

An Overview of Nasal polyps and its pathogenesis, commodities and treatment.

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Abstract: The seditionary noncancerous extensions of nasal and paranasal mucosa are called nasal polyps affecting up to 4% of population. They arise from the long-term inflammation of the mucosa of the nasal cavity leading to changes of olfactory, rhinorrhea, nasal blockage. If nasal polyps presents with at least two or more of the following symptoms persistently occur for 12 weeks or more, nasal discharge occurring anteriorly or runny nose, post nasal dripping, blockage of nasal cavity. Blockage of nose is the chief complain of patients with nasal polyps that is consistent with variety in severity depending on the size of the polyps, With the help of anterior Rhinoscopy or endoscopy polyps, hyperemia of the mucosa of nasal cavity, narrowing of the nasal pathway could be noticed. Risk Factors of nasal polyps include Asthma, cystic fibrosis, AERD, allergic fungal sinusitis. Treatment options includes with topical intranasal steroids. Glucocorticosteroids are the best to treat nasal polyps. In case of patients with AERD daily high dosage of acetylsalicylic acid have showed reduced the polyps recurrence and sinal infections, use of oral and topical corticosteroids have been reduced and also microsmia got improved. The aim of the contemporary study was to review the available literature regarding the etiologic factors, causative agents, diagnosis and treatment options of nasal polyps.

Keywords: Nasal polyposis, Chronicrhinosinusitis, sinonasal cavity, eosinophilic infiltration, hyposmia.

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I. Introduction

The seditionary noncancerous extensions of nasal and paranasal mucosa are called nasal polyps affecting up to 4% of population [1]. People with continuous ongoing diseases such as aspirin-aggravating respiratory problems or cystic fibrosis (genetic disease that occurs progressively and remains persistent limiting the functioning of lungs), asthma, Immune mediated responses like allergic reactions are more prevalent for Nasal polyps. They arise from the long-term on going inflammation of the mucosa of the nasal cavity leading to changes of olfactory, rhinorrhea, nasal blockage [2,3]. Though it seems to be an isolated disease it is associated with multiple factors such as chronicrhinosinusitis, allergic Rhinitis, other allergies or infections. Various studies have been made regarding the underlying causes which not only includes allergies and infection but also includes alterations in the aerodynamics (the interaction between the air and solid bodies moving through it), disrupted epithelial barrier of airway, aspirin sensitivity, defects in the epithelial cells, or deletions of gene (Cystic fibrosis transmembrane conductance regulator gene that codes for a transporter that conducts chloride and thiocyanate ions across epithelial cell membranes).

The ratio of males affected to females is 2 to 3:1 and adults are more affected than children. The etiology is not clear but the *Alterneria* and *Aspergillus* are suspected in the development of nasal polyps [4]. Although various investigations have been made on causative factors such as allergy, infection, genetics, immune mechanisms are involved in nasal polyps, the definite cause is largely unknown. They arise overhead of the nose all over the cleft to the ethmoidal sinus. The stroma of the polyp is exceedingly infectious with a variety of distinguishable inflammatory cells [5, 6]. Mostly they are bilateral but can also be unilateral. If nasal polyps are unilateral then differential diagnosis should be made to investigate any malignancies with the help of nasal endoscopy, computed tomography-ray and biopsy. If these polyps are present in juvenility then diseases of immune deficiencies must be excluded as in case of cystic fibrosis because they are more prone to nasal polyposis.

II. Pathogenesis of nasal polyps

Chronic rhinosinusitis is the most prevalent and common origin of nasal polyps when compared with other associative diseases. Rhinosinusitis is an inflammatory condition of nasal and paranasal sinuses. If it is with nasal polyps presents with at least two or more of the following symptoms persistently for 12 weeks or more with substantial patient burden.

