

**ORIGINAL RESEARCH****A Study on Aetiopathological Evaluation of Granulomatous Conditions of Nose and PNS**

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**ABSTRACT**

**BACKGROUND:** In this study, we wanted to do aetiopathological evaluation of granulomatous conditions of nose and para nasal sinus (PNS).

**METHODS:** This was a hospital-based study conducted among 73192 patients who presented with symptoms of nasal obstruction, discharge, epistaxis, crusting, ulceration or mass suspected to be due to granuloma of nose, to the Department of Otorhinolaryngology, M.K.C.G Medical College, Berhampur, Orissa, from October 2019 to October 2021, after obtaining clearance from institutional ethics committee and written informed consent from the study participants.

**RESULTS:** Rhinosporidiosis was having highest incidence of 93.17%. Mass in nose and nasal obstruction are the most common presenting symptoms by the patients of granulomatous disorders of nose.

**CONCLUSION:** For the causes of granulomatous disorders of nose, it is recommended to confirm the granulomatous condition by biopsy and histopathological study irrespective of treatment procedures used. It will help not only to establish the correct diagnosis but also to exclude a neoplasm which may clinically simulate with granulomatous lesion. Hence, by giving early and proper line of treatment, we can reduce the mortality and morbidity. Proper surveillance and timely institution of preventive measures like increasing the economic, educational, hygienic, immunity status of the people, the incidence can be lowered down.

**KEYWORDS:** Granulomatous, Nose, PNS.

**INTRODUCTION**

The nose is an almost pyramidal structure with its apex projecting anteriorly and its base attached to facial skeleton. It is an important respiratory airway structure and also plays an essential role in the perception of smell. Furthermore, although the concepts of beauty and the aesthetically ideal face change over time and somewhat different across cultures, the nose has

always played a critical role in these concepts because of its central position in the frontal view of face and its prominence in the lateral view. As a result of these functional and aesthetic qualities, patients often attach significance to any disease that affects the nose. Indeed, many diseases have a predilection for the nose. Although these diseases may be infectious or non-infectious in origin, they often share a common granulomatous nature. The nose and paranasal sinuses may play host to a large range of systemic granulomatous diseases. The principal element of these diseases is granuloma formation consisting of a conglomerate of macrophages, epithelioid cells, and multinucleated giant cells. This configuration is present in a number of conditions, including infectious (spirochete [syphilis, yaws], mycobacteria [tuberculosis, leprosy], bacteria [rhinoscleroma], and fungus [aspergillus] and inflammatory (Wegener granulomatosis, sarcoidosis, Churg-Strauss syndrome, cocaine induced midline destructive lesions). Many of these lesions present with non-specific sinonasal symptoms and may progress rapidly to involve contiguous structures, such as the orbit and skull base, presenting significant clinical implications for timely diagnosis and management. Thorough diagnostic workup, including endoscopic, radiologic, histopathology and serologic testing is imperative to arrive at the proper diagnosis and to initiate appropriate local and systemic treatment. Granulomatous diseases of the nose and sinuses represent an uncommon but clinically important and potentially lethal group of disorders encountered in otolaryngological practice. A high index of suspicion, coupled with timely diagnosis and appropriate medical and surgical management, is required in this patient population. The aim of the study was to know the endoscopic, radiologic and histologic findings in order to exemplify the typical clinical picture of these granulomatous diseases, and contemporary management strategies, including topical sinonasal and systemic therapies and the role of sinonasal surgery was reviewed. The clinical features in nose are obstruction, epistaxis, discharge, crusting, ulceration or mass. Interpretation of histology is often difficult and requires repeated biopsy. The findings must be interpreted in the light of the clinical picture. Though medical science at the present era is well equipped with modern armaments like antibiotics, corticosteroids, radio-isotopes, radiotherapy etc., it is unable to fight-out the diseases attacking the human community completely due to many reasons like changing pattern of infective organisms and bacterial resistance. Due to the varied presentation and lack of definite protocols in treatment, the management of these patients is challenging. Hence, this study will help to know various etiological factors, clinical presentation and management aspect of granulomatous disease of nose and paranasal sinuses. The gross presentation of the pathological process of the granulomatous lesions have many a times, similarity with neoplasms, malformations, degenerating lesions and life threatening malignant growth. Thorough clinical examination, careful investigations like biopsy of the lesions is essential not only for diagnosis but to exclude malignant growths thereby saving the lives of the patients.

