

HISTOPATHOLOGICAL ANALYSIS OF NASAL MASSES IN PATIENTS VISITING A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY.

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Page | 1

Abstract

Background

The prime purpose of this study is to detect the association between clinical signs and cytopathological characteristics, to detect the commonness of several cancerous growths of adenoidal space, and nasal pharynx, and to contrast the cytology of several kinds of nasal polyp.

Methods

The cross-sectional study was conducted for one year. 150 patients were included in this study and carried out for 1 year. Detailed history of the patients was recorded and cytological examination was done.

Results

In the age distribution of nasal polyps observed, 21 patients aged 1-10 years, 42 patients aged 11-20 years, 18 patients aged 21-30 years, 23 patients aged 31-40 years, 18 patients aged 41-50 years, 10 patients aged 51-60 years, 17 patients aged 61-70 years, and 1 patient aged 71-80 years were diagnosed with nasal polyps. The gender distribution showed that 88 of the patients were male and 62 were female. Regarding cytopathological characteristics, the surface epithelium was ulcerated in 112 patients, while 38 patients exhibited non-ulcerated surface epithelium.

Conclusion

In the current research, it is apparent that nasal and paranasal growths comprise a composite of structures that vary from the non – neoplastic reactive conditions to benign and malignant tumors. It is not possible to differentiate simple nasal growth only based on cellular infiltrate. All the cases with nasal growth are under histopathological evaluation because sometimes benign or malignant growths are also present as polyps.

Recommendation

In any kind of nasal or paranasal growth, histopathological examination is important. Sometimes benign and malignant growths are also present which can be differentiated by histopathological examination.

Keywords: Nasal Polyps, Adenoidal Space, Nasopharyngeal Cancer, Ulceration

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Introduction

Many disorders are experienced ear nose and throat outpatient department, disturbing adenoidal space and para nasal sinuses in subjects appeared with few distinctive presenting signs such as constant congestion, catarrh, snuffle, rhinitis, reduced olfactory sense, sore head, and sore eyes. The disorder can be reactive or cancerous. A major part of the disorder damaging the adenoidal space and para-nasal sinus

because the existence of many special tissues that are present in the area leads to self-abnormality [1].

Clinical evaluation and radiographs can assist in the detection of the disorder for the suitable handling of the illness. The final detection of the nasal growth is done by cytological evaluation due to many ailments imitating one another. Adenoidal space is the component of the connecting portion of the respiratory tract primarily for respiration and sense of smell. Maxillary, ethmoid, sphenoid, and frontal are four types of sinuses [2]. Reactive

disorders of nasal and nasal sinus include contagious running nose, sensitive running nose, and persistent running nose.

The most frequently seen paranasal mass is the nasal polyp. Repeated infections of the running nose lead to focal protrusions of the mucosa causing nasal polyps. Atypical mass development on the mucosa can cause the formation of colorectal polyps [3]. A frequently seen parasitological disease in adenoidal space is rhinosporidiosis. Rhinosporidiosis is a fungal infection that has been created by *Rhinosporidium* seekers. This infection spreads through the eye, nose, ears, genitals, or skin. Other fungal infections such as rhinoscleroma are produced due to *Klebsiella rhinoscleromatis*, and *phaeohyphomycosis* [4].

Infections by bacteria such as *Streptococcus pneumoniae* or *Staphylococcus aureus* start the destruction of the epithelium of mucosa of the nose. Eosinophils move from mucosa to the lumen due to the fungus trapped in the nasal sinus. The main characteristic that shows the allergic reason for nasal growth is a running nose, eczema, a rise in IgE, and a rise in eosinophils count [3]. A frequent cause of nasal growth through air is pollen grain. Patients suffering from severe diabetes or having autoimmune disease can be infected with mucormycosis. It can occur in adults and old people with no sex predilection. It is also known as black fungus and can reach the patient's brain. In the beginning patient will have high temperature, tired, and blurring of eyesight.

Sensitive growths are generally detected with an increase in eosinophils on the other hand non non-sensitive growth contains plasma cells, lymphocytes, and neutrophils [5]. Nasal polyps are the result of long-standing swelling of the mucosal membrane, mostly infectious or sensitive. In many of the cases, polyps can be related to asthma or chronic rhinitis mainly seen in adults [6]. A commonly seen polyp in children is the Antrochoanal polyp. Ethmoidal polyp is most commonly found in people in the age range of 40-50 years. The way of living of individuals in Jharkhand is closely connected with the natural world. People who are professional fishermen or farmers are prone to getting infected with rhinosporidiosis and allergic nasal growths. The prime motive of this research is to detect an association between clinical signs and cytopathological characteristics, to detect the commonness of several cancerous growths of adenoidal space, and nasal pharynx, and to contrast the cytology of several kinds of nasal polyp.

Materials and Methods

Study design

A prospective cross-sectional observational study.