1. Nasal discharge occurring anteriorly or runny nose
2. Post nasal dripping (glands at the back of the nose and throat produces extra mucous)
2. Blockage of nasal cavity (nasal congestion that occurs due to the swelling of mucous membrane due to inflamed blood vessels)
3. microsmia/hyposmia or complete loss of smell due to the inflammation of the olfactory mucosa.
4. with or without facial pain and tension (sense of pressure over forehead and face)
5. Snoring (noisy breathing during sleep)

These clinical manifestations should be parallel to the confirmation by a presence of mucosal damage, in addition to endoscopic confirmation of presence of mucopurulent discharge, inflammation, nasal polyposis with or without the thickening of mucous membrane on radiological examination such as CT[7][8]. Almost twenty percent of the people with Chronic Rhino sinusitis have nasal polyposis and also people who have family history are also at higher risk compared to people without family history [9].The most familiar indication for nasosinal surgery is Chronic Rhinosinusitis with nasal polyposis. Although the patients of Chronic rhinosinusitis with nasal polyposis are therapeutically and surgically treated the outcome is deficient and the symptoms may last for long time or recur[10].Although there are topographical variances there are 11 to 12 percent of population who are effected with this Chronic Rhinosinusitis with nasal polyposis[11].These population with Chronic Rhinosinusitis have serious effect on individual's perceived physical and mental health over time [12,13].The clinical manifestations of the this Chronic Rhinosinusitis definitely or indefinitely associates to sleep distress and also impacts on quality of several domains in life. Review analysis of character of sleep and sleep patterns in Chronic Rhinosinusitis have revealed that 60 to 75% of people suffering from Chronic Rhinosinusitis complain of difficulty in sleeping [14-17].

III. Pathology of Nasalpolyps

Eosinophilic inflammation is the characteristic feature of Nasal polyps. Nasal polyps are semiopaque, pallid gray(may be due to the reduced blood supply but later they might turn into pink and fleshy due to metaplasia of squamous epithelium),grape like Edematous protuberances of nasosinal tissue that usually expand bilaterally into sinonasal cavity.The epithelium of respiratory system is generally intact and frequently shows hyperplasia of goblet cells(increase in the size of a tissue or organ due to increased reproductive rate of its cell).The infiltrate of the inflammatory protuberance is made from the accumulation of plasma cells, white blood cells, monocytes, eosinophils, macrophages, mast cells, neutrophils in the mucosa of nasal cavity. Out of all eosinophils are of 60 percent[18,19].Profound edema of the tissue that supports the underlying epithelial organ which is called stroma, infiltration of inflammatory cells, submucosal fibrosis, a decline number of mucous glands and the development of pseudocysts(a fluid-filled cavity resembling a cyst but lacking a wall or lining) are the histopathological features of Nasal polyps. The growth and size of the Nasalpolyps is determined by the content of the albumin within the cavity of the pseudocysts [20].Depending on the structure of cells and tissues at the microscopic level they are categorized into four types at the minimum [21].Eosinophilic and edematous are most frequent at the prevalence of sixty-five to ninety percent of population effected with nasal polyps [22].

In Nasal polyps the activity of thymic stromal lymphopoietin to the mast cell proteases is affected and as a result of which mast cells are increased. Additionally other inflammatory cells such as Neutrophils, monocytes, eosinophils (a type of white blood cells and also a component of the immune system that combats the multicellular parasites and other infections) which contain various proteases are also raised in Nasal polyps. The amount of immunoglobulins(Ig) are also raised in nasalpolyposis, but not in the systemic circulation[23],[24].The enterotoxins released by the staphylococcus, atopic or anaphylactic reaction or hypersensitivity to fungi, or non allergic hypersensitivity to fungus are said to be a part of development of eosinophilic inflammation in the airways but exact role of these pathogens is still largely unknown though there are many pathogenesis of nasal polyps[25].Either or both the possibilities such as Eosinophilic inflammation and allergic response in the sinonasal cavity and sinus of the maxilla can lead to rapid reproduction of cells of mucosal layer, expands, rupture and hemorrhage of the blood vessels, which in turn lead to edema of mucosa and polypoid alterations[26].

IV. Risk Factors of nasal polyps

1. Asthma: The frequency of chronic rhino sinusitis which in turn mostly associated with nasal polyps is more common in asthmatic patients compared to patients who doesn't have asthma [27], [28]. The percentage of asthma patients affected with Chronic rhino sinusitis with nasal polyps is around 7 percent out of which women are at higher magnitude whereas non asthmatic patients affected with chronic rhino sinusitis is four 4 percent [29].

