

OUTCOMES OF TONGUE BASE REDUCTION AND LINGUAL TONSILLECTOMY FOR RESIDUAL PEDIATRIC OBSTRUCTIVE SLEEP APNEA AFTER ADENOTONSILLECTOMY



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ABSTRACT

Purpose: Multisite airway obstruction is one of the risk factors for residual obstructive sleep apnea (OSA) in children after tonsillectomy and adenoidectomy (TA). The aim of the present study is to evaluate outcomes of tongue base reduction and lingual tonsillectomy in children with persistent OSA after TA.

Study Design: Case series with chart review

Material and Methods: Medical charts of children who underwent tongue base reduction and lingual tonsillectomy for persistent OSA after TA were reviewed to obtain information on history and physical examination, past medical history, findings of drug induced sleep endoscopy (DISE), cine MRI, and polysomnogram, and surgical management. Pre- and post-operative polysomnograms were evaluated to assess resolution of OSA and determine improvement in obstructive apnea hypopnea index (AHI) and total AHI before and after surgery.

Results: Six children (3 male, 3 female, age range: 10 to 17yrs, mean: 5.8 ± 3.4) underwent tongue base reduction and lingual tonsillectomy. DISE and cine MRI revealed airway obstruction due to posterior displacement of base of tongue and hypertrophy of lingual tonsils. All patients reported subjective improvement in OSA symptoms. All patients had improvement in obstructive AHI and total AHI. Post-operative obstructive AHI (mean=3.5 events/hr, range: 1-5) and total AHI (mean=3.9 events/hr, range:1.8-6.2) after surgery were less compared to obstructive AHI (mean=29.7 events/hr, range:5.7-73.9) and total AHI (mean=31.6, range:6.6-74.7) before surgery.

Conclusion: Central apneic events occur in children with obstructive sleep apnea. After surgical treatment number of central apneic events and central sleep apnea index improves.

BACKGROUND

Hypertrophy of lingual tonsils has been implicated in the pathogenesis of residual OSA in healthy children, children with Down syndrome, and obese children. Macroglossia and glossoptosis are associated with OSA in children with Down syndrome. Polysomnogram parameters improved in children with OSA undergoing lingual tonsillectomy or partial glossectomy as a stand-alone procedure. Concurrent lingual tonsillectomy and midline posterior glossectomy alleviated OSA in adults. Outcomes of combined lingual tonsillectomy and partial glossectomy for treatment of OSA has not been studied in children with residual OSA after TA.

AIM

The aim of the present study is to evaluate outcomes of tongue base reduction and lingual tonsillectomy in children with residual OSA after TA.

METHODS

•The charts of patients undergone tongue base reduction and lingual tonsillectomy for treatment of residual OSA after TA between October 2010 and July 2015 were reviewed retrospectively..

•Patients under 18 years of age were included in the study if residual OSA was documented by polysomnogram.

•Patients were not excluded due to craniofacial anomalies, developmental delay, neuromuscular disorder, or other chronic condition. An electronic medical record system documenting surgeries performed by the author was used to identify the patients who had undergone tongue base reduction and lingual tonsillectomy for treatment of residual OSA after TA.

•Drug induced sleep endoscopy (DISE) and/or cine MRI were used to evaluate the location of upper airway obstruction.

•Lingual tonsillectomy was performed using plasma-mediated bipolar radiofrequency (coblation) under endoscopic guidance.

•Tongue base reduction was performed using submucosal minimally invasive lingual excision technique.

•Postoperatively, an all-night, attended polysomnography (PSG) was performed in the sleep laboratory using a computerized polygraph; sleep measurements were based on the criteria of the American Academy of Sleep Medicine.

•The obstructive apnea-hypopnea index (OAHl) was calculated as the sum of obstructive apneas and hypopneas per hour.

•The severity of obstructive sleep apnea was categorized according to OAHl: mild, OAHl between 1 and 5; moderate, OAHl between 5 and 10; or severe, OAHl greater than 10.

•Data pertaining to age, gender, past medical history, co-morbid conditions, body mass index (BMI), and findings of PSG were obtained from the charts. Centers for Disease Control and Prevention growth standards were used to determine BMI z-score. Children with a BMI z-score greater than 1.65 (95th percentile) were classified as obese.

•Preoperative and postoperative PSG values (number of obstructive and central apneas, number of obstructive hypopneas, and respiratory distress index) were compared and analyzed statistically (two-tailed paired t test). A P value of 0.05 was considered significant.

