AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY

FACT SHEET

Clinical Practice Guideline: Polysomnography for Sleep-Disordered Breathing Prior to Tonsillectomy in Children

Executive Summary

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INTRODUCTION

Polysomnography (PSG), commonly referred to as a "sleep study," is presently the gold standard for diagnosing and quantifying sleep-disordered breathing (SDB) in children.[1,2] SDB affects approximately 12% of children with manifestations ranging from simple snoring to potentially serious conditions including sleep apnea.[3] SDB is also the most common indication for tonsillectomy with or without adenoidectomy in the United States.[4,5] Since over 530,000 tonsillectomies are performed annually on children under age 15 years, primarily for SDB, clear and actionable guidance on optimal use of PSG is strongly needed.[6]

This guideline is intended to assist otolaryngologists – head and neck surgeons in making evidence-based decisions regarding PSG in children aged 2 to 18 years with a clinical diagnosis of SDB who are candidates for tonsillectomy and may benefit from PSG prior to surgery. The following definitions are used:

- *Polysomnography* (PSG) is the electrographic recording of simultaneous physiologic variables during sleep and is currently considered the gold standard for objectively assessing sleep disorders. Physiologic parameters typically measured include gas exchange, respiratory effort, airflow, snoring, sleep stage, body position, limb movement, and heart rhythm. PSG may be performed in a sleep laboratory with continuous attendance as defined below.[7]
- *Sleep disordered breathing* (SDB) is characterized by an abnormal respiratory pattern during sleep, and includes snoring, mouth breathing, and pauses in breathing. SDB encompasses a spectrum of disorders that increase in severity from snoring to obstructive sleep apnea. For example, *obstructive sleep apnea* (OSA) is diagnosed when SDB is accompanied by an abnormal PSG with obstructive events.

- *Tonsillectomy* is defined as a surgical procedure with or without adenoidectomy that completely removes the tonsil including its capsule by dissecting the peritonsillar space between the tonsil capsule and the muscular wall. For clarity, the term "tonsillectomy" is used instead of "adenotonsillectomy" in this guideline, recognizing that often, but not always, the adenoid is removed concurrently with the tonsils. A discussion on the merits of intracapsular versus complete tonsillectomy is beyond the scope of this guideline.

Although PSG can help guide medical decision making, assess surgical candidacy and optimize perioperative monitoring after tonsillectomy, the test is time-consuming and often not readily available.[5] Additional obstacles to testing include lack of consensus on what constitutes an abnormal study and access to a qualified sleep center and specialist to obtain and to interpret the results. Consequently, less than 10% of children undergo PSG prior to tonsillectomy, even though a clinical diagnosis of SDB in children is known to be a poor predictor of disease severity.[5,8] The decision to proceed with PSG is, therefore, often at the discretion of the physician or caregiver.[5]

There is increasing interest in portable monitoring (PM) devices, instead of formal PSG to assess children with SDB. For the purposes of this guideline, the term PM is used to refer to home monitoring performed without a technologist present. PM devices will typically measure at least four physiologic parameters, including two respiratory variables (i.e. respiratory effort and airflow), a cardiac variable (i.e. heart rate or electrocardiogram), and arterial oxygen saturation via pulse oximetry. In contrast, PSG includes 7 or more channels of monitoring and evaluates sleep stages.

Guideline Scope and Purpose

The primary purpose of this guideline is to provide evidence-based recommendations for PSG prior to tonsillectomy in children aged 2 to 18 years with SDB as the primary indication for surgery. The target audience is otolaryngologists in any practice setting where a child would be evaluated. Although the guideline was developed with input from other specialties, the intent is to provide guidance specifically for otolaryngologists – head and neck surgeons.

Additional goals are to highlight the evidence for obtaining PSG in special populations or in children who have modifiable risk factors. A guideline is necessary given the evidence of practice variation between practitioners and in the literature. The guideline does not apply to children under age 2 years or over 18 years of age, to those who have already undergone tonsillectomy, to children having adenoidectomy alone, or to children who are being considered for continuous positive airway pressure (CPAP) or other surgical therapy for SDB.

The guideline is intended to focus on a limited number of quality improvement opportunities, deemed most important by the working group, and is not intended to be a comprehensive, general guide for prescribing PSG for tonsillectomy candidates and patients with SDB. In this context, the purpose is to define actions that could be taken by otolaryngologists to deliver quality care. Conversely, statements in this guideline are not intended to limit or restrict care provided by clinicians based on assessment of individual patients.

STATEMENT 1. INDICATIONS FOR PSG: Before performing tonsillectomy, the clinician should refer children with SDB for PSG if they exhibit any of the following: obesity, Down syndrome, craniofacial abnormalities, neuromuscular disorders, sickle cell disease, or mucopolysaccharidoses. *Recommendation based on observational studies with a preponderance of benefit over harm.*

Evidence Profile for Statement 1: PSG for SDB with Comorbidity

- Aggregate evidence quality: Grade C, observational studies; one systematic review of observational studies on obesity
- Benefit: PSG confirms indications and appropriateness of surgery, helps plan perioperative management, provides a baseline for postoperative PSG, and defines severity of sleep disturbance
- Harm: None
- Cost: procedural cost; indirect cost of missed work
- Benefits-harm assessment: Preponderance of benefit over harm

