Acta Scientific Otolaryngology (ISSN: 2582-5550)

Volume 4 Issue 7 July 2022

Research Article

A Clinicopathological Study of Granulomatous Diseases of Nose

Tabreez[1]*, Minutha R[2] and Geetha N[3]

[1]Post Graduate Resident, Department of Otorhinolaryngology-Head and Neck Surgery, Vydehi Institute of Medical Sciences and Research Centre, Bangalore, India

[2]Assosciate Professor, Department of Otorhinolaryngology-Head and Neck Surgery, Vydehi Institute of Medical Sciences and Research Centre, Bangalore, India

[3]Assistant Professor, Department of Otorhinolaryngology-Head and Neck Surgery, Vydehi Institute of Medical Sciences and Research Centre, Bangalore, India

***Corresponding Author:** Tabreez, Post Graduate Resident, Department of Otorhinolaryngology-Head and Neck Surgery, Vydehi Institute of Medical Sciences and Research Centre, Bangalore, Karnataka, India.

Received: May 17, 2022

Published: June 16, 2022

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Abstract

Background: A granuloma is a focal, compact collection of inflammatory cells, predominantly mononuclear cells[1]. Any process in the body that results in granuloma formation are termed as granulomatous [2]. Granulomas of the nose are chronic inflammatory lesions characterised by formation of granulomatous tissue by circumscribed infiltrations of chronic inflammatory cells. They may be infectious or non-infectious. 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 [3].

Objectives of the Study: To identify the common clinical presentations of various granulomatous diseases of nose and also to correlate between clinical and histological findings of various granulomatous conditions of nose.

Materials and Methodology: A total of 38 patients presenting to ENT OPD in Vydehi hospital between the period of January 2020 to July 2021 were evaluated. Patients presenting with various nasal complaints are included. All patients are subjected to endoscopic examination and necessary blood investigations and radiological evaluation. All patients underwent surgical procedure for biopsy of the lesion under General Anaesthesia and are confirmed after histopathological examination. Cases are evaluated for various clinical presentations and each condition was correlated with its clinical and pathological findings.

Results: Out of 38 patients included in our study, majority of them belonged to the age group of 31 to 40 years (47.4%) with 18 patients are females (47.4%) and 20 patients are males (52.6%). Among all 38, 26 (68.4%) of them are diagnosed to have rhinoscleroma, 7 (18.4%) patients has rhinosporidiosis (), 3 (7.9%) patients has wegener's granulomatosis and 2 (5.3%) patients has nasal tuberculosis. Rhinoscleroma being the commonest among all with 26 cases, 13 of them are from 31-40 years of age group with female predominance. Majority of the patients with Rhinoscleroma presented with nasal obstruction (76.9%). On examination crusting of the nose (65.4%), external nasal deformity (23.1%)with ulcers over the mucosa (46.2%)were noted. On histopathological examination, inflammatory reactions with plasma cells, lymphocytes, eosinophils, Mikulicz cells and Russel's bodies were noted.

Conclusion: Granulomatous conditions of the nose occur due to various etiologies. We included 38 patients wherein majority of them were rhinoscleroma (26, 68.4%), followed by 7 cases of rhinosporidiosis (18.4%), 2 cases of nasal tuberculosis (5.3%) and 3 cases of wegener's granulomatosis (7.9%). Biopsy and histopathological examination are necessary for confirmation of the disease. Appropriate treatment with regular follow ups are necessary to prevent the recurrence.

Keywords: Granuloma; Rhinoscleroma; Rhinosporidiosis; Wegener's Granulomatosis; Mikulicz Cells; Russels Bodies

Abbreviations

CT Scan: Computerized Tomography Scan; CGD: Chronic Granulomatous Disease; DNE: Diagnostic Nasal Endocscopy; ECG: Electrocardiogram; E.N.T: Ear Nose Throat; HBsAg: Hepatitis B Virus Surface Antigen; HCV: Hepatitis C Virus; HPE: Histopathological Examination; *M. tuberculosis*: *Mycobacterium tuberculosis*; *M. Bovis*: *Mycobacterium bovis;* NC: Nasal Cavity; RS: Rhinoscleroma; WG: Wegener's Granulomatosis

Introduction

The term 'Granuloma' is derived from 'granule' meaning circumscribed granule-like lesion and '- oma' which is a suffix commonly used for true tumors but here it indicates a localized inflammatory collection of macrophages [4]. A granuloma is a focal, compact collection of inflammatory cells, predominantly mononuclear cells [1]. Any process in the body that results in granuloma formation are termed as granulomatous [2].

