

Clinico-histopathological Features of Sinonasal Lesions: An Experience from a Tertiary Care Hospital, Central India

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ABSTRACT

Introduction: Sinonasal Tract (SNT) lesions are frequently observed in the Ear, Nose and Throat (ENT) practice. These lesions have identical appearance and usually present with nasal obstruction, but have varying differential diagnosis that requires histopathological confirmation. Though a common pathology, studies correlating clinical and histopathological diagnosis of SNT lesions are scarce among patients residing in Central India.

Aim: To assess the prevalence of various lesions in SNT, compare the lesion in relation to age and sex, and simultaneously relate the clinical and histopathological diagnosis.

Materials and Methods: This was a cross-sectional study carried out, in the Department of ENT and Head and Neck Surgery, Gajraraja Medical College, Gwalior, Madhya Pradesh, India, between May 2019 to December 2020. A total of 109 patients with SNT lesions were evaluated and a provisional diagnosis was reached after evaluating the history, and performing the clinical examination. The SNT lesions were excised operatively and definitive diagnosis was reached after histopathologic examination. Finally, clinical diagnosis was related with histopathologic diagnosis and

percentage of patients in which clinical diagnosis similar to the histopathological diagnosis was calculated.

Results: A total of 109 patients with SNT lesions were evaluated and the most common age groups to be affected were 21-30 and 31-40 years (22.9% each). Majority of the patients were males (53.2%) and had the complaints for the last three months to a year (63.3%). The most common complaint was nasal obstruction (93.6%) followed by rhinorrhoea (71.6%). Most common types of lesions were non neoplastic (77.1%). Among the neoplastic lesion, majority were benign (70.8%). Among various lesions, inflammatory nasal polyp (78.8%), haemangioma (47.1%), and Squamous Cell Carcinoma (SCC) (57.1%) were the most commonly observed non neoplastic, benign, and malignant lesions, respectively. The concordance between clinical and histopathological diagnosis was 88.1%, as 96 patients out of 109 clinically diagnosed patients, were confirmed on histopathology.

Conclusion: The SNTs lesions are complex and their nature varies widely. The histopathological examination is essential to confirm the diagnosis and manage the patients, especially in patients with malignant lesions.

Keywords: Excised, Nasal cavity, Nasal obstruction, Neoplastic lesions, Polyps

INTRODUCTION

The nasal cavity and paranasal sinuses together constitute the SNT [1]. This tract is affected by a wide array of both non neoplastic and neoplastic lesions, which are frequently encountered in clinical practice. Among these lesions, Sinonasal Masses (SNMs) are one of the commonest presenting complaints in the ENT Outpatient Department and have a prevalence of 1-4% [2]. The SNMs can be congenital, inflammatory, traumatic, or neoplastic (benign or malignant) in origin and thus, have a variety of differential diagnoses. Among SNMs, nasal polyps are frequently reported with a prevalence of 2% [3]. The polypoidal SNMs result in various symptoms including obstruction, epistaxis, blood-stained nasal discharge, rhinorrhoea, and rarely facial pain and deformity [4].

Tumours in the SNTs are infrequently reported and constitute around 3% of all malignancies involving the head and neck region and also around 1% of the tumour affecting the human body [5]. These tumours usually present with features that are occasionally non specific and can imitate those of inflammatory SNT diseases such as nasal obstruction and discharge [6]. On the basis of histopathology, tumours can be either benign or malignant. The commonly observed benign tumours are haemangioma and inverted papilloma; while, the frequently observed malignant tumour is SCC which comprises 80% of the malignant tumours involving the SNT [7].

To arrive at a differential diagnosis, a complete clinical evaluation comprising of detailed history, radiological imaging, and endoscopic evaluation are required. However, to reach a definitive diagnosis, histopathological examination is necessary [8]. Thus, a combination

of clinical and histopathological examination results in opportune diagnosis and management [9]. Hence, the objective of the present study was to assess the prevalence of various lesions in SNT, compare the lesion in relation to age and sex, and simultaneously, relate the clinical and histopathological diagnosis.

MATERIALS AND METHODS

This was a cross-sectional study carried out, between May 2019 and December 2020, in the Department of ENT and Head and Neck Surgery, Gajraraja Medical College, Gwalior, Madhya Pradesh, India. Prior to the beginning of the study, the protocol was approved by the Institutional Ethics Committee (62/IEC/GRMC/2019) and written informed consent was obtained from the patients.

