Original Research Article

The Prevalence of Nasal Polyposis in Patients with Rhinitis and Asthma at aNorthern Indian Tertiary Care Hospital

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Abstract

Background: The etiology of Nasal polyps remains unclear, but they are known to have associations with allergy, asthma, infection, cystic fibrosis and aspirin sensitivity. The objective of this study was to investigate the prevalence of nasal polyposis in Northern Indian patients in a tertiary care hospital with rhinitis and asthma.**Materials and Methods:** This prospective observational study was done in the OPD of ENT Department of tertiary care teaching hospital in northern India, for a total duration of 3 years from January 2013 to December 2016. Demographic data including age, sex and clinical presentation was taken on the predesigned patient proforma. All patients were examined for nasal polyps by anterior rhinoscopy and endoscopic investigation.**Results:** In the present study we enrolled 576 patients of rhinitis and asthma..Non-allergic respiratory diseases were found to have a much higher percentage of association with Nasal Polyps as compared to those suffering from Allergic respiratory diseases, 25 (9.71%)& 7 (2.12%).Most prevalent associated symptoms was Nasal Obstruction (84.8%) followed by Headache (74%) least prevalent was Facial pain (14%).**Conclusion:** Evidence of nasal polyp is estimated more in non-allergic diseases rather allergic diseases.

Keywords: Nasal polyps,Allergic Rhinitis, Asthma.

Introduction

Nasal polyps are recognized as projections of the mucous membranes which develop in association with chronic rhinitis and sinusitis. The overall prevalence rate is probably about 2–4%which increases with age of the study population[1-3].The pathogenesis of nasal polyposis remains unknown. Some investigators have suggested that a genetic link might be present in these patients. Patients with male sex, aspirin intolerance, asthma, cystic fibrosis, and primary ciliary dyskinesia all seem to be associated with an increased risk of nasal polyposis [1,2].Nasal polyposis occurs with a high frequency in groups of patients with specified airway diseases.They are frequently allergic or inflammatory in origin. Allergic polypi are frequently bilateral and recurrent while inflammatory polyps are unilateral presenting with nasal obstruction, rhinorrhoea and disturbances of smell[1]. Rhinitis is defined as inflammation of the membranes lining the nose and is characterized by nasal congestion, rhinorrhea, sneezing, itching of the nose and/or post-nasal drainage[1].Atopy is an important risk factor for rhinitis and allergic rhinitis (AR) is the most common form. Allergic rhinitis has a high prevalence rate of about 15–20% [3-5]. Reports from India shows that 1 out of every 6 person has allergic rhinitis. Few reports from Indian population as Lathi et al[2]. and Dasgupta et al[2]gave a detailed study of nasal polyps in Indian context. Thus we noted the deficiency of topic which shows the association of allergic rhinitis on nasal polyp patients from different age groups. The aim of this study was to find out the association of Allergic rhinitis with Nasal polyp in Patients at a Tertiary Care Teaching Hospital in Northern India.

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Material & Methods

This prospective observational study was done in the OPD of ENT Department of tertiary care teaching hospital in northern India, for a total duration of 3 years from January 2013 to December 2016. Demographic data including age, sex and clinical presentation was taken on the predesigned patient proforma[6-10].This study included 576 consecutive cases of rhinitis with or without asthamawere enrolled during 3 year time period.The diagnosis of allergic rhinitis was made based on the clinical definition of allergic rhinitis as per Allergic Rhinitis and Its Impact on Asthma (ARIA) guidelines (2008 update) [2].Patients with symptoms of rhinorrhoea, nasal obstruction, nasal itching and sneezing which werereversible spontaneously or with treatment were diagnosed to have allergic rhinitis[11-13]. Asthma was diagnosed according to Global Initiative for Asthma (GINA) guidelinesby history and pulmonary function tests (reversal bronchial obstruction, bronchial hyperreactivity to methacholine).A predesigned and pretested questionnaire was developed at the Institute with the assistance from the faculty members and other experts in this field. Polyps were diagnosed by using either anterior rhinoscopy or standard nasal endoscopy with a 4-mm fiberoptic endoscope (after topical decongestant-anesthetic had been applied) [2].

