



## A Clinico-Pathological Study of Granulomas of the Nose

### KEYWORDS

granuloma, nose, rhinosporidiosis, rhinoscleroma

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### ABSTRACT

#### Background

Granulomas of the nose are chronic inflammatory lesions due to multiple aetiologies. They may be infectious, inflammatory or neoplastic in origin.

#### Methods

The present study comprises of 150 cases of granuloma nose to determine the aetiological agent(s).

#### Results

Most of the cases were found to be due to rhinosporidiosis (91.33%) and rhinoscleroma (6%). Other aetiologies like tuberculosis (1.33%), leprosy and foreign body granuloma (0.67% each) were also found.

#### Conclusions

A clinical suspicion about these relatively rare and neglected diseases and a histopathological examination is required for their early diagnosis and management.

### Background

Granulomas of the nose are chronic inflammatory lesions characterised by formation of granulomatous tissue by circumscribed infiltrations of chronic inflammatory cells, usually histiocytic in nature. Most of these granulomata are the result of specific infectious organisms. They may be bacterial in origin, like rhinoscleroma, syphilis, tuberculosis or leprosy or may be of fungal origin, like aspergillosis or candidiasis. Wegener's granulomatosis and sarcoidosis are some of the non-infectious causes of granuloma formation in the nose<sup>1</sup>.

Granulomas of the nose of infectious aetiology are common in the developing countries. Endoscopic, radiologic, histological and microbiological investigations are essential for their diagnosis and management. There is paucity of data regarding the aetiology and epidemiology of granulomas of nose. The present article is intended to highlight the various aetiologies of granulomas of nose and emphasises on their timely diagnosis and management.

### Materials and Methods

The present study was conducted in a tertiary care hospital over a period of two years. The patients attending the Otorhinolaryngology outpatient department clinically diagnosed with granuloma of nose were included in the study. Patients with hypertrophied turbinates or their polypoidal degeneration and neoplastic granulomas were excluded from the study.

Each patient was subjected to clinical assessment by anterior rhinoscopy, posterior rhinoscopy and examination of the throat and larynx after a detailed history was collected. The growth was examined to look for its shape, size, surface, consistency and mobility. Examination of the nasopharynx was done under general anaesthesia. The site, number of lesions, size, shape, colour, consistency, fluctuation and tenderness were noted. The appearance of bleeding on touch was looked for in each lesion.

Examination of the oral cavity and throat was done to ex-

clude any associated pathology in teeth, gum and tongue, floor of mouth, palate, pharynx and larynx. Examination of the ear, orbit and eyeball was done to exclude any pathology. Radiological examination was done to delineate the site and extension of the lesion and bony erosion. A piece of tissue was collected for histopathological studies. Gram and Ziehl-Neelsen staining was done and the tissue was inoculated onto media like blood agar, chocolate agar, MacConkey agar and Lowenstein-Jensen medium for culture.

### Results

A total of 150 cases were included in the study. Table 1 shows the age and sex distribution of the cases. Males were found to be affected more (106 cases; 70.7%) than females (44 cases; 29.3%), with a ratio of 2.41:1. The highest incidence was found in the 21-30 age group (34%) followed by 11-20 years (32.67%).

**Table 1: Age and sex distribution of cases (n=150)**

Age (years)	Male	Female	Total	%
5-10	10	1	11	7.33
11-20	37	12	49	32.67
21-30	34	17	51	34
31-40	14	3	17	11.33
41-50	5	3	8	5.33
51-60	3	5	8	5.33
61-70	2	2	4	2.67
71-80	1	1	2	1.33
Total	106	44	150	100

Rhinosporidiosis was responsible for a majority of cases (91.33%), followed by rhinoscleroma (6%). Tubercular granuloma was found in 2 cases (1.33%). Leprotic and foreign body granuloma were found in 1 case each (0.67%). Table 2 and Fig 1 show the relative incidence of granulomas of the nose.