The granuloma is formed as the end result of a complex interplay between invading antigen, chemical, drug or other irritant, prolonged antigenaemia, macrophage activity, a T type 1 helper cell mediated immune response, B cell hyperactivity, circulating immune complexes, and a vast array of biological mediators [1].

Granulomas, histologically are aggregates of mononuclear inflammatory cells or modified macrophages, which are usually surrounded usually by a rim of lymphocytes and often contain giant cells. Granulomas are typically formed to protect the host from persistent inflammatory stimuli, which if ongoing may produce locally inflammatory and destructive effects [2].

There are two types of granulomas which differ in their pathogenesis. Foreign body granuloma- incited by relatively inert foreign bodies like talc and suture material. Immune granuloma - caused by insoluble particle, typically microbes that are capable of including a cell mediated immune response.

The prototype of immune granuloma is that caused by tubercular bacilli. In this disease, the granuloma is referred to as tubercle characterized by presence of central caseous necrosis. In contrast caseous necrosis is rare in other granulomatous diseases. The morphologic patterns in the various granulomatous diseases may be sufficiently different to allow reasonable accurate diagnosis by an experienced pathologist: however they are so many atypical presentations that is always necessary to identify specific etiological agent by using special stains, culture methods, molecular techniques and by the biological studies [6].

Granulomatous diseases frequently affect the head and neck region, particularly nose and sinuses [7]. Trauma, inflammation, infection, autoimmune, neoplastic and substance abuse can lead to granulomatous inflammation in the nose and sinuses [8].

Infective granulomas may be due to bacterial agent (tuberculosis, non-tuberculous mycobacterial infection, scleroma, leprosy, syphilis and actinomycosis) or fungal agents (histoplasmosis, cryptococcosis, blastomycosis and paracoccidioidomycosis). Non-infective granulomas include Wegener's granulomatosis, sarcoidosis [9].

Materials and Methods

Study design

Descriptive study, including 38 patients who are presenting with nasal complaints are evaluated in details which includes history taking and detailed clinical examination (like anterior rhinoscopy, diagnostic nasal endoscopy), necessary blood investigations and radiological investigations (CT nose and PNS, both plain and contrast) and biopsy for histopathological examination.

Source of data

Study was carried out in Department of Otolaryngology, at Vydehi Institute of Medical Sciences and Research Centre, after obtaining clearance from Ethical Committee.

Duration of study

One and a half year, January 2020 to July 2021.

Inclusion criteria:

- Patients with nasal symptoms like nasal obstruction, chronic rhinorrhoea, epistaxis, crusting, ulceration, etc.
- Patients above 18 years of age
- Patients of both male and female sex.
- Written informed consent from the patient

Exclusion criteria

- Patients without nasal symptoms
- Patients below 18 years of age
- Patient who has undergone surgery.

Ethical clearance

It is obtained**.**

Method of data collection

Sample size:

Stratified Random Sampling based on age.

$$n = \frac{Z^2pq}{d^2}$$

Z = 1.96 at 95% confidence interval

P = proportion of patients having nasal obstruction (11.1%) [5]

q = 1-p

d= precision (10%)

$$n = \frac{(1.96\%)\ (0.111)\ (0.889)}{(0.1)^2}$$

n = 38.

Hence the sample size obtained for our study =38.

Method of collection of data

A uniform history was documented for each patient including nasal obstruction, nasal discharge (foul smelling or non-foul smelling), loss of smell, nasal mass or swelling, bleeding from nose. Previous medical management with antihistamines, decongestants (topical and/ or systemic), antibiotics, or steroids (topical and/ or systemic) was asked. The details of previous surgical treatment like biopsy or FESS were also taken.

Detailed clinical examination of the patients was done to note any external nasal deformity, nasal polypoidal mass, nasal crusting, ulceration, etc.

