Sleep Apnea Panel

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Abbreviations

• OSA=Obstructive sleep apnea
• AHI= Apnea hypopnea Index
• SaO2=Oxygen saturation (%)
• DISE=Drug induced sedated endoscopy
• VOTE=Velum, Oropharynx,Tongue, Epiglottis classification scheme
• PSG=Polysomnogram
• ESS=Epworth sleepiness scale
• MM = Mueller maneuver, ModMal = Modified Malampatti
• UARS= Upper airway resistance syndrome
• BMI= Body Mass Index
• CPAP/BIPAP= continuous positive airway pressure/bilevel positive airway pressure
Outline

• Diagnosis and management of OSA in adults and children – 3 representative case presentations
  – Snoring (mild OSA)
  – Severe sleep apnea (adult) following CPAP failure
  – Snoring after adenotonsillectomy

• Discussion based upon the latest peer-reviewed literature/recommendations/guidelines /consensus statements
Case 1- Snoring

- 65 year old male presents with snoring
  - Sleep study 10 years ago without sleep apnea (verbal)
  - Recently re-married
- Exam/History
  - Modified Mallampati 3, Angle Class 1, Tonsil 1+/4+
  - Septum midline, NOSE 40/100
  - ESS 10/24, Blood pressure 130/85
  - BMI 32 kg/M2
S1. Initial management should include a sleep study:

A. Yes
B. No

Panel: “Any other data or information?”
Sleep Studies

• “An objective sleep test (usually an outpatient recording) should be performed if a sleep-related breathing disorder is suspected, if there are relevant comorbidities, or if the subject is seeking therapeutic interventions for snoring”

Snoring Definition

• No snoring definition “Absence of OSA”
• Most “snoring” patients have mild OSA
  – Definition
    • Snoring choking insomnia, heart disease, diabetes, mood or cognitive disorder and AHI/RDI > 5 ICDSM 3 (2015)
Q2. Which treatment option would you prefer?

A. Custom mandibular advancement device
B. Non-custom MAD
C. Pillar TM Implant
D. Palate RF
E. Nasal steroid spray
• Recommendation: “We recommend that sleep physicians prescribe oral appliances, rather than no therapy, for adult patients who request treatment of primary snoring (without obstructive sleep apnea).”
  – Effective for snoring in adults (Quality of evidence: High)
  – Insufficient evidence for the improvement in quality of life

• AASM and AADSM Clinical Practice Guideline - 2015
Surgical Treatment of Snoring Diagnosis and treatment of snoring in adults—S2k Guideline

• Recommendation:
  – Minimally invasive procedures should be favored.
  – If snoring is accompanied by nasal obstruction, nasal surgery can be considered.
  – Velum presumed origin, surgical interventions such as UPP, radiofrequency surgery, or soft palate implants may be considered based on individual anatomy.
  – No indication for invasive surgical approaches at the tongue (radiofrequency tongue base or lingual tonsillectomy may be performed based on individual anatomy).
Snoring Surgery—Best Evidence Systematic Reviews

- Radiofrequency
  - May reduce symptoms of snoring and causes only minor discomfort and the risk of side effects seem to be small (relapse 50% at 13 months)
  - 46% reduction in mean VAS snoring (RoM0.54, 95% CI 0.41–0.70, p<0.00001)
  - Bach Laryngoscope 2009, Baba et al Sleep Breathing 2015

- Pillar
  - standardized mean difference [SMD], 0.591; 95% confidence interval [CI], 0.753 to 0.429, P < .001,
  - Choi et al Laryngoscope 2012
Case 2 Severe OSA-Failed CPAP

- 45 year Female
  - AHI 55, low SaO2 80% with 10% saturation less 80%
  - BMI 35
  - 2+ tonsil MM 2, Angle Class 2, a-fib
  - Failed multiple attempts at CPAP/BIPAP/
  - Septum minor displacement
Q3. Initial Management Should Include

A. DISE
B. Nasal surgery
C. Cephalometric X-rays
D. Weight loss
E. Positional therapy
F. Tracheotomy
Nasal Surgery and OSA

- "demonstrates improved CPAP compliance rates following septoplasty in OSA patients with nasal obstruction" (evidence level low)

- Poirier, J; George, G, Rotenberg B. Et al The Effect of Nasal Surgery on Nasal Continuous Positive Airway Pressure Compliance, Laryngoscope 2013
DISE Video to Review
Q4. The next step in surgical management

A. Evaluation for MMA
B. Cranial nerve stimulation
C. UPPP/Expansion PPP
D. UPPP/Lingual tonsil
Maxillo-mandibular Advancement and OSA

- Pooled effects of surgical success rate was 86.0% Reduction:
  - AHI (63.9 26.7/h vs. 9.5 10.7/h)
  - daytime sleepiness (ESS) 13.2 vs. 5.1