- Value judgments: Knowledge gained through PSG can assist in diagnosing those children with significant SDB; belief that PSG can improve surgical outcomes through improved perioperative planning
- Role of patient preferences: Limited
- Intentional Vagueness: The panel decided to use the broad categories of neuromuscular disorders and craniofacial anomalies, rather than a comprehensive list of diseases and syndromes, to emphasize the need for individualized assessment.
- Exclusions: None
- Policy level: Recommendation

STATEMENT 2. ADVOCATING FOR PSG: The clinician should advocate for PSG prior to tonsillectomy for SDB in children without any of the comorbidities listed in statement #1 for whom the need for surgery is uncertain or when there is discordance between tonsillar size on physical examination and the reported severity of SDB. *Recommendation based on observational and case-control studies with a preponderance of benefit over harm.*

Evidence Profile for Statement 2: Advocating for PSG

- Aggregate evidence quality: Grade C, observational and case-control studies
- Benefit: Selection of appropriate candidates for tonsillectomy
- Harm: None
- Cost: Time spent counseling the patient or family; financial implications to the family and insurance industry; time commitment for the study and follow-up
- Benefit-Harm assessment: Preponderance of benefit over harm
- Value judgments: Based upon expert consensus there are circumstances in which PSG will improve diagnostic certainty and help inform surgical decisions
- Intentional Vagueness: The panel decided to "advocate for" PSG rather than to "recommend" PSG in these circumstances to avoid setting a legal standard for care and to recognize the role for individualized decisions based on needs of the child and caregiver(s). Further, the word "uncertain"

is used in the statement to encompass a variety of circumstances regarding the need for tonsillectomy that include, but are not limited to, disagreement among clinicians or caregivers, questions about the severity of SDB or validity of the SDB diagnosis, or any other situation where the additional information provided by PSG would facilitate shared decisions.

- Role of patient preferences: Limited role in advocating; significant role in deciding whether or not to proceed with PSG
- Exclusions: None

STATEMENT 3. COMMUNICATION WITH ANESTHESIOLOGIST: Clinicians should communicate PSG results to the anesthesiologist prior to the induction of anesthesia for tonsillectomy in a child with SDB. *Recommendation based on observational studies with a preponderance of benefit over harm.*

Evidence profile for Statement 3: Communication with anesthesiologist

- Aggregate evidence quality: Grade C observational studies and Grade D panel consensus
- Benefit: Improve communication, provide information to the anesthesiologist that may alter perioperative management, reduce perioperative morbidity
- Harm: None
- Cost: None
- Benefit-Harm assessment: Preponderance of benefit over harm
- Value judgments: Promoting a team approach to patient care will result in improved patient outcomes
- Intentional vagueness: None
- Role of patient preferences: None
- Exclusions: None

STATEMENT 4. INPATIENT ADMISSION FOR CHILDREN WITH OSA DOCUMENTED IN RESULTS OF PSG: Clinicians should admit children with OSA documented in results of PSG for

inpatient, overnight monitoring after tonsillectomy, if they are under age 3 years or have severe OSA (apnea-hypopnea index of 10 or more obstructive events/hour, oxygen saturation nadir less than 80%, or both). *Recommendation based on observational studies with a preponderance of benefit over harm.*

Evidence Profile for Statement 4: Impact of PSG on Postoperative Monitoring

- Aggregate evidence quality: Grade C, observational studies on age; diagnostic studies, guidelines, and panel consensus on what constitutes a severely abnormal PSG
- Benefit: PSG can help determine the appropriate setting for recovery after tonsillectomy that would allow prompt detection and management of respiratory complications among high-risk children
- Harm: Unnecessary admission of children who do not have respiratory complications; occupying a hospital bed that might be better utilized; risk of iatrogenic injury (infection, parenteral narcotics causing respiratory depression, hyponatremia from hypotonic IV Fluids, etc.); reduced "family-centered care" during recovery process
- Cost: Hospital admission; cost of monitoring
- Benefit-Harm assessment: Preponderance of benefit over harm
- Value judgments: Despite the lack of consistent data on what constitutes severe OSA on PSG, the panel decided some criteria, based on consensus, should be provided to guide clinical decisions; perception by the panel that inpatient admission after tonsillectomy is underutilized for children with abnormal PSG and that obstacles exist in the healthcare system for pre-certifying inpatient admission, even when appropriate
- Intentional vagueness: None
- Role of patient preferences: Limited
- Exclusions: None

STATEMENT 5. UNATTENDED PSG WITH PORTABLE MONITORING DEVICE: In children for whom PSG is indicated to assess SDB prior to tonsillectomy, clinicians should obtain

laboratory based PSG, when available. *Recommendation based on diagnostic studies with limitations and a preponderance of benefit over harm.*

Evidence Profile for Statement 5: Unattended PSG with PM Device

- Aggregate evidence quality: Grade C, one small diagnostic study in children and extrapolation from diagnostic studies and guidelines for adults
- Benefit: Avoid inaccurate results or misdiagnosis of OSA because of limitations in the precision and accuracy of currently used PM devices
- Harm: Potential for delays in testing based on access to PSG and availability of child-friendly test facilities
- Cost: Procedure-related direct cost
- Benefit-Harm assessment: Preponderance of benefit over harm
- Value judgments: The panel chose to emphasize accuracy of test results over convenience of testing. The term "when available" was used to acknowledge that although home studies have limitations there may be circumstances when the caregivers express a strong preference for home-based testing or when access to laboratory-based PSG is limited by geography, scheduling conflicts, or insurance restrictions
- Intentional vagueness: None
- Role of patient preferences: Some role for patient preference in deciding whether or not a PM device would be an acceptable alternative to PSG
- Exclusions: None.