

ADENOID AND TONSILS HYPERTROPHY – SYMPTOMS AND TREATMENT

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Summary

Introduction. Adenoid and tonsil hypertrophy is widespread in the pediatric population, affecting primarily younger children, aged 3 to 6 years. In 1884, a German pathologist, von Waldeyer-Hartz, first described clusters of lymphoid tissue in mucosa of the throat, which he named facial lymphatic ring, known today as Waldeyer's tonsillar ring. Waldeyer's ring plays a significant role in the development of immune response by allowing the contact of the immune system with multiple antigens and thus, enabling the development of the specific immunological response. The main points of contact of the body with the external environment are the mucous membranes of the digestive and respiratory systems. Waldeyer's ring, being at the opening of both systems, has a particular role in the development of immune response, especially during the first years of life.

Aim. The aim of the study was to analyze the symptoms presented by children hospitalized in the Clinic of Pediatric Otolaryngology of the Medical University of Warsaw that had been qualified for the surgical removal of the adenoid and/or tonsils.

Material and methods. All the patients underwent physical examination, and filled in a survey. The study included 59 hospitalized patients, 2 of which refused to disclose the symptoms associated with adenoid and tonsil hypertrophy that was diagnosed in them.

Results. The study involved 59 children aged from 2 to 13 years old. The mean age was 6.2 years. The patients were qualified for adenoidectomy or adenotonsillectomy. In 26 cases, at least one of the parents of the patient smoked in the presence of the child. 28 patients reported nasal obstruction, and 29 denied such symptoms. As many as 41 patients (71.9%) reported snoring during sleep. 45 patients (78.9%) breathed through the mouth. Based on the medical history collected from the parents, 22 patients (37.3%) had upper respiratory tract infection at least once a month, 7 patients – every two weeks, 9 – every two months, 15 – every three months, 5 – every 6 months, and one – once a year.

Conclusions. 1. The most common symptom in pediatric patients with adenoid and tonsil hypertrophy is snoring. 2. 1/3 of the children with enlarged tonsils is diagnosed with allergies. 3. Almost 45% of children with hypertrophy of the tonsils are exposed to tobacco smoke. 4. Children with enlarged tonsils have upper respiratory tract infections on average once a month.

Keywords: adenoid, tonsils, adenoidectomy, adenotonsillectomy, adenotonsillectomy

INTRODUCTION

Adenoid and tonsil hypertrophy is widespread in the pediatric population, affecting primarily younger children, aged 3 to 6 years. The symptoms of tonsillar hypertrophy are one of the most common reasons for pediatric or ENT visits in children. Therefore, physicians must be aware of the possible complications of the tonsil hypertrophy and of the indications for surgery. Therefore, the physiology of tonsils, their role for the immune system, as well as the early and late consequences of tonsil hypertrophy must also be known. Multiple diagnostic tests enable the physician to decide between conservative and surgical treatment options (4, 5, 8).

In 1884, a German pathologist, von Waldeyer-Hartz, first described clusters of lymphoid tissue in mucosa of the throat, which he named facial lymphatic ring, known today as Waldeyer's tonsillar ring. The ring includes the following structures (1, 2):

- 1 pharyngeal tonsil (also known as nasopharyngeal tonsil, because of its location, and as adenoid when inflamed/swollen). It is located on the upper wall of nasopharynx, inferior to the sphenoid bone,
- 2 tubal tonsils (bilaterally). It is located at the opening of the Eustachian tube into the nasopharynx,
- 2 palatine tonsils (frequently referred to as "tonsils" in medical slang; also known as faucial tonsils). They are located in the oropharynx,
- 1 lingual tonsil. Located on the posterior part of the tongue.

Waldeyer's ring plays a significant role in the development of immune response by allowing the contact of the immune system with multiple antigens and thus, enabling the development of specific immunological response. The main points of contact of the body with the external environment are the mucous membranes of the digestive and respiratory systems. As our organisms are continuously exposed to various infectious agents,

many non-specific and specific defense mechanisms have been developed. Lymphoid tissue associated with mucous membranes (MALT) is of primary importance for the immune system. MALT can be further divided into the lymphatic tissue of the digestive system (GALT), of the bronchial tree (BALT), and of the nose and throat (NALT) (6, 8, 9).

