Clinico-pathological Profile and Management of Sino-nasal Masses: A Prospective Study

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Abstract The work was planned to study—the demographic profile of sino-nasal masses, the clinical and radiological findings of sino-nasal masses and the correlation of the clinical and radiological findings with the histopathology. The study was conducted on the patients having sino-nasal masses admitted in Department of ENT, SMS Hospital, Jaipur from August 2008 to July 2010. The study was designed to evaluate the demographic distribution, clinicopathological features, radiological finding of sino-nasal masses and to evaluate the correlation of clinical and radiological findings with the histopathological diagnosis. Comparison of clinical and radiological findings in our study showed that in 83.07 % patients the radiological findings were consistent with that of clinical suspicion. In rest either the radiological findings were different or inconclusive. It is concluded that for proper evaluation of nasal polyps clinical, radiological and histopathological evaluation should be done in all the patients, where radiology provides a road map to the endoscopic surgeons and

warns of any existing or impending complications. Histopathology always gives a confirmatory diagnosis.

Keywords Sino-nasal masses ·
Correlation of histopathology with radiology ·
Nasal polyps · FESS

Introduction

A variety of neoplastic, non neoplastic and inflammatory conditions involve the sino-nasal cavity and these are very common lesions encountered in clinical practice. The incidence is often stated to be between 1 and 4 % of the population [1]. Neoplasms of the sinuses and nasal cavity account for 0.2–0.8 % of all carcinomas [2].

Sino-nasal masses may be of inflammatory origin, infective origin, neoplastic and miscellaneous type. Inflammatory masses include polyps which are usually allergic in origin these are the commonest nasal masses. The prevalence rate of nasal polyposis is about 2 % [3].

Sino-nasal tumor poses significant problems of management due their late presentation and juxtaposition to important anatomical structures such eye and brain. The increasing application of endonasal endoscopic techniques to their excision offers potentially similar scales of resection but with reduced morbidity [4]. A detailed history, clinical examination, diagnostic nasal endoscopy along with advanced imaging (CT scan and or MRI) are required to make a presumptive diagnosis. Radiographic evidence of thickened mucosa, sinus opacification and bone erosion helps us to diagnose different diseases. However a careful histopathological examination is necessary to decide the nature of any particular lesion for final diagnosis and for management accordingly.

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Aims and Objectives

This work was planned to study

- (1) The demographic profile of sino-nasal masses.
- (2) The clinical and radiological findings of sino-nasal masses.
- (3) The correlation of the clinical and radiological findings with the histopathology.

Materials and Methods

The study was designed to evaluate the demographic distribution, clinicopathological features, radiological finding of sino-nasal masses, relative incidence and to classify the lesions in neoplastic and non neoplastic lesions. After establishment of accurate diagnosis their optimum management was done.

The study was conducted on all the patients having sino-nasal masses attending in patient department of ENT, SMS Hospital, Jaipur from August 2008 to July 2010.

A detailed history was taken with special reference to age, sex, residence, occupation, family history, past history, allergic disorders, any addictive habits detailed clinical examination local and general were made with special reference to nose and Paranasal sinuses. These cases were subjected to routine biochemical and haematological evaluation. Nasal endoscopy, X-ray PNS, CT scanning non enhanced/enhanced, MRI, FNAC, and biopsy were conducted. The tissues were routinely processed for histopathological sections of 5 µg thickness and were stained by haematoxylin and eosin stain. Special staining by reticulin, von Giesen, PAS, and Masson's trichrome were undertaken whenever applicable. Immunohistochemical marker studies were done whenever indicated.

Observation and Discussion

The incidence of mass in nasal cavity and paranasal sinuses was 51.11 per 1,000 cases admitted to ENT Wards of SMS Medical College, Jaipur from August 2008 to July 2010. Hospital admission incidence of sino-nasal masses found to be 1.55 per 1,000 admissions in SMS Hospital.

In present study of 264 cases (Table 1) of sino-nasal masses inflammatory and tumor like lesions were 68.56 % cases, benign tumors were 22.72 % (60 cases) and the malignant were 8.71 % (23 cases). The ratio of inflammatory and tumor like lesions to neoplastic lesions was 2.18:1. Similarly Lathi et al. [5] reported 71.4 % non neoplastic and 28.6 % neoplastic cases in their study of 112 patients with sino-nasal masses.

Inflammatory and tumor like lesions were mainly seen in 21–30 years of age (34.80 %) with a mean age of 30.11 years. Benign lesions were mainly seen in 11–20 years of age (43.33 %) with a mean age of 28 years and the malignant lesions were commonly seen beyond 40 years of age with a mean of 53 years of age (Fig. 1). Overall sex ratio (M:F) for sino-nasal masses was found to be 2.1:1. It was 1.7:1 for inflammatory lesions (Table 2), 4.4:1 for the benign tumors (Table 3) and 2.8:1 for the malignant lesions (Table 4). In inflammatory and tumor like lesions the most common was ethmoidal polyp (51.37 %), followed by antrochoanal polyp (27.07 %) (Table 2).

