

Long term outcome of tonsillar regrowth after partial tonsillectomy in children with obstructive sleep apnea



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ABSTRACT

Objective: We investigated the long-term effects of partial tonsillectomy, and potential risk factors for tonsillar regrowth in children with obstructive sleep apnea hypopnea syndrome (OSAHS).

Methods: Children affected by OSAHS with obstructive hypertrophic tonsils underwent partial tonsillectomy or total tonsillectomy with radiofrequency coblation. Polysomnography was performed prior to and 5 years following surgery. Blood samples from all participants were taken prior to and 1 month following surgery to assess immune function. All participants were interviewed 5 years following surgery to ascertain effects of the surgery, rate of tonsillar regrowth, and potential risk factors.

Results: All parents reported alleviation of breathing obstruction. Postoperative hemorrhage did not occur in the partial tonsillectomy group compared to 3.76% in the total tonsillectomy group. Tonsillar regrowth occurred in 6.1% (5/82) in children following partial tonsillectomy. Palatine tonsil regrowth occurred a mean of 30.2 months following surgery, and 80% of children with tonsillar regrowth were younger than 5 years of age. All five patients had a recurrence of acute tonsillitis prior to enlargement of the tonsils. Four of the five had an upper respiratory tract allergy prior to regrowth of palatine tonsils. There were no differences in IgG, IgM, IgA, C3, or C4 levels following partial tonsillectomy or total tonsillectomy.

Conclusion: Partial tonsillectomy is sufficient to relieve obstruction while maintaining immunological function. This procedure has several post-operative advantages. Palatine tonsils infrequently regrow. Risk factors include young age, upper respiratory tract infections, history of allergy, and history of acute tonsillitis prior to regrowth.

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Introduction

Children with obstructive sleep apnea-hypopnea syndrome (OSAHS) have hypertrophic tonsils that cause obstruction, and tonsillectomy is frequently performed for these patients [1,2]. This procedure removes the obstruction by resecting all of the tonsillar lymphoid tissue. Partial tonsillectomy (tonsillotomy, intracapsular tonsillectomy, or subtotal tonsillectomy) was popular in the late 1980s because it caused less pain, had an equivalent or easier recovery, and allowed retention of tonsillar immune function [3–5]. During the last decade, numerous studies have compared partial and total tonsillectomy surgical techniques and perioperative morbidity and recovery. In the early postoperative period, partial tonsillectomy patients experienced less pain, had an equivalent or easier recovery, and had better food intake while being as effective as a total tonsillectomy for treating airway

obstruction [6,7]. Some studies have reported the recurrence of obstructive symptoms due to regrowth of the remaining tonsillar tissue and recurrent tonsillitis [8,9]. The cause of the relatively high rate of regrowth remains unknown.

In the present study, we compared the long-term results of these procedures, and explored the risk factors for tonsillar regrowth following partial tonsillectomy.

Materials and methods

A total of 303 children who suffered from OSAHS with obstructive hypertrophic tonsils and adenoids were surveyed at the department of Otolaryngology in Dalian Municipal Central Hospital, Dalian China, between January 2007 and March 2008. Partial or total tonsillectomy and adenoidectomy were performed following radiography of the nasopharynx. Patient history was obtained, and children with recurrent tonsillitis or suspected tonsillar benign tumor underwent total tonsillectomy. Indications for a partial tonsillectomy included enlarged palatine tonsils protruding at least 5 mm from the anterior pillars with no

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recurrent tonsillitis. Children were randomly recruited for the study.

All participants had a medical history compatible with OSAHS with sleep apnea, snoring, mouth breathing, or otitis media. Polysomnography was performed prior to and 5 years following surgery and was required for diagnosis. Patients were discharged 1–3 days after surgery. Radiofrequency coblation was performed on all patients by the same surgeon using a radiofrequency device (Coblator II, Arthrocare, Sunnyvale California USA). All patients were treated under general anesthesia. Evac-70 Coblator II probes with suction and saline irrigation were used for resection, and the console was set for 7 (coblation) and 3 (coagulation). Adenoidectomy was performed in individuals with adenoid hyperplasia, as evidenced in radiographs of the nasopharynx. Some lymphoid tissue was left in the tonsillar surgical bed during partial tonsillectomy without exposing the tonsillar capsule and the pharyngeal muscles. For total tonsillectomy, tonsils were completely dissected by coblation.

Samples were obtained to measure the following: serum levels of immunoglobulins A, G, and M and complements C3 and C4. Samples obtained 24 h prior to partial tonsillectomy or total tonsillectomy, and 1 month following surgery.

All participants were comprehensively interviewed regarding postoperative hemorrhage, parent satisfaction level, obstructive breathing symptoms, and the like. Data were collected regarding age at the time of surgery, the rate of tonsillar regrowth, time between resection and regrowth, recurring obstructive symptoms, changes in the frequency and severity of symptoms, the presence of upper respiratory tract infections, history of allergy, and history of acute tonsillitis prior to regrowth.

