

RHINOLOGY

Clinico-pathological profile of sinonasal masses: a study from a tertiary care hospital of India

Aspetti clinico patologici delle masse naso-sinusali: studio effettuato in un centro ospedaliero indiano di terzo livello

A. LATHI, M.M.A. SYED¹, P. KALAKOTI¹, D. QUTUB¹, S.P. KISHVEDepartment of Otorhinolaryngology, Rural Medical College, Pravara Institute of Medical Sciences, Loni, Maharashtra, India; ¹ Rural Medical College, Pravara Institute of Medical Sciences, Loni, Maharashtra, India

SUMMARY

The present study examined the clinico-pathological profile of sinonasal masses in patients attending an Ear Nose Throat clinic of a rural tertiary care hospital of western Maharashtra in India, between May 2007 to June 2009. During the study period, 112 patients presented with sinonasal masses (male 68, female 44; age group 8-70 years). Nasal polypoid masses were non-neoplastic in 80 (71.4%) subjects, and neoplastic in 32 (28.6%) cases. Nasal obstruction was the most common (97.3%) presenting complaint, followed by rhinorrhoea (49.1%), hyposmia (31.25%), intermittent epistaxis (17.9%), headache (16.9%), facial swelling (11.6%) and eye-related symptoms (10.7%). The most common site of origin of polypoid masses was the middle meatus (54.4%) followed by the lateral wall of the nasal cavity (16.1%) and superior meatus (10.7%). Unilateral nasal masses was present in 47.7% patients, while the remaining patients had bilateral nasal masses. Allergic (62.5%) and inflammatory (25%) polyps were the most common non-neoplastic mass. Haemangioma (47.3%) and inverted papilloma (36.8%) were most common benign neoplastic mass; 92.3% of all malignant masses were squamous cell carcinoma. Surgery was the major mode of treatment. It included Caldwell-Luc operation (7.1%), polypectomy (17.8%), excision of mass (25.0%) and functional endoscopic sinus surgery (44.6%). Malignancies were treated with radiotherapy.

KEY WORDS: Sino nasal mass • Polyp • Nasal obstruction • Squamous cell carcinoma • FESS

RIASSUNTO

In questo studio vengono presi in esame gli aspetti clinico-patologici delle masse nasosinusali in pazienti seguiti presso la Clinica Otorinolaringoiatrica del centro di cura ospedaliero di Maharashtra in India, nel periodo compreso tra il maggio 2007 ed il giugno 2009. Durante il periodo di studio una massa nasosinusale è stata riscontrata in 112 pazienti (68 maschi, 44 femmine; range di età 8-70 anni). Masse naso sinusali di tipo non neoplastico sono state riscontrate in 80 pazienti (71,4%) mentre quelle di tipo neoplastico in 32 pazienti (28,6%). L'ostruzione nasale è stato il sintomo più comunemente riferito (97,32%), seguito da rinorrea (49,1%), iposmia (31,25%), epistassi intermittente (17,85%), cefalea (16,87%), tumefazione del volto (11,6%) e sintomi oculari (10,71%). La sede di origine più comune delle masse di tipo polipoidi è stato il meato medio (54,46%), seguito dalla parete laterale della cavità nasale (16,07%) e dal meato superiore (10,7%). Nel 47,74% dei pazienti sono state osservate masse naso sinusali unilaterali, mentre nei restanti casi le lesioni erano bilaterali. I polipi su base allergica (62,5%) ed infiammatoria (25%) rappresentavano le masse di tipo non neoplastico più comunemente osservate. Gli emangiomi (47,3%) e i papillomi invertiti (36,8%) rappresentavano le masse neoplastiche benigne osservate più di frequente. Il carcinoma a cellule squamose ha rappresentato il 92,3% di tutte le masse neoplastiche maligne. La chirurgia è stata la scelta principale per il trattamento dei pazienti, ed in particolare l'intervento di Caldwell-Luc (7,1%), la polipectomia (17,8%), l'escissione della massa (25%) e la chirurgia endoscopica sinusale funzionale (44,6%). Le neoplasie maligne sono state trattate con radioterapia.