**Table 2: Relative incidence of granulomas of nose (n=150)**

Type of granuloma	No of cases	Percentage
Rhinosporidiosis	137	91.33
Rhinoscleroma	9	6
Tubercular	2	1.33
Leprotic	1	0.67
Foreign body granuloma	1	0.67
Total	150	100

**Fig 1: Incidence of granulomas of nose.**

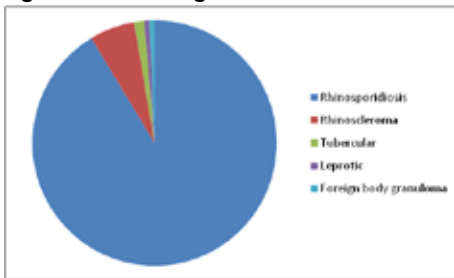


Table 3 and Fig 2 show the presenting symptoms in the cases presenting with granulomas of nose. Epistaxis was found in most cases (84%) followed by nasal obstruction (78.67%).

**Table 3: Incidence of symptoms in granulomas of nose.**

Clinical presentation (symptoms)	No of cases	Percentage (%)
Epistaxis	126	84
Nasal obstruction	118	78.67
Pain in the nose	39	26
Anosmia	13	8.67
Difficulty in breathing	16	10.67
Difficulty in taking food	16	10.67
Mass in throat	16	10.67
Foul breath	53	35.33
Change in voice	23	15.33
Headache	42	28
Epiphora	9	6

**Fig 2: Symptoms seen in patients presenting with granulomas of nose**

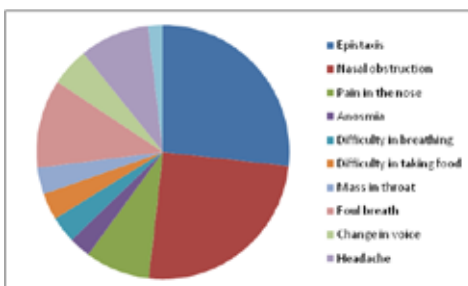
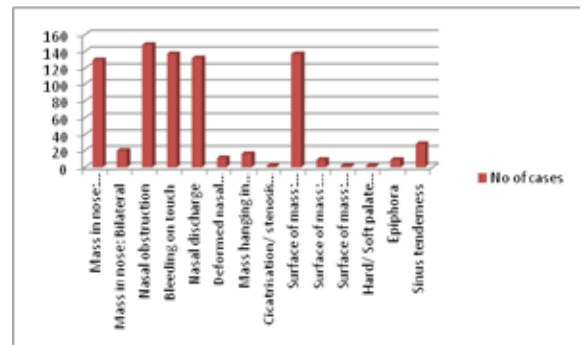


Table 4 and Fig 3 show that 148 cases (98.67%) had nasal obstruction, which was established by the cold spatula test. Bleeding on touch (91.33%) and nasal discharge (88%) were some of the other important signs in the cases.

**Table 4: Presenting signs of granuloma of nose**

Signs	No of cases	Percentage
Mass in nose: Unilateral	130	86.67
Mass in nose: Bilateral	20	13.33
Nasal obstruction	148	98.67
Bleeding on touch	137	91.33
Nasal discharge	132	88
Deformed nasal framework	11	7.33
Mass hanging in Nasopharynx	16	10.67
Cicatrisation/ stenosis of pharyngeal wall	2	1.33
Surface of mass: Granular	137	91.33
Surface of mass: Sclerotic	9	6
Surface of mass: crusted	2	1.33
Hard/ Soft palate involvement	2	1.33
Epiphora	9	6
Sinus tenderness	29	19.33

**Fig 3: Incidence of different signs in patients with granuloma of nose**



**Table 5: Occupation and habitat distribution of cases with rhinosporidiosis (n=137)**

Occupation	Rural	%	Urban	%
Cultivation	49	35.77	-	-
Business	-	-	6	4.38
Professional	-	-	1	0.73
Dependent/ student	46	33.57	9	6.57
Housewife	8	5.84	4	2.92
Daily labourer	10	7.30	4	2.92
Total	113	81.75	24	17.51

Table 5 shows that 49 (35.77%) cases with rhinosporidiosis were agricultural workers and 46 (33.17%) were dependents staying in rural areas. Table 6 and Fig 4 show that 79 cases (57.7%) of rhinosporidiosis were using infected pond or tank water for bathing.

