Tonsillectomy Cases

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Objective

• Highlight questions and controversies in tonsillectomy diagnosis and management
• Determine what clinical conditions warrant consideration of tonsillectomy
• Describe the current recommendations for pain control after tonsillectomy
Tonsil Structure/Function

• Secondary lymphoid organs
• Initiate immune response vs antigens entering nose or mouth
• Greatest activity: 3-10 years
• Studies after tonsillectomy
  – Minor alterations in Ig concentrations in serum
  – No studies show significant clinical impact on immune system

Image: www.daviddarling.info
Burden

- Tonsillectomy is the second most common ambulatory surgical procedure performed on children in the United States.

- The 2 most common indications for tonsillectomy are recurrent throat infections and SDB.

- SDB represents a spectrum of disorders ranging in severity from primary snoring to OSA.
Primary Indications for Tonsillectomy

- Recurrent throat infections
- Sleep disordered breathing

- Both with lower quality of life and significant caregiver impact versus healthy children

Harms/Adverse Events

• Morbidity
  – Possible hospitalization
  – Risk of anesthesia
  – Prolonged throat pain
  – Financial costs

Complications

• Bleeding
  – Primary 0.2 to 2.2%
  – Secondary 0.1 to 3%

• Most complications more frequent in children with comorbid conditions (DS, CP, cardiac dz, children under 3 years...)

Postoperative Complications

- Nausea/vomiting
- Pain
- Dehydration
- Referred otalgia
- Postobstructive pulmonary edema
- VPI
- Nasopharyngeal stenosis

Case 1

- 11 y/o male presents with recurrent sore throat (5x/year) for the last 2 years.
  - NO snoring or witnessed apneas.
  - Strep negative for each episode.
- PMH: none
- PSH/Meds/All/FH/Soc hx: unremarkable
- On exam:
  BMI% for age = 75%
  Nose: turbinates non-obstructing
  Oral cavity/Oropharynx: tonsils 3+, Mallampati 2
Case 1

– How many infections do you require prior to considering tonsillectomy for children with recurrent tonsil infections?

• 2-3 in a year
• 4-5 in a year
• 6-7 in a year
• 5-6 a year for 2 years
• 4-5 a year for 2 years
• 3-4 a year for 3 years
Recurrent Acute Tonsillitis

- French Guidelines 2012
- $\geq 3$ infections/yr x 3 yrs or 5/yr over 2 yrs
- $\geq 3$ months of chronic tonsillitis resistant to meds:
  - Local (pharyngeal pain, halitosis, inflammation) &
  - Regional (cervical adenopathy) (low level of evidence)

Recurrent Acute Tonsillitis

• AAO Guidelines 2012
• <7 /yr OR <5 /yr x 2 yrs OR <3 /yr x 3 yrs
• With documentation of each with 1 or more of:
  – Temp>38.3 C
  – Cervical adenopathy
  – Tonsillar exudate
  – Positive Strep test

Case 1

• So, in this child with recurrent tonsil infections and enlarged tonsils...

  – What additional information would you like?
  – What additional factors would predispose you to consider surgery with fewer recurrent infections?
Recurrent Acute Tonsillitis

• AAO Guidelines 2012
• Or with fewer infections if there is:
  – Multiple antibiotic allergy/intolerance
  – PFAPA (periodic fever, aphthous stomatitis, pharyngitis, and adenitis),
  – History of peritonsillar abscess

Recurrent Pharyngitis

• French Guidelines 2012
  – May be considered (low level of evidence) for:
    • Periodic fever/Marshall syndrome;
    • Post-streptococcal (group A) acute tonsillitis syndrome
      – Except renal post-streptococcal pathology
    • Acute tonsillitis with dyspnea, due to mono
    • Quinsy tonsillectomy with peritonsillar abcess

Case 1

• You decide to refer for surgery and your otolaryngologist agrees...

  – What preoperative workup do you recommend?
    • Cardiac
    • Coagulation profile
    • Hematocrit
    • Nothing

  – How do you assess for these risks?
Preoperative

Use of cardiac evaluation

Multiple studies have shown OSA to have detrimental effects on heart.

