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Research Paper

Evaluation of Asthma in Children with Tonsillitis

Medical Science

KEYWORDS : Chronic tonsillitis; childhood asthma;

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ABSTRACT

Chronic tonsillitis and childhood asthma, both are common childhood diseases, and it's not surprising to think of an association between the two by otolaryngologists treating chronic tonsillitis in children. A total of 500 children, aged 4–17 years, either reporting to OPD, Dept of Otolaryngology, or admitted in the Dept of Otolaryngology, during the period July'2011 and December'2012 were surveyed using the ISAAC questionnaire; and tonsils were evaluated by physical examination. A total of 446 questionnaires were completed giving an overall response rate of 89.2%. The prevalence of lifetime wheezing, 12-month wheezing and lifetime doctor-diagnosed asthma were 16.4%, 6.2% and 1.7%, respectively. The prevalence of frequent tonsillitis and tonsillar hypertrophy were 19.9% and 3.4%, respectively. Tonsillar hypertrophy was positively correlated with a history of frequent tonsillitis. Frequent tonsillitis and tonsillar hypertrophy could be evaluated as risk factors for asthma due to their significant association with asthma-related symptoms. And thus, it is expected that this study would be a suitable baseline source for future trends on the prevalence, diagnoses and severity of asthma among 4–17 year old children.

INTRODUCTION

Chronic tonsillitis is one of the most common disease entities encountered by otolaryngologists and is frequently associated with upper airway infections [1] including nasopharyngitis, pharyngitis, tonsillitis and otitis media constituting 87.5% of the total episodes of respiratory infections. Also the majority of acute upper respiratory tract infections are caused by viruses. [1], [2]

Asthma is also one of the most common chronic diseases in the pediatric population. [3] An estimated 5- 15% of children have asthma, and there are worldwide variations in the prevalence of the different symptoms of asthma.[4] The prevalence of asthma is increasing in western and developing countries.[5], [6]

The majority of acute asthma episodes are triggered by respiratory viral infections in which recruitment of Th2-type cells into the lungs might be responsible. [7] The frequency of upper respiratory tract infections was reported to be higher in asthmatic children than in controls. [8]

The tonsils are part of Waldeyer's ring, the basic function of which is antibody formation and defense against antigens. Allergic sensitization of the airways occurs partly in the mucosa of the afflicted organ, but also partly in the lymphatic stations draining these structures. Adenoids and tonsils are the relevant lymphatic stations of the nasal mucosa in humans. Allergy and sensitivity to different kinds of allergens are thought to be risk factors for adenoid hypertrophy (AH) in children. [9]

There are only a few studies on the relationship between asthma symptoms and tonsillar tissue in the literature. In this study, we aimed to evaluate the relationship between chronic tonsillitis and childhood asthma among 4–17 year old children.

MATERIAL AND METHODS:

A total of 500 children, aged 4–17 years, either reporting to OPD, Dept of Otolaryngology, or admitted in the Dept of Otolaryngology, during the period July'2011 and December'2012 were surveyed using the ISAAC (International Study of Asthma and Allergies in Childhood) questionnaire [4], [10] Children from each class level were included to provide an equal distribution of children according to age.

The questionnaire included questions on the history of frequent tonsillitis, tonsillectomy and/or adenoidectomy and symptoms of asthma. A detailed form was completed for each child by the parents/attendants. Thereafter, the tonsils were evaluated by otolaryngologists in all children and scored on a four-point scale as follows:

Grade 1, tonsils were in the tonsillar fossa, barely seen behind the anterior pillars;

Grade 2, tonsils were visible behind the anterior pillars;

Grade 3, tonsils extended three-quarters of the way to the midline;

Grade 4, tonsils were completely obstructing the airway.[11-13]

Grades 3 and 4 were accepted as tonsillar hypertrophy. The interrelationship between tonsillar hypertrophy and asthma-related symptoms was examined by the chi-squared test, and the 95% confidence interval (CI) was calculated for the differences where appropriate. Those with tonsillectomy and/or adenoidectomy were excluded. Frequent tonsillitis was defined as more than two episodes of tonsillitis per year. The interrelationships between a history of frequent tonsillitis, tonsillectomy and/or adenoidectomy and asthma-related symptoms were examined by the chi-squared test. A significant difference was indicated by a p-value < 0.05. Odds ratios and 95% confidence limits for risk factors were calculated with coefficients and standard errors.

