

Risk Factors for Adenoid Hypertrophy in Patients Aged 12 Years and Older

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Abstract

Background: Waldeyer's ring is composed of the adenoids, tonsils, and other lymphoid tissue. They can be hypertrophied causing many symptoms to the patient. Adenoidal tissue usually hypertrophied physiologically at middle childhood and starts to shrink at late childhood. However, in patients over the age of 10 they may enlarge leading to a number of obstructive symptoms.

Objectives: The aim of this study is to identify the risk factors and the presenting symptoms associated with adenoid enlargement in patients above the age of 12 year.

Methods: We studied 130 patients aged >12 years who underwent adenoidectomy between January 1, 2016 and January 1, 2021. Patients were evaluated at Otorhinolaryngology and Head & Neck Surgery department at Jordan University Hospital in Amman – Jordan. Patient's data was collected via medical records or telephone interviews.

Results: Of the 130 patients, 81 were males and 49 were females. The mean age was 19.68 years. The most common presenting symptom was snoring (81.5%). The second most common presenting symptom was nasal obstruction (75.4%) and mouth breathing (71.5%). The most common associated risk factor was septal deviation (44.6%) followed by passive smoking (40.8 %), allergic rhinitis (38.5%), and pollution (38.5%).

Conclusion: There are multiple suspected risk factors of adenoid hypertrophy in patients aged above 12 years old. In our study, septal deviation was found to be the most widely associated factor followed by passive smoking, allergic rhinitis and pollution. Patients commonly presented with symptoms of snoring and nasal obstruction.

Keywords: adult, adenoids, risk factors, clinical pattern.

(J Med J 2023; Vol. 57 (2): 175-181)

Received

Accepted

July 7, 2022

September 29, 2022

INTRODUCTION

Adenoid is a collection of lymphatic tissue at the posterosuperior part of the nasopharynx, and they are considered one of the constituents of Waldeyer's ring. Adenoids consist of lymphoepithelial tissue, which contain

epithelial cells, macrophages, dendritic cells with a predominance of both T and B- cell lymphocytes.¹ B-cell lymphocytes in adenoid tissues secrete immunoglobulins A and G mainly in children under the age of 3 years thus playing an important role in immunity.²

Normal diverse bacterial flora lives in adenoid. There are different grading systems for adenoid, one of them is depending on the degree of choanal obstruction as seen on clinical examination (Grade I: up to 25%

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obstruction of choanae, Grade II: 25% to 50%, Grade III: 50% to 75% and Grade IV: 75% to 100% obstruction).³

Another grading system depends on relation of the adenoid to vomer, torus tubaris and soft palate.³ A third grading system depends on the vertical height of the adenoid (Grade I: adenoid tissue filling one-third of vertical portion of the choanae. Grade II: adenoid tissue filling from one third to two-thirds of the choanae. Grade III: from two thirds to nearly complete obstruction of the choanae. Grade IV: complete choanal obstruction).⁴

Adenoids and tonsils may become hypertrophied leading to otitis media with effusion, nasal obstruction, rhinosinusitis, abnormal facial development, and obstructive sleep apnea.⁵ Some believe that "Adenoids hypertrophy in children is a natural response to increased immunologic activity in early life."⁶ The prevalence of adenoids hypertrophy is 34% in children 2.5% in adults.^{7,8}

Adenoids present at birth reaching their maximum growth between the age of 3 and 7 years⁹ and atrophy at puberty.¹⁰ However, in certain cases adenoids may persist into adult life,¹¹ the possible causes of adenoid hypertrophy are believed to be multifactorial involving; chronic bacterial infection, recurrent acute viral infections, passive smoking, allergic condition.¹²

Adenoid hypertrophy causes snoring, mouth breathing, rhinorrhea, Eustachian tube dysfunction and sometimes obstructive sleep apnea. We aim to identify the risk factors and the presenting symptoms associated with adenoid enlargement in patients above the age of 12 year and highlight the controversies in regards to the meaning of adenoid hypertrophy, prevalence, risk factors, evolution and other issues in-order to put a consensus about these issues.

Different devices and instruments are used to remove enlarged adenoid which include removal using curette, coblation and microdebrider.

METHODS

This retrospective study was conducted at

Jordan University Hospital to include all patients above the age of 12 years who presented with adenoid enlargement during the period from January 2016 to January 2021. A data sheet was constructed and filled-in, and included: patient's name, age, gender, comorbidities, presenting symptoms and the presence of risk factors.

Inclusion Criteria

1. Patients who agreed on participating in the study.
2. Patients aged above 12 years old.
3. Patients with enlarged adenoid finding on Flexible fiberoptic nasopharyngoscopy or CT scan or Postnasal space X ray.