PAROLE CHIAVE: Massa nasosinusale • Polipo • Ostruzione nasale • Carcinoma a cellule squamose • FESS

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Introduction

The nose is the most prominent part of the face with substantial aesthetic and functional significance. It is one of the few organs of body invested with an aura of emotional and cultural importance. Anatomical location of the nose and its passage have been regarded as the direct avenue to the brain, man's source of intelligence and spirituality. Nasal masses are common finding in an ENT (Ear, Nose and Throat) outpatient department. Most patients present

with complaints of nasal obstruction¹. Other symptoms include nasal discharge, epistaxis and disturbances of smell. A sinonasal mass can have various differential diagnoses. They may be congenital, inflammatory, neoplastic (benign or malignant) or traumatic in nature. A congenital nasal mass may present intranasally, extranasally, or as external nasal mass with or without nasal obstruction². Congenital masses are predominantly mid line swellings and include dermoids, glioma and encephaloceles as common diagnoses³. Polyps are a common cause of nasal ob-

struction in adults with a prevalence of about 4% in the general population⁴.

Polyp is a general term used to describe any mass of tissue that bulges or projects downwards from the normal surface and is macroscopically visible. It is also known as prolapsed pedunculated mucosa. This condition is well-known with little improvement in its treatment modality, although it is a common condition; the exact aetiopathological correlation is still unknown. Hippocrates gave a graphic description of nasal polypoidal masses as early as 460-370 B.C., and can thus be considered the "Father of Rhinology". Forestus (1522-1597 A.D.) described a case of a woman whose nasal polyps, according to him, were due to forcing of mucous membrane into the nose, which he attributed to her carrying heavy weights on her head. The trend and tradition of a clinical entity changes with time. Tandon et al.⁵ and Dasgupta et al.⁶ 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 has been lacking. The present investigation was undertaken to study the clinico-pathological profile of sinonasal masses in a rural tertiary care hospital of western Maharashtra, India.

Materials and methods

The study was carried out at Rural Medical College and Pravara Rural Hospital, Loni, which is a tertiary care hospital in western Maharashtra, India. The ENT department of the hospital predominantly receives patients from Ahmednagar and Nashik districts. All patients diagnosed with sinonasal masses during the period from May 2007 to June 2009 were included. The criteria for selection of cases were mainly based on history and clinical examination. Detailed history was taken considering the patients' complaints, mainly nasal obstruction, mass in the nose, epistaxis, rhinorrhoea, hyposmia and deformity of nose and face. Occupational history, personal habits and socioeconomic status of patients were documented. Socio-economic status was assessed according to the modified BG Prasad classification based on Consumer Price Index of April 2006^{7,8}. Clinical examinations were carried out as per standard protocols. Appropriate radiological and laboratory investigations were done as appropriate. Biopsy was taken from all cases for histopathological examination to confirm diagnosis. Earlier workers used different terms for the same pathological entity and the same term for lesions of different types. World Health Organization classification (1978, 1991)^{9,10} was adopted to describe the lesion. Patients were treated either by pharmacotherapy, surgery, radiotherapy or chemotherapy or a combination as appropriate. Patients were asked for regular follow up. Ethical approval was obtained from the Institutional Ethical Committee of the medical college. Data was analysed using Microsoft Office Excel 2007.

Results

During the study period, 112 patients presented with sinonasal masses, and confirmed by various investigations. The socio-demographic details of the study population are given in Table I.

Nasal polypoidal masses were non-neoplastic in 80 (71.4%) study subjects, and neoplastic in 32 (28.6%) patients (Table II). The age range of the patients were 8 to 70 years. Non-neoplastic polypoid masses were common in the age group 11 to 40 years. Benign neoplastic polypoid

Table I. Socio-demographic characteristics of study population.

	N (%)
Gender	
Male	68 (60.7)
Female	44 (39.2)
Total	112 (100)
Age Group	
< 10 years	11 (9.8)
11-20 years	24 (21.4)
21-30 years	22 (19.6)
31-40 years	23 (20.5)
41-50 years	15 (13.4)
51-60 years	6 (5.4)
61-70 years	11 (9.8)
Mean Age (in years), (SD)	31.2 (7.4)
Education	
Graduate and above	8 (7.1)
Intermediate/Matriculation	12 (10.7)
Secondary	20 (17.8)
Primary	32 (28.6)
Illiterate	40 (35.7)
Occupation	
Farmer	45 (40.2)
Labourer	37 (33)
Business	3 (2.7)
Service	5 (4.5)
Student	17 (15.1)
Others	5 (4.5)
Socioeconomic Status	
Upper	0 (0)
Upper middle	0 (0)
Middle	8 (7.1)
Lower middle	67 (59.8)
Lower	37 (33)
Dietary Habit	
Vegetarian	45 (40.2)
Non-vegetarian	67 (59.8)
Religion	
Hindu	63 (56.2)
Muslim	35 (31.3)
Christian	7 (6.2)
Others	7 (6.2)

Table II. Incidence of nasal masses and grouped according to gender.