- Predictive measures surgical success:
  - Younger age
  - Lower AHI
  - Lower BMI
  - Greater degree of maxillary advancement

Global UAW Therapy for OSA

- Upper Airway Stimulation pooled fixed effects analysis demonstrated statistically significant reductions pooled mean difference (3, 6, and 12 months)
  - AHI 23.9
  - ESS 4.04

Data

- Consensus statement CPAP?
- What other articles should be used as best evidence for key points
Case 3 Pediatrics

Snoring after adenotonsillectomy

- 12 year old African-American female
  - Adenotonsillectomy age 3 for SRBD
  - Snoring worsening over 4 years, daytime somnolence and poor school performance
  - AHI 5: Low SaO2 87%, 15% of study time with EtCO2 < 45 mmHg
  - BMI 97%, Mallampati 3, edematous turbinates, high arched palate
Risk factors for recurrence of OSA

- Severe pre-operative OSA
- Gain velocity in BMI
- Obesity
- African American
- Age > 7
- Asthma

AASM 2011: Practice Parameters for pediatric PSG

• 3.4.2 Polysomnography is indicated following adenotonsillectomy to assess for residual sleep related breathing disorder in children with
  – Preoperative evidence for moderate to severe OSAS
  – Obesity
  – Craniofacial anomalies that obstruct the upper airway
  – Neurologic disorders (e.g., Down syndrome, Prader-Willi syndrome, and myelomeningocele). [Review Section 4.2.3] (Standard)
  – Level 1 Evidence only for obesity

• 3.4.3 Polysomnography is indicated after treatment of children for obstructive sleep apnea syndrome with rapid maxillary expansion to assess for the level of residual disease and to determine whether additional treatment is necessary. [Review Section 4.4.3] (Option) Level 3 & 4

Aurora et al. Practice Parameters for the Respiratory Indications for Polysomnography in Children. SLEEP, Vol. 34, No. 3, 2011
Obesity and OSA

• A population-based study involving 400 children between 2 and 8 years of age found that obesity was the most significant risk factor for OSA with an odds ratio of 4.69 (95% CI 1.58–13.33).

• For each unit increase in BMI, there was a 12% higher risk of OSA

Q5. What is your initial management?

A. Montelukast/mometasone
B. Rapid maxillary expansion
C. Expansion sphincter pharyngoplasty
D. Drug induced sleep endoscopy
E. Cine MRI
Montelukast/mometasone

- Twenty four children with residual OSA (AHI >1 and <5/hour) were treated with montelukast and intranasal budesonide aqueous solution for 12 weeks.
- This combined anti-inflammatory therapy effectively improved and/or normalized respiratory and sleep disturbances in children with residual SDB after adenotonsillectomy.

Twenty-three individuals were followed up annually over a mean of 12 years after the completion of orthodontic treatment at a mean age of 8.68 years.

The stability and maintenance of the expansion over time was demonstrated by the maxillary base width and the distance of the pterygoid processes measured using CT imaging; PSG normal at 12 years.

Conclusion: A subgroup of OSA children with isolated maxillary narrowing initially and followed up into adulthood present stable, long-term results post RME treatment for pediatric OSA.

Pirelli et al. Rapid maxillary expansion (RME) for pediatric obstructive sleep apnea: a 12-year follow-up. Sleep Medicine 16(8):933-935 August 2015
Expansion sphincter pharyngoplasty

- Rotation and suspension of the palatopharyngeus muscle onto the soft palate, sparing the uvula.
- Stabilizes palate and improves diameter of the oral airway.
- May be incorporated into the initial surgical approach with tonsillectomy or as a secondary procedure in patients who have persistent sleep apnea after T&A.
- Outcomes: reduction in AHI in adults; limited evidence for children.

Expansion sphincter pharyngoplasty

Woodson Operative Techniques Otol 2012;23:3–10
Identification of Obstructive Sites

• Systematic review, 24 articles included
• Conclusions: Drug-induced sleep endoscopy and cine MRI are the most commonly reported tools to identify sites of obstruction for children with persistent OSA
• These techniques have not yet been clearly linked to outcomes.
• Evidence for treatment is extremely limited and focuses primarily on lingual tonsillectomy and supraglottoplasty.
• Reports regarding appropriate patient selection and outcomes in obese or otherwise healthy children are scant.

Higher total obstructive scores were associated with lower oxygen saturation nadir.

The scoring system was also used to quantitatively identify children with multilevel airway obstruction, who were found to have significantly worse PSG indices compared with children with single-level obstruction.

Allows for standardized reporting.
Sleep endoscopy

No apnea

Circumferential collapse
Thank You