Exclusion Criteria

1. Patients who disagreed to participate in the study
2. Patients aged 12 year or below.

Statistical tool

All collected data has been analyzed using SPSS version 28.

Tables were designed by using Microsoft Excel.

Medical records revealed 172 patients above the age of 12 year old underwent adenoidectomy from the previously mentioned period. However, only 130 patients could be accessed and participated in this study. Informed consent was taken from all the participants and from the parents of the patients who are below the age of 18 year old.

RESULTS

One hundred and thirty patients aged above 12 year old who underwent adenoidectomy from the period January 2016 - January 2021 were included in the study, distributed as 81 males and 49 females. The majority of the patients in our sample (64.6%) were adolescents with the age running between 13 year and 19 year old (Table 1). The mean age of the sample was 19.68 year ranging from 13-59 year. Additionally, we noted the absence of medical comorbidities in 86.2 % of the patients (n=112) (Table 2).

Table 1: Age and sex distribution of the patients with adenoid hypertrophy

Age group	Male	Female	Total
13-19	58 (71.6%)	26 (53.1%)	84 (64.6%)
20-29	15 (18.5%)	16 (32.7%)	31 (23.8%)
30-39	4 (4.9%)	2 (4.1%)	6 (4.6%)
40-49	3 (3.7%)	4 (8.2%)	7 (5.4%)
50-59	1(1.2%)	1 (2.0%)	2 (1.5%)

Table 2: Sex distribution for comorbidities of the patients

Comorbidity	Male	Female	Total
Respiratory	3 (3.7%)	3 (6.1%)	6 (4.6%)
Cardiac	2 (2.5%)	0	2 (1.5%)
Endocrine	1 (1.2%)	3 (6.1%)	4 (3.1%)
Renal	1 (1.2%)	1 (2.0%)	2 (1.5%)
Hematologic	1 (1.2%)	1 (2.0%)	2 (1.5%)
Neurologic	1 (1.2%)	0	1(0.8%)
Metabolic	1 (1.2%)	0	1(0.8%)

After analyzing the presenting symptoms of patients with adenoid enlargement we found that “*snoring*” is the most common presenting symptom (found in 81.5%, 67 males and 35

females). This was followed by “*nasal obstruction*” in 75.4%of patients (66 males and 32 females). The percentages of the presenting symptoms are shown in (Table 3).

Table 3: Sex distribution for the presenting symptoms

Symptom	Male	Female	p value	Total
Snoring	67 (81%)	35 (33%)	0.02	81.5% (n=106)
Nasal Obstruction	66 (67.3%)	32 (32.7%)	0.032	75.4% (n=98)
Mouth Breathing	59 (63.4%)	34 (36.6%)	0.41	71.5% (n=93)
Obstructive sleep apnea	39 (63.9%)	22 (36.1%)	0.43	46.9% (n=61)
Hoarseness	29 (70.7%)	12 (29.3%)	0.124	31.5% (n= 41)
Decreased hearing	30 (71.4%)	12 (28.6%)	0.098	32.3% (n=42)
Headache	30 (57.7%)	22(42.3%)	0.268	40% (n=52)
Hyponasal speech	40 (35.5%)	22 (64.5%)	0.718	47.7% (n=62)

Moreover, we analyzed the possible risk factors associated with adenoid enlargement. The percentages of suspected risk factors are included in (Table 4). Our data yielded the prevalence of “septal deviation “in our cohort of patients (44.6%). similarly, the influence of “passive smoking” on adenoid enlargement was noted as (40.8%) of our sample were exposed to some form of passive smoking. This was

followed by “allergic rhinitis “and “pollution” with a percentage of (38.5%). Moreover, we found a statistically significant difference between the occurrence of allergic rhinitis in accordance to gender with higher percentage of female patients displaying co-existing AR (p= 0.018). No one of the patients in our sample showed malignant sinonasal tumors or were on a diet other than regular diet.