Inclusion criteria: All patients with the lesions in the SNT or symptoms of nasal blockage, epistaxis, or rhinorrhoea were enrolled in the study.

Exclusion criteria: Those patients not willing to undergo surgery or biopsy, previously treated for the lesions in SNT with recurrence, or specimens poorly preserved in formalin were excluded.

Study Procedure

A total of 109 postoperative specimens fixed in formalin, accompanied by detailed history, and findings of clinical and radiological examinations were obtained from the ENT Department. Following which, specimens were grossly examined and all the available findings (i.e., history, clinical, laboratory, radiological, and gross examination) were recorded in a specifically designed case report form. Adequate sections were obtained from the specimens and then the sections were subjected to Haematoxylin and Eosin (H&E) stains. Moreover, immunohistochemical

and special stains were used to finalise the diagnosis, wherever required. Finally, histopathological findings were recorded in the case report form.

Other data pertaining to age, sex, presenting complaints, duration of complaints, general examination, local examination of site, and other characteristics of lesions in SNT were recorded. For the presentation of the results, the lesions in SNT were divided into neoplastic and non neoplastic. The neoplastic lesions were further divided into benign and malignant.

STATISTICAL ANALYSIS

The present study was descriptive in nature and non parametric data was represented in terms of frequencies (N) and percentages (%).

RESULTS

Majority of the patients were males (58, 53.2%) and had the presenting complaints for the last three months to a year (69, 63.3%). Most common types of lesions affecting the SNT were non neoplastic (85, 78.0%), involved the nasal cavity (86, 78.9%), and aroused from the right side of the nasal cavity (40, 36.6%). Among the neoplastic lesion (24, 22.01%), majority were benign (17, 70.8%) [Table/Fig-1].

Characteristics	Number of patients (N)	Percentages (%)
Sex		
Male	58	53.2
Female	51	46.8
Duration of complaints		
<3 months	6	5.5
3 months-1 year	69	63.3
>1 year	34	31.2
Type of lesions		
Neoplastic	24	22.01
Non neoplastic	85	78.0
Site of lesions		
Nasal cavity	86	78.9
Paranasal sinuses	23	21.1
Laterality of lesion		
Left	36	33.1
Right	40	36.6
Bilateral	33	30.3

[Table/Fig-1]: Distribution of patients on the basis of sex, duration of complaints, types, sites, and laterality of lesion.

The most and least common age groups to be affected were 21-30 and 31-40 years (both 25, 22.9%), and 0-10 years (2, 1.8%), respectively. The youngest and oldest patients were a six-year-old girl and a 76-year-old woman, respectively. The most common complaint was nasal obstruction (102, 93.6%) followed by rhinorrhoea (78, 71.6%), while the least common complaint was facial swelling (29, 26.6%). Both males (47, 43.1%) and females (38, 34.9%) were frequently affected by non neoplastic lesion of the SNT [Table/Fig-2]. Among the lesions involving the SNT, inflammatory nasal polyp (67, 61.5%), haemangioma (8, 7.3%), and SCC (4, 3.7%) were the most commonly observed non neoplastic, benign, and malignant lesions, respectively [Table/Fig-3].

On the basis of the age groups affected, the non neoplastic lesions were most commonly observed in 31-40 years age group (23, 21.1%) followed by 21-30 years age group (21, 19.27%). Following the similar trend, inflammatory nasal polyps were frequently observed in 31-40 years (22, 25.9%) followed by 21-30 years (15, 17.6%) age group. Allergic polyps were frequently observed in 41-50 years age group (3, 3.5%). While, rhinosporidiosis was frequently observed 61-70 years age group (3, 3.5% each). Moreover, fungal infections were observed in 11-30 years age group. Majority of the benign and malignant neoplasms were reported after fourth and fifth decade, respectively. Haemangioma was observed equally in 11-20, 21-30,

Characteristics	Non neoplastic (N=85)	Neoplastic lesions (N=24)		Total cases	Percentage (%)
		Benign	Malignant		
Presenting complaints					
Nasal obstruction	78	17	7	102	93.6
Rhinorrhoea	62	12	4	78	71.6
Nasal mass	32	10	6	48	44.1
Epistaxis	45	10	5	60	55.1
Hyposmia	43	9	3	55	50.5
Headache	39	6	3	48	44.1
Facial swelling	18	7	4	29	26.6
Sex					
Male	47	7	4	58	53.2
Female	38	10	3	51	46.8
Age groups (years)					
0-10	2	0	0	2	1.8
11-20	15	2	0	17	15.6
21-30	21	3	1	25	22.9
31-40	23	1	1	25	22.9
41-50	10	6	0	16	14.7
51-60	4	4	2	10	9.2
61-70	8	1	1	10	9.2
71-80	2	0	2	4	3.7

[Table/Fig-2]: Distribution of the patients on the basis of presenting complaints, sex and age groups.