– Global left ventricular dysfunction

– LVMI, interventricular and posterior wall thickness indices, & relative wall thickness significantly related to severity of OSA

– OSA independent risk factor for RV and LV dysfunction

Attia G et al., Impact of obstructive sleep apnea on global myocardial performance. Pediatr Cardiol. 2010;31(7):1025-1036
Preoperative

• Use of cardiac evaluation
• However testing does not necessarily detect the abnormalities
  – Retrospective review of patients who underwent both echo and PSG within 6 months prior to TA for OSA
  – Even in the most severe category of patients with OSA, there were no clinically relevant findings on cardiac echo
  – Conclusion: aggressive cardiac workup may not be indicated unless dictated by comorbidities

Revenaugh PC et al., Utility of preoperative cardiac eval in pediatric patients undergoing surgery for OSA. Arch OtoHNS. 2011;137(12):1269.
Preoperative

- When do you get coagulation workup?
- What kind of work up do you obtain?
Preoperative Assessment

• French Guidelines 2012

• Bleeding
  – Precise history, family history
  – + or unreliable history – hemostasis study (factor analysis, Von Willebrand evaluation)
  – If +
    • Refer to hematology
    • Check platelets and aPTT

Preoperative

- Use of coagulopathic evaluation
- Studies show preop evaluation is not predictive of bleeding risk
  - Routine preop PT/PTT not recommended to screen T and A patients and isn't cost-effective \(^1\)
  - Routine coagulation parameters (aPTT, PT, PLC) is not able to reliably identify relevant coagulation disorders or to predict risk for postoperative hemorrhagic complications after T&A \(^2\)

Preoperative Assessment

• French Guidelines 2012

• Respiratory
  – Assess for signs of obstruction & severity
  – Increased risk
    • Age < 3 years
    • Signs right heart failure/elevated pulmonary A pressure
    • Metabolic disease
    • Morbid obesity
    • Craniofacial / upper ariway malformation
    • Neuromuscular disease with decreased pharyngeal tone

Preoperative

– Overall, what do you do for preoperative evaluations in healthy children with no other comorbidities and OSA?
Case 1

• So, in this child with recurrent tonsil infections and enlarged tonsils..

  – How would you screen for upper airway obstruction?
  – What signs or symptoms would you look for?
Preoperative Assessment

• French Guidelines 2012

Table 1 Signs of respiratory disorder in case of tonsillar hypertrophy (in bold: the most discriminative signs).

<table>
<thead>
<tr>
<th>Nocturnal signs</th>
<th>Signs in awake state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snoring</td>
<td>Difficulty in waking</td>
</tr>
<tr>
<td>Respiratory pauses</td>
<td>Irritability on awakening, hyperactivity, attention and memory disorder</td>
</tr>
<tr>
<td>Night sweats</td>
<td>Asthenia on awakening, daytime sleepiness</td>
</tr>
<tr>
<td>Enuresis</td>
<td>Morning headache or vomiting</td>
</tr>
<tr>
<td>Parasomnia</td>
<td>Breakfast anorexia</td>
</tr>
<tr>
<td>Agitated sleep</td>
<td>Mouth breathing</td>
</tr>
<tr>
<td>Abnormal sleeping posture (head in hyperextension)</td>
<td>Late growth disorder</td>
</tr>
</tbody>
</table>
Case 2

- 4 y/o girl presents with moderate snoring, mouth breathing and possible apnea. She has been on nasal steroids for the past month with slight improvement of snoring & mouth breathing.

- PMH: being evaluated for ADHD
- PSH/Meds/All/FH/Soc hx: unremarkable otherwise
- On exam:
  - BMI% for age = 50%
  - Nose: turbinates non-obstructing
  - Oral cavity/Oropharynx: Tonsils 3+, Mallampati 2
Case 2

• So, in this child with possible apnea and enlarged tonsils...
  – What is your suspicion for OSA by history and exam alone?
Case 2

- So, in this child with possible apnea and enlarged tonsils...
  
  – Would you get a PSG?
Case 2

• So, in this child with possible apnea and enlarged tonsils...

  – What other evaluation methods would you consider?
Evaluation

- Role of PSG; AAO-HNS Guidelines
- Indications for PSG:
  - With comorbidities:
    - Obesity
    - Down syndrome
    - Craniofacial abnormalities
    - Neuromuscular disorders
    - Sickle cell disease
    - Mucopolysaccharidoses
  - Without comorbidities:
    - When need for surgery is uncertain
    - Discordance between tonsil size and reported severity of SDB

Roland PS et al., Clinical Practice Guideline: Polysomnography for SDB Prior to Tonsillectomy in Children. Oto-HNS 2011;145:S1
Evaluation

- Role of PSG; AAP Guidelines
- Indications for PSG:

  If a child or adolescent snores on a regular basis and has any complaints/findings in table