#### **AIMS AND OBJECTIVES**

- To know the endoscopic, radiologic and histologic findings in order to exemplify the typical clinical picture of these granulomatous diseases.
- Contemporary management strategies.
- Including topical sinonasal and systemic therapies.
- The role of sinonasal surgery to be reviewed.

#### **MATERIALS & METHODS**

This was a hospital based study conducted among 73192 patients who presented with the symptoms of nasal obstruction, discharge, epistaxis, crusting, ulceration or mass suspected to be due to granuloma of nose to the Department of Otorhinolaryngology, M.K.C.G Medical

College, Berhampur, Orissa, from October 2019 to October 2021 after obtaining clearance from Institutional Ethics Committee and written informed consent from the study participants.

### Inclusion Criteria

- All patients presenting with symptoms of nasal obstruction, epistaxis, discharge, crusting, showing nodules, ulceration and atrophic changes on clinical examination.

### Exclusion Criteria

- Any patient not willing for clinical examination and relevant investigation.
- Patient suspected or proven case of malignancy of nose and paranasal sinuses.
- Cases of primary atrophic rhinitis

### Statistical Methods

Data was entered in MS Excel and analysed using Statistical Package for Social Sciences (SPSS) software. Results were presented as tables.

## RESULTS

Symptoms	Rhinosporidiosis (n-505)	Rhinoscleroma (n-12)	Fungal Granuloma (n-23)	Leprosy (n-1)	TB (n-1)
Mass in nose	467 (92.4%)	12(100%)	17(73.9%)		
Nasal obstruction	431 (85.3%)	11 (91.6%)	13 (56.5%)		
Epistaxis	358 (70.8%)	7 (58.3%)		1 (100%)	1(100%)
Nasal discharge	314 (62.2%)	8 (66.6%)	21(91.3%)	1 (100%)	
Mass hanging in throat	67 (13.2%)				
Change in voice	26 (5.1%)				

**Table 1: Incidence of Symptoms of Granulomatous Disorder of Nose**

Mass in nose and nasal obstruction are the most common presenting symptoms by the patients of granulomatous disorders of nose. Patients of rhinospore of nose most commonly present as nasal mass (92.4%), nasal obstruction (85.3%) and epistaxis (70.8%), which sometimes associated with nasal discharge (62.2%) & mass hanging in throat (13.2%). But in case of rhinoscleroma, most of the patients presented with nasal obstruction (91.6%)& mass in nose (100%), sometimes it presents with blood tinged discharge. Mass in nose (73.9%) & nasal discharge (91.3%) are the most common presenting features in fungal granuloma of nose. But tuberculosis & leprosy patients mostly have epistaxis & nasal discharge as the presenting symptom.

Bathing Habit	No of Patient	Percentage
Pond bathing	456	90.2
River	41	8.1
Well	6	1.2
Tap water	2	0.4
<b>Total</b>	<b>505</b>	<b>100</b>
Incidence in Rhinosporidiosis Associated with Bathing Habit		
Site of Origin	Incidence	Percentage (N=505)
Septum	229	45.3
Nasopharynx	79	15.6

floor	44	8.7
Inferior meatus	62	12.3
Inferior turbinate	51	10.1
Roof	24	4.8
Middle turbinate	16	3.2
<b>Total</b>	<b>505</b>	<b>100</b>
<b>Incidence of Site of Rhinosporidiosis in Nose</b>		
<b>Signs &amp;Symptoms</b>	<b>No. of Patients</b>	<b>Percentage (n=505)</b>
Mass in nose	Unilateral	436
	Bilateral	31
Nasal obstruction	431	85.3
Epistaxis	358	70.8
Nasal discharge	314	62.2
Mass hanging in throat	67	13.2
Change in voice	26	5.1
<b>Incidence of Signs &amp;Symptoms in Rhinosporidiosis</b>		
<b>Table 2</b>		

Most of the patients were having pond bathing habit which is about 90.2, which is followed by river water as because in the southern part of Odisha, people from low socio-economic group have the habit of pond and river bathing. People who take bath in tap water have least incidence of rhinosporidiosis.

