ORIGINAL ARTICLE

pISSN 2093-9175 / eISSN 2233-8853
Sleep Med Res 2015;6(1):24-27

Do Adenoids Regrow after Adenoidectomy?

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Background and Objective To compare the correlation between nasopharyngeal airway 1 month and 1 year after adenoidectomy using skull lateral views and subjective symptoms.

Methods Thirty two children who underwent adenoidectomy and tonsillectomy from January 2003 through June 2006 were included. All were checked by skull lateral view as described above by retrospective review of medical records. Measurements included the nasopharyngeal air space from the choana to the lowest margin of C1 and the narrowest diameters of the nasopharyngeal air space and adenoid area. The adenoid-nasopharyngeal air space was determined as the A/N ratio. The parents completed a visual analog scale questionnaire at 1 month and 1 year post-operatively.

Results The adenoidal-nasopharyngeal ratio was significantly increased at post-operative 1 year compared to 1 month after adenoidectomy on skull lateral views ($p = 0.024$). There was no significance of the size change between the other parameters in the 1 month and 1 year post-operative skull lateral views. There was no significant correlation between all parameters in the 1 month and 1 year post-operative skull lateral views, and change of subjectively rated symptoms.

Conclusions There was no significant correlation between adenoid regrowth after adenoidectomy and the change of subjective symptoms.

Sleep Med Res 2015;6(1):24-27

Key Words Adenoidectomy, Adenoids, Cephalometry.

INTRODUCTION

Upper airway obstruction may cause ventilator distress, especially during sleep, which can lead to various complications.[1,2] Adenoid hypertrophy is a common condition and the main cause of upper airway obstruction during childhood. Nasopharyngeal obstruction due to adenoid hypertrophy may induce several symptoms that include mouth breathing, snoring, sleep apnea, and hyponasal voice, and can be the cause of facial asymmetry, recurrent otitis media with effusion, and sinusitis.[3,4] In the skull lateral view, nasopharyngeal airway stands in marked contrast to soft tissue shadow and skull base shadow. Therefore, the skull lateral view is widely used for diagnosis of adenoid hypertrophy.

The obstructive symptoms usually improve mostly after a successful adenoidectomy or adenotonsillectomy. The cure rate of obstructive sleep apnea after adenotonsillectomy is estimated to be 80%.[5] Symptoms of nasopharyngeal obstruction can recur after surgery with possible adenoid regrowth. The rate of regrowth varies from 1.3% to 26%.[6,7] The correlation of adenoid regrowth and recurred symptoms is controversial.

This study analyzed the change of parameters related to adenoid regrowth and the correlation between those changes and subjective symptoms.

METHODS

A retrospective review of the medical records of patients who received adenoidectomy and

Received: November 18, 2014
Revised: December 5, 2014
Accepted: December 8, 2014

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tonsillectomy by a single surgeon from January 2003 through June 2006 at Asan Medical Center was done. The center is a tertiary care facility.

Adenoidectomy was performed transorally with a debrider. Bleeding was controlled using suction coagulation. Tonsillectomy was done by monopolar coagulation in all cases.

Cephalometric measurement of the adenoids was performed in 1 month and 1 year after adenoidectomy in all patients. In the skull lateral view, the nasopharyngeal air space from the choana to the lowest margin of C1 was divided into three parts: high, middle, and low. Measurements included the adenoidal-nasopharyngeal air space (A/N ratio), narrowest diameters of nasopharyngeal air space, and adenoid area defined as the area from the skull base to the lowest margin of C1.

The parents were asked to fill out a Visual Analog Scale questionnaire listing the symptoms of nasal obstruction, snoring, rhinorrhea, postnasal drip, cough, apnea, mouth opening, inattention, and sore throat to assess the subjective change of the surgery 1 month and 1 year postoperatively.

To investigate the correlation between the changes of the nasopharyngeal air space and change of subjective symptoms, the patients were divided into two groups: regrowth group and non-growth group. The regrowth group was defined as patients in whom the adenoidal area was increased or the narrowest diameters of nasopharyngeal air space was decreased 1 year after adenoidectomy compared with 1 month after adenoidectomy in the skull lateral view.

All statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) software (version 18.0; SPSS Inc., Chicago, IL, USA). Paired t-test compared the change of cephalometric parameters at 1 month and 1 year after adenoidectomy. Correlation analysis was used to analyze the correlation between the change of parameters and the change of the subjective symptoms. The Wilcoxon test was performed to compare the change of the subjective symptoms in both groups. A p-value < 0.05 was considered statistically significant.

Table 1. Patient characteristics and changes of subjective symptoms

	Number of patients (%)
Sex	
Male	16/32 (50)
Female	16/32 (50)
Mean age, years (range)	7.4 (4–13)
Symptom worsening after 1 year	
Nasal obstruction	8/15 (53.3)
Snoring	5/15 (33.3)
Rhinorrhea	5/15 (33.3)
Post nasal drip	4/15 (26.7)
Cough	6/15 (40)
Apnea	1/15 (6.7)
Mouth breathing	4/15 (26.7)
Inattention	3/15 (20)
Sore throat	3/15 (20)

RESULTS

The 32 children comprised 16 males and 16 females, with a mean age of 7.4 years (range, 4–13 years). Fifteen patients completed the questionnaire at 1 month and 1 year post-operatively (Table 1).