RESULTS

•Subjects:

- Six children (3 male, 3 female)
- Age range: 10 to 17yrs, mean: 5.8 ± 3.4
- Severity of OSA: moderate in 1 and severe in 5

•All patients had direct laryngoscopy and bronchoscopy which revealed hypertrophy of lingual tonsils (Figure 1).

•Diagnosis of posterior displacement of tongue and lingual tonsil hypertrophy

- DISE in 6
- Cine MRI and DISE in 1 (Figure 2)

Figure 1

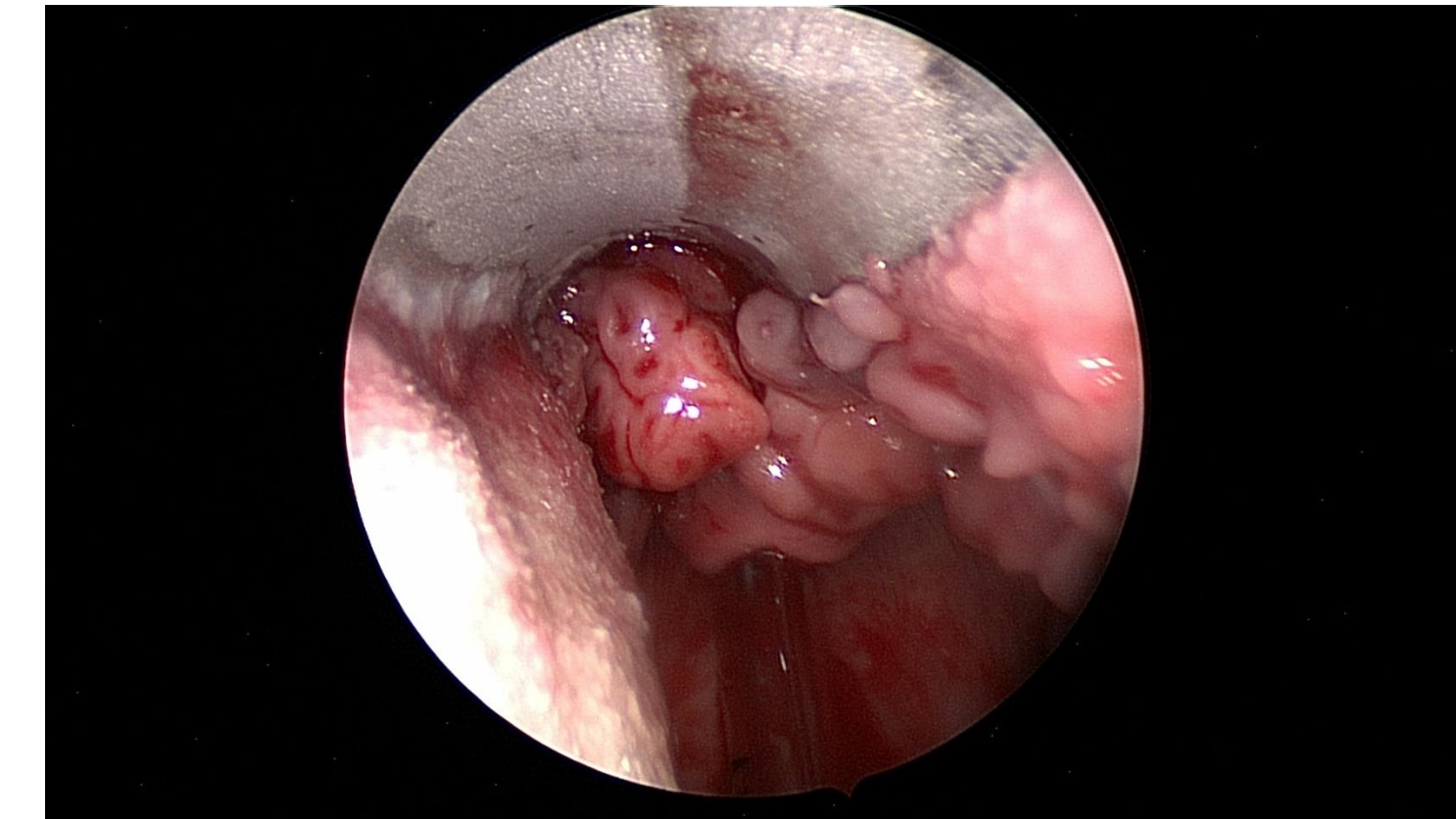


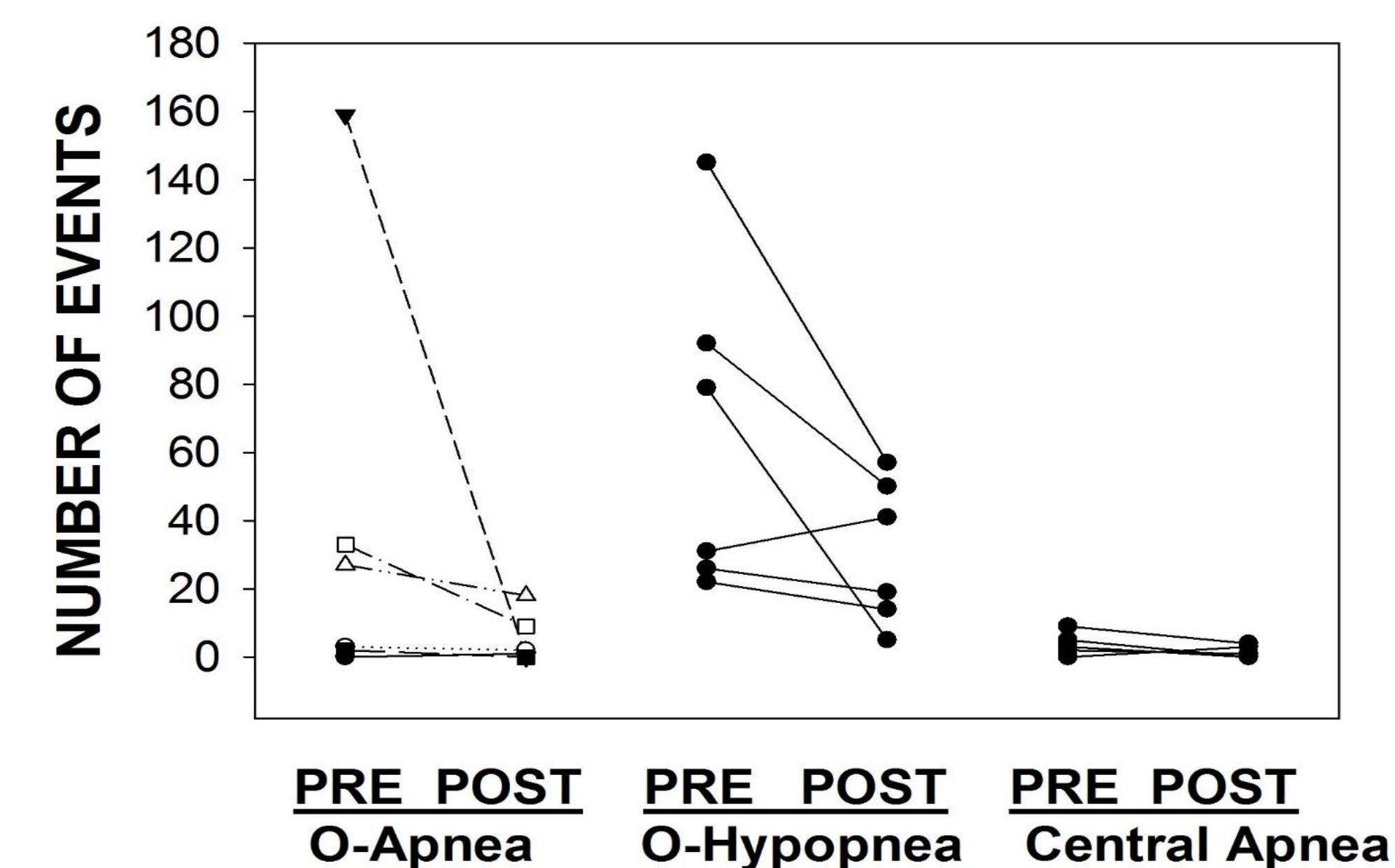
Figure 2



•No complications occurred. All patients reported subjective improvement in OSA symptoms after surgery.