Histopathological findings	Number of patients	Percentage (%)
Inflammatory polyp	67	61.5
Allergic nasal polyp	08	7.3
Rhinosporidiosis	05	4.6
Mucormycosis	02	1.8
Aspergillosis	01	0.9
Rhinocleroma	01	0.9
Nasolabial cyst	01	0.9
Haemangioma	08	7.3
Inverted Papilloma (IP)	04	3.7
Pleomorphic Adenoma (PA)	01	0.9
Fibroma	01	0.9
Neurofibroma	01	0.9
Schwannoma	01	0.9
Angiofibroma	01	0.9
Squamous Cell Carcinoma (SCC)	04	3.7
Acinar Cell Carcinoma (ACC)	01	0.9
Primitive Neuroectodermal Tumour (PNT)	01	0.9
Olfactory Neuroblastoma (ON)	01	0.9
Total	109	100

[Table/Fig-3]: Distribution of patients on the basis of histopathological findings.

and 41-50 years age group (2, 11.8% each). However, the SCC (SCC) was the most commonly observed in 51-60 years age group (3, 42.9%) [Table/Fig-4].

On the basis of the sex affected, the non neoplastic lesions were most commonly observed in males (47, 55.3%). Following the similar trend, inflammatory nasal polyps were frequently observed in males (40, 47.1%). However, allergic polyps (6, 7.1%) and rhinosporidiosis (2, 2.3%) were frequently observed in females. The benign neoplastic lesions revealed a female predominance (9, 52.9%). However, haemangioma was equally observed in males and females (4, 23.5% each). In contrast to benign lesions, malignant lesions revealed a male predominance (5, 71.4%). Similarly, SCC was predominantly observed in males (3, 42.8%) [Table/Fig-5].

Types of lesions	Age groups (years)								N
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	
Non neoplastic lesions									
Inflammatory polyp	2	13	16	21	7	3	3	2	67 (78.8)
Allergic polyp	0	0	2	1	3	0	2	0	8 (9.4)
Rhinosporidiosis	0	0	2	0	0	0	3	0	5 (5.9)
Mucormycosis	0	2	0	0	0	0	0	0	2 (2.3)
Aspergillosis	0	0	1	0	0	0	0	0	1 (1.2)
Rhinoscleroma	0	0	0	1	0	0	0	0	1 (1.2)
Nasolabial cyst	0	0	0	0	0	1	0	0	1 (1.2)
Total	2	15	21	23	10	4	8	2	85 (100)
Benign lesions									
Haemangioma	0	2	2	1	1	2	0	0	8 (47.1)
IP	0	0	0	0	2	1	1	0	4 (23.5)
PA	0	0	0	0	1	0	0	0	1 (5.9)
Fibroma	0	0	0	0	1	0	0	0	1 (5.9)
Neurofibroma	0	0	0	0	1	0	0	0	1 (5.9)
Schwannoma	0	0	0	0	0	1	0	0	1 (5.9)
Angiofibroma	0	0	1	0	0	0	0	0	1 (5.9)
Total	0	2	3	1	6	4	1	0	17 (100)
Malignant lesions									
SCC	0	0	0	1	0	2	0	1	4 (57.1)
ACC	0	0	0	0	0	0	0	1	1 (14.3)
PNT	0	0	0	1	0	0	0	0	1 (14.3)
ON	0	0	0	0	0	0	1	0	1 (14.3)
Total	0	0	1	1	0	2	1	2	7 (100)

[Table/Fig-4]: Distribution of patients on the basis of age groups and types of lesions.

Inf. Polyp: Inflammatory polyp; IP: Inverted papilloma; PA: Pleomorphic adenoma; SCC: Squamous cell carcinoma; ACC: Acinar cell carcinoma; PNT: Primitive neuroectodermal tumour; ON: Olfactory neuroblastoma

Clinical and histopathological concordance revealed that among non neoplastic lesions, of 82 (85.42%), 5 (5.21%), 5 (5.21%), and 4 (4.16%) clinically diagnosed patients of inflammatory polyps, fungating mass, rhinosporidiosis, and inverted papilloma, 74 (90.2%), 3 (60%), 4 (80%), and 3 (75%), respectively, were confirmed on histopathology. Among benign lesions, all the eight patients were clinically diagnosed as haemangioma were confirmed on histopathology. Similarly, among malignant lesions, all the four patients clinically diagnosed as malignancy were confirmed on histopathology. Finally, out of 109 clinically diagnosed patients, 96 were confirmed on histopathology. Thus, the clinico-histopathological concordance was 88.1% [Table/Fig-6].