The A/N ratio at 1 year was significantly increased compared to 1 month after adenoidectomy in the skull lateral view (p = 0.024). However, there was no significant size change between the upper third, middle third, and lower third anterior-posterior (A-P) diameter of the nasopharyngeal air space, narrowest diameters of nasopharyngeal air space, adenoid area 1 month post-operatively, and 1 year post-operatively (Table 2).

Pearson analysis revealed no significant correlation between the upper third, middle third, and lower third A-P diameter of the nasopharyngeal air space, A/N ratio, narrowest diameters of the nasopharyngeal air space, adenoid area in at 1 month and 1 year post-operatively, and the change of all subjective symptoms.

Twenty six patients (81.25%) were included in the regrowth group and six patients (18.75%) in the non-growth group. There was no significant correlation between the change of the nine

Table 2. Correlation between cephalometric parameters 1-month and 1-year postoperatively in the skull lateral view

	1-month	1-year	t	p
A/N ratio	0.62 (0.35–0.84)	0.65 (0.42–0.88)	2.371	0.024
High length	1.13 (0.51–1.72)	0.92 (0.57–2.21)	1.725	0.095
Mid length	1.09 (0.28–1.9)	0.95 (0.35–1.9)	1.440	0.160
Low length	0.94 (0.45–1.49)	0.93 (0.38–1.7)	1.139	0.264
Narrowest	0.83 (0.28–1.49)	0.83 (0.35–1.35)	1.934	0.062
Adenoid area	435.71 (235.17–634.39)	478.49 (300–689.14)	-1.946	0.061

All values are expressed as median (range).
A/N ratio: adenoidal-nasopharyngeal ratio.

subjectively rated symptoms at both 1 month and 1 year after adenoidectomy in either group concerning the adenoid area and the narrowest diameters of nasopharyngeal air space on skull lateral views.

DISCUSSION

The number of adenoidectomies and adenotonsillectomies performed has increased due to the growing awareness of obstructive sleep apnea in children.[8] This prompts concern about revision adenoidectomy due to the recurrent or remnant subjective symptoms.

In this study, we analyzed the cephalometric measurement using the skull lateral view. Nasopharyngeal endoscopy, fiberoptic nasophryngoscopy, computed tomographic scan, and magnetic resonance imaging are other diagnostic approaches.[9-13] They are not commonly used in children for diagnosis of adenoid hypertrophy because of their cost, radiation exposure, and challenges with patient cooperation.

The adenoids may regrow after adenoidectomy. Several factors have been proposed as being associated with adenoid regrowth. Younger children have a smaller nasopharynx, which may lead to more conservative adenoidectomy to avoid injuries of surrounding structures. That combined with the active immune system in this population can result in gradual hypertrophy of a minute amount of residual tissue.[14] Another factor is the method of adenoidectomy. Curettage adenoidectomy leaves residual adenoid tissue in about 60% of patients.[15] Gastroesophageal reflux disease (GERD) can cause respiratory mucosa irritation, edema, and nasal discharge. GERD has been correlated with adenoid regrowth. Inflammation of the tissue can be the reason of regrowth, but allergic rhinitis or middle ear effusion has not shown a significant positive correlation with adenoid regrowth.[14]

Despite these possible mechanisms, several previous studies described the rare regrowth of adenoids, with rare recurrence of obstructive symptoms.[16,17] The regrowth rate varies from 1.3% to 26%.[6,7] In the present study, only the A/N ratio showed statistically significant changes 1 year after surgery indicating a low chance of adenoid regrowth 1 year after surgery. This is consistent with other studies.

In some cases, symptomatic recurrence requires revision adenoidectomy. However, whether recurrence of symptoms is really due to adenoid regrowth is contentious. The correlation between adenoid regrowth and the recurrent obstructive symptoms in children has not been evaluated. Among the symptoms related to adenoid hypertrophy, the number of patients who complain about snoring and apnea tended to decrease, but was not statistically significant. In contrast to this finding, there was low rate of response concerning improvement of nasal obstruction, rhinorrhea, and mouth breathing. Concerning nasal obstruction, many other factors may contribute; these include deviated septum, turbinate hypertrophy, and allergic conditions. Mechanical obstruction due to adenoid hypertrophy can be a bacterial reservoir for rhinosinusitis.[18,19] Adenoid hypertrophy has been correlated with rhinosinusitis.[20,21] However, rhinorrhea probably has little association with mechanical obstruction due to adenoid regrowth as compared with allergic rhinitis or rhinosinusitis. Mouth breathing also showed relatively unsatisfactory changes 1 year after surgery. The reasons could be that habitual mouth opening did not correct fully postoperatively or the patient did not actually mouth breath preoperatively. To correct mouth breathing, effective behavior education and longer follow-up might be needed.

There are several limitations of this study. It was retrospective. A 1-year follow-up might be insufficient to observe the adenoid regrowth. Other medical diagnoses, such as allergy or asthma, were not considered in analyzing change of subjective symptoms. Lastly, the effect of combined tonsillectomy in some cases was not analyzed as a factor that could affect the change of symptoms. Despite these limitations, our study suggests a guideline to counsel parents about the low risk of adenoid regrowth after adenoidectomy and correlation of recurred or remnant symptoms postoperatively.

Conclusion

This retrospective study investigated the prevalence of adenoidal regrowth after adenoidectomy in aspects of the skull lateral view. A/N ratio was the only parameter displaying significant change 1 year after surgery. There was no significant correlation between the adenoid regrowth after adenoidectomy and the change of subjectively rated symptoms.

Conflicts of Interest

The authors have no financial conflicts of interest.

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