All the patients were subjected for diagnostic nasal endoscopy. The evaluation was performed under topical anaesthesia after insertion of cotton pledgets soaked with a combination of 4% xylocaine and 1:30,000 Adrenaline. Examination was performed with 30°-4 mm endoscope. An First pass was made along the floor of the nose to examine the area of inferior meatus and the nasopharynx. A Second pass was then made to examine posterior end of middle turbinate, sphenoethmoidal recess, superior turbinate, superior nasal meatus. A Third pass was performed by passing into the middle meatus. we can identify head of the middle turbinate, the uncinate process and depending upon the presence of pathologic changes, parts of the ethmoidal bulla, sinus of the turbinate, hiatus semilunaris inferior is and superioris and frontal recess area were examined, whenever possible.

Relevant investigations were done like ESR, RPR, Mantoux test, skin prick test, serum ACE levels, cANCA and pANCA, and CT scans were reviewed with particular attention to the surgical anatomy and the extent of disease.

Surgery was done to take biopsy of the lesions. The general anaesthesia was used in all patients. The local anaesthesia began with 4% xylocaine with 1:30,000 adrenaline soaked cotton pledgets kept in the nasal cavities for 10 minutes which helped in nasal decongestion. Infiltration anaesthesia was given wherever necessary with 2% xylocaine with 1:2,00,000.

Whenever bleeding occurred, cotton pledgets soaked in 4% xylocaine with 1:30,000 adrenaline were used to achieve haemostasis. A ribbon gauze soaked with nadoxin ointment was put into the nasal cavity for one day. The nasal cavity was packed with merocele soaked in nadoxin ointment for 24-48 hours of time and then pack removal is done. Patient discharged and followed up with biopsy reports.

Statistical analysis

Statistical Package for Social Sciences [SPSS] for Windows Version 22.0 Released 2013. Armonk, NY: IBM Corp., will be used to perform statistical analyses.

Descriptive statistics

Descriptive analysis includes expression of the study variables using frequency and proportions.

Results and Discussion

Granulomas of the nose are chronic inflammatory lesions characterised by formation of granulomatous tissue by infiltrations of chronic inflammatory cells. Granulomas can be of infectious type or non-infectious type. Granulomas of the nose of infectious

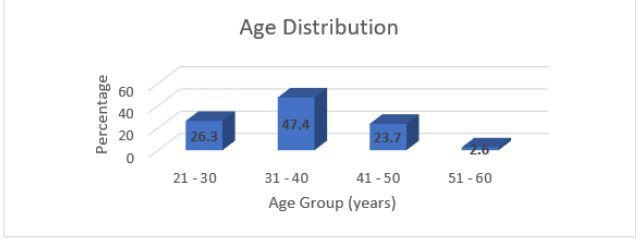
causes are more common in the developing countries. Detailed Endoscopic, radiologic, histological investigations and evaluations are essential for their diagnosis and management. There is paucity of data regarding the aetiology and epidemiology of various granulomas of nose [3]. Hence in this study, we are aiming to find out the various granulomatous lesions of nose, presentation of each condition, with emphasis on their timely diagnosis.

In the present study including 38 patients, on clinical, radiological and histological evaluation, the various granulomatous conditions we found include rhinoscleroma in 26 patients (68.42%), tuberculosis in 2 (5.26%), rhinosporidiosis in 7 (18.42%) and Wegener's granulomatosis in 3 (7.89%). Here rhinoscleroma is found to be the commonest among the study population, followed by rhinosporidiosis, wegener's granulomatosis and then tuberculosis (Table 5, graph 5). But Mohanty., *et al*. conducted a study in 150 patients, concluded that Rhinosporidiosis was the predominant condition accounting for majority of cases 137 (91.33%), followed by rhinoscleroma (9, 6%), Tubercular granuloma was seen in 2 patients (1.33%). Leprosy and foreign body granuloma were found in 1 patient each (0.67%). This is contradicting to our study, where as tuberculosis in his study was seen among 2 patients which is similar to out study [8]. Another study conducted by Siddharth., *et al*. found out that tuberculosis was the commonest granulomatous condition in their study population which was seen among 8 patients (5.3%), followed by Leprosy in 4 (2.7%) and rhinosporidiosis 4 (2.7%) cases and syphilis in 2 (1.3%)[10].

