Is there a Relationship Between Depression and Adenoid Volume in the Pediatric Population?

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Abstract

Objective: Adenoid tissue hypertrophy is a common problem in childhood. In addition, it can also cause obstructive sleep apnea syndrome (OSAS). The relationship between adenoid size and quality of life or psychological status has not been evaluated as an independent variable. Therefore, this study investigated the relationship between adenoid size, obstructive symptoms, and depression.

Methods: In total, 180 children were included and divided into two groups: 92 children with OSAS and 88 without OSAS. The adenoid size was assessed by calculating the adenoid nasopharynx ratio, which is the maximum adenoid size to a line drawn from the posterosuperior hard palate to the sphenoid-occipital synchondrosis. The Turkish version of the pediatric depression scale was used to evaluate depression symptoms. The results of two evaluations were statistically compared to assess any correlation.

Results: The mean age of the OSAS was 7.61 and the control group was 7.95 years. There were no statistical differences in sex and age between the groups. The adenoid nasopharynx ratio significantly differed p<0.001 (p=0.001) between the two groups, whereas the pediatric depression scale scores did not differ (p=0.472). There was no correlation between the adenoid nasopharynx ratio and depression.

Conclusion: The adenoid nasopharynx ratio is not a significant predictor of depression in children with OSAS.

Keywords: Sleep apnea, depression, adenoid hypertrophy, children

INTRODUCTION

Adenoids are lymphoid tissues located in the posterosuperior nasopharynx. Adenoid tissue hypertrophy is a common problem in childhood that can cause symptoms of obstruction, including oral breathing, snoring, hyponasal speech, recurrent otitis media, and otitis media with effusion; growth retardation; and facial growth problems (1). Adenoid hypertrophy can also cause obstructive sleep apnea syndrome (OSAS), which may result in morning drowsiness, fatigue, and memory and concentration problems, thereby decreasing the school and social performance of these children (2-4).

An association between depression and OSAS has been reported (5). Another study has claimed that the use of sleep medication, daytime sleepiness, and symptoms of initial insomnia are independently associated with depression, whereas the severity of OSAS is not (6). These studies were conducted in adults. Studies with children also support an association of depression with OSAS or symptoms of OSAS (7, 8). In addition, the adenoid size and obstructive symptoms correlate with each other (4, 9, 10). However, the relationship between the adenoid size and quality of life or psychological status has not been evaluated as an independent variable. This study aimed to investigate the relationship...
between the adenoid size and depression prevalence in the pediatric population.

**METHODS**

An approval from the International Review Board was obtained from the Okmeydani Training and Research Hospital Ethics Committee on 17.11.2015 and protocol number is 365. Informed consent was obtained from all participants. The study was conducted between September 1, 2015, and December 1, 2015 and enrolled 92 children with OSAS and 88 without OSAS. Children with septal deviation, conchal hypertrophy, grade ≥3 tonsillar hypertrophy according to the Brodsky grading system (11), body mass index for age percentile of >90 (2–20 years), cleft lip and palate, and lower airway pathology were excluded. OSAS was diagnosed based on the history which was description by parents of children. Children whose parents defined apnea attacks and had no neurological diagnosis were accepted as apneic.

The adenoid size was assessed by calculating the adenoid nasopharynx (A/N) ratio proposed by Fujioka et al. (12) using the maximum adenoid size to a line drawn from the posterosuperior hard palate to the sphenoid-symphysis synchondrosis (Figure 1) (13). The Turkish version of the pediatric depression scale validated by Öy et al. (14) was used to evaluate depression symptoms. This scale comprises 27 questions to be answered based on the status in the previous 2 weeks. Each question is scored from 0 to 2, with 0 representing the lowest depressive status and 2 representing the maximum status. The maximum score is 54, and the cut-off score for depression is 19.

**Statistical Analysis**

The relationship between the A/N ratio and pediatric depression scale score was calculated. Statistical analysis was performed using the IBM Statistical Package for Social Sciences software version 22 (IBM SPSS Corp.; Armonk, NY, USA). The Shapiro–Wilks test was used to verify whether the data had a normal distribution. Student’s t-test and Yates continuity correction test were used to compare data between the groups.

**RESULTS**

The mean age of the OSAS (43 girls and 49 boys) and control (46 girls and 42 boys) group participants was 7.61 ± 2.66 and 7.95 ± 2.12 years, respectively. There were no statistical differences in sex and age between the groups (Table 1). Table 2 summarizes the A/N ratio and pediatric depression scale results. The A/N ratio significantly differed (p=0.001) between the two groups, whereas the pediatric depression scale scores did not (p=0.472). There was no correlation between the A/N ratio and depression (Table 2).

**DISCUSSION**

The prevalence of sleep apnea in the pediatric population is 1%–5%, and adenoid and tonsillar hypertrophy are the main risk factors (15). The complications and clinical findings of OSAS are different in the pediatric population. Daytime sleepiness and falling asleep are not common in children, but aggression and concentration problems are common. Because of their concentration is effected so their success in school and social problems are also affected (16).
noid size (18, 19). It is the highest at the age of 4–5 years, although the adenoid tissue reaches its maximum size at 7–10 years, but facial growth is greater and prevents further obstruction (12).

Several studies have examined depression and the determinants of depression in children with OSAS (5, 7, 20-23). Yilmaz et al. (7) have reported that depressive symptoms are more common in children with OSAS. Depression is also claimed to be the most common mood disorder in patients with OSAS (24). Decreased oxygen saturation is considered responsible for depression. Micro-awakenings cause daytime fatigue and sleepiness, which results in depressive symptoms (25). It has been postulated that hormonal changes are responsible for depression in OSAS (26). Obesity is more common in patients with OSAS and is an independent risk factor for depression (5). In addition, low serotonin levels in patients with OSAS may be responsible for depression (27).

In this study, the mean depression score was below the cut-off for depression in the OSAS group. Unlike previous studies, the depression status of our study group was not different from that of controls, although the A/V ratio was significantly higher. This could be because our study participants did not have tonsillar hypertrophy, whereas the published studies included children with both adenoid and tonsillar hypertrophy (20-23). The main limitation of our study was that we could not diagnose OSAS with polysomnography. Another limitation was that the severity of OSAS was not investigated. The difference between our results and results in the literature can be related to the severity of OSAS. Because we excluded patients with tonsillar hypertrophy, our patients might have a milder disease than those of the previous studies. Although there is not enough evidence in children, the oropharyngeal region is the most important area in the development of OSAS in adults (28). Andrew et al. (29) performed tonsillectomies on adult patients with OSAS and concluded that tonsillar hypertrophy is a major determinant of OSAS.

We found no relationship between depression and the A/N ratio. Although the A/N ratio was higher in the OSAS group, the pediatric depression scale scores did not differ between the two groups.

**CONCLUSION**

The A/N ratio is not an independent predictor of depression in children with OSAS. So; adenoid hypertrophy has not been identified as a factor directly related to depression in children.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Okmeydani Training and Research Hospital.

**Informed Consent:** Written informed consent was obtained from all participants who participated in this study.

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