During the childhood, an intensive growth of the adenoid and tonsils is observed. The enlargement of tonsils is physiological from the 3rd to the 7th year of age, as they are very immunologically active. From the 8th year of age to the end of the puberty, adenoid gradually reduces its size. Tonsils, on the other hand, start to atrophy at about 17-20 years of age. Pathological hypertrophy affects primarily the adenoid, especially in younger children. Tonsils hypertrophy less frequently and are usually accompanied by adenoid hypertrophy (3, 8, 9).

Therefore, the main functions of tonsils include:

- providing contact with antigens,
- providing a first line of defense for respiratory and digestive tract,
- the promotion of the development of humoral and cellular immunity.

The role of tonsils is especially big during the first years of life. Infants start to lose passive immunity from their mothers at about 6 months of age and start to develop their own immunological response. Tonsils grow and acquire their proper shape. The physiological growth of tonsils concerns especially adenoid and tonsils. The speed of growth of the tonsils is influenced by infectious agents. Moreover, it is also hypothesized that dietary habits and hormonal status can also affect their growth (5, 8).

The tonsils reach their peak size at about 6-7 years of age and it is also the time of their biggest activity. After the puberty, adenoid and tonsils undergo involution and lymphoid follicles of the back and lateral sides of the throat are in the state of functional hypertrophy until 40 years of age. After that, they undergo involution and lingual tonsil hypertrophies until 60 years of age, when it, in turn, begins its involution (5, 8).

AIM

The aim of the study was to analyze the symptoms presented by children hospitalized in the Clinic of Pediatric Otolaryngology of the Medical University of Warsaw that had been qualified for the for the surgical removal of the adenoid and/or tonsils.

MATERIAL AND METHODS

The study was based on physical examination, a subjective examination and a written survey of children hospitalized in the Clinic of Pediatric Otolaryngology of the Medical University of Warsaw. The survey consisted of two surveys, once, my authority survey and the second one standardized survey, Child Health Question-

naire (CHQ-PF28). The questionnaires were dedicated to parents of children which were hospitalized due to adenoid hypertrophy and /or palatine tonsils. The study included 59 hospitalized patients, 2 of which refused to disclose the symptoms associated with hypertrophy adenoids and/or tonsils.

RESULTS

The study involved 59 children aged from 2 to 13 years old. The mean age was 6.2 years. The patients were qualified for adenoidectomy or adenotonsillotomy. Parents described health status of their child as good in 33 cases, as very good in 21 cases, as satisfactory in 3 cases, and as excellent in 2 cases. Among all patients, only 2 of the them did not attend to school or to kindergarten. 47 patients (79.7%) had a sibling, whereas 12 (20.3%) did not. In 26 cases (61%), at least one of the parents of the patient smoked in the presence of the child. In our survey, 28 patients (49.2%) reported nasal obstruction, and 29 (50.8%) denied such symptoms. As many as 41 patients (71.9%) reported snoring during sleep. 26 patients (44%) presented with nasal speech and 6 patients (10.5%) – with slurred speech or dental malocclusion. Speech impediment was present in 20 patients (35%). In our survey, 45 patients (78.9%) reported breathing through the mouth. In 20 cases (35%), the parents reported that their child significantly increased the volume of the TV, in 18 cases (31.6%), the parents were frequently being asked to increase the volume, and otitis was present in 21 patients (36%) which coincides with the number of children in whom hearing impairment was diagnosed. Body mass deficiency was present in 9 patients (15.8%), and growth deficiency – in 4 patients (7%). The parents reported concentration difficulties in 19 cases (33.3%). Frequent change of sleeping position was reported in 25 children, and restless sleep – in 15 children (26.3%). 18 patients (31.6%) were diagnosed with allergy. The most common allergens were: grass pollen, tree pollen, milk, dust, nuts, pet dander, feathers, drugs, chocolate, and tomatoes. Based on the medical history collected from the parents, 22 patients (37.3%) had upper respiratory tract infection at least once a month, 7 patients (12.3%) – every two weeks, 9 (15.8%) – every two months, 15 (26.3%) – every three months, 5 (8.8%) – every 6 months, and one (1.7%) – once a year.

