged between 0-10 (17%). On the other hand ethmoidal polyps were found to be more predominant in the age group 31-40 years (31%), followed by those aged between 21-30 years (26%).

Table 6: Sex Distribution of Nasal Polyps

Type	Males	Percentage	Females	Percentage
Ethmoidal	44	81%	10	19%
Antro-choanal	14	48%	15	52%

Nasal polyps were found to be more common among males. Ethmoidal polyps were had an obvious male preponderance while antro-choanal polyps were seen relatively more in females.

Table 7: Duration of Symptoms of Nasal Polyps

Duration	Ethmoidal Polyps	Antro-Choanal Polyps
0-6	8	1
07-12	19	16
13-24	20	10
>24	7	2

Ethmoidal polyps had a maximum duration of symptoms with 13 to 24 months. In antrochoanal polyps it was found to be 7 to 12 months.

Table 8: Clinical Findings in Case of Nasal Polyps

Type	Laterality		Number		Choanal Extension in DNE	
	Unilateral	Bilateral	Single	Multiple	Present	Absent
Ethmoidal polyp	3	51	0	54	29	3
Antro-choanal polyp	24	5	29	0	34	24

It was observed that ethmoidal polyps were usually bilateral and multiple whereas antro-choanal polyps were mainly single and unilateral. Choanal extension was seen in both types.

Table 9: Proportion of Nasal Polyp with Previous History of Polypectomy

Type	Present	Percentage	Absent	Percentage
Ethmoidal polyp	7	23%	47	77%
Antro-choanal polyp	5	17%	24	83%

DISCUSSIONS

The mean age being 35 years. There were 70 males and 32 females in the study. The proportion of the non-neoplastic and neoplastic lesions was compared with those of earlier studies, the most prominent of them being the studies conducted by Tondon et al and Dasgupta et al. Majority of the non-neoplastic lesions were found in patients between the ages of 21-30 years, similar to the observations made by Tondon et al (20-29 years)^[9], while neoplastic lesions were more among those aged between 51-60 years again comparable to that seen in the same study. Present study again reiterates that non-neoplastic lesions are mainly seen in the younger age group while neoplastic were found to be more common in the older age group. Majority of the patients was males which is coherent with the findings cited by Tondon and Dasgupta in their study. The proportion of nasal polyps was statistically significant $p < 0.05$ with incidence rate (94%).

Nasal Polyps

Drake Lee and Majumdar in their article have studied nasal polyps extensively. In their study Drake Lee found 18% of the nasal polyps were between the ages 21-30 years^[21], Majumdar^[52] in their study had a majority (23%) in the age range 41-50 years. In our study majority belonged to the age group 21-30 years (38%)

Antro-choanal polyps were seen more among younger age group while ethmoidal polyps were seen in the older age group. It was observed that ethmoidal polyps occurred maximally in the age group 11-20 years, followed by those aged between 0-10. On the other hand antro-choanal polyps were found to be more predominant in the age group 31-40 years, followed by those aged between 21-30 years. As obvious from the table 3, the incidence of nasal polyps is more in males as compared to females.

Patients with nasal polyps presented with nasal obstruction, nasal discharge and headache. Patients with ethmoidal polyps had more of allergic symptoms like sneezing as compared to those with antro-choanal polyps. The incidence of previous polypectomy was seen more in ethmoidal polyps Table 9, showing that it has more chance to recur. Non-neoplastic lesions comprised of 2 cases of rhinosporidiosis, 2 cases of fungal sinusitis and a case of infective granuloma. The percentage of patients with rhinosporidiosis was found to be only 2%, this is really low as compared to the findings of Tondon and Dasgupta. It is most likely due to the fact that Karnataka is not endemic for rhinosporidiosis. There was one case of infective granuloma reported in a young female patient, who presented with epistaxis and mass in the nose. The incidence of the same was found to be 10% in earlier studies like in Tondon et al. The incidence of benign neoplasms is found to be more than that of malignant neoplasms. Our study showed similar results when compared to other studies. The incidence of epithelial neoplasms was more than that of the mesenchymal neoplasms in our study, but it is the reverse in the study by Dasgupta et al.

Inverted Papilloma

There were 4 cases of inverted papilloma in our study with an age of range of 35 to 52 years, with a mean of 43 years. All were males in our study. They presented with nasal obstruction and epistaxis. CT scan was done in all patients, which showed the site of origin and extent. Histopathological examination revealed the characteristic microscopic invagination of surface epithelium into the stroma with intact basement membrane.

Angiofibroma

The incidence was found to be in our study, which was comparable to the study by Dasgupta et al. The 2 cases in

our study were both 13 years of age. The symptoms included nasal obstruction and epistaxis in both cases.

CT scan was done for both cases, of which one showed antral bowing and the other showed extension into the infra-temporal fossa. Histopathological examination showed characteristically large, thin walled sinusoidal vessels with intervening fibrous stroma.