Photomicrograph of non neoplastic, benign, and malignant SNT lesions are illustrated in [Table/Fig-7,8,9].

Clinical diagnosis	Histopathological diagnosis													
	IFN	IP	FM	HAE	Rhino	FIB	Mal	RSL	NLC	PA	NF	SCW	NAF	
Nasal polyposis with sinusitis (N=82)	74	1	-	1	1	-	3	1	-	-	-	1	-	
FM (N=5)	-	-	3	-	-	-	-	-	-	-	1	-	1	
Rhino (N=5)	-	-	-	-	4	-	-	-	1	-	-	-	-	
Fibroma (N=1)	-	-	-	-	-	1	-	-	-	-	-	-	-	
IP (N=4)	-	3	-	-	-	-	-	-	-	1	-	-	-	
Haemangioma (N=8)	-	-	-	8	-	-	-	-	-	-	-	-	-	
Malignancy (N=4)	-	-	-	-	-	-	4	-	-	-	-	-	-	

[Table/Fig-6]: Clinical diagnosis and histopathological features of lesions in SNT.

IFN: Inflammatory nasal polyp; IP: Inverted papilloma; FM: Fungating mass; Mal: Malignancy; RSL: Rhinoscleroma; HAE: Haemangioma; Rhino: Rhinosporidiosis; FIB: Fibroma; NLC: Nasolabial cyst; PA: Pleomorphic adenoma; NF: Neurofibroma; SCW: Schwannoma; NAF: Nasopharyngeal angiofibroma

Types of lesions	Sex				Total
	Males		Females		
	(N)	(%)	(N)	(%)	
Non neoplastic lesions					
Inflammatory Polyp	40	59.7	27	40.3	67
Allergic Polyp	2	25	6	75	8
Rhinosporidiosis	2	40	3	60	5
Mucormycosis	0	0	2	100	2
Aspergillosis	0	0	1	100	1
Rhinoscleroma	1	100	0	0	1
Nasolabial Cyst	1	100	0	0	1
Benign lesions					
Haemangioma	4	50	4	50	8
IP	3	75	1	25	4
PA	0	0	1	100	1
Fibroma	0	0	1	100	1
Neurofibroma	0	0	1	100	1
Schwannoma	0	0	1	100	1
Angiofibroma	1	100	0	0	1
Malignant lesions					
SCC	3	75	1	25	4
ACC	0	0	1	100	1
PNT	1	100	0	0	1
ON	1	100	0	0	1

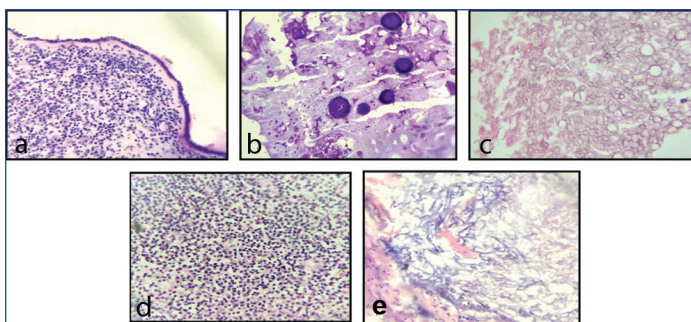
[Table/Fig-5]: Distribution of patients on the basis of sex and types of lesions.

Inf. Polyp: Inflammatory polyp; IP: Inverted papilloma; PA: Pleomorphic adenoma; SCC: Squamous cell carcinoma; ACC: Acinar cell carcinoma; PNT: Primitive neuroectodermal tumour; ON: Olfactory neuroblastoma

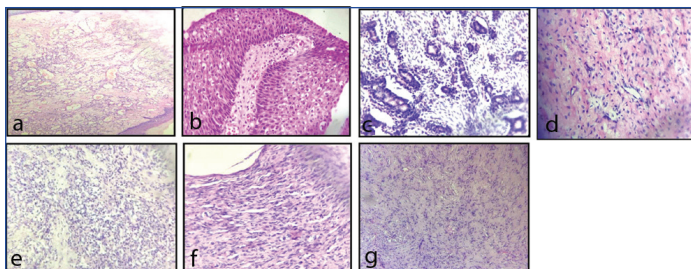
DISCUSSION

In the present study, majority of the SNT lesions were non neoplastic (77.9%). Other studies evaluating the clinicopathological profile of SNMs reported similar findings [10-12]. However, another study reported almost equal prevalence of non neoplastic and neoplastic lesions [13]. This could be due to the nearly equal presence of younger patients with non neoplastic and older patients with neoplastic lesions.