DISCUSSION

Tonsillar hypertrophy can be caused by various factors, including pathogens, allergies, and genetic predisposition, and, rarely, neoplastic proliferation. Typically, the observed asymmetry of the tonsils or adenoids increases significantly in teenagers or young adults. The symptoms of tonsillar hypertrophy are quite characteristic. In case of adenoid hypertrophy, breathing through the nose is impaired (4, 8). This results in

mouth breathing, snoring, and sometimes sleep apnea. Recently, more attention has been drawn to the obstructive apnea in pediatric population. It has been discovered that the main causes for peripheral sleep apnea are associated with impaired patency of the upper respiratory tracts, with tonsillar hypertrophy being the first reason for it in pediatric population. Chronic hypoxia in children can result in behavioral changes, excitability, aggressive behavior, concentration problems, limited educational opportunities, bedwetting, decreased body weight and mass. Continuous mouth breathing has an influence on the development of the facial skeleton, resulting in a so-called adenoidal face. The characteristics include:

- small, revoked jaw,
- narrow and high-arched palate,
- dental malocclusion: cross bite or underbite,
- oblong face with possible underdevelopment of sinuses (7).

Breathing through the mouth dries oral mucosa, making it susceptible to infectious agents. Thus, children breathing through the mouth often present with throat infections and tonsillitis. Chronic tonsillitis affects not only the tonsils. For instance, beta-hemolytic *Streptococcus* group A belongs to the flora of tonsils. The contact with streptococcal antigens triggers the production of antibodies which may form immune complexes, inducing inflammation of distant organs, particularly kidneys, myocardium, pericardium, and iris. It may also be responsible for some forms of psoriasis, polyneuritis and vasculitis (5, 8, 9).

Nasal obstruction in the course of adenoid hypertrophy causes retention of secretions – initially mucus, later pus – in the nasal cavity. Parents of children suffering from tonsil hypertrophy frequently report continuous runny nose that does not respond to treatment with nasal drops, anti-inflammatory drugs, and antibiotics. The immunity of the child after several courses of antibiotic treatment frequently decreases and the infection become even more difficult to treat. In the next stage of the infection, the secretion is retained in the sinuses and the child presents with recurrent sinusitis. Moreover, purulent secretions often stream down the back wall of the throat, leading to chronic, productive cough and pulmonary diseases (4).

Characteristic nasal speech develops because of the nasal obstruction. Children with adenoid hypertrophy often have speech impairment that requires ENT care. There are multiple reasons for this: adenoidal face (anomaly in the construction of the palate and jaw), impaired mobility of the tongue, and hearing impairment. Enlarged tonsils limit the mobility of the soft palate, further encouraging the development of speech defects (1-4).

A significantly enlarged adenoid can cause the obstruction of the Eustachian tube, preventing proper ven-

tilation of the middle ear. This results in an accumulation of fluid in the tympanic cavity, periodic ear pain without the symptoms of an inflammation, and cyclic conductive hearing defects. This condition is referred to as otitis media secretoria (OMS). Prolonged OMS can cause irreversible hearing defects, adhesions between auditory ossicles, and retraction pockets of the tympanic membrane, which, in turn, can lead to chronic otitis media. The incidence of recurrent acute otitis, and, consequently, chronic otitis, is high in children with adenoid hypertrophy (1, 4, 5).

Surgical treatment is indicated when conservative treatment has failed and when the symptoms of tonsillar hypertrophy worsen in spite of pharmacological treatment. Conservative treatment includes intranasal corticosteroids, decongestants, mucolytics, antiallergic drugs, immunostimulatory drugs, and antibiotics (during exacerbations). Due to the multifactorial etiology of the tonsillar hypertrophy, the patient's comorbidities must also be taken into account. The management of allergy, elimination diet in younger children, and diagnosis and management of immune deficiency can all alleviate the symptoms of tonsillar hypertrophy (8, 9).