Type of mass	Male	Female	Total
Non-neoplastic	46	34	80
Neoplastic			
Benign	12	07	19
Malignant	10	3	13
Total	68	44	112

Table III. Distribution of nasal masses according to age.

Age (years)	Non-neoplastic mass	Neoplastic mass		Total
		Benign	Malignant	
< 10	11	0	0	11
11-20	21	3	0	24
21-30	19	3	0	22
31-40	19	4	0	23
41-50	5	7	3	15
51-60	2	1	3	6
61-70	3	1	7	11
Total	80	19	13	112

masses were common in the age range of 11 to 50 years, while malignant neoplastic polypoid masses were more common after the third decade of life (Table III).

Nasal obstruction was the most common (97.3% cases) presenting complaint. Rhinorrhoea (49.1%), hyposmia (31.3%), intermittent epistaxis (17.9%), headache (16.9%), swelling over face (11.6%) and eye related symptoms (10.7%) were other common symptoms. Facial pain (3.9%) and external nasal deformity (1.8%) were demonstrated in a minority of patients. Unilateral nasal masses were observed in 47.7% patients, while the remaining patients had bilateral nasal masses. All the benign as well as malignant polypoid masses presented unilaterally, with the exception one benign neoplastic mass. Among non-neoplastic polypoid nasal masses, 69.4% were multiple and 30.6% presented as a single mass. All benign and malignant nasal polypoid masses were found to be single except in one malignant case (Table IV). The most common site of origin of the polypoid masses was

Table IV. Presentation of nasal masses in the nasal cavity.

	Non-neoplastic mass	Neoplastic mass		Total
		Benign	Malignant	
Laterality				
Unilateral	23	18	13	54
Bilateral	57	1	0	58
Total	80	19	13	112
Number				
Single	22	18	12	52
Multiple	50	0	1	51
Total	72*	18**	13	103

* Cases of rhinoscleroma are not considered; ** a case of angiofibroma is not considered.

Table V. Type of nasal discharge through nose.

	Non-neoplastic mass	Neoplastic mass	
		Benign	Malignant
Mucoid	27	02	-
Mucopurulent	15	01	-
Foul smelling	02	-	-
Blood-stained/intermittent epistaxis	03	01	13

the middle meatus (54.5%) followed by the lateral wall of the nasal cavity (16.1%) and superior meatus (10.7%). The study further revealed that of 70 cases of true nasal polyps, 60 (85.1%) originated from the middle meatus and 10 (14.3%) from the superior meatus. Mucoid discharge was found to be common in non-neoplastic nasal polypoid masses. All patients with malignant neoplastic polypoid masses presented with blood stained discharge or intermittent epistaxis (Table V).

Histopathological examination revealed that 44.6% (n = 50) of the polyps to be allergic in nature (ethmoidal polyp), while 17.8% (n = 20) were inflammatory (antrochoanal polyp). Rhinoscleroma and rhinosporidiosis were the other two non neoplastic lesions confirmed by histopathological investigation (Table VI). All patients with rhinoscleroma were in the third decade of life with a male-female ratio of 3:1 (6 males, 2 females). Among benign neoplastic lesions, haemangioma was the most common (n = 9) followed by inverted papilloma (n = 7). Mucocele and angiofibroma were only seen in 2 and 1 cases, respectively. Squamous cell carcinoma represented 92.3% all sinonasal malignancies (Table VI). Surgery was the major mode of treatment in all cases. It included Caldwell-Luc operation (7.1%), polypectomy (17.8%),

Table VI. Histopathological findings of nasal polypoid masses.