Allergic rhinitis:A diagnosis of allergic rhinitis was made in all patients on the basis of a thorough history, physical examination, and positive skin prick test responses to appropriate aeroallergens (including dust mites, ragweed extract, cat, and dog).

Allergy And Inflammation Markers: Skin prick testing to 58 common aeroallergens was performed in all the patients as per standard guidelines[2]. 58 different types of allergens, included five types of grass pollens (Cenchrus, Cynodon, Imperata, Pennisetum, Sorghum),16 types of weed pollens(Adhatoda,Ageratum, Amaranthusspinosus, Argemone, Artemisia, Asphodelous, Brassica,

Cannabis, Cassia occidentalis, Chenopodium album, Chenopodium M, Dodonaea, Gynandropsis, Parthenium, Suaeda, Xanthium), 11 types of tree pollens (Cassia siamea, Ehretia, Eucalyptus, Kigelia, Melia, Morus, Prosopis, Putranjiva, Ricinus, Salvadora, Holoptelia), 4 types of dusts (house dust, wheat dust, paper dust, cotton dust), 12 types of fungi (Alternaria, Aspergillusfumigatus, Aspergillus tamari, Candida, Cladosporium, Curvularia, Helminthosporium, Mucor, Phoma, Trichoderma, Rhizopus, Epicoccum), 6 types of insects (cockroach (M), cockroach (F), housefly, rice weevil, mosquito, moth) and others (house dust mite, kapok cotton, wool, silk) antigens[14]. Atopy was defined as a positive SPT (wheal diameter of >3 mm as compared to buffer saline as control) for at least ≥1 aeroallergen[15].

Statistical analysis

The statistical analysis was performed using SPSS Windows 20.0 version. The frequency analysis of the symptoms. Differences in proportions were tested by means of chi-square statistics. When comparisons were made between groups, Odd ratio was calculatedto compare the relative odds of the occurrence of the outcome of interest. *P* value of <0.05 was considered statistically significant.

Results

A total 576 patients were divided in two groups. Non-allergic respiratory diseases and Allergic respiratory diseases. Further these groups were categorized as Allergic& Non-allergic rhinitis as well as Allergic& Non- allergic asthma. Prevalence of allergic rhinitis was maximum recorded as 30% while Non- allergic asthma was lowest as 8.7%. The prevalence of nasal polyps was 14.06% in patients with non-allergic asthma, 2.7% in patients with allergic asthma, 8.74% in patients with non-allergic rhinitis, and 1.8% in patients with allergic rhinitis.(table no 1). Under Gender based distribution Males were more frequent as compared to females in all the categories (table no 2). Association of Nasal Polyps with Allergic& Non-allergic rhinitis as well as Allergic& Non- allergic asthma was significant (P value= 0.003-0.428as well as the OR=0.17-0.71) (table no 3).Association of Nasal Polyps with Non-allergic respiratory diseases and Allergic respiratory diseases was also exhibiting highly significant relation(P value<0.001 & X^2= 10.125)(table no 3).Most prevalent associated symptoms was Nasal Obstruction (84.8%) followed by Headache (74%) least prevalent was Facial pain (14%)(table no 4)