In our study, Out of 38 patients, 18 patients were (47.4%) in the age group of 31-40 years, 10 patients in the age group of 21-30 years (26.3%), 09 patients in the age group of 41-50 years (23.7%) and 1 patient in the age group of 51-60 years (2.6%) (Table 1 and Graph 1). In a study conducted by Mohanty., *et al*. including 150 patients found that majority of the patients were in the range of 21-30 years of age including 51 patients (34%), followed by 49 in 11-20 years of age (32.67%) and so on [8]. out of 38 cases of granulomatous diseases of nose, 20 patients were male and 18 were females (Table 2 and Graph 2). In a study conducted by Siddharth., *et al*. involving 150 patients, 96 patients had inflammatory lesions (64%), followed by 22 benign lesions (15%), 18 granulomatous lesions (12%) and malignant lesions of 14 (9%). Among 18 patients with granulomatous lesions, 12 were male and 6 females with male preponderance which is consistent with our study [10].

Age Group (years)	Frequency	Percentage
21 - 30	10	26.3
31 - 40	18	47.4
41 - 50	9	23.7
51 - 60	1	2.6

Table 1: Distribution of Age.



Graph 1: Distribution of age.

Sex	Frequency	Percentage
Female	18	47.4
Male	20	52.6

Table 2: Distribution of Sex.

Graph 2: Distribution of sex.

In the current study population of 38 patients, 25 of them hailed from rural areas (65.8%) and 13 patients hailed from urban areas (34.2%). Also in this study, 25 patients had history of contact with water (66%) and remaining 13 patients had no history of contact with water (34%). In a study conducted by Siddharth., *et al*. majority of the patients, i.e. 14 out of 18, hailed from rural areas, indicating that granulomatous diseases are more commonly seen in rural areas [10] which is similar to our study. Mohanty., *et al*. in their

study found that the rural population are at higher risk to suffer than those live in urban areas, with prevalence of malnutrition, lack of education, unhygienic practices and less access to proper health-care services. There is also much scarcity of safe water for daily use [3]. This relation of rural population at higher risk for acquiring the disease due to contact with water is positively seen in our study as 25 patients hailing from rural areas have positive history of contact with water.

In this study, the most common symptom among 38 patients is nasal obstruction, which was present in 28 patients (73.7%) followed by nasal discharge in 17 (44.7%), bleeding from nose in 14 (36.8%), loss of smell was seen in 9 patients (23.7%) and nasal mass in 3 patients (7.9%) (Table 3 and Graph 3). Unlike our study, Siddharth., *et al*. conducted a study in a tertiary care centre with 150 patients and 18 out of 150 patients had granulomatous conditions, and they found that bleeding from nose was the most common symptom of presentation seen among 12 patients out of 18 followed by other symptoms like hyposmia in 8 patients, unilateral nasal obstruction and nasal discharge in 4 patients each and bilateral nasal obstruction in 2 patients [10]. Mohanty., *et al*. conducted a study involving 150 patients concluded that epistaxis as the most common presenting symptom in their study seen in 126 patients (84%), followed nasal obstruction as the second common symptom seen in 118 (78.67%), others symptoms includes Pain in the nose, Anosmia in 13 (8.67%) [3].

Clinical Presentation	Frequency	Percentage
Bleeding from Nose	14	36.8
Nasal Mass	3	7.9
Nasal Discharge	17	44.7
Loss of Smell	9	23.7
Nasal Obstruction	28	73.7

Table 3: Distribution of Clinical Presentation.

Graph 3: Distribution of clinical presentation.

In this study, On clinical and endoscopic nasal examination in 38 patients, we have found that nasal crusting is the common clinical sign, which is seen among 15 patients (39.5%), ulceration of the nasal mucosa were seen in 9 patients (23.7%), polypoidal mass was seen in 7 patients (18.4%), external deformity of the nose were seen in 4 patients (10.5%) and septal perforation was seen among 2 patients (5.3%) (Table 4 and Graph 4). Mohanty., *et al*. conducted a study involving 150 patients found in his study, mass from the nose (unilateral) in 130, 86.67% patients, followed by deformed nasal framework in 11 patients (8%), bilateral nasal mass in 20 (13.3%) [3].