RESULTS:

Of the 500 children, 54 were excluded due to refusal. A total of 446 questionnaires were completed with an overall 89.2% response rate. Of 446 children, 201 (45%) were boys and 245 (55%) were girls. The male to female ratio was 0.82. Demographic data of the study population are given in Table 1.

Table 1 Demographic data of the study population

Number of the study population	446
Sex, n (%) Male Female	 201 (45) 245 (55)
Age, median years (range)	11(4-17)
Children with frequent tonsillitis, n (%)	89(19.9)
Children with tonsillar hypertrophy, n (%)	15 (3.4)
Children with tonsillectomy and/or adenoidectomy, n (%)	24 (5.5)
Children with adenoidectomy, n (%)	10 (2.2)

In this study, the prevalence of lifetime wheezing, wheezing in the previous year, and life time doctor diagnosed asthma were 16.4%, 6.2%, and 1.7%, respectively. The prevalence of other asthma-related symptoms is given in Table 2.

Table 2 Prevalence of asthma and other symptoms

Question	N (%)
Lifetime wheezing	73 (16.4)
Wheezing in last year	28 (6.2)
Attacks of wheezing in last year None 1-3 4-12 More than 12	 2 (0.5) 20 (4.5) 3 (0.6) 2 (0.4)

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Sleep disturbance by wheezing in last year Never woken with wheezing Less than one night per week One or more nights per week	 13 (2.9) 10 (2.2) 3 (0.8)
Severe attacks of wheezing limiting speech in last year	6 (1.3)
Lifetime doctor diagnosed asthma	8 (1.7)
Wheezing after exercise in last year	20 (4.5)
Walking with cough in last year	123 (27.6)
Total	446 (100)

The prevalence of frequent tonsillitis was 19.9%. The results of tonsil scoring were as follows: Grade 1, 62.7%; Grade 2, 28.4%, Grade 3, 3.3%; Grade 4, 0.1%; tonsillectomy, 5.5%. Twenty four patients were found to have had a tonsillectomy and/or adenoidectomy. The prevalence of tonsillar hypertrophy in the school children was 3.4%.

A history of frequent tonsillitis was found to be significantly associated with tonsillar hypertrophy (Odds ratio [OR] = 3.45; 95% confidence interval [CI] = 2.03-5.88). The history of frequent tonsillitis and tonsillar hypertrophy decreased with increasing age (Fig. 1).

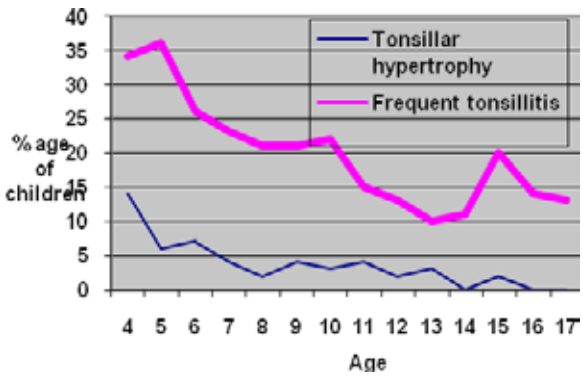

Fig. 1 The relationship between tonsillar hypertrophy and frequent tonsillitis according to age.

The number of children with frequent tonsillitis and tonsillar hypertrophy who showed a high level of asthma-related symptoms was significant. Frequent tonsillitis was found to be significantly associated with lifetime wheezing (OR = 2.84; CI = 2.15-3.74), 12-month wheezing (OR = 1.56; CI = 0.95-2.56), exercise wheezing (OR = 2.32; CI = 1.44-3.74) and waking with a cough (OR = 2.31; CI = 1.81-2.96). Frequent tonsillitis and asthma-related symptoms were found to decrease with increasing age except for 12-month wheezing which showed two peaks at 5 and 16 years, respectively (Fig. 2). Tonsillar hypertrophy was found to be significantly associated with lifetime wheezing (OR = 1.95; CI = 1.08-3.52).