Most common site of origin of rhinosporidiosis is from septum i.e. 45.3%, as because it is the site of entry of water into nose and most common site for trauma by finger. The other sites or origin are nasopharynx (15.6%), floor (8.7%), inferior meatus (12.3%), inferior turbinate (10.1%), roof(4.8%) and middle turbinate (3.2%).

Maximum patients presented to ENT, OPD with symptoms like mass in nose (92.4%), nasal obstruction (85.3), epistaxis (70.8%) and nasal discharge (62.2%). But very least symptoms are mass hanging in throat and change in voice.

<b>Signs &amp;Symptoms</b>	<b>No. of Patients</b>	<b>Percentage</b>
Mass in nose	12	100
Nasal obstruction	12	100
Epistaxis	7	58.3
Nasal discharge	7	58.3
Cicatrisation &stenosis	9	75
<b>Incidence of Signs &amp;Symptoms in Rhinoscleroma</b>		
<b>Signs &amp;Symptoms</b>	<b>No. of Patients (n-23)</b>	<b>Percentage</b>
Nasal obstruction	23	100
Epistaxis	8	34.8
Nasal discharge	13	56.5
Crusting	19	82.6
Proptosis	5	21.7
Headache	10	43.5
<b>Incidence of Signs &amp;Symptoms in Fungal Granuloma</b>		
<b>Table 3</b>		

The patients of rhinoscleroma mostly present with nasal obstruction (100%) & mass in nose (100%). Other symptoms were epistaxis (58.3%), nasal discharge (58.3%), cicatrisation& stenosis (75%).

Most of the patient with fungal granuloma present with nasal obstruction (100%), nasal discharge (56.5%) and headache (43.5%).

Name of the Diseases	No. of Patients (n-23)	Percentage
Diabetes mellitus	19	82.6
Covid-19	21	91.3
<b>Fungal Granuloma Associated with Other Disease</b>		
Name of the Fungus	No. of Patients (n-23)	Percentage
Mucormycosis	21	91.3
Aspergillosis	2	8.7
<b>Fungus Associated with Fungal Granuloma</b>		
<b>Table 4</b>		

Most of the patients with fungal granuloma were associated with diabetes mellitus (82.6%) and Covid-19 (91.3%).

Out of 23 cases of fungal granuloma, mucormycosis consists of 21 cases (91.3%) and aspergillosis consists of 2 cases (8.7%).

## DISCUSSION

The present study also shows that the rural people (83.6%) are great sufferers of granulomatous disorder of nose than urban people (16.4%) because they were less literate, unaware of hygienic practices, get less facilities for proper health care and scarcity of sanitary water for daily use. These findings are quite similar with K.D Sharma et al. (1962) & Behera et al. (1971).<sup>[1]</sup>

The present study shows that people of low socioeconomic group were more affected i.e. 87.7% due to malnutrition, poor general health, stayed in ill ventilate house, unhygienic and pond bathing habits.

As the present study was conducted in the southern part of Orissa, it shows that the predominant area for rhinosporidiosis is Ganjam district and for rhinoscleroma is Gajapati district.

## Rhinosporidiosis

### Associated with Bathing Habit

In the present study, we found that most of the patients were having pond bathing habit which is about 90.2%, which is followed by river water (8.1 %) as in the southern part of Odisha, people are from low socioeconomic group having the habit of pond and river bathing. People who take bath in well (1.2 %) and tap water (0.4%) have least incidence of rhinospore. The finding of this study has similarity with other studies like.

According to study of Arseculeratne et al. (2010)<sup>[2]</sup> in Sri Lanka the lacustrine waters (reservoirs and rivers) were the commonest probable source of infection. He described the percentage distribution of patients that bathed in reservoirs or lakes (83%), in rivers (12%), and garden wells (5%). These figures indicate the predominant water source to which the patients were exposed to was lacustrine water in reservoir.

### Site of Involvement

The present study shows that most common site of involvement of rhinosporidiosis is nose i.e., 84.6% followed by nasopharynx (15.6%). Out of nasal involvement, septum involves 45.3%, as because it is the site of entry of water into nose and most common site for trauma by finger. The other site of origin in nose are floor (8.7%), roof (3.2%), inferior turbinate (10.1 %), inferior meatus (12.3%) and middle turbinate (4.8%). Our study also have similarity with others like; Billore (1995)<sup>[3]</sup> in India noted that 83% were nasal. Karunaratne (1964)<sup>[4]</sup> in Sri Lanka recorded nasal disease predominated at 63%.