Clinical Signs	Frequency	Percentage
Nasal Crusting	15	39.5
External Deformity	4	10.5
Ulceration	9	23.7
Septal Perforation	2	5.3
Polypoidal Mass	7	18.4

Table 4: Distribution of Clinical Signs.

Graph 4: Distribution of clinical signs.

Rhinoscleroma is the most common granulomatous condition in our study which is seen in 26 out of 38 patients (68.42%). Mohanty., *et al*. did a study on 150 patients according to which, rhinopsoridiosis was the most common condition which was seen in 137 patients (91.33%) and rhinoscleroma cases in 9 patients (6%) [3]. Out of 26 cases, 50% of the patients belonged to the age group of 31-40 years (13), 8 patients were in the age group of 21-30 years (30.8%) and remaining 5 patients belonged to the age

group of 41-50 years with total age group of presentation of 21 - 50 years. Hence The peak age of presentation was between 31-40 years of age (Table 5 and Graph 5). Out of 26 cases, 15 patients are females (57.7%) and 11 are males (42.3%) indication female preponderance in our study (Table 6 and Graph 6). Fawaz S., *et al*. conducted a study in 88 cases which included 56 female patients (64%) and 32 male patients (36%) with female preponderance which Is consistent with our study. The age group of presentation ranged from 13 to 57 years with mean age group of 35 years, which is also similar to our study [11].

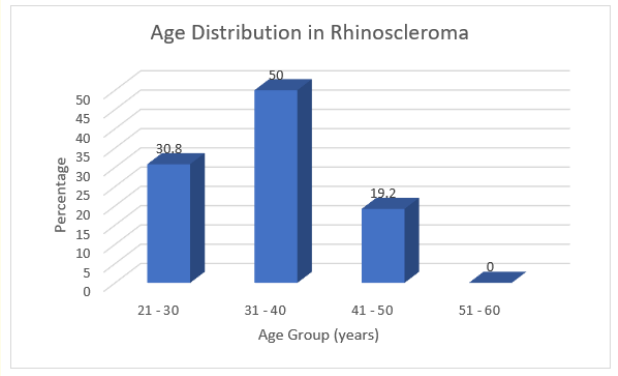
Condition	Frequency	Percentage
Rhinoscleroma	26	68.42
Rhinosporidiosis	7	18.42
Tuberculosis	2	5.26
Wegener's Granulomatosis	3	7.89

Table 5: Distribution of Condition.

Graph 5: Distribution of condition.

Age Group (years)	Frequency	Percentage
21 - 30	8	30.8
31 - 40	13	50
41 - 50	5	19.2
51 - 60	0	0

Table 6: Distribution of Age in Rhinoscleroma.



Graph 6: Distribution of age in rhinoscleroma.

Sex	Frequency	Percentage
Female	15	57.7
Male	11	42.3

Table 7: Distribution of Gender in Rhinoscleroma.

Graph 7: Distribution of gender in rhinoscleroma.

Also 17 patients of rhinoscleroma hailed from rural areas (65.4%) whereas only 9 are from urban areas (34.6%) concluding that rural population is at higher risk (Table 8 and Graph 8). Gaafar H., *et al*. conducted a study on 56 patients from January 1999 to January 2009, found out that 60% of the rhinoscleroma patients belonged to rural areas with remaining 40% from urban areas which correlates with our study [12].

Residence	Frequency	Percentage
Rural	17	65.4
Urban	9	34.6

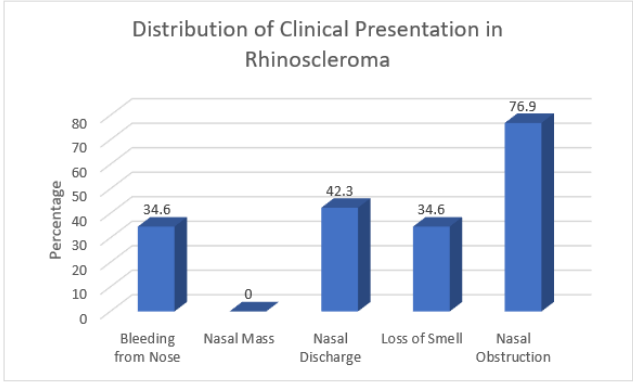
Table 8: Distribution of Residence in Rhinoscleroma.