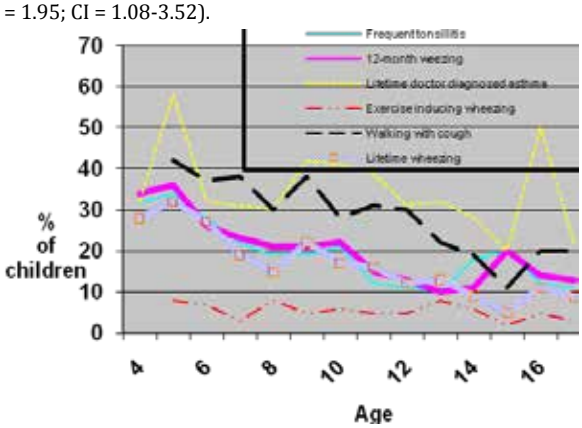

Fig. 2 The relationship between frequent tonsillitis and asthma-related symptoms according to age.

DISCUSSION:

This study aimed at establishing the relation between chronic tonsillitis and childhood asthma among 4-17 year old children at Dhaka Medical College Hospital, where the reporting children came from all over the Dhaka city and even from far off places of Bangladesh, where air pollution is a major problem. The prevalence of childhood asthma in Bangladesh is not well documented; however related studies prove it to be high. As reported to be 16.1% in one of the studies. [14] The prevalence of asthma using the ISAAC questionnaire among school children has been reported to vary between 4.9% and 16.4% in Turkey[15–22] and between 2.1% and 30.2% in some other countries.[23] Bangladesh is a country with different geographic regions, where plant cover, society structure, socioeconomic status, climate, and level of air pollution vary. These factors can explain the different prevalence ratios of allergic diseases obtained in different cities and countries. High rates for asthma and asthma-related symptoms are usually reported in English-speaking countries. [24] In Bangladesh the discrepancy in the prevalence of symptoms of allergic diseases may be due to the selection of different age groups and regions and the fact that the parents completed the questionnaires. The low rates in Dhaka may be associated with a lower awareness of allergic diseases.

There was a positive correlation between frequent tonsillitis and tonsillar hypertrophy; thus frequent tonsillar infection may cause tonsillar hypertrophy. Patients with a history of recurrent tonsillitis had larger tonsils than those without tonsillitis. [24] In the present study, children with tonsillar hypertrophy had significantly higher frequency of lifetime wheezing than children with a normal tonsil size. Other asthma-related symptoms were also common in children with tonsillar hypertrophy, but they were not statistically significant. These findings suggest that tonsillar hypertrophy might be a risk factor for asthma-related symptoms.

We also observed that the number of children with frequent tonsillitis who showed a high level of asthma-related symptoms was significant. Allergic children may have an increased tendency to upper airway diseases since the airways of asthmatics are more vulnerable due to allergic inflammation. Most asthmatic children might also have allergic rhinitis. [26] Children with allergic rhinitis usually had nasal congestion causing them to breathe through the mouth. This might lead to frequent tonsillo-pharyngitis and enlarged tonsils resulting in tonsillectomy. Since respiratory viruses were the most common cause of upper airway infections[1] and these were well recognized as major triggers of acute exacerbation of asthma in children, [7] frequent tonsillitis could trigger acute asthma episodes and asthma-related symptoms.

Exercise-induced wheezing in the previous year was statistically low in children with tonsillectomy/and or adenoidectomy. This might be explained by improvement in the course of the disease due to the removal of a triggering factor, the tonsils as the focal source of infection precipitating frequent upper airway infections in asthmatic children. The lack of a statistical relationship between other symptoms and tonsillectomy and/or adenoidectomy might be due to the small number of children with tonsillectomy/and or adenoidectomy.

Thus, it is expected that this study would be a suitable baseline source for future trends on the prevalence, diagnoses and severity of asthma among 4–17 year old children. Frequent tonsillitis and tonsillar hypertrophy could be evaluated as risk factors for asthma due to their significant association with asthma-related symptoms.

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