Sleep-Disordered Breathing in Children and a Critical Review of T&A

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- No disclosures

Objectives

- Summarize AAO-HNS and AAP guidelines for Sleep Disordered Breathing and Tonsillectomy in children.
- Identify discordance between guidelines.
- Acknowledge that guidelines work together with physician assessment of individual patients.

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2011

- Tonsillectomy Guidelines (AA0-HNS-T):
  - Baugh, RF, et al. Clinical Practice Guideline : Tonsillectomy in Children. Otolaryngology -- Head and Neck Surgery 2011 144: S1-15.
- Polysomnography Guidelines (AAO-HNS-PSG):
  - Roland PS, Rosenfeld RM, Brooks LJ, et al., Clinical practice guideline: Polysomnography for sleep-disordered breathing prior to tonsillectomy in children. Otolaryngology -- Head and Neck Surgery 2011 Jul;145(1 Suppl):S1-15.

Slide 4

1 Anna Meyer, 2/18/2013

2012

- American Academy of Pediatrics (Marcus ,et al., 2012)
  - Diagnosis and Management of OSA
  - 6 pediatric pulmonologists
  - 3 pediatricians
  - 1 pediatric otolaryngologist

Effect of Guidelines

- UK guidelines, 1999
  - 0.2% of children fulfill criteria for recurrent tonsillitis in 2008 study
- Italian T&A guidelines, 2003, 2008:
  - Evaluation of effect, 2013
  - No change in frequency or indication for T&A
    - Except for acute recurrent tonsillitis

Motta, et al., 2013;
Elizabeth, et al., 2013

Effects of Guidelines

- Laryngoscope 2013:
  - ASPO survey: pediatric otolaryngologists non-compliant.
- Disagreement between guidelines nearly 20% (Aarts, et al., 2012)

AAO-HNS-T Statement 1: Watchful Waiting for Recurrent Throat Infection

- Paradise criteria (NEJM, 1984)
- Fewer than
  - 7 episodes in the past year
  - 5 episodes per year in the past 2 years
  - 3 episodes per year in the past 3 years
  - Document, document, document!

AAO-HNS-T Statement 2: Recurrent Throat Infection with Documentation

- Clinicians may recommend tonsillectomy for recurrent throat infection with the recommended frequency WITH DOCUMENTATION of one or more of the following:
  - Temperature >38.3
  - Cervical lymphadenopathy (tender or >2cm)
  - Tonsillar exudate
  - Positive GABHS

-OR-

- Not fully documented and observe for frequency and features of next two episodes.

Why document?

- Less severe do not gain benefit > risks
- Children who meet the strictest criteria
  - modest benefit
  - may fade by 3 years post-op
- Shared decision-making with family

AAO-HNS-T Statement 3: Recurrent infection with modifying factors

- Clinicians should assess for modifying factors in those who do not meet criteria in Statement 2
  - Multiple antibiotic allergy/intolerance
  - Recurrent severe infections requiring hospitalization
  - PFAPA (periodic fever, aphthous stomatitis, pharyngitis, adenitis)
  - History of PTA
  - Lemierre's
  - FH of rheumatic heart disease
  - Numerous repeat infections in a household
  - PANDAS?

AAO-HNS-T Statement 3: Tonsillectomy for recurrent infection with modifying factors

- Others: school absences affecting performance, very severe sore throats
- Poorly validated:
  - chronic tonsillitis, febrile seizures, hot potato voice, tooth malocclusion, cryptic tonsils, chronic pharyngeal carriage of GABHS

AAP Statement 1

- PCPs should ask about snoring
- PCP should ask about snoring in all children with ADHD

TABLE 2 Symptoms and Signs of OSAS

History
- Frequent snoring (≥3 nights/wk)
- Labored breathing during sleep
- Gasps/snorting noises/observed episodes of apnea
- Sleep enuresis (especially secondary enuresis)[a]
- Sleeping in a seated position or with the neck hyperextended
- Cyanosis
- Headaches on awakening
- Daytime sleepiness
- Attention-deficit/hyperactivity disorder
- Learning problems

Physical examination
- Underweight or overweight
- Tonsillar hypertrophy
- Adenoidal facies
- Micrognathia/retrognathia
- High-arched palate
- Failure to thrive
- Hypertension

[a] Enuresis after at least 6 mo of continence.