**Table 6: Personal habits of cases with rhinosporidiosis (n=137)**

Personal habits	No of cases	%
Nose picking	35	25.5
Bathing in ponds/ tanks	79	57.7
Bathing in rivers	8	5.83
Bathing in wells	13	9.50
Bathing with tap water	2	1.46
Total	137	100

**Fig 4: Personal habits of cases with rhinosporidiosis.**

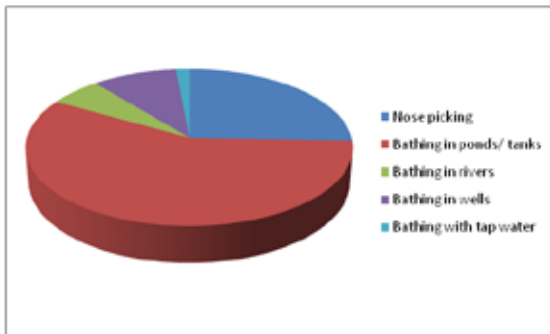
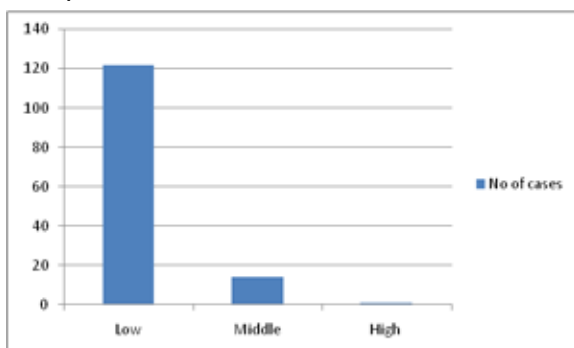


Table 7 and Fig 5 demonstrate that rhinosporidiosis is more prevalent in the lower socioeconomic class (89.05%).

**Table 7: Socio-economic class distribution of patients with rhinosporidiosis (n=137)**

Socio-economic status	No of cases	%
Low	122	89.05
Middle	14	10.21
High	1	0.74
Total	137	100

**Fig 5: Socio-economic class distribution of patients with rhinosporidiosis**



**Table 8: Rhinosporidiosis of nose with extranasal sites.**

Extranasal site	No of cases	% in relation to total cases
Nasopharyngeal with nasal	14	10.22
Ocular with nasal	2	1.46
Oropharyngeal with nasal	2	1.46
Total	18	13.14

Table 8 shows that the nasopharynx was the most common extranasal site for rhinosporidiosis (10.22%).

9 cases (6%) of rhinoscleroma were seen in our study, out of which 3 (33.33%) were males and 6 (66.67%) were females, with 7 (77.78%) in the age-group of 21-30 years. 2 cases (1.33%) had tubercular granuloma of the nose, presenting with nasal obstruction, occasional epistaxis, nasal pain and crusting. There was ulceration of the nasal septum with a sloughy base and unhealthy granulation tissue. The diagnosis was confirmed by biopsy findings.

A 40-year-old male complaining of nasal obstruction and discharge with anaesthetic patches over the face and neck was found to be a case of leprotic granuloma of the nose. A 5-year-old male child was found to be suffering from foreign body granuloma in the right nasal cavity. This was associated with the formation of rhinolith.

**Discussion**

The nose and paranasal sinuses are the sites of a large range of systemic granulomatous diseases. These diseases involve granuloma formation consisting of a conglomerate of macrophages, epithelioid cells, and multinucleated giant cells. This is present in a number of infectious conditions like syphilis, tuberculosis, leprosy, rhinoscleroma, rhinosporidiosis, inflammatory conditions (Wegener granulomatosis, sarcoidosis and Churg-Strauss syndrome) and neoplastic diseases (histiocytosis X and lobular capillary hemangioma)<sup>1</sup>. These lesions present with non-specific sinonasal symptoms and may progress rapidly to involve contiguous structures such as the orbit and skull base. Timely diagnosis is imperative for the management of these conditions.

The present work comprises of 150 cases of granulomatous lesions of the nose seen in the outpatient department. The incidence of granulomatous disease in relation to the total number of nasal cases seen was 27.12%, which signifies their high frequency in the locality of southern Odisha. There is a high incidence of rhinosporidiosis (91.33%), followed by rhinoscleroma (6%).

