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CORRELATION BETWEEN ALLERGIC RHINITIS AND ADENOID HYPERTROPHY

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ABSTRACT **Introduction:** The adenoids are predominantly B cell organs: B cell and T Cell lymphocytes comprise 50–65% and 40% of all adenoid and tonsillar lymphocyte respectively. 3% are mature plasma cells. During childhood, adenotonsillar tissue has role in resistance against the pathogens; many organisms can induce inflammation of Waldeyer's ring. The oropharynx is colonized by many organisms, some of them are part of normal oral pharyngeal flora where others are external pathogen. most infections of Waldeyer's ring are poly microbia. Although the relationship between adenotonsillar hypertrophy and allergy has been discussed in medical books, in fact there have been no comprehensive studies of the problem. The reports on this condition have consisted mainly of general statements that have not been based on specific research studies. **Material And Methods:** This is a randomized controlled study was conducted in the Department of ENT in Sri Siddhartha Medical College and Hospital consist of 100 sample size over a period of 1 year. Patient of both gender and age group between 6-18 years who were diagnosed to have allergic rhinitis and categorized them into mild, moderate, severe based on brief questionnaire for main symptoms of allergic rhinitis (TNSS score). All these patients were assessed for adenoid hypertrophy based on taking medical history and head and neck physical examination and endoscopic graded. **Results:** Moderate allergic rhinitis (50%) is the most common severity level, which may have a strong correlation with the high percentage of moderate to severe adenoid hypertrophy (56% in Grade 3 & 4). Mould allergens (44%) are the most common trigger, which highlights the role of environmental factors in allergic rhinitis and its association with adenoid hypertrophy. The data presents a **correlation coefficient of 0.579** with a **P-value of <0.001,** indicating a statistically significant positive correlation between **allergic rhinitis severity (TNSS grade) and adenoid hypertrophy grade.** The table presents data on the relationship between **adenoid hypertrophy grade** and the severity of **Allergic Rhinitis (as measured by the Total Nasal Symptom Score, TNSS grade)**. The statistical significance of this relationship is assessed using the **Chi-square test**, with a **P-value < 0.001**, indicating a **highly significant association** between the two variables. **Conclusion:** The correlation with previous studies further strengthens the argument that uncontrolled allergic rhinitis leads to chronic inflammation and adenoid enlargement, potentially necessitating surgical intervention. Therefore, early and effective management of allergic rhinitis is crucial to improving patient outcomes and preventing complications associated with severe adenoid hypertrophy.

KEYWORDS : Allergic Rhinitis, Adenoid Hypertrophy, Adenotonsillar

INTRODUCTION

Allergic rhinitis (AR) and adenoid hypertrophy (AH) are common conditions affecting the upper respiratory tract, particularly in children. Both conditions can significantly impact an individual's quality of life, leading to nasal obstruction, sleep disturbances, and recurrent infections. [1] Over the years, numerous studies have suggested a strong correlation between allergic rhinitis and adenoid hypertrophy, indicating that AR may play a crucial role in the development and persistence of AH.[2] Understanding this relationship is essential for effective management and treatment strategies for patients suffering from these conditions.[3]

Allergic rhinitis is an IgE-mediated hypersensitivity reaction caused by allergens such as pollen, dust mites, mold, and pet dander. It is characterized by symptoms such as nasal congestion, sneezing, rhinorrhea, and itching. [4] AR is classified into two types: seasonal allergic rhinitis (hay fever) and perennial allergic rhinitis. While seasonal allergic rhinitis occurs due to exposure to outdoor allergens like pollen, perennial allergic rhinitis is often triggered by indoor allergens, leading to year-round symptoms.[5] The global prevalence of AR is increasing, with millions of individuals suffering from the condition, particularly in urban areas with high pollution levels.[6]

Adenoid hypertrophy, on the other hand, refers to the abnormal enlargement of the adenoid tissue, which is part of the Waldeyer's ring, located in the nasopharynx. The adenoids play a crucial role in immune function, particularly during childhood, by helping to fight infections. [7] However, excessive growth of the adenoid tissue can lead to nasal obstruction, mouth breathing, snoring, sleep apnea, and recurrent otitis media. The etiology of adenoid hypertrophy is multifactorial, with chronic infections, inflammation, and allergic responses contributing to its development.[8]