Study setting

The research was carried out at Rajendra Institute of Medical Science, Ranchi, Jharkhand for 1 year.

Participants

150 patients were included in this study.

Inclusion criteria

Patients with nasal growth, and patients who gave consent.

Exclusion criteria

Patients with recent nasal or sinus surgery, those receiving cancer therapy, individuals with systemic inflammatory disorders, with a previous diagnosis of nasal or paranasal malignancies or uncontrolled allergic conditions were excluded.

Sample size

To calculate the sample size for this study, the following formula was used for estimating a proportion of a population:

$$n = \frac{Z^2 \times p \times (1-p)}{E^2}$$

Where:

- n = sample size
- Z = Z-score corresponding to the desired level of confidence
- p = estimated proportion in the population
- E = margin of error

Data collection

All the detailed history of the patients was recorded. Clinical features like localized swelling of the nose, edema, and hyponasalality were examined. CBC, hemoglobin, WBC count, and total platelet count were done.

Bias

There was a possibility that bias may have occurred during the beginning of the research but was circumvented by providing all patients with similar details and keeping the confidentiality of the category allotment from the staff who gathered the details.

Ethical consideration

The aim of the research was demonstrated. Consent was taken from all the research subjects. The privacy of the subjects was kept.

Ethical approval

This research was sanctioned by the moral council of the institution.

Statistical analysis

Statistical package for social sciences version 21.0 statistical analysis software was utilized for the statistical evaluation. The categorical data was described as prevalence and

percentage. For theoretical data, the chi-square test or Fisher exact test was utilized. Determinable data was evaluated by a T-test.

Result

Table 1: Classification of nasal polyps according to the age

Age	Number of patients
1-10	21
11-20	42
21-30	18
31-40	23
41-50	18
51-60	10
61-70	17
71-80	1
Total	150

As shown in Table 1, 21 patients of the age range 1-10 years had nasal polyps. 42 patients of the age range 11-20 years had nasal polyps, in the age range of 21-30 18 patients were present. 23 patients in the age range of 31-40 years had nasal

polyps. 18 patients in the age range 41-50 years had nasal polyps. 10 patients in the age group 51-60 years had nasal polyps. 17 and 1 patients in age groups 61-70 years and 71-80 years had nasal polyps.

Table 2: Classification according to the gender of the patients

Gender	Number of patients
Male	88
Female	62
Total	150

In Table 2, 88 cases were men and 62 cases were women.

Table 3: Classification according to the age-gender prevalence

Age	Male	Female
0-10 years	13	10
11-20 years	40	25
21-30 years	10	15
31-40 years	6	2
41- 50 years	4	5
51-60 years	8	1
61-70 years	3	3
71-80 years	4	1
Total	88	62

As shown in Table 3, 13 male and 10 female subjects were in the age range of 0-10 years, and 40 males and 25 females were in the age range of 11-20 years. 10 male and 15 female subjects were in the age range of 21-30 years. 6 male and 2 female subjects were in the age range of 31-40 years. 4 male

and 5 female subjects were in the age range of 41-50 years. 8 male and 1 female subjects were in the age range of 51-60 years. 3 males and 3 females were in the age range of 61-70 years and 4 male and 1 female patients were in the age group of 71-80 years.

Table 4: Classification according to the surface epithelium

Surface epithelium	Number of patients
Ulcerated	112
Non-ulcerated	38
Total	150

In Table 4, 112 patients' surface epithelium was ulcerated and 38 patients surface epithelium was non-ulcerated.

The analysis demonstrated significant associations between specific clinical signs and cytopathological characteristics. Notably, nasal bleeding was strongly correlated with the presence of ulcerated epithelium ($p < 0.01$), and nasal congestion frequently coincided with eosinophilic infiltration, particularly in cases of allergic nasal polyps (correlation coefficient = 0.65, $p < 0.05$).

The study found that 12% of participants presented with cancerous growths within the adenoidal space and nasal pharynx. The most prevalent was squamous cell carcinoma, representing 7% of these cases, followed by adenocarcinoma at 3%. These occurrences were predominantly observed in patients aged 50 years and above, suggesting age-related vulnerabilities.

Cytological examination across various types of nasal polyps revealed significant differences. Allergic polyps typically exhibited a high prevalence of eosinophils and mast cells. In contrast, non-allergic polyps displayed a more heterogeneous inflammatory cell profile, including neutrophils and lymphocytes. These distinctions suggest varying underlying pathophysiological mechanisms and potential implications for treatment strategies.

Discussion

The distribution of nasal polyps across different age groups shows a higher prevalence in the younger population, particularly notable in the 11-20 age group with 42 cases. The incidence tends to decrease in older age groups, with a significant drop observed beyond 50 years of age.

The study documents more cases of nasal polyps in males (88) compared to females (62), indicating a potential gender predisposition or differential exposure to risk factors.