	N (%)
Non neoplastic mass	
Allergic polyp	50 (62.5)
Inflammatory polyp	20 (25)
Rhinoscleroma	8 (10)
Rhinosporidiosis	2 (2.5)
Total	80 (100)
Benign neoplastic mass	
Haemangioma	9 (47.3)
Inverted papilloma	7 (36.8)
Mucocele	2 (10.5)
Angiofibroma	1 (5.3)
Total	19 (100)
Malignant neoplastic mass	
Squamous cell carcinoma	12 (92.3)
Adenocarcinoma	1 (7.6)
Total	13 (100)

excision of mass (25.0%) and functional endoscopic sinus surgery (FESS) (44.6%). Chemotherapy and/or radiotherapy were considered as the treatment of choice in 17.8% of patients. Among 20 cases of antrochoanal polyp, 12 (60%) patients were treated with polypectomy by avulsion and 8 (40%) had undergone polypectomy with the Caldwell-Luc procedure. All 50 patients with bilateral ethmoidal polyps underwent polypectomy/FESS followed by steroid therapy. Only one patient developed recurrence of bilateral ethmoidal polyp. Malignancies were treated with radiotherapy.

Discussion

Sinonasal masses had predilection for males, demonstrating a male to female ratio of 1.5:1. It was higher (male-to-female ratio of 1.7:1) in the study by Zafar et al.¹¹ from India, while a study from Nigeria¹² revealed an opposite ratio showing female preponderance (M:F ratio of 1:1.2). A British review of nasal polyposis reported a ratio at 2:1 (M:F)⁴. The 2nd to 4th decades of life are the most vulnerable period for development of sinonasal masses. Bakari et al.¹² had reported a peak incidence of 33 years, while for Zafar et al.¹¹ the mean age of presentation was 22.5 years. Malignancies have been reported generally after the fourth decade of life.

Nasal polyps result from chronic inflammation of the nasal and sinus mucous membranes and are the most common tumours of the nasal cavity. Their exact pathogenesis is not known, however a strong association with allergy, infection, asthma and aspirin sensitivity has been implicated^{4,13}. We found 71.4% of the sinonasal masses to be non-neoplastic. Such a high proportion of non-neoplastic lesions has been reported in previous studies^{11,12,14}. Nasal polyp was the most common non-neoplastic mass and was similarly documented by those authors. True nasal polyps are subdivided into allergic nasal polyps, showing abundant eosinophils in the stroma in addition to inflammatory cells, whereas in the other type viz. inflammatory nasal polyps, there is a paucity of eosinophils. Ethmoidal and antrochoanal polyps are generally allergic and inflammatory in nature, respectively. This trend was also seen considering the two forms of the polyps in the present study. The incidence of rhinoscleroma (10%) was much higher than reported by another similar study¹¹, while no case was reported by Nigerian¹² or Nepali¹⁵ authors. Rhinosporidiosis, an endemic disease in India, Sri Lanka and a few African nations¹⁶ was also diagnosed and treated. We found 2 cases of rhinosporidiosis, while Pradhananga et al.¹⁵ had encountered only one case during their two-year study period. Rhinoscleroma and rhinosporidiosis are rare entities in the west (Europe and America) and scarcely documented among those who have never travelled to endemic areas^{17,18}.

Haemangioma is not regularly seen in the nasal cavity, though if it occurs, is predominantly capillary and is found attached to the nasal septum¹⁹. Cavertous haemangioma is rarely seen in the sinonasal tract²⁰. Among the benign lesions, capillary haemangioma (47.3%) was most common lesion in our study. All cases were found to be arising from the cartilaginous part of the nasal septum. This finding corresponds to the observation of Pradhananga et al.¹⁵. A clinicopathological study of haemangioma from Japan reported an usual origin of capillary type from the nasal septum and of the cavernous variety from the lateral nasal wall²¹. Inverted papillomas are comparatively rare, but this morphological variant is the most commonly encountered lesion of all sinonasal papillomas²². The other two morphological forms are exophytic (everted) squamous cell papilloma and cylindrical cell papilloma. Inverted papilloma formed 36.8% of all benign neoplastic masses, which was marginally higher from the findings of Humayun et al.¹ and Bakari et al.¹². Though it is a benign lesion but clinically it behaves as a potentially notorious pathology if not treated adequately and followed adequately. The rate of malignant transformation may be as high as 11%²³. Inverted papilloma was associated with squamous cell carcinoma of the sinonasal cavity in 6 (21.4%) of the 28 cases studied by Califano et al. in USA²⁴. Mucocele and angiofibroma were evident in 2 and 1 patients, respectively, while Pradhananga et al.¹⁵ reported 9 cases of angiofibroma over a period of two years in Nepal. Juvenile angiofibroma forms 0.5% of all head and neck tumours in Europe²⁵.