We had 60 cases of benign sino-nasal lesions (Table 2). They constitute 22.72 % of all sino-nasal masses. 43.33 % of those were of age group of 10–20 years of age. This was due to high number of cases of angiofibromas, a disease affecting adolescent males. Benign lesions are rarely (6.61 %) seen above 61 years of age. The findings of present study closely resembled those of Narayana Swami and Gowda Chandre [6]. The most common benign neoplastic lesions to be found was angiofibroma (28/60) 46.67 % of cases, followed by pyogenic granuloma with 12 (20 %) cases. The sex ratio for benign sino-nasal tumors reported by Das and Rashid [7] and Khan [8] was 2.72:1 and 2.75:1. However we found a sex ratio of 4.4:1 this was because of the high proportion of angiofibroma (an exclusive male disease) and inverted papilloma (a predominantly male disease) cases in present study. This finding was shared by Shashin et al. [9]. Their study showed even higher sex ratio of 7.5:1 for the similar reason.

The mean age for malignant sino-nasal tumors was 53 years. Squamous cell carcinomas of maxilla were the commonest malignant lesion with 47.82 % of total malignant cases (Table 4).

In present study we did not find any significant correlation of smoking and alcohol consumption with sino-nasal masses.

Patient presented with complaint (Table 5) of nasal mass were 92.81, 71.66 and 73.9 % for inflammatory, benign, and malignant lesions respectively. Nasal discharge and nasal obstruction were the main complains of the patient with inflammatory and tumor like lesions. 75 % patient of benign lesions presented with complain of minor to significant nasal bleeding this was due to higher number of cases of angiofibromas and haemangiomas. Pain was complained by 43.47 % and secondaries in neck by 34.6 % cases of malignant masses. But the secondaries in the neck were shown by nasopharyngeal malignancies.

80 % patients with benign sino-nasal mass in present study presented with complaint of nasal obstruction. 71.6 % patient gave history of nasal bleed. This high

Table 1 Comparison of distribution of sino-nasal lesions in present study with earlier studies on the basis of their nature

	No. of cases	Inflammatory and tumor like lesions (%)	Benign tumors (%)	Malignant tumors (%)
Tondon et al. [14]	134	74.61	16.8	8.6
Dasgupta et al. [15]	354	50.7	31.88	17.4
Diamantopoulos [13]	2,021	90.5	4.8	4.8
Shashin et al. [9]	193	76.68	8.80	13.47
Khan [8]	240	60	23.33	16.67
Lathi et al. [5]	112	71.4	16.96	11.60
Present study	264	(181) 68.56	(60) 22.72	(23) 8.71

Fig. 1 Age wise distribution of Sino-nasal masses **Table 2** Distribution of inflammatory and tumor like lesions

Inflammatory and tumor like lesions	Male	Female	Mean age (year)	Total	%
Antrochoanal polyp	25	24	19.4	49	27.07
Ethmoidal polypi	63	30	35	93	51.37
Fungal Granuloma	10	6	36.4	16	8.84
Rhinosporidiosis	9	4	29.6	13	7.18
Rhinoscleroma	1	–	31	3	0.55
Mucocele	4	1	33.4	5	2.76
Rhinolith	2	2	9.25	4	2.21
Total	114	67	30.11	181	

number of nasal bleed was due to higher number (46.67 %) of cases of angiofibromas and haemangiomas (25 %) invariably presenting with episodes of minor to significant nasal bleed. Similar finding was noted by Khan [8] and Shashin et al. [9]. Facial swelling was seen in 23.3 %, and ear findings in 10 % of cases. Ear symptoms included pain, discharge and decrease hearing due secretory otitis media or adhesive otitis media. 10 % patient had palatal bulge. In a similar study by Lathi et al. [5] nasal obstruction was the most common (97.3 % cases) presenting complaint followed by rhinorrhoea (49.1 %), hyposmia (31.3 %), intermittent epistaxis (17.9 %), headache (16.9 %), swelling over face (11.6 %) and eye related symptoms (10.7 %).

Pain is an important feature in present study which has been complained of by 39.1 % patients of sino-nasal malignancies, so it is imperative that every case presenting with facial pain or headache should be investigated thoroughly to rule out any hidden malignancy.

Nasal endoscopy allows a thorough evaluation of intra-nasal anatomy and identification of pathology that is impossible to see using standard techniques of anterior rhinoscopy. It has proven more sensitive than CT scan for the evaluation of accessible disease and provides valuable information regarding asymptomatic disease postoperatively.

