

## COMMENTARY

## Adenotonsillectomy for pediatric obstructive sleep apnea: how to predict those at risk for postoperative complications

Commentary on Katz SL, Monsour A, Barrowman N, et al. Predictors of postoperative respiratory complications in children undergoing adenotonsillectomy. *J Clin Sleep Med*. 2020;16(1):41–48.

Heidi V. Connolly, MD<sup>1</sup>; Laura T. Tomaselli, MD<sup>1</sup>; Margo K. McKenna Benoit, MD<sup>2</sup>

<sup>1</sup>Department of Pediatrics, Division of Pediatric Sleep Medicine, University of Rochester School of Medicine and Dentistry, Rochester, New York; <sup>2</sup>Department of Otolaryngology, University of Rochester School of Medicine and Dentistry, Rochester, New York

Untreated pediatric obstructive sleep apnea leads to both adverse cardiopulmonary and neurocognitive outcomes. Adenotonsillectomy is currently recommended by both the American Academy of Pediatrics<sup>1</sup> as well as the American Academy of Otolaryngology Head and Neck Surgery<sup>2</sup> as effective treatment for pediatric obstructive sleep apnea with a success rate of approximately 80%.<sup>3,4</sup> The overall frequency of adenotonsillectomy has decreased in recent years as the indication for surgical intervention due to infection has dropped in both the United States<sup>5</sup> as well as England<sup>6</sup> whereas adenotonsillectomy performed as surgical treatment for sleep-disordered breathing has increased. Adenotonsillectomy comes with attendant risks of general anesthesia in addition to complications including postoperative respiratory compromise as well as postoperative bleeding. The potential for irreversible hypoxic-ischemic encephalopathy and even death from respiratory compromise in an unmonitored setting highlights the need for clear guidelines for inpatient admission as well as clear recommendations for intensity of monitoring during hospitalization. In the era of preferential outpatient procedures, it is imperative to identify those children at risk for perioperative respiratory compromise to ensure that they are in a monitored setting until this risk is minimized.

In the current issue of the *Journal of Clinical Sleep Medicine*, Katz et al<sup>7</sup> report on analysis of respiratory complications occurring anytime during hospitalization immediately following adenotonsillectomy in 374 children who were studied with preoperative polysomnography and underwent adenotonsillectomy from January 2010 through December 2016 at a tertiary children's hospital. This study is an excellent example of the utility of a retrospective review to assess risk in specific clinical scenarios. Their patient population consisted mostly of preschool and school aged children (average age 6.1 years). More than 75% of the children had medical comorbidities and nearly 50% of the population had two or more comorbidities. Obesity was highly prevalent as approximately 35% of the study population had a body mass index (BMI) above the 95th percentile for age and sex. The apnea-hypopnea index (AHI) reported on preoperative polysomnography showed an approximately even distribution

of mild (AHI 1–5 events/h), moderate (AHI 5–10 events/h) and severe (AHI > 10 events/h) obstructive sleep apnea. Nearly 20% of the children had at least one postoperative respiratory complication consisting mostly of need for supplemental oxygen for desaturation but also including intubation, bag valve mask ventilatory support or physical maneuvers to support the airway (jaw thrust, oropharyngeal airway, etc.). Their findings demonstrate that patients with comorbid craniofacial, genetic, cardiac, airway anomaly or neurologic conditions are at higher risk for airway complications. Age less than 3 years was the strongest predictor of perioperative respiratory compromise, but children aged 3–6 years had a nearly 2-fold increased risk compared to school-age children. Both severity of sleep apnea and depth of oxyhemoglobin desaturation were independent predictors of postoperative respiratory compromise.

