



ELSEVIER

Sleep Medicine 4 (2003) 273–274

**SLEEP
MEDICINE**

www.elsevier.com/locate/sleep

Editorial

Identification and evaluation of obstructive sleep apnea prior to adenotonsillectomy in children: is there a problem?

In this issue of *Sleep Medicine* Weatherly et al. [1] have described in their article, Identification and Evaluation of Obstructive Sleep Apnea Prior to Adenotonsillectomy in Children: A survey of Practice Patterns, how otolaryngologists approach sleep disordered breathing (SDB) in children. Based on this study, SDB has overtaken recurrent throat infections as the major surgical indication for adenotonsillectomy (AT) in children. They also note that less than 10% of children suspected of having SDB had any objective testing performed prior to surgery and that less than 5% had laboratory based polysomnography. This is in direct conflict with the recommendations of both the American Academy of Pediatrics [2] and the American Thoracic Society [3], both of whom recommend objective confirmation of SDB prior to consideration of any intervention for SDB. A brief review of SDB in children, its clinical consequences and treatments may be helpful to understanding the differences in the recommendations of pediatricians and pulmonologists who are involved in the diagnosis of SDB and the practice patterns of surgeons, to whom these patients are usually referred for treatment.

In both children and adults, SDB is a state dependent, partial or complete obstruction of the pharyngeal airway that occurs during sleep. Soft tissue anatomy, craniofacial structure and neuromuscular control of the pharynx are all factors that together determine the site and degree of pharyngeal collapse during sleep. Though, in any individual child, the relative contribution of each cannot be predicted, adenotonsillar hypertrophy is the primary factor leading to SDB in most children, and AT is curative in 80% of children. The clinical symptoms of upper airway obstruction occur along a spectrum ranging from snoring to obstructive apnea. These symptoms directly relate to the pathophysiology of SDB. With sleep onset the pharyngeal dilators of the upper airway relax, resulting in a smaller pharyngeal airway. This in turn changes the airflow through the upper airway from laminar (quiet) to turbulent (audible). As the upper airway resistance increases, the upper airway obstruction worsens, until a complete obstructive apnea occurs. Most children with SDB fall within this spectrum of disease, not at the ends; meaning they often do not have complete obstructive apneas. In addition to the cardio-

spiratory symptoms of sleep-disordered breathing, a range of neuropsychiatric symptoms in both children and adults, including excessive daytime sleepiness (EDS), attention deficit disorder (ADD), impairments in learning, irritability and behavioral problems have been described [4]. This has been an active area of research in the pediatrics community. Chervin et al. [5] suggested that 15–39% of hyperactive behavior in children may be attributable to SDB, and could be effectively treated by the identification and treatment of the underlying SDB. Otolaryngologists are clearly aware of this. Weatherly et al. [1] noted that, among the otolaryngologists surveyed, poor learning, poor attention, memory and learning problems were all considered to be important relative indications for surgery 3–14% of the time.

The necessity of an objective preoperative assessment of children with SDB hinges on two issues:

1. Can the diagnosis of SDB be made based solely on the pre-operative history and physical examination?
2. Can the children who are at high risk for the development of postoperative respiratory complications be identified, based solely on a pre-operative history and physical examination?

The accuracy of the history and physical examination to correctly identify SDB depends upon where one draws the line defining clinically significant disease along the spectrum of upper airway obstruction. If one requires the presence of obstructive apneas and/or hypopneas for the diagnosis of SDB then the evidence is clear that polysomnography is necessary. Numerous studies in the ENT [6], pediatric [2], and pulmonary [3] literature document the failure of history and physical examination alone to correctly identify which snoring children have obstructive apneas. However, a history of habitual snoring alone may be adequate for the diagnosis if one accepts a lower level of severity along the spectrum of upper airway obstruction to define what is clinically significant SDB. Unfortunately, the literature is not clear as to where the line demarcating the lower limits of SDB should be drawn.

The second, less discussed but equally important issue to consider is whether history and physical examination

alone can identify those children who are at risk for the development of postoperative respiratory complications. This is a relevant clinical question because most ATs are performed as same-day surgery. Several studies looking at postoperative respiratory complications in children after AT for SDB have identified a high-risk profile which includes the following: age < 3 years, failure to thrive (weight < 10 percentile for age), obesity, cardiac complications of SDB (right ventricular hypertrophy), craniofacial anomalies, neuromuscular disease, severe OSA, and sleep O₂ saturations < 80% [2,3,7,8]. All of these features except the last two (severe OSA and O₂ saturations < 80%) can be reliably identified by a history and physical examination alone. However, some form of objective testing is necessary to identify those children with severe OSA and those children with sleep-related desaturations. At a minimum, overnight oximetry needs to be performed to screen for these problems.

It is clear from the present article by Weatherly et al. [1] that the majority of ENT surgeons do not believe objective testing to be a necessary part of children's evaluation prior to AT. This may be true for the diagnosis of SDB if one accepts habitual snoring as a sign of significant SDB. However, the history and physical examination alone simply cannot identify all children who are at risk for the development of postoperative respiratory complications after AT. If the AT is performed as a same-day surgery, which is the rule in the United States, this becomes a problem; the most severe postoperative respiratory complications are likely to occur during REM sleep, which occurs long after the child has left the hospital. The solution may come from the anesthesiologists, who are responsible for deciding when the children can be safely discharged from the hospital. A recent article [8] in the anesthesia literature highlights this problem and recommends preoperative overnight oximetry as a screen to help decide which

children can be safely discharged from the hospital on the day of surgery.

References

- [1] Weatherly RA, Mai EF, Ruzicka DL et al. Identification and evaluation of obstructive sleep apnea prior to adenotonsillectomy in children: A survey of practice patterns. *Sleep Med* 2003; S1389-9457(03)00100-X.
- [2] Section on pediatric pulmonology, subcommittee on obstructive sleep apnea syndrome. Clinical practice guideline: diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics* 2002; 109:704–712
- [3] American Thoracic Society, Standards and indications for cardiopulmonary sleep studies in children. *Am J Respir Crit Care Med* 1996;153: 866–79.
- [4] O'Brien LM, Holbrook CR, et al. Sleep and neurobehavioral characteristics of 5- to 7-year old children with parentally reported symptoms of attention-deficit/hyperactivity disorder. *Pediatrics* 2003; 111:554–63.
- [5] Chervin RD, Archbold KH, Dillon JE, et al. Inattention, hyperactivity, and symptoms of sleep-disordered breathing. *Pediatrics* 2002;109: 449–56.
- [6] Wang RC, Elkins TP, Keech D, et al. Accuracy of clinical evaluation in pediatric obstructive sleep apnea. *Otolaryngol Head Neck Surg* 1998; 118:69–73.
- [7] Rosen GM, Muckle RP, Mahowald MW, et al. Postoperative respiratory compromise in children with obstructive sleep apnea syndrome: Can it be anticipated? *Pediatrics* 1994;93:784–8.
- [8] Wilson K, Lalcheeram L, Morielli A, et al. Can assessment for obstructive sleep apnea help predict postadenotonsillectomy respiratory complications? *Anesthesiology* 2002;96:313–22.

G. Rosen
*Hennepin County Medical Center,
 Minnesota Regional Sleep Disorders Center,
 701 Park Ave. South,
 Minneapolis, MN 55415, USA*

Received 21 April 2003; Accepted 21 April 2003