Table 4: Sex distribution for the suspected risk factors of adenoid hypertrophy

Risk factor	Male	Female	Total	p value
Septal deviation	36(44.4%)	22 (44.9%)	58 (44.6%)	0.622
Allergic rhinitis	25 (30.9%)	25 (51.0%)	50 (38.5%)	0.018
Passive smoking	36 (44.4%)	17 (34.7%)	53 (40.8%)	0.181
Pollution	34 (42.0%)	16 (32.7%)	50 (38.5%)	0.192
Dental infection	27 (33.3%)	16 (32.7%)	43 (33.1%)	0.547
Recurrent tonsillitis	37 (45.7%)	26 (53.1%)	63 (48.5%)	0.263
GERD *	9 (11.1%)	14 (28.6%)	23 (17.7%)	0.012
Otitis Media	28 (34.6%)	13 (26.5%)	41 (31.5%)	0.224
Active smoking	26 (32.1%)	11 (22.4%)	37 (28.5%)	0.163
Chronic rhinosinusitis	20 (24.7%)	14 (28.6%)	34 (26.2%)	0.386
Recurrent pharyngitis	21 (25.9%)	16 (32.7%)	37 (28.5%)	0.265
Nasal polyposis	16 (19.8%)	5 (10.2%)	21 (16.2%)	0.116
Craniofacial anomalies	1 (1.2%)	0	1 (0.8%)	0.623
Benign sinonasal tumors	5 (6.2%)	3 (6.1%)	8 (6.2%)	0.65
Malignant sinonasal tumors	0	0	0	-
Special Diet	0	0	0	-

*: Gastroesophageal reflux disease , p value =0.012

Adenoidectomy was the surgical treatment of choice for all patients in our sample. A total of 17.7% (n=23) of patients (14 males and 9

females) had a previous adenoidectomy and 16.2% of patients (n=21) had a previous tonsillectomy (15 males and 6 females) (Table 5).

Table 5: Sex distribution for patients who had previous Tonsillectomy and Adenoidectomy

surgery	Male	Female	Total
Previous Adenoidectomy	14 (17.3%)	9 (18.4%)	23 (17.7%)
Previous Tonsillectomy	15 (18.5%)	6 (12.2%)	21 (16.2%)

DISCUSSION

An adenoid is a collection of lymphatic tissue at the posterosuperior part of the nasopharynx. "It is proven to have a key role in the development of an 'immunological memory' in younger children."¹³ Adenoidal tissue usually hypertrophies during mid-childhood and starts to shrink in late childhood.¹⁴

Waldeyer's ring which is composed from adenoid, tonsils and lymphatic tissue help in preventing the pathogens from invading the body. Adenoid lies deeply in the posterosuperior part of the nasopharynx, so it can't be seen easily as the tonsils which can be seen through oral cavity examination. Recurrent infections can occur in both tonsils and adenoid, which will lead to adenoidal tissue enlargement. Because adenoid lies at the

posterosuperior part of the nasopharynx and may extend to the nasal cavity, its enlargement leads to nasal obstruction.¹⁵ As depicted in our findings, the most common symptoms associated with this enlargement are snoring and nasal obstruction.

Adenoid may fail to be atrophied at late childhood and persists into adulthood causing many symptoms. In adults, wrong diagnosis and maltreatment of adenoid enlargement is a problem due to insufficient nasopharyngeal examination and due to overlapping with other associated rhinological diseases.¹⁶

Until now, there is no definite single cause for adenoid enlargement, but some factors have been suggested to contribute to the occurrence. Some believes that the presence of adenoid enlargement in adults is usually due to a persistence from childhood which is usually caused by chronic

infections.¹⁷ There is a capability for the atrophied adenoidal tissue to enlarge again in response to irritants and infections.¹⁸

Snoring is a prominent presenting symptom in pediatrics in comparison to adults.¹³ Snoring was the most common symptom according to our findings with a percentage of 81.5% (106 patients, 67 males and 35 females) followed by nasal obstruction 75.4% (98 patients, 66 males and 32 females). Similarly, Hamdan et al showed that “Prevalence of adenoid hypertrophy in adults with nasal obstruction approached 63.6% in patients with nasal obstruction and 55.1% in the control group ($p = 0.007$).”¹⁹

Yildirim et al observed that “Adult adenoids were associated with nasal septal deviation in 25% of patients”. In our study, it was found to be the most common predisposing factor present in 44.6% of the patients (58 patients, 36 males and 22 females).

Around 38.5% (50 patients, 34 males and 16 females) of patients were exposed to pollution, leading us to think about pollution as a significant factor for adenoid enlargement. Also, dental infection was a significant risk factor, it was seen in 33% of patients (43 patients, 27 males and 16 females) and it may be a source for ascending infection of the adenoid. The results also showed that chronic infections including recurrent tonsillitis (48.5%), otitis media (31.5%), CRS (26.2%) and recurrent pharyngitis (28.5%) play a role in adenoid hypertrophy.