The diagnostic algorithm for sinus diseases continues to evolve along with the advances in imaging modality. Plain

Table 3 Age and sex distribution of benign sino-nasal tumors

Benign tumors	Male	Female	Mean age	Total	%
Angiofibroma	28	–	17.14	28	46.67
Pyogenic granuloma	6	6	34.08	12	20
Inverted papilloma	10	–	53.5	10	16.67
Cavernous haemangioma	1	2	42	3	5
Ectopic meningioma	2	–	21	2	3.33
Ossifying fibroma	1	1	16.5	2	3.33
Nasolabial cyst	1	1	21	2	3.33
Fibrous dysplasia	–	1	22	1	1.67
	49	11	28	60	

Table 4 Age and sex distribution of malignant sino-nasal tumors

Malignant tumors	Male	Female	Mean age	Total	%
Squamous cell CA of Maxilla	7	4	53	11	47.82
Nasopharyngeal CA	6	–	51.83	6	26.09
Malignant melanoma	1	–	65	1	4.35
Adeno CA of ethmoid	1	–	66	1	4.35
Mucoepidermoid CA	–	2	51	2	8.7
Esthesioneuroblastoma	1	–	13	1	4.35
Plasmacytoma	1	–	85	1	4.35
	17	6	53	23	

Table 5 Clinical profile of sino-nasal lesions

Symptoms and signs	Inflammatory and tumor like lesions (181)	Benign tumors (60)	Malignant tumors (23)
Nasal discharge	122 (72.18 %)	39 (65 %)	12 (52.1 %)
Nasal obstruction	169 (93.37 %)	48 (80 %)	12 (52.1 %)
Nasal mass	168 (92.81 %)	43 (71.66 %)	17 (73.9 %)
Bleeding per nose	31 (17.12 %)	45 (75 %)	14 (60.9 %)
Headache	72 (39.77 %)	11 (18.33 %)	2 (8.7 %)
Pain	3 (1.65 %)	5 (8.33 %)	10 (43.47 %)
Sneezing	41 (22.65 %)	1 (1.66 %)	1 (4.3 %)
Post nasal drip	34 (18.78 %)	6 (10 %)	5 (21.7 %)
Sinuses tenderness	76 (41.98 %)	9 (15 %)	12 (52.1 %)
Alteration in smell	80 (44.19 %)	16 (26.6 %)	4 (17.3 %)
Swelling face	2 (1.1 %)	14 (23.3 %)	11 (47.82 %)
Proptosis	8 (4.41 %)	5 (8.3 %)	6 (26 %)
Nasal intonation of voice	30 (16.57 %)	10 (16.67 %)	8 (34.7 %)
Epiphora	12 (6.62 %)	2 (3.33 %)	3 (13)
Loosening of tooth	–	1 (1.66 %)	7 (30.4)
Palatal bulge	3 (1.65 %)	10 (16.67 %)	7 (30.4)
Ear findings	30 (16.57 %)	6 (10 %)	4 (17.3)
Neck swelling	–	–	8 (34.6)

radiographs were once the mainstay of diagnosis of the sinus disease and now have been replaced by high resolution computerized tomography for the evaluation of the

sinus diseases. Plain radiographs do not allow adequate evaluation of the osteomeatal complex or of the sphenoid and ethmoid sinuses because of overlapping anatomic