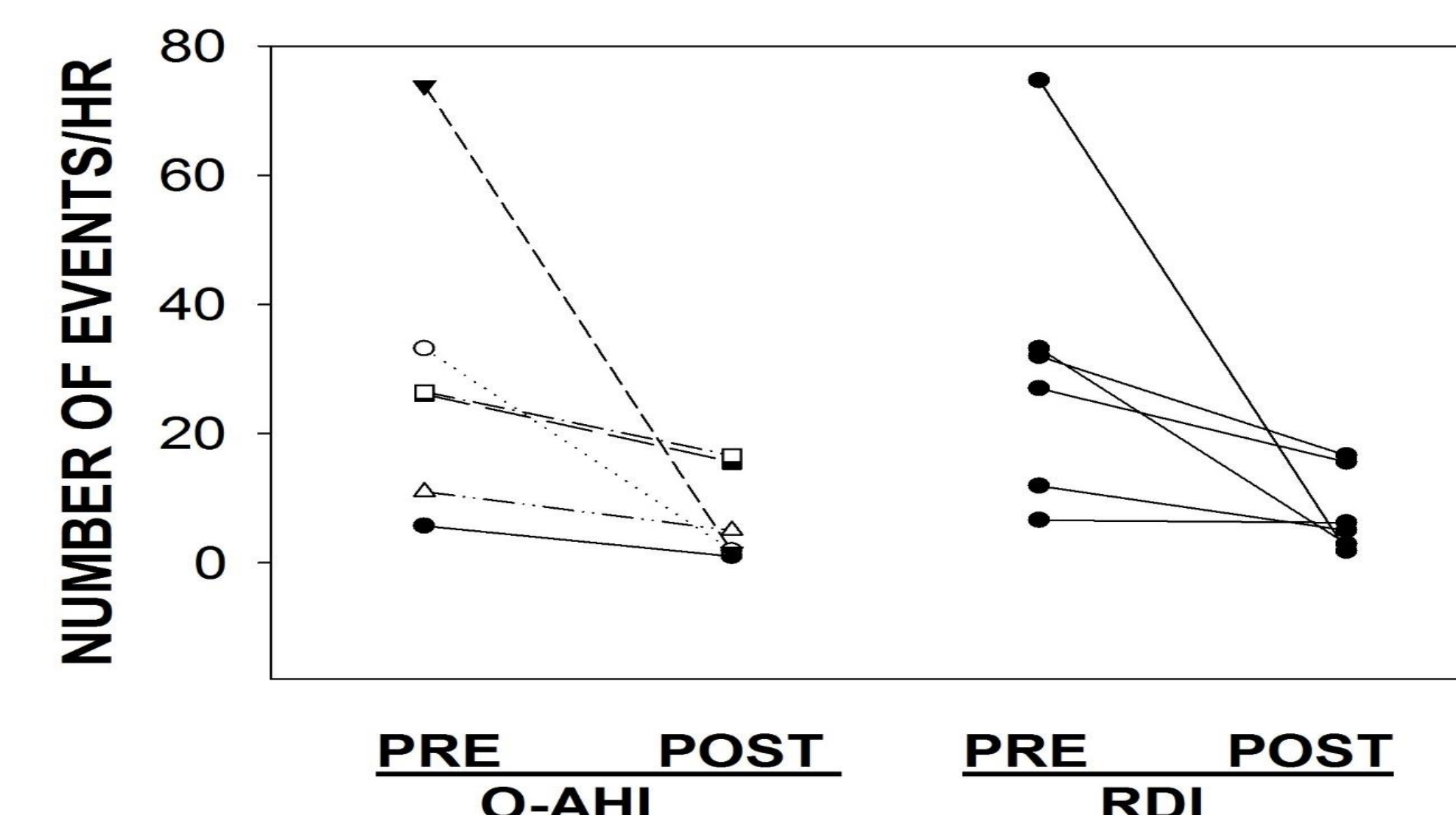
• All children had improvement in the number of obstructive apnea (O-Apnea), obstructive hypopnea (O-Hypopnea), and central apnea events. (Figure 3).

Figure 3



•Obstructive apnea hypopnea index (median=26) and respiratory disturbance index (median=29.6) after base of tongue reduction and lingual tonsillectomy was less than obstructive apnea hypopnea index (median=3) and respiratory disturbance index before surgery (median=5.6) ($p < 0.05$) (Figure 4)

Figure 4



CONCLUSIONS

•Tongue base reduction and lingual tonsillectomy resulted in subjective and objective improvement of OSA in children with airway obstruction due to posterior displacement of tongue base and hypertrophy of lingual tonsils.

•Concurrent lingual tonsillectomy and partial glossectomy can be included in the armamentarium for surgery in children with residual OSA after tonsillectomy and adenoidectomy.