AAP Statement 2A

- If regular snorer or Table 1 features
  - H&P not sufficient
  - Obtain PSG

    -or-
  - *Refer to Sleep Specialist or Otolaryngologist*
- UCSF
  - Sleep studies can only be ordered by pulmonologist or otolaryngologist

Realities

- Access to pediatric PSG facilities
- PSG does not measure all effects of snoring
- Financial implication for healthcare cost astronomical
- Medi-Cal now asking for PSG for all patients

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AAP Statement 2B

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- If no PSG available
  - Nocturnal video recording
  - Nocturnal oximetry
  - Daytime nap PSG
  - Ambulatory PSG

AAO-HNS-PSG Statement 5
- PSG gold standard
- Portable monitoring devices
  - Limited studies in adults
  - Very little in children
  - None assess children with comorbidities
- Additional research needed
- Still significant cost and access issues

AAO-HNS-PSG Statement 1: PSG in high-risk children

- Refer patients for pre-op PSG if:
  - Obesity
  - Down Syndrome
  - Craniofacial abnormalities
  - Neuromuscular disorders
  - Sickle cell disease*
  - Mucopolysaccharidoses

Role of PSG in High-Risk

- Avoid unneccessary procedures
- Diagnostic certainty in high anesthesia risk
- Define severity of SDB for preoperative planning
- Postoperative management
- Provides baseline for postop comparison

AAO-HNS-PSG Statement 2: PSG for Uncertain Presentations

- Children *without* comorbidities
  - Discordance between tonsillar size and reported symptom severity (#1 reason)
  - Need for surgery uncertain
- Children with large tonsils/nasal obstruction and concordant symptoms can proceed without PSG

Parent Awareness

- Sleep habits and quality
  - Length of sleep
  - How they wake in the am
  - Car/TV/reading/naps
  - Enuresis/tantrums
  - Instruction on listening to sleep
- Behavior
  - Unaware
  - Accustomed
  - Denial
- OSA-18

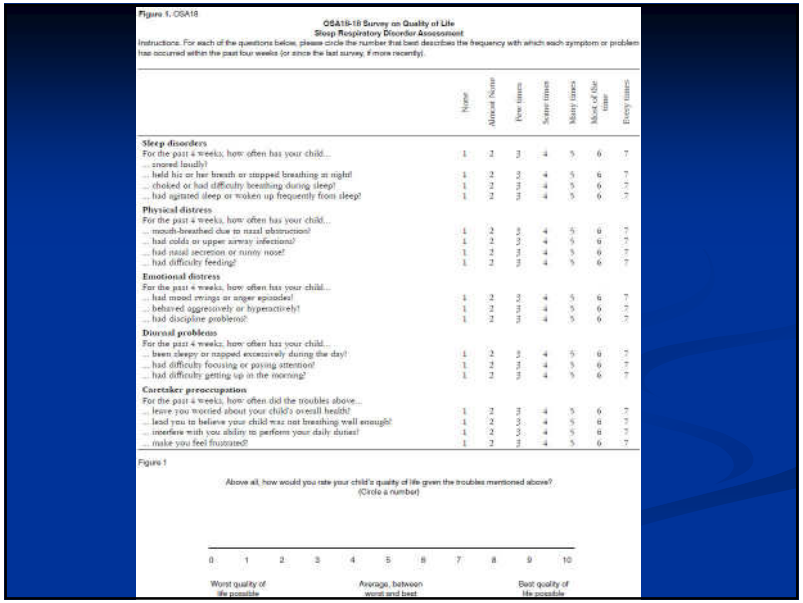


Figure 1. OSA18

OSA18 Survey on Quality of Life
Sleep Respiratory Disorder Assessment

Instructions. For each of the questions below, please circle the number that best describes the frequency with which each symptom or problem has occurred within the past four weeks (or since the last survey, if more recently).

