

ORIGINAL RESEARCH

Medicine Science 2019;8(3):732-5

Prevalence of atopy in children with hypertrophic tonsil and recurrent/chronic tonsillitis

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Received 10 May 2019; Accepted 06 July 2019

Available online 12.2019 with doi:10.5455/medscience.2019.08.9078

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Abstract

The incidence of allergic diseases is increasing every day. Many studies have been conducted to investigate the relationship between many diseases and the presence of atopy. However, there is not enough publication about the presence of atopy and a similar relationship between tonsil diseases. The aim of this study was to determine how hypertrophic, recurrent / chronic tonsils are affected by the presence of atopy. Study was conducted by produced from the thesis of Atopy Prevalence in Hypertrophic Tonsil and Recurrent / Chronic Tonsillitis Children. This study was carried out in Azerbaijan, Neriman Nerimanov Medical University, Department of Ear-Nose-Throat, on the children under the age of 15 years (minimum 2, largest 15 years, mean age 6.3). Tonsillectomy was diagnosed as recurrent / chronic tonsillitis or tonsillar hypertrophy and the first 50 patients were included in the study group and discussed with the literature. In our study, the presence of atopy in 50 children between the ages of 2-15 with tonsillar hypertrophy and recurrent / chronic tonsillitis was investigated. In 27 patients with advanced hypertrophic tendencies 7 (25.9%), in 23 patients with recurrent / chronic tonsillitis, atopy was detected in 1 (4.3%) and the difference was statistically significant. Serum total IgE levels were higher in patients with hypertrophic tonsil than patients with recurrent / chronic tonsillitis. This difference seems to be related to the high atopy rate seen in the hypertrophic tonsil group. As a result of these evaluations, it can be predicted that atopic patients may have hypertrophy in tonsils and atopy may be present in patients with tonsillar hypertrophy. Thus, tonsils may be one of the allergic organs such as lower respiratory tract, nose, skin, eye.

Keywords: Hypertrophic tonsil, recurrent-chronic tonsillitis, atopy

Introduction

The first line of defence against microorganisms in the respiratory tract is adenoid and tonsils. They originated from lymphoid tissues. Tonsils and adenoids, together with mucosal lymphoid tissues, are important in the production of secretory immunoglobulins [1,2]. Most of the antigenic substances enter the body via this route, therefore, the role of this region in the immune system is crucial. Severe hypertrophic tonsils cause disorders such as chronic persistent otitis media with effusion, upper airway obstruction, and chronic sinusitis. IgE-mediated type I hypersensitivity reactions have been implicated in both sinusitis and otitis media with effusion [3, 4]. However, there is not enough data about the role and frequency of allergic reactions in tonsil disorders. In the few publications we have found in the literature, conflicting results have been reported about the relationship between tonsil diseases and allergy [5, 6]. The aim of this study is to compare the

prevalence of atopy in children with tonsillar hypertrophy with the prevalence of atopy in children with recurrent / chronic tonsillitis, to evaluate the results clinically and to draw attention to allergy and allergic diseases that are one of the most important problems of today [7]. The fact that medical treatment was not successful enough in patients with hypertrophic tonsil or chronic tonsillitis, different treatment results in each patient, frequent recurrences and lack of aetiology was thought to be related to atopy and led us to conduct this research..

Material and Methods

This study was produced from the thesis of Mustafa Altintas titled "Prevalence of Atopy in Children with Hypertrophic Tonsil and Recurrent / Chronic Tonsillitis" at Neriman Nerimanov Medical University, Ear-Nose-Throat Department, Azerbaijan. Tonsillectomy was performed on a total of 50 patients (22 girls, 28 men) under the age of 15 years (minimum 2 and maximum 15 years old, mean = 6.3 years). Tonsillectomy was diagnosed as recurrent / chronic tonsillitis or tonsillar hypertrophy and the first 50 patients were included in the study group and discussed with the literature. Ear, nose and throat examinations of the children

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were performed before the operation in the Ear-Nose-Throat Clinic and the children who had recurrent / chronic tonsillitis and tonsillar hypertrophy were included in the study. Distinction between recurrent / chronic tonsillitis and tonsillar hypertrophy in all children was made by the same team physicians.

The inclusion criteria in patients with hypertrophic tonsil:

1. Tonsils to be +3 and +4 in size
2. Difficulty swallowing tonsils

Inclusion criteria in patients with recurrent / chronic tonsillitis:

1. Despite repeated medical treatment, there are recurrent attacks of tonsillitis.
2. Had more than 7 tonsillitis attacks in the last one year or 5 tonsillitis attacks every year in the last two years, or 3 attacks every year in the last three years.
3. Having systemic disease due to streptococcal tonsillitis
4. Chronic - intermittent sore throat that cannot be attributed to another cause.
5. Tonsillitis-induced febrile seizure.
6. Tonsillitis-associated abscessed cervical adenopathy.
7. Halitosis due to debris in the tonsils.
8. The history of peritonsillar abscess.
9. Presence of peritonsillar hyperaemia-congestion, presence of tonsillolith.