Patients of all ages and both sexes were found to suffer from granulomatous conditions of the nose in this study, the youngest being a five-year old. Rhinosporidiosis is most common in the age-group of 15-39 years<sup>2</sup>. Males are often more affected than females (in the ratio of 3:1)<sup>3</sup>. The present study also shows a male predominance. Nasal picking, transmission by fomites, bathing in infected ponds, association of domestic animals like cattle and agricultural occupation may have predisposed the development of granuloma in the nose.

It was found that the rural populace were found to suffer more than the people living in urban areas. They were from a lower socio-economic group, with prevalence of malnutrition, illiteracy, unhygienic practices and less access to proper health-care services. There is much scarcity of safe water for daily use.

Nasal obstruction was present in 98.67% of the cases with granulomas of nose. All the 9 cases of rhinoscleroma com-

plained of bilateral nasal obstruction.. Nasal discharge was present in 88% of our cases. The discharge was mucopurulent in most cases suggesting secondary bacterial infection in the granulomas. Epistaxis was found in 84% of our cases. The clinical symptoms and signs found in our study are similar to an Indian study <sup>4</sup>.

Rhinosporidiosis has been known for many years but the mode of infection, mechanisms of spread and mechanisms of immunity are still not well defined till today. Highest incidence of the disease is in India and Sri Lanka, though it is found in other parts of the world<sup>5</sup>. In our study 91.33% of the cases were suffering from rhinosporidiosis. It is prevalent in this particular region of Southern India<sup>6</sup>. Lack of adequate clean water for bathing purposes and a large population of cattle suffering from similar granulomas in the nostrils <sup>7, 8</sup> may have been responsible for the high prevalence of the disease in this region.

Molecular biological analysis has included *Rhinosporidium seeberi* in the new clade Mesomycetozoa which includes the hydrophilic organisms of the former DRIP (Dermocystidium, Rossete agent, Ichthyophonous and Psorospermium) clade, consisting of aquatic protistan species. The rhinosporidial lesions are typically polypoidal, granular and red (due to pronounced vascularity) with the surface having yellowish granules, which represent the mature sporangia. The polyps are multi-lobed with a variegated appearance <sup>9</sup>. The definitive diagnosis of rhinosporidiosis is done by histopathology, since the organism cannot be cultured on artificial culture media. Staining with Gomori methenamine silver (GMS), periodic acid-Schiff (PAS) and haematoxylin-eosin (HE) gives excellent results <sup>10</sup>. Treatment is by excision and electrocautery, but recurrence is very common.

Rhinoscleroma is a chronic granulomatous disease caused by the capsulated gram negative bacillus *Klebsiella pneumoniae* subsp *rhinoscleromatis*. It is endemic in parts of Africa, the Middle East, Central and South America, South, Central and Eastern Europe, China, India and Indonesia <sup>11, 12</sup>. Rhinoscleroma has been a long-neglected tropical disease. In the present study it was found in 6% of the patients. The bacillus was described for the first time by von Frisch in 1882. The most common sites are the nose and the upper lip, with involvement of the pharynx, larynx and trachea in some cases. It is essentially a disease of the poorer population, with primitive living conditions. It has been described as the "disease of the great unwashed". Granulomatous tissue infiltrates the submucosa and large foam cells called "Mikulicz cells"

are found. These cells have a central nucleus and a vacuolated cytoplasm in which the bacilli are found. There are three recognised stages of the disease, the atrophic stage, granulation stage and the cicatrising stage <sup>13</sup>. Antibiotics are prescribed and debridement is performed when cicatrization is present.

Tuberculosis is a common infectious disease in India. Tuberculosis of the upper respiratory tract is relatively infrequent and nasal involvement is rare. Involvement of the nose is usually unilateral, manifesting as a granular mass or ulcer <sup>14</sup>. The smears and cultures for acid fast bacilli are usually negative and diagnosis is done by histopathological examination <sup>15</sup>. The nasal skin is often the first to be infected in leprosy. Granulomatous nodules appear with subsequent ulceration and perforation of the nasal septum in many cases<sup>16</sup>. A combination of drugs is required to control both the diseases <sup>17</sup>. Foreign body granuloma can develop in nasal mucus membrane following local steroid injections <sup>18</sup>. The granuloma contains amorphous foreign material in the centre.