El-Taher M said that “Benign lesions in nasopharynx in adults include cystic lesions like Brachial cleft cyst, Thornwaldt cyst and Mucus retention cyst.”²⁰ 6.2% of patients had benign nasopharyngeal neoplasm. Although none of our patients have malignant sinonasal tumors, Rout MR found that “Non-Hodgkin’s lymphoma and other sinonasal malignancy was associated with 3.3 % cases each”. Johnsson et al., found that “nasopharyngeal carcinoma was the most common malignant nasopharyngeal disease followed by Plasmacytoma, Lymphoma and Rhabdomyosarcoma.”²¹ Mostafa et al., concluded that “reactive lymphoid hyperplasia is the most common pathology encountered in nasopharynx of adult population followed by nasopharyngeal

carcinoma and nasopharyngeal lymphoma. Nasopharyngeal cysts were the least diagnosed lesion.”²²

Moreover, France et al found “adenoidal hypertrophy in 33 (60%) of 55 HIV-positive patients in their series.”²³ Yet, None of our patients showed evidence of a compromised immune system or were previously diagnosed with HIV. We noted the presence of other potential predisposing factors which included GERD (17.7%), nasal polyposis (16.2%) and craniofacial anomalies (0.8%, 1 patient has down syndrome).

Finally, our study found that 16.2% of patients had a previous tonsillectomy. Similarly, we noted that 17.7% had undergone previous adenoidectomy. Shama Shetty believes that “adult adenoid hypertrophy is a persistent childhood adenoid hypertrophy in early adulthood.”¹⁶

CONCLUSION

There are multiple risk factors associated with adenoid enlargement. Our study showed that septal deviation (44.6%), passive smoking (40.8 %%), allergic rhinitis (38.5%), and pollution (38.5%) were the most common predisposing factors. Snoring was the most common presenting symptom (81.5%) followed by nasal obstruction (75.4%).

Due to the increasing incidence of adenoid hypertrophy in adults, it should always be considered in adult patients presenting with the above-mentioned symptoms. This will allow for earlier detection and therefore, earlier management and better prognosis.

ETHICAL APPROVAL

Ethical clearance was obtained from institutional review board (IRB) of university of Jordan. Verbal consent was obtained from the patients and from the parents of the participants who are under the age of 18 year. This study was done according to the Declaration of Helsinki.

ACKNOWLEDGMENTS

We want to thank otolaryngology unit and medical records workers in Jordan University Hospital for their help in the research.

FUNDING

This research is not funded by any authorities.

DISCLOSURE

There is no conflicts of interest in this research.

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عوامل الخطر التي تؤدي إلى تضخم الزائدة الأنفية في المرضى الذين تزيد أعمارهم عن 12 سنة

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الملخص

خلفية البحث: تتكون حلقة فالداير من الزوائد الأنفية، اللوزتين، وأنسجة ليمفاوية أخرى. يمكن أن تتضخم الزوائد الأنفية مسببة العديد من الأعراض للمريض. تتضخم الزوائد الأنفية فسيولوجياً في منتصف عمر الطفولة وتبدأ بالضمور في آخر عمر الطفولة. على جميع الأحوال، في المرضى الذين تزيد أعمارهم عن 10 سنوات يمكن أن تتضخم وتؤدي إلى العديد من الأعراض الانسدادية.

هدف البحث: الهدف من هذه الدراسة هو الكشف عن عوامل الخطر والأنماط السريرية المرتبطة بتضخم الزائدة الأنفية في المرضى الذين تزيد أعمارهم عن 12 سنة.

المنهجية: تمت دراسة 130 مريض فوق عمر ال 12 عام والذين أجري لهم عملية إزالة الزائدة الأنفية في الفترة من كانون الثاني 2016 إلى كانون الثاني 2021. تم تقييم المرضى في قسم الأنف والأذن والحنجرة وجراحة الرأس والعنق، مستشفى الجامعة الأردنية، عمان-الأردن، بعض المرضى تم الوصول إليهم باستخدام السجلات الطبية وتم جمع معلوماتهم من خلال الهاتف. **النتائج:** من 130 مريض، 81 مريض كانوا ذكراً و 49 مريض كانوا إناثاً. متوسط عمر العينة كان 19.68. الشخير كان أكثر الأعراض شيوعاً (81.5%) يليه انسداد الأنف (75.4%) والتنفس عن طريق الفم (71.5%). أكثر عامل خطر مرتبط كان انحراف الوتيرة الأنفية (45%) يتبعه التدخين السلبي (40.8%)، الحساسية الأنفية (38.5%) والتلوث (38.5%). **الاستنتاج:** هناك عوامل خطر متعددة مشتبه بها لتضخم الزائدة الأنفية في المرضى الذين تزيد أعمارهم عن 12 سنة. في دراستنا، انحراف الوتيرة الأنفية كان أكثر عامل مرتبط بتضخم الزائدة الأنفية يليه التدخين السلبي، الحساسية الأنفية والتلوث. الشخير كان أكثر عرض شيوعاً يليه انسداد الأنف.

الكلمات الدالة: بالغ، الزوائد الأنفية، عوامل الخطر، النمط السريري.