Graph 8: Distribution of residence in rhinoscleroma.

In our study, the clinical and endoscopic examination on all 26 patients with rhinoscleroma, nasal obstruction was present in 20 patients (76.9%), nasal discharge in 11 patients (42.3%), loss of smell in 9 patients (34.6%) and bleeding from nose in 9 patients (34.6%). Fawaz S., *et al*. conducted a study in 88 cases, found that nasal obstruction was the most common symptom, seen in 83 patients (94%), followed by other symptoms like rhinorrhea in 36 (41%), anosmia or cacosmia in 31 (35%), epistaxis in 24 (27%) [11] (Table 9 and Graph 9). On clinical examination among 26 patients with rhinoscleroma, nasal crusting were present in 17 patients (65.4%), ulceration were present in 12 patients (46.2%) and external nasal deformity was noted in 6 patients (23.1%) (Table 10 and Graph 10). Gaafer A H., *et al*. showed in their study that clinical signs on examinations included hebra nose, nasal crusting with viscid discharge filling the nasal cavities from nares to choanae in 19 patients, combinations of granulations, fibrosis with nasal collapse was seen in 5 patients [12].

Clinical Presentation	Frequency	Percentage
Bleeding from Nose	9	34.6
Nasal Mass	0	0
Nasal Discharge	11	42.3
Loss of Smell	9	34.6
Nasal Obstruction	20	76.9

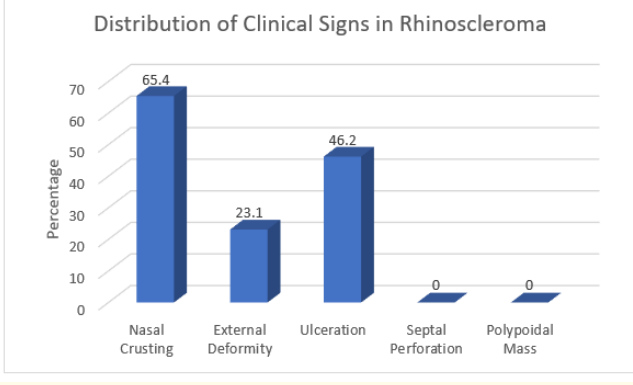
Table 9: Distribution of Clinical Presentation in Rhinoscleroma.



Graph 9: Distribution of clinical presentation in rhinoscleroma.

Clinical Signs	Frequency	Percentage
Nasal Crusting	17	65.4
External Deformity	6	23.1
Ulceration	12	46.2
Septal Perforation	0	0
Polypoidal Mass	0	0

Table 10: Distribution of Clinical Signs in Rhinoscleroma.

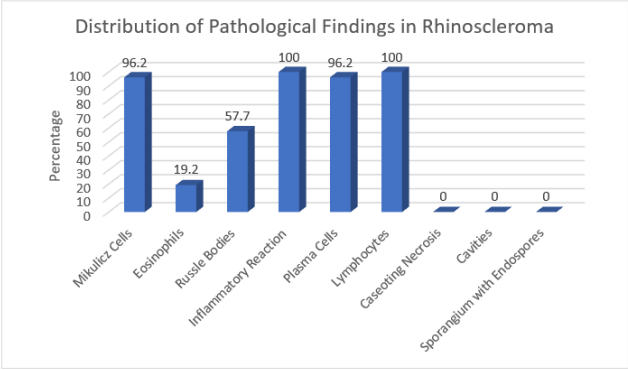


Graph 10: Distribution of clinical signs in rhinoscleroma.