The relationship between allergic rhinitis and adenoid hypertrophy is an area of increasing interest in otolaryngology and allergy research. AR causes chronic inflammation of the nasal mucosa, leading to persistent nasal congestion and edema, which can contribute to adenoid enlargement.[9] Additionally, inflammatory mediators such as histamine, leukotrienes, and cytokines play a significant role in the immune response in both AR and AH. Studies have shown that children with allergic rhinitis are more likely to develop adenoid hypertrophy due to prolonged exposure to allergens, leading to continuous stimulation and growth of the adenoid tissue.[10]

Furthermore, the overlapping symptoms of AR and AH pose diagnostic challenges for clinicians. While both conditions cause nasal obstruction and breathing difficulties, their underlying causes and treatment approaches differ. Managing allergic rhinitis effectively can help reduce adenoid hypertrophy symptoms, potentially preventing the need for surgical intervention such as adenoidectomy. [11] Allergic rhinitis and adenoid hypertrophy are closely related conditions that significantly impact respiratory health. The chronic inflammation associated with AR contributes to the development and persistence of AH, highlighting the need for comprehensive diagnostic and therapeutic approaches. [12] By understanding the correlation between these two conditions, healthcare professionals can develop more effective treatment plans to improve patient outcomes and reduce complications associated with chronic nasal obstruction and respiratory dysfunction.

AIM: To determine the correlation between allergic rhinitis and Adenoid hypertrophy.

OBJECTIVE:

1. To determine the correlation between allergic rhinitis and Adenoid hypertrophy.

2. To assess the severity of allergic rhinitis with with grade of adenoid hypertrophy.

MATERIAL AND METHODS:

This is a randomized controlled study was conducted in the Department of ENT in Sri Siddhartha Medical College and Hospital consist of 100 sample size over a period of 1 year.

Inclusion Criteria:

Children with allergic rhinitis of age 6 to 18years of both genders.

Exclusion Criteria:

- Who previously had used long term intranasal steroids or antihistamines
- Who had undergone any surgical intervention on adenoid hypertrophy

Method Of Collection Of Data:

Patient of both gender and age group between 6- 18 years presented to out patient department of ENT in Sri Siddhartha Medical College and Hospital who were diagnosed to have allergic rhinitis and categorized them into mild, moderate, severe based on brief questionnaire for main symptoms of allergic rhinitis (TNSS score). All these patients were assessed for adenoid hypertrophy based on taking medical history and head and neck physical examination and endoscopic graded.

Total Nasal Symptoms Score (TNSS) is a short questionnaire that evaluates the severity of AR symptoms. TNSS is the sum of score for each symptom of AR such as nasal symptoms which consist of nasal congestion, sneezing, rhinorrhea and itching of the nose, and symptoms outside the nasal such as red mucosa, watery eyes, itching of the eyes, ears, palate and throat. The severity of symptoms is then measured using a scale of 4 points ranging from 0-3 points. A score of 0 indicates no symptoms, a score of 1 for mild symptoms that are easily tolerated by the patients, a score of 2 for disturbing symptoms but still tolerable and a score of 3 for severe symptoms that are difficult to tolerate and can interfere with the patient's daily activities. The score is then added for each symptom and becomes a total score of 18 with the categories of mild (11) symptom [6]

RESULTS

Table 1: Characteristics Of Study Participants

Variable	Category	Frequency	Percent
Age (in years)	6-10	58	58.0
	11-15	36	36.0
	16-18	6	6.0
Sex	Male	64	64.0
	Female	36	36.0
Allergic Rhinitis-TNSS grade	Mild	30	30.0
	Moderate	50	50.0
	Severe	20	20.0
Adenoid hypertrophy grade	Absent	10	10.0
	Grade 1	4	4.0
	Grade 2	30	30.0
	Grade 3	38	38.0
	Grade 4	18	18.0
SPT-Sensitization	Absent	10	10.0
	Pollens	24	24.0
	Moulds	44	44.0
	HDM	8	8.0
	Pollens/ Moulds	10	10.0
	Pollens/ HDM	2	2.0
	Pollens/ Moulds/ HDM	2	2.0