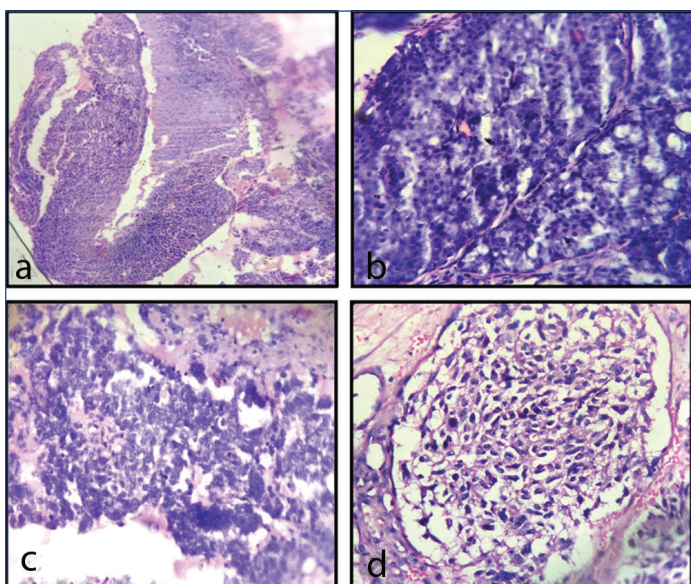
The most susceptible period of life for the growth of SNMs is between 2nd and 4th. Moreover, period after 4th decade of life is usually associated with increase in prevalence of malignancies. Similarly, in the present study, the patients presenting with the SNT lesion belonged to a wide range of age i.e., from 6 to 76 years and the peak prevalence was observed in 31-40 years age groups (22.9%). Other studies have reported similar findings [14]. However, according to another study, peak prevalence of SNT lesions was reported equally in 11-20 and 31-40 years age groups [10]. On analysing the lesions according to their type, peak prevalence of non neoplastic lesions was observed between 21 and 40 years of age. However, benign lesions were more prevalent between 41 and 60 years of age, and



[Table/Fig-7]: Photomicrograph of non neoplastic SNT lesions. a: Inflammatory polyp (H&E stain, 40x); b: Rhinosporidiosis (PAS, 40x); c: Aspergillosis (PAS stain, 40x); d: Rhinoscleroma (H&E stain, 40x); e: Mucormycosis (PAS, 40x).



[Table/Fig-8]: Photomicrograph of benign SNT lesions. a: Haemangioma (H&E stain, 40x); b: Inverted papilloma (H&E stain, 40x); c: Pleomorphic adenoma (H&E stain, 10x); d: Fibroma (H&E stain, 10x); e: Neurofibroma (H&E stain, 10x); f: Schwannoma (H&E stain, 40x); g: Angiofibroma (H&E stain, 40x).



[Table/Fig-9]: Photomicrograph of malignant SNT lesions. a: Squamous cell carcinoma (H&E stain, 10x); b: Acinar cell carcinoma (H&E stain, 40x); c: Primitive neuroectodermal tumour (H&E stain, 10x); d: Olfactory neuroblastoma (H&E stain, 40x).

malignant lesions were more prevalent after 30 years of age. These findings are supported by other studies [10,11].

The distribution of SNT lesions by sex revealed that males are commonly predisposed (53.2%) and male to female ratio was 1.1:1. Various studies have also reported male preponderance [8,10,15,16]. This could be due higher prevalence of SNT lesions in males.

The distribution of SNT lesions by location revealed that nasal cavity was most commonly involved (78.9%), which was similar to the findings of other studies [8,17]. This could be due to relatively higher exposure of nasal cavity to external agents than the paranasal sinuses. Moreover, the maximum number of patients (69.7%) had unilateral SNT lesions. Similar finding are reported by other studies [4,15,16]. The maximum number of patients presented within 3 months to 1 year of symptom onset (63.3%), and this was comparable to the findings of Bist SS et al., [18]. However, another study observed that maximum number of patients presented between six months to two years [15]. This could be due to relatively slower growth rate

of SNMs and general tendency of patients to delay the hospital visit till the symptoms become unbearable.