2. Cystic fibrosis : The rate of occurrence of Chronic Rhino sinusitis with nasal polyps is greater in patients who has cystic fibrosis that is 7 to 48 percent[30]. The inflammation of nasal polyps is mediated by neutrophilic type 1 T helper cells[31].

3.AERD(Aspirin exacerbated respiratory disease): It is a group of diseases characterized by Chronic rhino sinusitis with repetitive nasalpolyps, aspirin hypersensitivity and also other NSAID's,asthma that occurs consistently[32],[33]. The percentage of AERD people affected with nasalpolyps are 8 to 26 percent[34].

4.Allergic fungal sinusitis: It is also known as Eosinophilic MucinRhinosinusitis(EMRS). In the sin nasal mucosa of air way tract, allergens of fungi triggers eosinophilic IgE-mediated type 1 hypersensitivity that cause the edema of the tissue and rapid fungal reproduction will raise the exposure of antigens and aggravates the inflammation which results in Chronic rhinosinusitis and nasal polyps[35,36].

V. Diagnosis of Nasal Polyps

Although this is a well diagnosed entity but the etiology still remains unclear because there are many causative agents associated with it. Blockage of nose is the chief complain of patients with nasal polyps that are consistent with variety in severity depending on the size of the polyps.

Physical examination: On observation we might get a clue of diseases of sinonasal cavity like facial deformity and visible palpable polyps on the ethmoid sinus if they are enlarged. With the help of anterior Rhinoscopy or endoscopy polyps, hyperemia of the mucosa of nasal cavity, narrowing of the nasal pathway could be noticed [37]. Sometimes even with the help nascope (equipment that has light and lens) the cavity can be visible to some extent.

In the Orbit's superiomedial quadrant a palpable mass is noticed which is often presented by patients.

If polyps are one sided then they should be ruled out for malignancies [38]. The proper investigation of nasal polyps is very crucial because their presence in children could be due to Cystic Fibrosis[39].

Imaging and CT

Polyps may be crudely categorized into (a) those confined to the middle meatus, (b) those beyond the middle meatus but not completely obstructing the nose, and (c) those completely obstructing the airway. To the untrained eye it can sometimes be difficult to distinguish hypertrophied inferior turbinate from nasal polyps. Gentle palpation will show that the polyp is insensitive in contrast to the turbinate which has an excellent sensory supply.

VI. Treatments available for Nasal polyps

Once the polyp is noticed in the nose the patient should be treated with topical intranasal steroids. Glucocorticosteroids are the best to treat nasal polyps [40]. As they are efficacious and exhibits anti-inflammatory effects that will reduce the eosinophil triggered inflammation [41].

Drugs are given in order to reduce the inflammation and shrinkage of polyps.

Nasal Polypectomy is one of surgical treatments.

In case of patients with AERD daily high dosage of acetylsalicylic acid have showed reduced the polyps recurrence and sino infections, use of oral and topical corticosteroids have been reduced and also microsmia got improved[42,43].

The incidence of reoccurrence of nasal polyps is higher so the importance to nasal polypectomy (a surgical procedure in which polyps are resurrected from the nasal cavity) has been declined. Nasal polyposis and Chronic Rhinosinusitis has been treated with fluticasone propionate nasal drops for over a period of twelve weeks have reduced the need of surgery[44].

VII. Conclusion

Nasal polyposis is one of the common disease which is multifactoral and linked to many others diseases most specifically Chronic Rhinosinusitis. Nasal polyps being associated with many other diseases might be the reason for unclear etiology. They are pale, opaque, tear shaped outgrowths of nasal tissue that expand into sinonasal cavity. Any disease or allergic reaction that triggers inflammation might lead to polyps. It is difficult to treat if it is associated with riskfactors because they might reoccur even after surgery. This is most

the common and effects the individual's quality of life. So the considerable importance must be given to treat them and improve the quality of life.

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