On histopathological Examination of all the cases of rhinoscleroma in this study, inflammatory reaction with lymphocytes were present in all 26 cases (100%) with other cells like plasma cells in 25 patients (96.2%), Mikulicz cells in 25 patients (96.2%), russels bodies in 15 (57.7%) and eosinophils in 5 (19.2%) (Table 11 and Graph 11). N'gattia K V., *et al*. conducted a

Clinical Presentation	Frequency	Percentage
Mikulicz Cells	25	96.2
Eosinophils	5	19.2
Russle Bodies	15	57.7
Inflammatory Reaction	26	100
Plasma Cells	25	96.2
Lymphocytes	26	100
Caseoting Necrosis	0	0
Cavities	0	0
Sporangium with Endospores	0	0

Table 11: Distribution of Pathological Findings in Rhinoscleroma.



Graph 11: Distribution of pathological findings in rhinoscleroma.

study on 14 patients and in their study the diagnosis of cases were established by histological examination of biopsy samples which showed Mikulicz cells in 13 cases and Russel bodies in one case [13]. Gaafer H A., *et al*. conducted a study on 56 patients confirmed the cases by histopathological examination which showed plenty of plasma cells, the presence of numerous large foamy cells (Mikulicz cells) that contained bacilli and Russell bodies [12].

The second most common condition in our study is rhinosporidiosis seen among 7 patients out of 38 with a percentage of 18.42%. But contrary to this, Mohanty., *et al*. conducted a study in the year 2014 with 150 patients where rhinosporidiosis was seen among 137 patients (91.33%) and this was the common granulomatous condition [3]. Out of 7 patients in this study, 4 of them belonged to the age group of 31-40 years (57.1%), 2 from 21-30 years of age (28.6%) and one patient from the group of 41-50 years (14.3%) of age with 5 male (71.4%) and remaining 2 female patients (28.6%). Hence according to our study, rhinosporidiosis is more commonly seen in male patients. Karthikeyan P., *et al*. conducted a retrospective study among 32 patients, where 18 (56.25%) patients were male and 14 (43.75%) were females. Also they concluded that most of the cases were found to be within the 21-50 years age group, with the maximum in the third and fourth decades of life, but this showed no statistically significant relationship between age and incidence of rhinosporidiosis [14].

Among 7 cases of rhinosporidiosis in our study, 5 of them hailed from rural areas (71.4%) and 2 patients from urban areas (28.6%). Also in our study we found that 5 patients has history of contact with water (71.4%) and remaining 2 has no such history. As in our study, Karthikeyan P., *et al*. in their study foumd that majority of the patients were from rural areas with the percentage of 59.38% (n = 19) while, 7 in semi-urban areas (21.88%) and 6 in urban areas (18.75%). In their study, they have also found that majority of their patients had history of bathing in river (31.25%) or ponds (59.38%), (contact with water) with statistical significance [14].

7 patients with rhinosporidiosis in our study presented with symptoms like bleeding from nose (28.6%), nasal obstruction (71.4%), nasal mass (42.9%) and nasal discharge (42.9%). Majority of the patients presented with nasal obstruction (n = 5, 71.4%). On examination, polypoidal nasal mass was the commonest finding seen in all 7 patients (100%) and external nasal deformity was seen in 2 patients (28.6%). Senugupta S., *et al*. did a study on 273 patients found that nasal polypoidal masses as the common clinical presentation in 189 patients (95.9%), epistaxis in 148 (75.1%), nasal obstruction (23.3%) and rhinorrhoea in 29 (14.7%). On histopathological examination of all 7 cases, inflammatory reaction was seen in all 7 patients. Also sporangium with endospores are seen in all 7 patients. The other histologic findings are plasma cells and lymphocytes in 6 each (85.7%). Senugupta S., *et al*. in their study found that raised total leukocyte count was encountered in 19 (6.9%) cases. 64.8% (177 out of 273) of the patients had eosinophil count 5% or less. Histopathological study done over biopsied or resected tissue specimens reveal multiple sporangia in various stage of maturity bounded in a thick chitinous wall. Overlying epithelium become hyperplasic with loose fibrovascular stroma infiltrated with lymphocytes, plasma cells and macrophages. Neutrophilic infiltration can also be evident [15].