Surgical treatment of adenoid hypertrophy consists of adenoidectomy or the complete removal of tonsillar tissue from the nasopharynx. Surgery should be considered for each patient individually. Absolute indication for surgery is the coexistence of sleep apnea and progressive conductive hearing loss (1, 5).

Numerous studies have shown that adenoidectomy is more effective than conservative treatment in patients with recurrent otitis media, especially exudative otitis media. The size of the adenoid is not so important in the qualification for surgery in case of recurrent otitis media, as even a small adenoid obstructing the opening of the Eustachian tube or narrowing the nasopharynx may be the cause of auricular problems in a patient. Qualification for adenoidectomy in patients with recurrent upper respiratory infections should be carefully considered. In general, adenoidectomy restores the physiological path of breathing through the nose, but, in some patients, e.g. with allergies or immune disorders, the incidence of upper respiratory tract infection does not change after the procedure (1-3).

Adenoidectomy is contraindicated in palatopharyngeal insufficiency, which is present in patients with cleft palate (including submucosal cleft palate), excessively short soft palate, or uvula bifida. In cases in which speech impediment after the surgery cannot be excluded, the patient should be consulted by a phoniatric specialist (1, 4).

There are two surgical treatment options for tonsil hypertrophy in children – partial removal of tonsils (tonsillotomy) or complete removal (tonsillectomy). The aim of leaving some tonsil tissue in tonsillotomy is

to enable the proper immunological function of the Waldeyer's ring. It is indicated in uncomplicated tonsil hypertrophy in which tonsils cause obstruction in breathing and swallowing (2, 3). Therefore, children with a significant deficit in weight or height without signs of chronic tonsillitis are qualified for the surgery (tonsillectomy). According to the guidelines, tonsillectomy is indicated if any of Paradise's criteria is fulfilled (2, 3). Tonsillectomy should be performed in patients who had undergone local complications of acute tonsillitis, such as abscess or paratonsillar edema. Unilateral tonsillar hypertrophy should always raise suspicion of a tumor. The most common tonsillar tumor in children is lymphoma (1).

CONCLUSIONS

1. The most common symptom in pediatric patients with adenoid and tonsil hypertrophy is snoring.
2. 1/3 of the children with enlarged tonsils is diagnosed with allergies.

Conflict of interest

None

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3. Almost 45% of children with hypertrophy of the tonsils are exposed to tobacco smoke.
4. Children with enlarged tonsils have upper respiratory tract infections on average once a month.

References

1. Baugh RF, Archer AM, Mitchell RB et al.: Clinical practice guideline: tonsillectomy in children. *Otolaryngol Head Neck Surg* 2011; 144: 1-30.
2. Paradise J, Bluestone C, Bachman R: Efficacy of tonsillectomy for recurrent throat infection in severely affected children. *N Engl J Med* 1984; 310: 674-683.
3. Paradise J, Bluestone C, Colborn K: Tonsillectomy and adenotonsillectomy for recurrent throat infection in moderately affected children. *Pediatrics* 2002; 110: 7-15.
4. Marseglia GL, Caimmi D, Pagella F: Adenoids during childhood: the facts. *Int J Immunopathol Pharmacol* 2011; 24 (suppl. 4): 1-5.
5. Zautner AE: Adenotonsillar disease. *Recent Pat Inflamm Allergy Drug Discov* 2012; 6(2): 121-129.
6. Jakóbsiak M: *Immunologia*. PWN, Warszawa 1995.
7. Goldstein NA, Pugzhendhi V: Clinical assessment of pediatric obstructive sleep apnea. *Pediatrics* 2004; 114: 33-43.
8. Zawadzka-Głós L, Chmielik M, Wąsik M: Immunological cellular response in hypertrophied palatine tonsil in children. *New Med* 1997; 1: 9-10.
9. Zawadzka-Głós L, Chmielik M, Wąsik M: Immunological response in hypertrophied palatine tonsils and blood pre- and post adenotonsillectomy. *New Med* 1999; 3: 72-73.

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