Children with both hypertrophic and recurrent / chronic tonsillitis were included in the hypertrophic tonsil group. Medical treatment was given to children with acute tonsillitis and their surgery was postponed. During their evaluation in the ENT department, the history of the presence of atopy or atopic family history from children and their families were not obtained and therefore, ENT physician was blinded to the presence of atopy. Routine tests (haemoglobin, white blood cell, platelet counts, prothrombin time, thromboplastin time, lung radiography, complete urinalysis) and total IgE measurements were obtained for preoperative preparation during the preoperative period. Paediatric consultation was requested for evaluation from the Paediatrics Department and a consultation was requested from the Anaesthesiology and Reanimation Department for local anaesthesia. While the consultation was requested, the patient was informed about that they will undergo tonsillectomy, but no information was given about the tonsillar morphology. Fifteen minutes after the epidermal and intradermal application of allergens to the skin, induration and redness bigger than 3 mm of the negative control group were considered to be a positive. Both the prick test and the intradermal test were positive in the patients whom we considered as positive. This shows a high degree of sensitivity. Allergen groups used were various meadows species, tree pollen, house dust, mites, fungi, various types of foods and animal hairs. Skin tests were performed at least 10 days washout period after discontinuation of antihistaminic drugs. As an exception, patients receiving astemizole were not included in the study. Because this antihistamine is excreted from the body after 3-6 weeks. All operations were performed under local anaesthesia. Dissection / snare technique was used during tonsillectomy operations. All tonsillectomy specimens were sent to the pathology department in physiologic saline solution.

Results

The number of patients included in the study with diagnoses of hypertrophic tonsil and recurrent / chronic tonsillitis was 50. Twenty-seven of these patients had hypertrophic tonsil (54%) and 23 had recurrent / chronic tonsillitis (46%). Skin tests revealed atopy in 8 of 50 children (16%). Atopy was detected in 7 (25.9%) of 27 children with hypertrophic tonsil and in 1 (23%) of 23 children with recurrent / chronic tonsillitis (Table 1). The difference between the two groups was statistically significant in terms of the presence of atopy (Table 2). Fisher's Exact Chi-square test was used for statistical evaluation and p value was found as 0.035 ($p < 0.05$).

As a result of the study, there was a correlation between the degree of hypertrophy and the presence of atopy. Atopy was detected in 3 of 5 children with hypertrophic tonsils with the size of +4 (60%) and in 4 of 22 children with hypertrophy of +3 size (18.1%). When children whose tonsils were between +3 and +4 were compared with the presence of atopy, the difference was statistically significant ($p < 0.05$). As the degree of hypertrophy increased, incidence of atopy tended to increase.

Table 1. Comparison of the presence of atopy and tonsil size

		Atopy		Total
		Present	Absent	
Degree of hypertrophy	+3	4 (18.1 %)	18 (81.8 %)	22 (44 %)
	+4	3 (60 %)	2 (40 %)	5 (10 %)
	0	1 (4.3 %)	22 (95.6 %)	23 (46 %)
Total		8 (16 %)	42 (84 %)	50 (100.0 %)

Table 2. Allergy test results of hypertrophic tonsil and recurrent / chronic tonsillitis groups

			Allergy test		Total
			Atopy absent	Atopy present	
Diagnosis	Hypertrophic Tonsil	Number	20	7	27
		%	74.0%	25.9 %	100.0 %
	Recurrent / chronic Tonsillitis	Number	22	1	23
		%	95.6 %	4.3%	100.0 %
Total		Number	42	8	50
		%	84 %	16 %	100.0 %

Discussion

The first defence against the antigen is conducted by the mucus layer covering the mucosal surfaces in the upper respiratory tract. Secretory immunoglobulins in the mucus form the basis of this defence. The production of secretory immunoglobulins takes place in mucosal lymphoid tissues, periglandular lymphoid tissue, tonsils and adenoids [8,9]. The second defence barrier against the antigen is the mucosa. Mucosal lymphoid tissue and its drained lymph nodes are the areas responsible for immune response. In the upper respiratory tract, the tonsils and adenoids act as a mucosal lymphoid tissue. Tonsils and adenoids are located at the entrance of

the respiratory tract and gastrointestinal tract and are the lymphoid organs responsible for local immunity. For this reason, the first contact of the immune system with various antigenic substances in the microorganisms, foods and inhaled air occurs in this region [10,11].