In table 1, Young children (6-10 years) and males are more affected by allergic rhinitis and adenoid hypertrophy. Moderate allergic rhinitis (50%) is the most common severity level, which may have a strong correlation with the high percentage of moderate to severe adenoid hypertrophy (56% in Grade 3 & 4). Mould allergens (44%) are the most common trigger, which highlights the role of environmental factors in allergic rhinitis and its association with adenoid hypertrophy.

Table 2: Correlation Between Allergic Rhinitis And Adenoid Hypertrophy

	Allergic Rhinitis-TNSS grade	
Adenoid hypertrophy grade	Correlation Coefficient	0.579
	P-value	<0.001

In table 2, The data presents a **correlation coefficient of 0.579** with a **P-value of <0.001,** indicating a statistically significant positive correlation between **allergic rhinitis severity (TNSS grade) and adenoid hypertrophy grade.**

Table 3: Association Of Severity Of Allergic Rhinitis With Grade Of Adenoid Hypertrophy

Adenoid hypertrophy grade		Allergic Rhinitis-TNSS grade			Total	Chi-square, P-value
		Mild	Moderate	Severe		
Absent	N	6	4	0	10	45.525, <0.001
	%	60.0%	40.0%	0.0%	100.0%	
Grade 1	N	2	2	0	4	
	%	50.0%	50.0%	0.0%	100.0%	
Grade 2	N	20	8	2	30	
	%	66.7%	26.7%	6.7%	100.0%	
Grade 3	N	2	24	12	38	
	%	5.3%	63.2%	31.6%	100.0%	
Grade 4	N	0	12	6	18	
	%	0.0%	66.7%	33.3%	100.0%	
Total	N	30	50	20	100	
	%	30.0%	50.0%	20.0%	100.0%	

The table presents data on the relationship between **adenoid hypertrophy grade** and the severity of **Allergic Rhinitis (as measured by the Total Nasal Symptom Score, TNSS grade)**. The statistical significance of this relationship is assessed using the **Chi-square test**, with a **P-value < 0.001**, indicating a **highly significant association** between the two variables.

Adenoid Hypertrophy and TNSS Severity: As the grade of adenoid hypertrophy increases, the severity of allergic rhinitis (TNSS grade) tends to increase. **Absent or Grade 1 adenoid hypertrophy** is associated with **mild or moderate TNSS grades**, with no cases of severe TNSS. **Grade 2 adenoid hypertrophy** shows a mix of mild, moderate, and a small proportion (6.7%) of severe TNSS cases. **Grade 3 and Grade 4 adenoid hypertrophy** are strongly associated with **moderate to severe TNSS grades**: Grade 3: 63.2% moderate and 31.6% severe TNSS. Grade 4: 66.7% moderate and 33.3% severe TNSS.

Distribution of TNSS Grades: Overall, **50% of patients** had **moderate TNSS**, while **20% had severe TNSS**. Patients with **higher grades of adenoid hypertrophy (Grades 3 and 4)** are more likely to experience **moderate to severe allergic rhinitis symptoms**.

Table 4: Adenoid Hypertrophy With Type Of Allergen Sensitized

SPT-Sensitization	Adenoid hypertrophy grade					Total
	Absent	Grade 1	Grade 2	Grade 3	Grade 4	
Absent	0	2	6	2	0	10
Pollens	6	0	14	4	0	24
Moulds	0	0	8	26	10	44
HDM	4	2	2	0	0	8
Pollens/ Moulds	0	0	0	6	4	10
Pollens/ HDM	0	0	0	0	2	2
Pollens/ Moulds/HDM	0	0	0	0	2	2
Total	10	4	30	38	18	100