Discussion

Allergy is a hypersensitivity disorder of the immune system of the human body. Allergic reactions occur when a person's immune system reacts abnormally to normally harmless substances, present in the environment. The burden of allergic diseases in India has been on an uprising trend in terms of prevalence as well as severity[2].Approximately 20% to 30 % of total population suffers from at least one of these allergic diseases in India. A study carried, over 30 years ago in Delhi reported around 10% allergic rhinitis and 1% asthma in 1964[2]. Thereafter later studies have reported that 20% to 30% of the population suffer from allergic rhinitis and that 15% develop asthma[2,3].In the present study we enrolled 576 patients of rhinitis and asthma. Enrolled patients were classified as allergic and non-allergic and examined for nasal polyps by anterior rhinoscopy and endoscopic investigation.The prevalence of Nasal Polyps in the population has beengrossly estimated as 1–4%, though supporting evidence for this finding is scarce . Older reports have suggested a prevalence ranging from 0.2% to 2.2%[4], and autopsy studies have reported an incidence of bilateral nasal polyps at 1.5 to 2%[5].Various comorbidities such as allergic rhinitis (AR), generalized atopic status, and asthma have all been proposed as factors in the genesis of nasal polyp. Yet the data for these associations have been the subject of on-going investigations and conflicting reports can be identified.The etiology of nasal polyposis is not well known, but may involve several potential factors such as chronic persistent inflammation and oxidative stress. Inflammation triggers include bacterial, fungal and viral infection, allergy, and environmental pollution[3,4]. Nasal polyps frequently occur in patients with cystic fibrosis a type of asthma. Eosinophils have long been implicated in the pathogenesis of asthma. Eosinophilic asthma has classically been associated with allergic sensitization and a Th 2-dominant inflammatory response[3].Increased presence of eosinophils is associated with ineffective local T helper (Th) 1-based immune response[3]. Weakened Th1 response in nasal polyp patients may follow the down-regulation of specific toll-like receptors (TLR) involved in immune response. Tissue eosinophilia is the general characteristic of 80 % to 90 % of nasal polyps. Activated eosinophils produce and secrete different vasoactive substances, cytokines, chemotactic factors, leukotrienes, major basic proteins, eosinophilic cationic protein (ECP), and eosinophilic peroxidases (EPOs).Inducement of higher IgE levels in allergic patients and presence of asthma in patients with Chronic rhinosinusitis with nasal polyposis.Staphylococcus aureus enterotoxins (SEs) act as superanti-gens and induce local polyclonal IgE formation combined with severe eosinophilic inflammation. Moreover, formation of IgE against SEs in nasal polyp tissue is strongly associated with asthma in patients with chronic rhinosinusitis with nasal polyposis. Bachert et al. has theorizedthat the relationship between severe chronic rhinitis and asthma may be due to the production of inflammatory cytokines in airways which induce the upregulation of eosinophils,mast cells, and basophils by the bone marrow up regulation. These inflammatory cells then migrate to the airway mucosa resulting in a reactive inflammatory response leading to nasal polyps formation[3].In the present study, about one fourth of the patients of polyps (24.80%) has associated non allergic condition like asthma or rhinitis as compared to allergic conditions (1.7%). This is in conformity with what is been reported in other studies. Grigoreas C et al observed that nasal polyps was more prominent in patients with non-allergic asthma (13%) followed by non-allergic rhinitis (8.9%), least was observed in allergic rhinitis (1.7%). Few reports like, Caplin et al[3] examined 3000 consecutive atopic patients and found that only 0.5% had polyps. Bunnag et al[4] reported a 4.5% incidence of nasal polyps in 300 patients with allergic rhinitis. Settipane and Chaffe[5] found that only 0.1% of paediatric patients attending an allergy clinic had nasal polyps. Thus, the prevalence of nasal polyps in allergic patients is low, usually under 5%, which is similar to that of the general population.Association of nasal polyp between Asthma and rhinitis was been computed. It revealed a significantly higher association of polyp with allergic and non-allergic asthma than with rhinitis.($p<0.05$). Our results were consistent with Settipane GA[6], which reported nasal polyps are statistically more common in non-allergic asthma than allergic asthma exhibiting significant association. Similarly Grigoreas C et al[1] reported highly significant association of polyp with non-allergic conditions. Settipane GA[9] reported nasal polyps are statistically more common in non-allergic asthma than allergic asthma.Ahmadiafshar A et al[7] reported, there was a statistically significant relation between asthma and nasal polyposis, but not between allergic rhinitis severity and nasal polyposis prevalence.