Despite the strengths of this study in assessing perioperative risk for respiratory compromise in a referral population with highly prevalent medical comorbidities, this study does not provide significant insight into the management of otherwise healthy children in a community setting who are undergoing adenotonsillectomy. This is important because a large number of adenotonsillectomies are performed outside of a tertiary referral center and many of these children may not have undergone preoperative polysomnography to stratify risk. The utility of preoperative polysomnography in the evaluation of all children undergoing adenotonsillectomy remains controversial, with the American Academy of Otolaryngology Head and Neck Surgery recommending polysomnographic evaluation only for children less than 2 years of age, those with obesity, specific medical comorbidities or in situations where there are not comorbidities but the need for tonsillectomy is uncertain or there is a discordance between the physical examination and the reported severity of sleep apnea.<sup>2</sup> In contrast, the American Academy of Sleep Medicine guidelines recommend preoperative polysomnographic evaluation for all children undergoing adenotonsillectomy for a sleep-related breathing disorder.<sup>8</sup>

The well-conducted, retrospective chart review study by Katz et al<sup>7</sup> adds important information to the published literature about risk stratification for children in a tertiary referral

population undergoing adenotonsillectomy. Their findings indicate that younger children remain at higher risk as well as those children with complex comorbid medical disease. Their results indicate that children with severe sleep apnea or significant oxyhemoglobin desaturation are likewise at higher risk of postoperative respiratory compromise—emphasizing the need for preoperative polysomnography—particularly in a tertiary setting where many patients have medical comorbidities. This study does not address the utility of polysomnography in community based populations of otherwise healthy children. It is imperative to accurately ascertain risk so perioperative planning can ensure the safety of children at higher risk following adenotonsillectomy; however, there remains a paucity of studies assessing the cost-effectiveness as well as the positive and negative predictive value of polysomnographic findings. This study highlights the need for community based studies of otherwise healthy children undergoing adenotonsillectomy to ensure that children at risk receive appropriate monitoring in an inpatient setting whereas those at lesser risk are not unnecessarily hospitalized postoperatively.

## CITATION

Connolly HV, Tomaselli LT, McKenna Benoit MK. Adenotonsillectomy for pediatric obstructive sleep apnea: how to predict those at risk for postoperative complications. *J Clin Sleep Med*. 2020;16(1):3–4.

## REFERENCES

1. Marcus CL, Brooks LJ, Davidson Ward S, et al. Diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatr*. 2012;130(3):e714–e755.

2. Mitchell RB, Archer SM, Ishman SL, et al. Clinical practice guideline: tonsillectomy in children (update). *Otolaryngol Head Neck Surg*. 2019;160(1\_suppl):S1–S42.
3. Brietzke SE, Gallagher D. The effectiveness of tonsillectomy and adenoidectomy in the treatment of pediatric obstructive sleep apnea/hypopnea syndrome: a meta-analysis. *Otolaryngol Head Neck Surg*. 2006;134(6):979–984.
4. Marcus CL, Moore RH, Rosen CL, et al; for the Childhood Adenotonsillectomy Trial. A randomized trial of adenotonsillectomy for childhood sleep apnea. *N Engl J Med*. 2013;368(25):2366–2376.
5. Hall MJ, Schwartzman A, Zhang J, Liu X. Ambulatory surgery data from hospitals and ambulatory surgery centers: United States, 2010. *Natl Health Stat Rep*. 2017;(102):1–15.
6. Banigo A, Moinie A, Bleach N, Chand M, Chalker V, Lamagni T. Have reducing tonsillectomy rates in England led to increasing incidence of invasive Group A Streptococcus infections in children? *Clin Otolaryngol*. 2018;43(3):912–919.
7. Katz SL, Monsour A, Barrowman N, et al. Predictors of postoperative respiratory complications in children undergoing adenotonsillectomy. *J Clin Sleep Med*. 2020;16(1):41–48.
8. Aurora RN, Zak RS, Karipott A, et al. Practice parameters for the respiratory indications for polysomnography in children. *Sleep*. 2011;34(3):379–388.

## SUBMISSION & CORRESPONDENCE INFORMATION

**Submitted for publication November 14, 2019**

**Submitted in final revised form November 14, 2019**

**Accepted for publication November 14, 2019**

Address correspondence to: Heidi V. Connolly, MD, University of Rochester Pediatric Sleep Medicine Services Center, 2180 S. Clinton Ave Suite C, Rochester NY 14618; Tel: (585) 340-8949; Fax: (585) 785-9901; Email: Heidi\_Connolly@urmc.rochester.edu

## DISCLOSURE STATEMENT

All of the authors above have seen and approved of this commentary. The authors report no conflicts of interest.