Neurilemmoma

In our study we had one case of neurilemmoma (1%). The incidence reported in world literature is around 4%. It was an adult patient who reported with nasal obstruction. The incidence and findings in Arora MMC et al^[44] series is 5% and mean duration of 8 months, are more or less similar to that in our series. Histopathology showed typical neurilemmoma findings of Antoni-A and Antoni-B areas. Antoni-A areas composed of spindle cells arranged in palisade pattern (Verocay bodies) showed dense and compact cellularity, where as Antoni-B area consisting of loose a cellular areas separated by edematous stroma.

Pleomorphic Adenoma

We found 2 cases of pleomorphic adenoma of nasal septum, which is very rare tumour of sinonasal cavity, with only few cases reported in the world literature. R.K Mundra (1991), Tahalan (2004) as quoted by Sarafudin PK et al^[33] have reported one case each in India. Histopathology revealed classical epithelial and stromal components, with trabecular pattern in stroma showing myxoid and chondiod components. There was incomplete encapsulation with transcapsular growth with pseudopodal extension confirming the diagnosis of pleomorphic adenoma. The proportion of malignant neoplasms in nasal polypoidal masses in our series is 3.9% which is lesser than the other studies.

Age: The age range of our patients was 46 to 68 years with mean age of 56 years, similar to Tondon study where it was 60 years. The ratio of male to female was 1:1.

Site of Origin: The commonest site of origin was maxillary antrum with which is similar to Chessman AD et al^[46] who reported the incidence of 60% for antral carcinoma.

Clinical Features: The predominant symptoms were nasal obstruction (100%), epistaxis (100%). 50% of our cases had bony erosion and infiltration. One of them presented with epiphora and cheek swelling. The mean duration of symptoms was 2 months. One case of adenoid cystic carcinoma was documented in our study arising from nasopharynx, but presented as a polypoidal mass in the nasal cavity. Histopathologically it was characterized by cribriform appearance, showing epithelial tumour cells of ducts and myoepithelial cells arranged in duct like structures, having typical fenestrations or cyst-like spaces.

One case of olfactory neuroblastoma arising from left cribriform area has been reported in our study. The main symptom was left sided nasal obstruction with epistaxis and smell disturbance since 3 months showing epiphora with proptosis. The mass was highly friable and bled on touch. Histopathological examination revealed small cell tumour of neural crest origin and classical Homer-Wright's rosette (pseudo rosette), which had central fibrillar eosinophilic material surrounded by radially arranged tumour cells. Tumour cells were small, slightly larger than lymphocytes and having poorly defined cytoplasm with hyper chromatic nucleus separated by fibro vascular stroma.

MANAGEMENT

Investigations

Nasendoscopy was done in almost all cases. X-ray was done in almost all cases. CT scan was done in most of the cases based on clinical presentation, extension and size of the mass and for pre-operative evaluation. Haematological investigation like Hb%, total leukocyte count, differential count, absolute eosinophil count, bleeding time, clotting time, blood grouping and typing and urine routine examinations were done in all cases. Biopsy was done in suspected cases of malignancies.

Treatment

Most of the cases of nasal polyp, underwent endoscopic assisted polypectomy. Patients with ethmoidal polyp, underwent functional endoscopic clearance of ethmoidal sinus. Postoperative care was taken as per the protocol. Topical steroid spray was given two weeks after surgery. Regular follow up was done for all cases.

Patients with antrochoanal polyp underwent functional endoscopic sinus surgery (FESS). In all cases middle meatal antrostomy was done to remove osteomeatal complex block to provide good ventilation. In the remaining cases the polyps were avulsed either transorally or transnasally depending on the size of the polyp. The case of sphenoidal polyp was treated with FESS. Postoperative care was the same as in ethmoidal polyps. A case of infective granuloma, the lesion was removed by wide excision. All cases of rhinosporidiosis were removed by wide excision leaving raw area followed by chemical cauterization of the base. Both angiofibroma cases, the lesions were excised completely by Wilson's transpalatal approach. All of 4 cases of inverted papilloma underwent complete excision using lateral rhinotomy approach along with medial maxillectomy. The patients continue to be under close observation for recurrence. Neurilemmoma and Pleomorphic adenoma, the lesions were excised using nasal endoscope leaving disease free mucosal margin. Two cases of maxillary squamous cell carcinoma were treated with total maxillectomy along with functional neck dissection and reconstruction using glabellar flap. In the other two cases, where the disease was advanced, were treated with palliative chemoradiation. One case of adenoid cystic carcinoma was treated by chemo radiation as the patient was clinically not fit for surgery. A patient with olfactory neuroblastoma was lost to follow up.

CONCLUSIONS

The Maximum number of ethmoidal polyps was found in younger age group between 21 to 30 years in males. Allergy is the most common predictors and rate of recurrence (23%) could be directly proportional to ethmoidal polyps. The Etiology of allergy will be substantiated by histopathology and allergic type of cytology. Thus, clinical diagnosis of sinonasal masses can be erroneous. Histopathological test is preferred examination for deciding the appropriate management for the patient. The need for early recognition and referral to the ENT surgeon needs to be advocated among the primary care physicians as well as continuing medical education for the primary care physician on the care of sinonasal masses.

ACKNOWLEDGEMENTS

The author acknowledges the Dean Cum Director, BMCRI, HOD Department of ENT and all staff members for their encouragement to conduct research study.

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