	None	Almost None	Few times	Some times	Many times	Most of the time	Every time
Sleep disorders							
For the past 4 weeks, how often has your child...							
... snored loudly?	1	2	3	4	5	6	7
... held his or her breath or stopped breathing at night?	1	2	3	4	5	6	7
... choked or had difficulty breathing during sleep?	1	2	3	4	5	6	7
... had agitated sleep or woken up frequently from sleep?	1	2	3	4	5	6	7
Physical distress							
For the past 4 weeks, how often has your child...							
... mouth-breathed due to nasal obstruction?	1	2	3	4	5	6	7
... had colds or upper airway infections?	1	2	3	4	5	6	7
... had nasal secretion or runny nose?	1	2	3	4	5	6	7
... had difficulty feeding?	1	2	3	4	5	6	7
Emotional distress							
For the past 4 weeks, how often has your child...							
... had mood swings or anger episodes?	1	2	3	4	5	6	7
... behaved aggressively or hyperactively?	1	2	3	4	5	6	7
... had discipline problems?	1	2	3	4	5	6	7
Diurnal problems							
For the past 4 weeks, how often has your child...							
... been sleepy or napped excessively during the day?	1	2	3	4	5	6	7
... had difficulty focusing or paying attention?	1	2	3	4	5	6	7
... had difficulty getting up in the morning?	1	2	3	4	5	6	7
Caretaker preoccupation							
For the past 4 weeks, how often did the troubles above...							
... leave you worried about your child's overall health?	1	2	3	4	5	6	7
... lead you to believe your child was not breathing well enough?	1	2	3	4	5	6	7
... interfere with you ability to perform your daily duties?	1	2	3	4	5	6	7
... make you feel frustrated?	1	2	3	4	5	6	7

Figure 1

Above all, how would you rate your child's quality of life given the troubles mentioned above?
(Circle a number)

0 1 2 3 4 5 6 7 8 9 10

Worst quality of life possible — Average, between worst and best — Best quality of life possible

AAP Statement 3

- Criteria for T&A
  - Has OSA
  - Adenotonsillar hypertrophy
  - No contraindications
- Issues
  - Not address behavioral
  - Not address treatment when no ATH
- Pediatric OHNS
  - Children without adenotonsillar hypertrophy
    - Sleep endoscopy

TABLE 3 Contraindications for Adenotonsillectomy

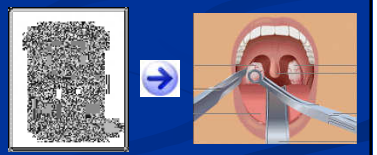
Absolute contraindications
No adenotonsillar tissue (tissue has been surgically removed)
Relative contraindications
Very small tonsils/adenoid
Morbid obesity and small tonsils/adenoid
Bleeding disorder refractory to treatment
Submucus cleft palate
Other medical conditions making patient medically unstable for surgery

AAO-HNS-T Statement 5: Tonsillectomy and Polysomnography

- Clinicians should counsel caregivers about tonsillectomy as a means to improve health in children with abnormal PSG who have tonsillar hypertophy and SDB

AAO-HNS-T Statement 4: Tonsillectomy for SDB

- Clinicians should identify conditions that may improve after surgery:
  - Growth retardation
  - Poor school performance
  - Enuresis
  - Behavioral problems



AAO-HNS-PSG Statement 4: Communication

- Communicate PSG results to anesthesiologists prior to induction.

Anesthesia Risks

- Difficult airway
- Abnormal central respiratory drive
- Abnormal cardiopulmonary physiology
- Increased sensitivity to Rx
  - Opioids
  - Nitrous oxide
- Post-operative monitoring for ventilation/oxygenation

Admission recommendations

AAO-HNS PSG Guidelines

- Under 3 years old
- AHI > 10 or 02 sat < 80%
- Continuous pulse oximetry
- Availability of ICU
  - Very severe OSA
  - Comorbidities → → → → →
  - Significant post-op obstruction and desaturation

AAP Guidelines

- Under 3 years old
- AHI >24 or 02 sat <80%
- Cardiac disease
- Failure to thrive
- Obesity
- Craniofacial anomalies
- Neuromuscular disorders
- Current URI

Statement 7: Intraoperative Steroids

- Administer a single dose
- For post-op nausea and vomiting
- Throat pain
- 90% post-guidelines (Setabutr, 2013)

AAO-HNS-T: Perioperative Antibiotics

- Should not routinely administer perioperative antibiotics
- 46% still do this (Setabutr, 2014)
- 1/3 stopped after guidelines