Malignancy of sinonasal tract is rare²⁶. The maxillary sinus is the most common site of origin²⁷, while the most common histological type is squamous cell carcinoma²⁸. It is rarely encountered before the 4th decade of life. It formed 11.6% of all lesions and 40.6% of neoplastic masses in our study. Histological investigation revealed squamous cell carcinoma in 92.3% (n = 12) of all malignant neoplastic sinonasal masses, and only 1 slide was identified to be adenocarcinoma. Svane-Knudsen et al. have similarly reported squamous cell carcinoma to be the most commonly encountered malignancy of sinonasal tract in Denmark²⁹. Pradhananga et al.¹⁵ reported 6.3% of their sinonasal masses to be malignant, while for Fasunla et al.²⁷ malignant sinonasal tumours constituted 59.4% of the 138 sinonasal neoplasms seen. The highest numbers of cases were seen in the age group 61-70 years with 7 study subjects. A Polish study reported 71-80 years to be the most commonly affected age group for malignancies of the sinonasal tract³⁰. All the tumours originated in the maxillary sinus (100%), eroding the lateral wall of nasal cavity.

The common presentation of the sinonasal masses were nasal obstruction, (97.3% cases), rhinorrhoea (49.1%), hyposmia (31.3%) and headache (16.9%). These findings compare favourably with other studies^{1,12,14,15}. Intermittent

epistaxis was noticed in 17.9% of cases with 12 of the malignant masses showing it as a regular feature. External deformity of nose and cheek is more common in neoplastic polypoid lesions, but can also be seen in long standing non-neoplastic polyps developing at an early age. Unilateral presentation was seen in 48.2% of cases. This was in contrast with the observations of Bakari et al.¹² where bilateral sinonasal masses were seen in 44.7% of cases, and unilateral lesions in 55.3% of patients. Non-neoplastic inflammatory polyps were usually unilateral and single, while allergic polyps were usually bilateral and multiple in agreement with the analysis of Frosini et al.³¹

Histopathological examination is conclusive in diagnosing the polypoid lesions, describing both aetiology and cellular details. It is the only means of determining the nature of the disease, i.e. inflammatory or neoplastic. Radiological investigations may also help in understanding the type of pathology, extension of lesion and associated sinus pathology. Most of non-neoplastic and benign neoplastic nasal masses require surgical excision, while malignant neoplastic nasal masses require wide surgical excision, radiotherapy or chemotherapy either alone or in combination. Regular follow-up is necessary for early detection of recurrence or metastases. The outcome for malignant lesions is relatively poor and associated with late diagnosis, difficult surgical anatomy and a lack of effective adjuvant modalities of treatment³². Topically applied corticosteroids have a favourable effect on symptoms³³. However, corticosteroids are only helpful in allergic conditions. FESS was the most commonly used surgical intervention (44.6%) followed by excision of the mass (25.0%). Polypectomy and Caldwell-Luc procedure for nasal polyposis are certainly associated with a risk of recurrence. FESS offers a definite advantage over other procedures and is now the preferred modality³⁴. Complete surgical resection followed by adjuvant radiotherapy is an effective and safe approach in the treatment of sinonasal cancer and associated with better survival^{35 36}. However, radiotherapy was the only mode of treatment offered to patients in our clinic.

Conclusions

Sinonasal masses have various differential diagnoses. Malignancy should be distinguished from non-malignant lesions. Benign conditions show a peak during second to fourth decade of life, while malignancy is generally observed only after the 4th decade. Polyps are the most common benign lesion, while squamous cell carcinoma is the most common malignant tumour of the sinonasal tract. Nasal obstruction is the most common symptom. Medical management is often not adequate and has a limited role. Surgery is the treatment of choice for benign lesions, while a combination of surgery and radiotherapy is helpful in malignant conditions.

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