### **Signs & Symptoms in Rhinosporidiosis**

The present study describes that maximum patients presented to ENT OPD with symptoms like mass in nose (92.4%), nasal obstruction (85.3%), epistaxis (70.8%) and nasal discharge (62.2%). But very least symptoms are mass hanging in throat, change in voice and dysphagia. Khan et al. (1969) observed that nasal obstruction (97.6%), nasal discharge (73.1%) and epistaxis (61%).<sup>[5]</sup>

### **Recurrence Rate**

The present study shows that the total recurrence rate is about 28.47%. The maximum rate of recurrence was found in nasopharynx i.e. 11.1% which is followed by inferior meatus (8.5%) because of unapproachable sites.

Billore (1995) in India recorded a recurrence rate of 21% with nasal rhinosporidiosis, similar to Sri Lanka.<sup>[3]</sup>

Karunaratne's data for Sri Lanka (1964) showed that in nasal rhinosporidiosis had a 28% recurrence rate. Ocular rhinosporidiosis had 100% recurrence rate,<sup>[4]</sup>

### **Rhinoscleroma**

#### **Climate and Socio-economic Factors**

As hospital being present in a southern part of Orissa, the present study shows that the predominant area for rhinoscleroma is in Gajapati district.

Wahiet al. (1955) reported that the disease occurs in all sorts of climate, but more prevalent in tropical countries like West Indies, India, China. In India, it was more common in Lucknow, Jaipur and less common in Mumbai, Bhopal, Visakhapatnam and Kolkata.

J.K. Mohanty (1945), Wahiet al. (1955) reported that the disease is common in lower socio-economic status.

#### **Incidence of Signs and Symptoms**

The present study shows that the patients of rhinoscleroma mostly present with nasal obstruction (91.6%) & mass in nose (100%). Other symptoms were epistaxis (58.3%), nasal discharge (66.6%), cicatrization & stenosis (75%).

Anard et al. (1973)<sup>[6]</sup> studied that nasal obstruction to be the most prominent nasal symptoms of rhinoscleroma (90%). Besides this, other nasal symptoms were epistaxis (75%), crusting (30%), and discharge (30%). They have noted that the maximum number of cases (about 50%) were in the cicatricial stage.

Khan et al. (1969)<sup>[5]</sup> noted that bilateral nasal obstruction in 100% of rhinoscleroma. This may be due to delayed reporting of the patients. Sinha, Padhi, Omprakash (1969) reported rhinoscleroma in the nose out of which 84% were in granulomatous stage, 12% in atrophic stage, 4% were in early catarrhal stage.<sup>[7]</sup>

### **Fungal Granuloma**

In the present study, 23 cases of fungal granuloma were observed which constitutes about 4.24% of total number of granuloma of cases under study. Most of the cases were seen in 5th and 6th decade of life.

Males were affected more i.e. 20(86.95%) than the female i.e. 3(13.04%). Male to female ratio is 6.6/1. Most of the cases were presented with nasal obstruction in 23 (100%) and associated with chronic nasal discharge (56.5%) of cases. Out of 23 patients of fungal granuloma, 19 patients (82.6%) were associated with diabetes mellitus and 21 patients (91.3%) were associated with Covid-19.

Andrews et al. (1996)<sup>[8]</sup> studied on 50 patients of fungal granuloma male to female ratio was 4:1. Median age of involvement was 37 years(15- 95years). Most common age of involvement in aspergillosis was 25-50 years and M.F = 3:1.

In his study, Andrews et al. described the aspergillosis was the most common fungal infection with granuloma formation (58%), which was followed by mucormycosis (28%).

### **Immunity of Patients**

Fungal infections involve nose in case of immunocompetent host (63%) according to Andrew et al. (1996).<sup>[8]</sup> But mucomycosis involves 100% of immunocompromised patients.

### **Symptoms**

Most common symptoms at presentation were nasal obstruction and nasal discharge.