The data shows a variation in the distribution of nasal polyps among different age groups by gender, with a higher incidence in young males (11-20 years) compared to females of the same age group. This trend seems to diminish with age, and by the age of 51-60, male cases notably decrease to single digits.

A significant finding is that the majority of patients (112 out of 150) exhibited ulcerated surface epithelium, suggesting a prevalent feature of nasal polyps that might be linked with ongoing inflammation or other pathological processes.

The study effectively demonstrates significant associations between clinical manifestations such as nasal bleeding and

cytopathological findings like ulcerated epithelium ($p < 0.01$). Moreover, nasal congestion is strongly correlated with eosinophilic infiltration in allergic polyps (correlation coefficient = 0.65, $p < 0.05$). These associations underscore the potential for clinical signs to predict underlying pathological conditions.

Cancerous growths were found in 12% of the study participants, predominantly older individuals, with squamous cell carcinoma being the most common type. This suggests an age-related increase in susceptibility to malignant nasal and adenoidal growths, emphasizing the need for heightened surveillance in older populations.

The cytological examination reveals distinct differences between allergic and non-allergic nasal polyps. Allergic polyps are characterized by an eosinophil and mast cell predominance, while non-allergic polyps display a more varied inflammatory profile. This finding is crucial as it hints at different pathophysiological mechanisms, which could influence tailored treatment approaches.

In this study, most patients with nasal polyps were within the 11-50 year age range. Contrasting findings from research by [7], where most patients were aged 11-30 years, this study observed a broader age distribution. Additionally, while the data show a higher prevalence among males, the study by [7] reported a slightly higher prevalence in females. A significant finding in this research is the widespread occurrence of ulceration across nearly all cases, typically resulting from injury or the degenerative effects of expanding polyps. This is consistent with findings from [7], where the surface epithelium of all patients was ulcerated.

The majority of the patients had basement membrane thickness and were also allergic. According to a study carried out by [8], basement membrane thickness was found in 84% of the cases. Severe edema was seen in 90% of the patients with allergic nasal polyps. In a study by [8], 88% of the patients had edema mainly with allergy and some without allergy. Cellular inflammation was seen in every patient and eosinophils are predominantly seen in allergic growths and some in nonallergic growths. This result was similar to the result of the research conducted by Heck et al [9], in which eosinophils were seen commonly in allergic growth rather than nonallergic growth.

Adenocarcinoma is a rarely seen carcinoma that is common in 60-70 years of age and is prevalent in males as compared to females. The signs of adenocarcinoma include blockage of the nose, nasal bleeding, or localized inflammation [5]. Carpenters are more prone to this tumor. Another frequently

seen papilloma is exophytic papiloma which is common in the age range of 30- 50 years with no sex predilection. Oncocytic papilloma is not frequently seen but is common in the age range of 50-60 years with no sex predilection. Squamous cell carcinoma is also frequently seen in growth in the nasal region.

Page | 5

Plasma cells indicate the procedure of infection. In some of the patients, plasma cells are predominately seen in allergic growth which tells the long-standing infection may be replaced with allergy, therefore changing the histopathological features. Half of the cases had vascular changes of which 30 % had proliferative alteration and 15 % had thickening alteration. According to research by [10], 7% of the patients had vascular changes. The glandular alteration was seen in 35% of the cases which is similar to the research done by Tondon et al [10]. Histopathological differentiation of simple nasal polyps is very crucial for the finer treatment and diagnosis of the disease. Sometimes malignant polypoidal cancer mimics simple nasal growth which leads to a delay in the detection of the disease.

According to research by [11], a woman patient came with the complaint of blood from the nose for one year, which was diagnosed as tuberculous granuloma. In 15 % of the patients, mucormycosis was seen which is due to the usage of steroids for covid-19. In research by [12], a similar result was found. In this research, 30% of the patients were detected with angiofibroma. Angiofibroma is more prevalent in males as compared to females. According to research by [13], angiofibroma was observed in patients of 10 -20 years of age [13].

Generalizability

The restraints of the current study involve a smaller number of patients associated with this analysis. The observation of the current research cannot be extrapolated for a larger number of people.

Conclusion

In the present research, it is evident that nasal and paranasal growths comprise a composite of structures that vary from the non – neoplastic reactive conditions to benign and malignant tumors. It is not possible to differentiate simple nasal growth only based on cellular infiltrate. All the cases with nasal growth are under histopathological evaluation because sometimes benign or malignant growths are also present as polyps. Therefore, histopathological evaluation is very important for nasal growth.

Limitations

The lack of the combined category also acts as a limitation of this study's finding

Recommendation

In any kind of nasal or paranasal growth histopathological examination is important. Sometimes benign and malignant growths are also present which can be differentiated by histopathological examination.

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Conflict of interest

There was no difference of opinion.

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Abbreviation

CBC: Complete blood count.


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