Nasal obstruction (93.6%) followed by rhinorrhoea (71.6%), and facial swelling (26.6%) were the most common, and least common presenting complaints and this was consistent with the findings of other studies [10,11,16]. The most common lesion involving the SNT was the simple nasal polyp (68.8%). Similarly, the simple nasal polyps were the most common non neoplastic lesions (88.2%). These findings were supported by various studies [16,19-22]. Haemangioma (47.1%) was the most common benign lesions, and was comparable to other studies [10,16]. Similarly, SCC (57.1%) was the most common malignant lesions. However, the prevalence of the malignant lesions, in the presents study, was less than that observed by others [10,12,16]. This could be due to differences in the genetic make-up of the patients studied.

The maximum number of non neoplastic lesions were observed in the 2nd and 3rd decade. Similar prevalence of non neoplastic lesions was reported by other researchers [8,10-12]. However, for benign lesions, majority of the patients were in the 5th and 6th decade and these findings are supported by other researchers [10,20,23]. Moreover, the peak prevalence of haemangioma was in the second, third, and fifth decade, which was comparable to the findings of Garg D and Mathur K [12]. The prevalence of schwannoma, pleomorphic adenoma, fibroma, neurofibroma, and angiofibroma was less and consisted of one case each. The rare occurrence of these benign lesions is supported by other researchers [12,19]. For malignant lesions, the incidence began in the 4th decade and the highest prevalence was observed in between 6th and 8th decade and these findings are supported by other studies [4,10,16,20]. All four patients with SCC were observed after the 4th decade. Similar findings were reported by others [10,12,24]. There was a patient of primitive neuroectodermal tumour (PNET) that was CD99(+), and vimentin (+) on immunohistochemistry. Similarly, Garg D and Mathur K reported a case of PNET, suggestive of its rarity [12]. Olfactory neuroblastoma is a rare tumour arising from olfactory sensory epithelium in the upper part of nose. There was a single case of olfactory neuroblastoma (14.3%) and the findings are in concordance with Parajuli S and Tuladhar A [20]. Thus, the findings of the present study are supported by the literature that non neoplastic SNT lesions are highly prevalent in the young age group, while neoplastic SNT lesions are highly prevalent in the middle and elderly age group.

The non neoplastic lesions had higher prevalence in males (54.1%). Similarly, other studies have also reported male preponderance [4,10,21]. Contrarily, Parajuli S and Tuladhar A reported the female preponderance [20]. The prevalence of benign lesions was higher in females (52.9%). This finding was comparable with the findings of others [20]. However, other studies have reported a higher prevalence in males [4,10,21]. In the present study, haemangioma was equally prevalent in both the sexes. However, Ghanghurde and Dhawle M reported a higher prevalence of haemangioma in males [19]. Moreover, similar to the findings of the present study, Ghanghurde and Dhawle M reported one case of pleomorphic adenoma in a female [19]. Similar to the non neoplastic and benign lesions, the prevalence of malignant lesions was higher in males (66.67%) and this was consistent with the findings of other researchers [4,10,11,20]. However, Mane P and Agale S reported a higher prevalence among females [21]. Similarly, SCC was prevalent in males. However, Ghanghurde S and Dhawle M reported higher prevalence in females [19]. Thus, the findings of the present study are supported by the literature that males have higher prevalence of both neoplastic and non neoplastic SNT lesions.

The relation between clinical and histopathological diagnosis of SNT lesions was 88.1% i.e. out of 109 clinically diagnosed patients, 96 were confirmed on histopathology. Similarly, Sharma R et al., reported 84% correlation in clinical and histopathological diagnosis [15]. However, other studies have reported more than 95% correlation

[3,18]. In another study by Kale SU et al., 99.7% correlation was achieved in the diagnosis of nasal polyps [25].

Limitation(s)

The study is limited by its small sample size.

CONCLUSION(S)

From the present study, it is evident that lesions of SNTs are complex and their nature varies widely. These lesions were predominantly seen in males and commonly affected individuals in the age group of 31-40 years. Inflammatory nasal polyps were the most common non neoplastic condition. While, haemangioma and SCC were the commonest benign and malignant neoplasms, respectively. The overall clinical and histopathological concordance achieved was 88.1%. Thus, histopathological examination is essential to correctly diagnose remaining 11.9% patients.

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