The most common presenting symptoms in our study was nasal obstruction found in 84.8% cases, followed by nasal discharge (66.8%) and headache (74%). In a similar study, the most common symptom was nasal obstruction (94%), followed by loss of smell (68%).Another study observed that the most common symptoms were nasal blockage (71%), nasal discharge (54%), and swelling or mass (39%).Nasal obstruction was the most common symptom observed in other similar studies but the frequency of other symptoms varied.In our study, most common examination finding was facial swelling observed in 28.8% of cases, whereas in another study it was found in 48% of cases[8-10].

Conclusion

Recent progress in understanding the biology of airway disease has identified inflammationas playing a critical and integrating role in rhinosinusitis and asthma. Rhintis associated with nasal polyps and

asthma is the most severe form of unified respiratory tract disease, more prominent systemic inflammation markers, blood leukocyte and eosinophil count, higher IgE level extend chronic sinus disease to nasal polyps and asthma.Rhinitis associated with nasal polyps and asthma is the most severe form of unified respiratory tract disease characterized by greater duration of nasal symptoms. Evidence of nasal polyp is estimated more in non-allergic diseases rather allergic diseases.

Limitation

In our study, we excluded the family history of the cases,but there exists a hereditary factor for development of nasal polyps. Their associated comorbidities and relationship with family history that have been poorly investigated.Secondly there were Lacunae of literature.

Table 1: Shows distribution of patients on the basis of Allergic& Non-allergic rhinitis as well as Allergic& Non- allergic asthma

Variable	No of Patients (%)	No of patients in Nasal Polyp (%)
Allergic rhinitis	219 (30)	4 (1.8)
Allergic Asthma	110 (15)	3 (2.7)
Non-allergic rhinitis	183 (25)	16 (8.74)
Non- allergic asthma	64 (8.7)	9 (14.06)

Table 2: Shows gender based distribution of patients underAllergic& Non-allergic rhinitis as also Allergic& Non- allergic asthma

Variable	Male	Female	Total
Allergic rhinitis	137	82	219
allergic asthma	69	41	110
Non-allergic rhinitis	113	70	183
Non-allergic asthma	40	24	64

Table 3: Records extent of association of Nasal Polyps with Allergic& Non-allergic rhinitis as well as Allergic& Non- allergic asthma

Variable	Nasal Polyp (%)	OR*/P Value#
Allergic Asthma	3 (2.7)	0.1713/0.0102
Non-allergic asthma	9 (14.06)	
Allergic rhinitis	4 (1.8)	0.1942/0.0039
Non-allergic rhinitis	16 (8.74)	
Rhinitis	15 (3.7)	0.7106/0.4288
Asthma	9 (5.17)	

*OR= Odds Ratio. P Value >0.05= Non –significant and P Value <0.05= significant

Table 4:Shows that patients ailing with Non-allergic respiratory diseases and Allergic respiratory diseases

Variable	Nasal Polyp (%)	X^{2*}/P Value
Allergic respiratory disease	7 (2.12)	10.125/0.001**
Non-allergic respiratory disease	25 (9.71)	

*X^2= Chi Square, ** P Value 0.001= highly significant.

Table 5: Shows Symptoms of Allergy

Symptoms	No of Patients (%)
Nasal Obstruction	488 (84.8%)
Nasal discharge	385 (66.8%)
Headache	426 (74%)
Sneezing	219 (38%)
Decreased sense of smell	184 (32%)
Facial swelling	166 (28.8%)
Nasal bleeding	154 (26.8%)
Protrusion of eyes	120 (20.8)
Change in voice (hypo nasal)	92 (16%)
Facial pain	35 (14%)

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