In our study, we found 2 cases of nasal tuberculosis (5.26%). 1 patient is in the age group of 31-40 years and other patient belonged to the group of 41-50 years and both are male patients coming from rural areas. But only 1 patient has history of contact with water whereas other patient has no history. Mohanty., *et al*. did a study on 150 patients who found 2 cases of nasal tuberculosis (1.33%) in their study [3]. Sharma., *et al*. conducted a study on ENT manifestations of tuberculosis including 520 patients. They have found only 1 case of nasal tuberculosis in their study who was of 21 year old female patient [16]. Kim Y M., *et al*. did a retrospective study on nasal tuberculosis in 8 patients where the age varied from 17 to 51 years, with a mean age of 31 years. The male-to-female ratio was 1:3 in their study concluding that females are at more risk for nasal tuberculosis [17].

Both the patients of nasal tuberculosis presented with nasal obstruction (100%), but bleeding from nose is present in 1 patient (50%) and loss of smell (50%). Kim Y M., *et al*. did a study on 8 patients with nasal tuberculosis including symptoms like nasal obstruction which is most common symptom, then followed by rhinorrhea, symptoms from nasal masses, epistaxis, and crust formation [17]. On examination, ulceration is noted in both the patients (100%) and septal perforation noted in only among two (50%). Kim Y M., *et al*. did a retrospective study where 3 out of 8 patients with nasal tuberculosis had septal perforations. On histopathological examination, inflammatory reaction, lymphocytes, plasma cells, caseating necrosis and cavities are seen in both the patients whereas eosinophils are seen in only 1 patient. Kim Y M., *et al*. did a study on 8 cases of nasal tuberculosis where diagnosis was made after histopathological examination which showed granulomatous inflammation with caseous necrosis [17].

We have found 3 cases of Wegener's Granulomatosis (7.89%) in our study. 2 patients are in the age group of 41-50 years (66.7%) and third patient is in the age group of 51-60 years (33.3%) and out of 3, 2 are male patients (66.7%) and 1 female patient (33.3%). Cannady S B., *et al*. conducted a retrospective analytical study including 120 patients with primary diagnosis of Wegener's Granulomatosis who found that the mean age at the time of presentation was 46.6 years, with a range of 15 to 97 years. There were 81 (67.5%) females and 39 (32.5%) males with a female: male ratio of 2.1:1. This is contrary to our study where male predominance is seen [18].

In our study, out of 3 cases of Wegener's, bleeding from nose is seen in 2 patients (66.7%) and nasal discharge is seen among 2 patients (66.7%). On examination, external deformity with ulceration of the mucosa was noted in 2 patients each (66.7%), with nasal crusting in 1 (33.3%) and septal perforation in 1 (33.3%). Cannady S B., *et al*. conducted a retrospective analytical study including 120 patients with primary diagnosis of Wegener's Granulomatosis who detected that the nasal symptoms of presentation includes nasal crusting (69.2%), nasal obstruction (58.3%), bloody discharge from nose (51.7%) and epiphora (13.3%) and signs on examination included in this study are septal perforation (32.5%), saddle nose deformity (22.7%), mucocele (3.3%) [18].

Figure 1: Photograph of a patient with rhinoscleroma showing external nasal deformity.

Figure 2: Histopathology of rhinoscleroma - H and E stained sections showing ill formed granuloma comprising of epithelioid cells and lymphocytes.

Conclusion

In the current study, patients presented with various nasal symptoms like nasal obstruction, nasal discharge, bleeding from nose, loss of smell, crusting, etc. without generalized symptoms. The clinical diagnosis is difficult in these patients and hence it has to be accompanied with histopathological examination for definitive diagnosis of granulomatous conditions.

In our study, rhinoscleroma is the most common condition among all the granulomatous diseases of nose, then followed by rhinosporidiosis, Wegener's granulomatosis and then tuberculosis. Awareness regarding this condition and health education regarding hand hygiene, less contact with pond waters, less contact with cattles, nutrition, etc. must be given to the population, especially to the rural peoples, in order to reduce the incidence of these conditions.

Early diagnosis will minimize the rate of deformity in these patients. Early management with medical regimens have reduced the disease burden to a larger extent. For conditions with severe deformity and recurrence, etc. surgical treatments have to be considered.

Regular follow up is important to assess the prognosis of medical treatment and to assess the recurrence of this condition.

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