Table 6 Correlation of clinical, radiological and histopathological diagnosis

Clinical diagnosis	No. of patients	Radiological diagnosis	No. of patients	Histopathological diagnosis	No. of patients
B/L nasal polyposis	60	Sinusitis with polyposis	50	Inflammatory polyp	48
				Fungal sinusitis	2
		Fungal sinusitis	10	Fungal sinusitis	6
				Chronic inflammation	4
Chronic sinusitis without polyposis	59	Sinusitis with polyposis	39	Chronic inflammation	38
				Fungal sinusitis	1
		Fungal sinusitis	6	Chronic inflammation	3
				Fungal sinusitis	3
		Antrochoanal polyp	2	Chronic inflammation	2
		Mucocele	5	Chronic inflammation	5
		Rhinolith	4	No biopsy done	4
		Meningioma	2	Meningiomas	2
		Malignant mass	1	Round cell tumor	1
Fungal sinusitis	4	Fungal sinusitis	4	Fungal sinusitis	4
Antrochoanal polyp	46	Antro choanal polyp	45	Inflammatory polyp	45
		Nasal mass? Inverted papilloma	1	Inverted papilloma	1
Haemangioma	16	Haemangioma	4	Lobular capillary haemangioma	3
				Cavernous haemangioma	1
		Nasal mass	2	Cavernous haemangioma	1
				Rhinosporidiosis	1
		CT not done in 10 cases ^a	10	Lobular capillary haemangioma	10
Angiofibroma	28	Angiofibroma	28	Angiofibroma	28
Inverted papilloma	9	Inverted papilloma	3	Inverted papilloma	3
		Nasal mass	5	Inverted papilloma	5
		Antrochoanal polyp	1	Inflammatory polyp	1
Rhinosporidiosis	13	Rhinosporidiosis	4	Rhinosporidiosis	4
		nasal mass	8	Rhinosporidiosis	8
		Antrochoanal polyp	1	Inflammatory polyp	1
Rhinoscleroma	1	Nasal mass	1	Rhinoscleroma	1
Nasolabial cyst	2	Nasolabial cyst	2	Nasolabial cyst	2
Nasopharyngeal carcinoma	6	Nasopharyngeal carcinoma	6	Squamous cell carcinoma	4
				Undifferentiated	2
Malignant melanoma	1	Mass/tumor	1	Malignant melanoma	1
Tumor benign/malignant	4	Fibrous dysplasia	1	Fibrous dysplasia	1
		Ossifying fibroma	1	Ossifying fibroma	1
		Nasal mass	2	Extramedullary plasmacytoma	1
				Inverted papilloma	1
Malignant tumor	15	Malignant tumor	13	Squamous cell carcinoma	11
				Adenocarcinoma	1
				Mucoepidermoid carcinoma	1
		Mucoepidermoid?	1	Mucoepidermoid carcinoma	1
		Ossifying fibroma	1	Ossifying fibroma	1

^a Small anteriorly placed lesion

structures. CT scan has been very useful and informative as an aid in diagnosis and tumor staging, and for appropriate management. All the patient of sino-nasal masses had

undergone CT scan except 10 cases having small lesions confined to nasal septum anteriorly and could be easily visualized.

Several studies have provided evidence that CT and symptoms do not necessarily correlate. In a study by Bolger et al. [10] 42 % of asymptomatic patients had mucosal changes on CT scan. In a study Stankiewicz and Chow [11] examined 78 patients meeting chronic rhinosinusitis symptom criteria of which only 47 % had evidence of chronic rhinosinusitis on CT. A prospective study of patients without chronic rhinosinusitis by Flinn et al. [12] found that 27 % had mucosal changes suggestive of chronic rhinosinusitis.

In present study, endoscopic sinus surgery was the surgical procedure used most frequently. Most of the inflammatory and tumor like lesions managed by endoscopic surgery. Angiofibromas were excised by endoscopic (1), transpalatine (7), transantral (13), and maxillary swing approaches (7). Total and partial maxillectomies were used for malignant lesions. In three cases of large angiofibromas (operated by maxillary swing approach) temporary occlusion of external carotid artery was done by using Bulldog clamps and it significantly reduced the intraoperative bleeding during tumor handling, tumor removal, and ligation of internal maxillary artery. So we recommended that for vascular tumor of large size temporary occlusion of feeding vessel should be done as it significantly reduces the blood loss and acts as 'temporary embolization' of feeding vessels without any complication of embolization.

Comparison of clinical and radiological findings (Table 6) in our study showed that there were 211 patients out of 254 (83.07 %) in whom the radiological findings were consistent with that of clinical suspicion. In 43 (16.73 %) patients either the radiological findings were different or inconclusive. However in 11 (4.33 %) patients radiological findings changed the plan of management. Comparison of histopathological findings with clinical findings showed that of the 119 patients with clinically non-neoplastic benign polyps, 100 patients had inflammatory, 12 fungal nasal polypi, 4 rhinolith, 2 meningioma, and 1 case of esthesioneuroblastoma.

A previous study by Diamantopoulos et al. [13] on 2021 patients reported that 1.1 % of their patients had histopathological findings which were different from their clinical diagnosis and led to alteration in management. However, histopathology still remains the gold standard for diagnosis in most cases.

Conclusion

Both nasal endoscopy and CT are objective measures that can increase accuracy of diagnosis in nasal pathologies. For areas that are not accessible to nasal endoscopy, CT can be useful in identifying disease and its extension. It is concluded that significant lesions can be missed on either

clinical or radiological evaluation and a thorough histopathological evaluation should be done in all cases of nasal polypoidal lesions for accurate diagnosis and management. Radiology proves to be indispensable in cases of nasal polyps as it provides a road map to the endoscopic surgeon and warns one of any existing or impending complications. Histopathology gave a confirmatory diagnosis in all cases in present series and was the gold standard investigation in all cases of nasal polyps. We had a few drawbacks in our study like the inability to use special fungal stains and to check IgE levels and skin test reports in most of our patients due to lack of affordability. But we think that these drawbacks have not significantly affected our results.

Conflict of interest Author declared no conflict of interest.

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