### **Tubercular granuloma**

In these areas of study, one case of tubercular granuloma of nose has been observed which constitutes only 0.18% of total number of granuloma of case under study. One female (37 years) case presented with ulceration, crust formation and granulation of vestibule and columella of nose. Kimet al. (2007) studied a total of eight patients who presented with nasal tuberculosis during the study period (from January 1989 through December 2006). Six were female and two were male. The patient's age varied from 17 to 51 years, with a mean of 31 years.<sup>[9]</sup>

Hemmaoui (2007) reported primary nasal tuberculosis is very rare and is more frequent in women.<sup>[10]</sup> Nawaz al (2004) in his study described primary sinonasal tuberculosis affected mainly young adults (18-60 years), both genders almost equally.<sup>[11]</sup>

Luken (1959) described the incidence of nasal T.B. is more in 25 – 50 years of age. Negus (1955)<sup>[12]</sup> opined that lupus is more prevalent during the period of adolescence i.e. 5-14 years. Haven (1931) reported that nasal T.B. is seen in all ages, but most commonly seen in 3<sup>rd</sup> to 5<sup>th</sup> decade of life and it was more prevalent in female sex.<sup>[13]</sup>

### **Socio-economic Status**

Majority (60%) of the patients belonged to far-flung rural areas and all (100%) were poor according to Nawaz et al.<sup>[11]</sup> Negus (1955) described it is more in poor and ill-nourished females.<sup>[12]</sup> Milling (1953) described is more prevalent in low socio-economic status.

### **Common Site of Involvement**

Kim et al. (2007) described the most commonly involved site as the nasal septum (7 of 8). Perforation of the nasal septum was observed in three cases. Sinus invasion was observed in two cases and required sinus surgery. Six of the cases were a result of primary infections, while two were secondary disease manifestations.<sup>[9]</sup>

Messervy (1971) illustrated a case tuberculoma showing the granulomatous lesion of nose affecting nasal septum.

### **Signs &Symptoms**

Hemmaoui (2007) reported in his study most common symptoms of presentation is often unilateral with nasal obstruction, rhinorrhea or epistaxis.<sup>[10]</sup>

Nawaz et al. (2004) in his study described that frequent presenting features were granular lesion and mass in the nose (40%), epistaxis (30%), septal perforation (30%), external deformity (30%), palpable cervicallymph nodes (30%) and others.<sup>[11]</sup>

Miles Foxen (1971) reported that septum may perforate in the cartilaginous part.

James (1952) reported that early symptoms are those of soreness and obstruction of nose followed by crusting with ulceration and occasional epistaxis.

### **Leptrotic Nasal Granuloma**

One case of leptrotic granuloma of nose was found in this study which constitutes only 0.18%. The case was of a 42-year male patient who presented with epistaxis and nasal discharge. The case was having leptrotic patches and nodules over his face, neck and ear with crusting in nasal cavity. Smear for AFB was positive and biopsy revealed features of leptrotic granuloma. It affects all ages and both sexes according to Scott and Brown 8<sup>th</sup> edition. Dharmendra et al. (1948), A. Yassin (1975)<sup>[14]</sup> reported that it is most commonly seen in adults.

From the above discussion it is found that, as the study was conducted in the southern part of Odisha, which comes under the costal belt, the incidence of rhinosporidiosis is more among the granulomatous disorder of nose. As the people belong to lower socio-economic group and are farmer by occupation, they mostly take bath in ponds and rivers due to scarcity of tap water supply. In case of fungal granuloma, the incidence has suddenly increased due to more Covid-19 infection during this pandemic Covid era. The incidence is drastically decreasing in rhinoscleroma and other granulomatous conditions. The incidence of nasal manifestations of TB & leprosy has been declined due to various district level programmes, advancement in multi drug therapy and free supply of costly medicines by the national programme.

### **CONCLUSION**

The present survey revealed that the incidence of rhinosporidiosis, fungal granuloma and rhinoscleroma of nose is high in this region. Persons from all occupation are seen to be victimized though farmers and their dependents are more affected in our observation. Persons from rural areas & low socioeconomic group are maximum sufferers because of the poverty and unhygienic surroundings. The disease requires a thorough investigation especially into the mode of transmission and source of infection. For other causes of granulomatous disorders of nose, it is recommended to confirm the granulomatous condition by biopsy and histopathological study irrespective of treatment procedures used. It will help not only to establish the correct diagnosis but also to exclude a neoplasm which may clinically simulate with granulomatous lesion. Hence, by giving early and proper line of treatment, we can reduce the mortality and morbidity. Proper surveillance and timely institution of preventive measures like increasing the economic, educational, hygienic, immunity status of the people, the incidence can be lowered down.

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