AAO-HNS-T Statement 9: Postoperative pain control

- Advocate for pain management after tonsillectomy
- Educate caregivers about the importance of managing and reassessing pain

Pain Control

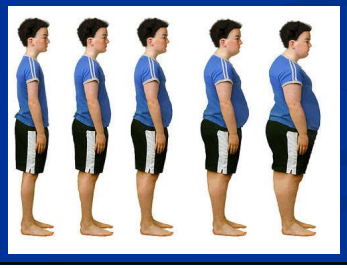
- Local anesthetic does not improve pain
- Acetominophen with codeine no better than acetominophen alone
  - Significant % codeine hypo- and hypermetabolizers
  - FDA black box against codeine for T&A, 2012
- NSAIDS: Cochrane review: 1000 children
  - Not significantly increase post-op bleeding
  - Only 43% using after guidelines (Setabutr, 2014)

Statement 10: Post-tonsillectomy hemorrhage

- Clinicians should determine their rate of primary and secondary post-tonsillectomy bleeding.

AAO-HNS/AAP Statements Outcome Assessment for SDB

- Counsel that SDB may persist or recur after surgery
- Reassess post surgery at 6 to 8 weeks*
- Repeat sleep study in high risk patients or residual sx



Weight and SDB

- Growth failure in untreated SDB (Bonuck, et al. 2009)

vs.

- Adenotonsillectomy as risk factor for childhood obesity (Jeyakumar, 2011)

Failure of tonsillectomy

- SDB often is multifactorial
- Obesity
- Craniofacial syndrome
- Effective in 60-70% of children with significant tonsillar hypertrophy
- Only effective in 10 – 25% of obese children

Residual OSA

AAP

- Refer for CPAP in persistent OSA
- Treat mild with nasal steroids

Pediatric OHNS

- Nasal steroids
  - Nasal congestion/allergy
  - Isolated adenoid hypertrophy
  - Turbinate hypertrophy
- Sleep endoscopy
  - Lingual tonsillectomy
  - Turbinate reduction
  - Tongue base advancement
  - Supraglottoplasty
  - Repeat adenoidectomy
- CPAP very poorly tolerated

Summary

- Guidelines for SDB emphasis the complexity of diagnosis of SDB and the role of a multitude of comorbid conditions.
- Several areas of discordance between AAP and AAO-HNS
- Tonsillectomy is a major surgery for which careful perioperative management should be organized.
- Advocate for appropriate use of PSG!

References

- Baugh, RF, et al. Clinical Practice Guideline : Tonsillectomy in Children. Otolaryngology -- Head and Neck Surgery 2011 144: S1-15.
- Roland PS, Rosenfeld RM, Brooks LJ, et al., Clinical practice guideline: Polysomnography for sleep-disordered breathing prior to tonsillectomy in children. Otolaryngology -- Head and Neck Surgery 2011 Jul;145(1 Suppl):S1-15.
- Jeyakumar A, Fettman N, Armbrecht ES, Mitchell R. **A systematic review of adenotonsillectomy as a risk factor for childhood obesity.** Otolaryngol Head Neck Surg. 2011 Feb;144(2):154-8.
- Bonuck KA, Freeman K, Henderson J. **Growth and growth biomarker changes after adenotonsillectomy: systematic review and meta-analysis.** Arch Dis Child. 2009 Feb;94(2):83-91. Epub 2008 Aug 6.
- Amir I, Belloso A, Broomfield SJ, Morar P. 26.**Return to theatre in secondary post-tonsillectomy haemorrhage: a comparison of coblation and dissection techniques.** Eur Arch Otorhinolaryngol. 2012 Feb;269(2):667-71.
- Khan I, Abelardo E, Scott NW, Shakeel M, Menakaya O, Jaramillo M, Mahmood K. **Coblation tonsillectomy: is it inherently bloody?** Eur Arch Otorhinolaryngol. 2012 Feb;269(2):579-83. Epub 2011 May 6.
- Mozet C, Prettin C, Dietze M, Fickweiler U, Dietz A. **Use of Floseal and effects on wound healing and pain in adults undergoing tonsillectomy: randomised comparison versus electrocautery.** Eur Arch Otorhinolaryngol. 2011 Dec 30. [Epub ahead of print]

Thank You!