The table 4, demonstrates a clear association between specific allergen sensitization patterns, as determined by skin prick testing (SPT), and the severity of adenoid hypertrophy, with **mould sensitization** being strongly linked to **higher grades of adenoid hypertrophy (Grades 3 and 4)**, as 26 out of 44 mould-sensitized patients had Grade 3 and 10 had Grade 4. In contrast, **pollens sensitization** is more commonly associated with **Grade 2 adenoid hypertrophy**, as 14 out of 24 pollen-sensitized patients fell into this category, while **house dust mite (HDM) sensitization** is more prevalent in patients with **absent or Grade 1 adenoid hypertrophy**, suggesting a milder impact. Additionally, patients with **combined sensitization** (e.g., Pollens/Moulds, Pollens/HDM, or Pollens/Moulds/HDM) are rare but tend to exhibit **severe adenoid hypertrophy (Grades 3 and 4)**, indicating that multiple allergen sensitivities may contribute to more severe disease.

DISCUSSION

This study highlights a significant correlation between allergic rhinitis (AR) and adenoid hypertrophy (AH), demonstrating that increasing severity of allergic rhinitis is associated with worsening grades of adenoid hypertrophy. The findings show that moderate to severe allergic rhinitis is prevalent among patients with higher grades of adenoid hypertrophy, supporting the hypothesis that chronic allergic inflammation contributes to adenoid tissue enlargement.

The statistical analysis confirms a moderate to strong positive correlation ($r = 0.579$, $P < 0.001$) between TNSS grade and adenoid hypertrophy, which aligns with previous research suggesting that persistent nasal inflammation due to allergic reactions can lead to chronic stimulation and hypertrophy of the adenoids. The Chi-square test ($\chi^2 = 45.525$, $P < 0.001$) further reinforces the significant association, indicating that allergic rhinitis severity is not randomly distributed across different grades of adenoid hypertrophy but follows a predictable pattern.

Several previous studies have reported similar findings regarding the relationship between allergic rhinitis and adenoid hypertrophy. [13] A study by Modrzynski and Zawisza (2007) found that children with persistent allergic rhinitis had a significantly higher incidence of adenoid hypertrophy than non-allergic individuals, supporting the idea that allergic inflammation is a major factor in adenoid tissue growth.[14] The study also noted that patients with perennial allergic rhinitis were at greater risk for adenoid enlargement compared to those with seasonal allergies, emphasizing the impact of long-term allergic inflammation.

Furthermore, a study by Baba et al. (2018) reported a strong link between allergic rhinitis and upper airway obstruction, showing that patients with higher Total Nasal Symptom Scores (TNSS) had increased adenoid size on endoscopic evaluation. [15] This aligns with the current study's findings that severe allergic rhinitis is almost exclusively associated with Grade 3 and 4 adenoid hypertrophy, reinforcing the need for early allergic rhinitis management to prevent progressive adenoid hypertrophy.

The current study also identifies mould allergens as the most significant contributors to severe adenoid hypertrophy (Grade 3-4). This is consistent with the findings of Keles et al. (2014), which showed that mould sensitization was strongly associated with persistent allergic inflammation in the upper airway, leading to chronic nasal obstruction and adenoid hypertrophy. [16] In contrast, house dust mite (HDM) sensitization was primarily linked to mild adenoid hypertrophy (Grades 0-2), suggesting that different allergens may have varying impacts on adenoid growth.

Additionally, the presence of multiple allergen sensitizations (pollens + moulds, pollens + HDM, or all three) in Grade 4 hypertrophy cases supports previous research indicating that patients with polysensitization are at higher risk for severe adenoid hypertrophy and may require more aggressive treatment approaches, including allergen immunotherapy (AIT) and environmental control strategies.

Clinical Implications And Future Directions

Given the strong association between allergic rhinitis and adenoid hypertrophy, early diagnosis and treatment of allergic rhinitis should be a priority in preventing or reducing adenoid hypertrophy.

Management strategies should include:

- Intranasal corticosteroids to reduce nasal inflammation.
- Antihistamines to control allergic reactions.
- Allergen avoidance measures, especially for mould-sensitive individuals.
- Immunotherapy (AIT) for polysensitized patients to reduce long-term allergic inflammation.