### Conclusion

Specific granulomas of the nose are due to different infectious aetiologies. One hundred and fifty cases were considered in the present study out of which the majority were due to rhinosporidiosis (91.33%) and rhinoscleroma (6%), which underlines the importance of these diseases in this geographical region. Tuberculosis and leprosy of the nose, although relatively rare, were seen in our study (1.33% and 0.67% respectively).

Biopsy and histopathological examination are mandatory for prompt diagnosis and institution of appropriate treatment strategies. This study outlines that these diseases have long been neglected and epidemiological surveys are essential for control and management.

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### REFERENCE

1. Fuchs H. A., Tanner S.B. Granulomatous disorders of the nose and paranasal sinuses. *Curr Opin Otolaryngol Head Neck Surg* 2009 Feb;17(1):23-7 | 2. Karunaratne, W.A.E.: The pathology of rhinosporidiosis.1936. *J. Path. Bact.* 1936; 42, 193. | 3. Mohapatra LN, Rhinosporidiosis. In: The Pathologic Anatomy of Mycoses, Vol. 3 / 5, 1971, pp 676-683 | 4. Zafar U, Khan N, Afroz N, Hasan SA, Clinicopathological study of non-neoplastic lesions of nasal cavity and paranasal sinuses.. *Indian J of Path and Microbiol.* 2008; 51 (1); 26-29 | 5. Arsecularatne SN, Recent advances in Rhinosporidiosis and Rhinosporidium seeberi. *Ind J of Med Microbiology*, 2002; 20 (3):119-13 | 6. Nayak S., Rout T.K., Achariya B., Patra M.K., Subcutaneous Rhinosporidiosis. *Indian J Dermatol.* 2008 Jan-Mar; 53(1): 41-43 | 7. Ayyar VK, Rhinosporidiosis in cattle. *Trans Far-East Asso Trop Med.* 1927; 3: 658-664. | 8. Rao MAN, Rhinosporidiosis in bovines in the Madras Presidency, with a discussion on the probable modes of transmission. *Ind J Vet Sci.* 1938; 8: 187-198. | 9. Das S, Kashyap B, Barua M, Gupta N, Saha R, Vaid L, Banka A. Nasal rhinosporidiosis in humans: new interpretations and a review of the literature of this enigmatic disease. *Med Mycol.* 2011 ; 49(3):311-5 | 10. Morelli L, Polce M, Pisciolli F, Nonno FD, Covello R, Brenna A, Cione A, Licci S. Human nasal rhinosporidiosis: an Italian case report. *Diag Pathology.* 2006; 1: 25 | 11. Mukara BK, Munyarugamba P, Dazert S, Löhler J. Rhinoscleroma: A case series report and review of literature. *Eur Arch Otorhinolaryngol.* 2013 | 12. Fevre C, Passet V, Deletoile A, Barbe V, Frangeul L et al (2011) PCR-Based Identification of *Klebsiella pneumoniae* subsp *rhinoscleromatis*, the Agent of Rhinoscleroma. *Plos Negl Trop Dis* 5(5):e1052 | 13. Hart AC, Rao KS (2000) Rhinoscleroma. *J Med Microbiol* 49:395-396 | 14. BlancoApanclo, M, Vereá-Hernando, H. and Pombo, E (1995). Tuberculosis of the nasal fossa manifested by a polypoid mass. *Journal of Otolaryngology.* 24(5).317-318 | 15. Bal MS, Kanwal S, Ritu P, Tuberculous granuloma in haemangiomas of the nasal polypoidntan *Journal of Otolaryngology and Head and Neck Surgery* Vol. 54No 4 October -December 2002 | 16. Hughes RCM and Drake-Lee A (2001) Nasal manifestations of granulomatous disease. *Hospital Medicine* 62 (7): 417 – 412 | 17. Quinn F.B., Granulomatous diseases of the Head and Neck: Evolution and current concepts. In: *Granulomatous Diseases of the Head and Neck.* 2nd ed.1999. 4-7. | 18. Marceri D. R., Epistaxis and nasal trauma. In: *Cummings: Otolaryngology: Head & Neck Surgery*, 4th ed, Mosby, 2005; 4-5. |