Statistical analysis

Data were analyzed using a *t*-test with SPSS for Windows (ver. 16.0). Results were considered significant at $p < 0.05$. All data are presented as means \pm standard error (SE).

Results

A total of 82 patients treated with partial tonsillectomy (38 females, 44 males) and 133 patients treated with total tonsillectomy (71 females, 62 males) were surveyed in an outpatient setting. Of these, 88 refused re-examination and were lost to follow-up. The follow-up period ranged from 60 to 72 months (mean 64.3 months). The average age of the study and control groups was 4.8 years (2.4–11) and 6.4 (4.5–16), respectively. Mean time for partial tonsil resection using a coblator was 13.12 ± 3.28 min, while the average operation time for total tonsillectomy was 21.56 ± 5.37 min. All of the parents reported relief of breathing obstruction 7–10 days following surgery in both groups (Table 1). No postoperative hemorrhage occurred in the partial tonsillectomy group while 3.76% (5/133) of patients experienced hemorrhage after total tonsillectomy. Two patients had a severe episode of postoperative bleeding 7–14 days following discharge and required general anesthesia for treatment. Other patients with postoperative hemorrhage during hospitalization required no intervention. All patients were discharged 24 h after surgery except those in the total tonsillectomy group that had severe pain or dehydration and required prolonged hospitalization. No other

Table 1
Results of AHI and LSAT before and 5 years after the partial tonsillectomy.

	Preoperative	Postoperative	<i>p</i>
AHI	25.47 \pm 10.34	1.76 \pm 0.54	$p < 0.05$
LSAT	88.74 \pm 10.12	98.25 \pm 1.72	$p < 0.05$

Table 2

Age, physical findings, history and symptoms of the children with tonsillar hyperplasia.

Patient No.	1	2	3	4	5
Age at the time of surgery (years)	3	4.5	3.5	4	5.5
Time between surgery and regrowth (months)	18	41	29	15	48
Obstructive sleep apnea, snoring, mouth breathing	+	–	–	+	–
History of acute tonsillitis prior to regrowth	+	+	+	+	+
Asymmetrical tonsillar growth	+	–	+	+	–
upper respiratory tract allergy	+	–	+	+	+

complications were reported in either group. Tonsillar regrowth occurred in 6.1% (5/82) of patients following partial tonsillectomy. Regrowth of palatine tonsils following adenoidectomy and partial tonsillectomy was treated by a total tonsillectomy in two individuals that developed obstructive sleep-disordered breathing. Three children with asymptomatic regrowth required no treatment. Regrowth of palatine tonsils occurred a mean of 30.2 months (range 15–48 months) after adenoidectomy and partial tonsillectomy. It was observed in four individuals < 5 years of age and in one child > 5 years of age at the time of surgery. Of the children who had no tonsillar regrowth, 87.1% were older than 5 years whereas 80% of the children who had tonsillar regrowth were younger than 5 years. More tonsillar regrowth occurred more frequently in younger children. All five patients with regrowth had recurrence of acute tonsillitis before enlargement of the tonsils. Four of five had an upper respiratory tract allergy before regrowth of palatine tonsils (Table 2). Most parents were “very satisfied” (89.1%) or “satisfied” (8.6%) with the results of surgery. The parents of children with tonsillar regrowth (2.3%) were “not satisfied.”

Serum concentrations of IgG, IgA, IgM, C3, and C4 were measured and there were no differences in levels prior to and 1 month after partial tonsillectomy (Fig. 1) and total tonsillectomy (Fig. 2).

Discussion

This study demonstrates that diminution of tonsillar tissue with partial tonsillectomy using radiofrequency coblation relieves airway obstruction in children with OSAHS that have no history of recurrent tonsillitis. This procedure maintains immunological function of the tonsils, and has the following advantages: shorter

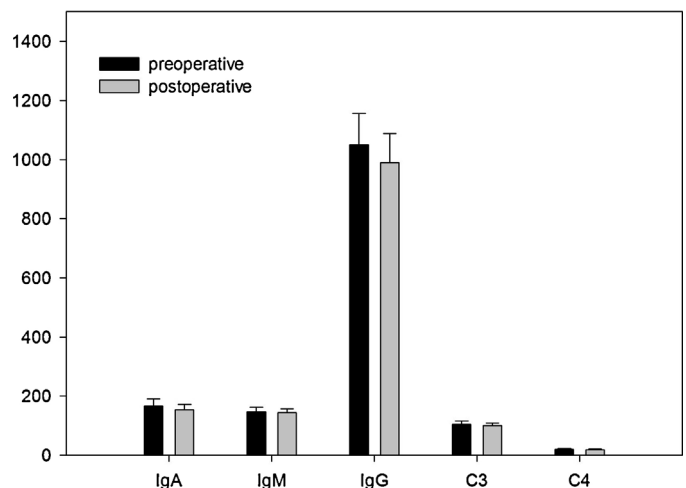


Fig. 1. Humoral immune parameters in children (mg/dl) before and 1 month following partial tonsillectomy.

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