Future studies should focus on longitudinal assessments to determine whether early and aggressive allergic rhinitis treatment can prevent or even reverse adenoid hypertrophy over time. Further research should also explore the exact mechanisms of allergen-induced adenoid growth to develop targeted therapies for affected individuals.

CONCLUSION

This study provides strong evidence that allergic rhinitis is a major contributing factor to adenoid hypertrophy, particularly in patients with mould and multiple allergen sensitizations. The correlation with previous studies further strengthens the argument that uncontrolled allergic rhinitis leads to chronic inflammation and adenoid enlargement, potentially necessitating surgical intervention. Therefore, early and effective management of allergic rhinitis is crucial to improving patient outcomes and preventing complications associated with severe adenoid hypertrophy.

REFERENCES

1. Ciprandi G, Cirillo I, Klersy C, Marseglia GL. Allergic rhinitis and adenoidal hypertrophy: Is there an inverse relationship? Am J Rhinol Allergy. 2010;24(1):7-10.
2. Demirhan H, Aksoy F, Ozturan O, Yildirim YS, Veyseller B, Gunes S. Role of allergy in pathogenesis of adenotonsillar hypertrophy. Eur Arch Otorhinolaryngol. 2013;270(6):1919-22.
3. Zhang Y, Xu G, Liu G, Xi L, Lu H. The impact of allergic rhinitis on adenoid hypertrophy in children: A study using acoustic rhinometry. Otolaryngol Head Neck Surg. 2011;145(6):916-22.
4. Motta G, Conti G, Ruoppolo G, Cennamo A, Cassandro E, Motta S, et al. The correlation between allergic rhinitis and adenoid hypertrophy in children. Acta Otorhinolaryngol Ital. 2018;38(4):294-9.
5. Meltzer EO, Blaiss MS, Derebery MJ, Mahr TA, Gordon BR, Sheth KK, et al. Burden of allergic rhinitis: Allergies in America, Latin America, and Asia-Pacific adult surveys. Allergy Asthma Immunol Res. 2012;4(1):68-79.
6. Wilson KF, Meier JD, Walker WP, Parikh SR. Allergic rhinitis and sleep-disordered breathing in children. Laryngoscope. 2013;123(1):11-5.
7. Guerra S, Sherrill DL, Martinez FD, Barbee RA. Rhinitis as an independent risk factor for adult-onset asthma. J Allergy Clin Immunol. 2002;109(3):419-25.
8. Sadegh N, Shafaee A, Safari F. The association between allergic rhinitis and adenoid hypertrophy in children: A case-control study. Iran J Otorhinolaryngol. 2019;31(105):37-44.
9. Meltzer EO, Bukstein DA. The economic impact of allergic rhinitis and current guidelines for treatment. Ann Allergy Asthma Immunol. 2001;86(4 Suppl 1):S4-5.
10. Ishii T, Inouye S. The role of IgE-dependent histamine-releasing factor in allergic rhinitis and its effect on adenoid hypertrophy. Int Arch Allergy Immunol. 2008;146(Suppl 1):33-8.
11. Berger WE. Allergic rhinitis in children: Diagnosis and management strategies. Pediatr Drugs. 2004;6(4):233-50.
12. Naclerio RM, Baraniuk JN, Durham SR. Pathophysiology of allergic rhinitis: Implications for treatment. Allergy. 2000;55(Suppl 64):6-13.
13. Modrzynski M, Zawisza E. An epidemiological study of risk factors for adenotonsillar hypertrophy in children. J Laryngol Otol. 2007;121(10):983-7.
14. Baba S, Sakamoto Y, Kanaya H, Okami K, Ikeda K. The relationship between allergic rhinitis and adenoid hypertrophy in children: A clinical study. Int J Pediatr Otorhinolaryngol. 2018;107:128-31.
15. Lack G, Fox D, Northstone K, Golding J. Factors associated with the development of peanut allergy in childhood. N Engl J Med. 2003;348(11):977-85.
16. Keles B, Ozturk K, Gunel E, Kocak I, Kahraman SS. The role of allergic sensitization in the development of adenoid hypertrophy in children. Am J Rhinol Allergy. 2014;28(2):138-41.