In 1982, Ostergaard et al. [12] found plasma cells bearing IgE in 9 of 30 (30%) tonsillectomy specimens of 28 children with chronic tonsillitis. 27 of these children were followed for 8 years. While three of the children were Alteman et al. [13] conducted tonsillectomy and adenoidectomy due to various reasons on 153 children with previously known allergies- In the pathological examination of the tonsil and adenoid specimens, tissue edema was detected in the submucosal corium layer, and edema in the adenoid tissue was found to be higher than the edema in the tonsils. It has been suggested that this edema can be reduced by antihistamine treatment in their study, Ramadan et al. [14] investigated the relationship between adenotonsillar disease and allergy in 108 children and 59 control cases who underwent tonsillectomy. The frequency of allergy (21%) in the adenotonsillectomy group due to hypertrophy or chronic / recurrent infection was not different from the frequency of allergy in the control group (20%). Vinke et al. [15], in their study, have found that adenoid tissue plays an active role in the pathogenesis of allergic reactions. In comparison of the adenoidectomy specimens of 16 allergic and 16 nonallergic adenoidectomy children, helper T lymphocytes, cytotoxic T lymphocytes, macrophages, chymase, trypsinase, IgE, major basic proteins and IL-4-bearing cells did not differ between the two groups, whereas CD1a-expressing cells were found to be increased in the children in the allergic group. This finding supports the active role of adenoid tissue in allergic reactions. Gorfien et al. [16] compared the tonsillectomy specimens of 90 children aged between 2 and 13 years who were operated after the diagnosis of hypertrophic tonsils and recurrent tonsillitis and found that the area of germinal centres in hypertrophic tonsil cases increased significantly compared to recurrent tonsillitis cases.

This study was conducted on 50 children (28 male and 22 female) aged between 2-15 years (mean age 6.3 years). Tonsillectomy patients were diagnosed with severe hypertrophic (+3 and +4) tonsils and had a tonsil size was between the anterior and posterior tonsil plica were selected for study group. The number of children with hypertrophic tonsil was 27 and the number of patients with recurrent / chronic infected tonsil was 23. The diagnosis of atopy was made by skin prick test. The skin prick test was performed with two different techniques by intradermal and epidermal application and the international evaluation rules were complied with in the literature [17]. As a result of our study, overall atopy rate was found to be 16% (8 of 50 children). Çelik et al. reported this rate as 25% in the normal adult population in and around Ankara [18]. Atopy was present in 7 (25.9%) of 27 children with hypertrophic tonsil and it was found in 1 (23%) of 23 children with recurrent / chronic tonsillitis. In patients with hypertrophic tonsil, there was a relationship between the degree of hypertrophy and the presence of atopy (Table 2). Of the 5 children with hypertrophic tonsils with a size of +4, 3 (60%) had atopy and 4 of 22 (22.1%) children whose tonsils were hypertrophic with a size of +3. There was a difference in the presence of atopy among children with tonsil size of +3 and +4. As the degree of hypertrophy increased, presence of atopy tends to increase.

There was a difference in serum total IgE levels between the two groups. Serum IgE levels were found to be high in children with hypertrophic tonsils and while lower values were found in the other group. The presence of atopy between the two groups and the difference in serum total IgE levels suggest that there is a relationship between the presence of atopy and tonsillar hypertrophy [19,20]. Allergens abundantly present in nature do antigenic stimulation in allergic individuals. As a result, other B lymphocytes, together with the increasing number of IgE-producing plasma cells, cause growth in tonsil size with mechanical effect. Tissue edema in tonsil hypertrophy is also present in atopic children Edema and paleness in the mucous membranes are one of the allergic manifestations [21,22]. Eosinophils can be seen in nasal smears, in serum, allergic rhinitis and nonallergic seasonal rhinitis, but are not primarily responsible for allergy. The serum total eosinophil count increases after 4-11 hours after exposure to the allergen. Eosinophils are thought to migrate to the allergy region by responding the eosinophil chemotactic factor secreted by mast cells and basophils, phagocyte the damaged tissue, and inactivate the heparin and histamine released from basophil and mast cells [23].

Conclusions

In conclusion, children with hypertrophic tonsil should be evaluated for the presence of atopy, in other words, it should be kept in mind that atopy-dependent tonsil hypertrophy can be found in a child having an atopic physiology. It may be appropriate to follow the children who have hypertrophic tonsils and who do not have atopy detected by skin prick test at least once a year in the allergy department. Serum IgE measurements in late spring and early summer, when the pollens are abundant, may be effective in the early detection of such patients. **** Children with hypertrophic tonsils and are not diagnosed with atopy should be monitored for atopy in the future.

Financial Disclosure

All authors declare no financial support.

Ethical approval

The study protocol has approved from local ethic committee

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