<table>
<thead>
<tr>
<th>Symptoms and Signs of OSAS</th>
<th>Physical Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>Underweight or overweight</td>
</tr>
<tr>
<td>Frequent snoring (≥ 3 nights/wk)</td>
<td>Tonsillar hypertrophy</td>
</tr>
<tr>
<td>Labored breathing during sleep</td>
<td>Adenoidal facies</td>
</tr>
<tr>
<td>Gasps/snoring noises/observed episodes of apnea</td>
<td>Micrognathia/retrognathia</td>
</tr>
<tr>
<td>Sleep enuresis (especially secondary enuresis)</td>
<td>High-arched palate</td>
</tr>
<tr>
<td>Sleeping in a seated position or with the neck hyperextended</td>
<td>Failure to thrive</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Headaches on awakening</td>
<td>Enuresis after at least 6 months of continence</td>
</tr>
<tr>
<td>Daytime sleepiness</td>
<td></td>
</tr>
<tr>
<td>Attention-deficit/hyperactivity disorder</td>
<td></td>
</tr>
<tr>
<td>Learning problems</td>
<td></td>
</tr>
</tbody>
</table>

Evaluation

• So, what are American pediatric otolaryngologists doing?
• Internet survey of American Society of Pediatric Otolaryngology members

• Children with SDB were referred for PSGs:
  – "most of the time" 4%
  – "sometimes" 65%
  – “rarely or never” 31%

• Children with Down syndrome or obesity
  – "always" 20% and 8% of the time

Case 2

- So, in this child with possible apnea and enlarged tonsils..
  - What is your practice?
  - Do you have situations when you don’t follow the guidelines?
Case 2

• So, in this child with snoring, possible ADHD and enlarged tonsils, PSG is completed...

– What if the results are as follows?
  • RDI 4 events/hour
  • CO2 > 50: 0% of TST (peak 49)
  • O2 saturation <90%: 0% of TST (nadir 92%)

• Would you recommend surgery?
<table>
<thead>
<tr>
<th>KAS</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Clinicians should counsel caregivers about tonsillectomy as a means to improve health in children with abnormal polysomnography who also have tonsil hypertrophy and sleep-disordered breathing.</td>
<td>Recommendation</td>
</tr>
</tbody>
</table>
Treatment

• Role of T&A; American Academy of Pediatrics guidelines
  – Statement 3: If a child is determined to have OSAS, has a clinical examination consistent with adenotonsillar hypertrophy, and does not have a contraindication to surgery, the clinician should recommend adenotonsillectomy as the first line of treatment. If the child has OSAS but does not have adenotonsillar hypertrophy, other treatment should be considered

Case 2

- So, in this child with OSA, possible ADHD and enlarged tonsils...

  - What comorbid conditions do you discuss with the family?
4. Clinicians should ask caregivers of children with sleep-disordered breathing and tonsillar hypertrophy about comorbid conditions that might improve after tonsillectomy, including growth retardation, poor school performance, enuresis, and behavioral problems.
Case 2

• So, how do you counsel the patients and parents regarding resolution of OSA after T&A ...

  – What persistence or recurrence rate do you discuss with the family?
**Persistent Pediatric OSA - Likelihood**

<table>
<thead>
<tr>
<th>Study name</th>
<th>Event rate</th>
<th>Lower limit</th>
<th>Upper limit</th>
<th>Relative weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shintani T. et al. 1998</td>
<td>0.754</td>
<td>0.667</td>
<td>0.825</td>
<td>13.0</td>
</tr>
<tr>
<td>Nieminen P. et al. 2000</td>
<td>0.905</td>
<td>0.689</td>
<td>0.976</td>
<td>8.2</td>
</tr>
<tr>
<td>Mitchell RB et al. 2005</td>
<td>0.529</td>
<td>0.303</td>
<td>0.745</td>
<td>10.6</td>
</tr>
<tr>
<td>Stewart MG. et al. 2005</td>
<td>0.245</td>
<td>0.174</td>
<td>0.334</td>
<td>13.0</td>
</tr>
<tr>
<td>Guillemannult C. et al. 2007</td>
<td>0.538</td>
<td>0.468</td>
<td>0.606</td>
<td>13.4</td>
</tr>
<tr>
<td>Mitchell RB. 2007</td>
<td>0.709</td>
<td>0.600</td>
<td>0.798</td>
<td>12.8</td>
</tr>
<tr>
<td>Gozal D. et al. 2008</td>
<td>0.600</td>
<td>0.403</td>
<td>0.770</td>
<td>11.4</td>
</tr>
<tr>
<td>Gozal D. et al. 2008</td>
<td>0.243</td>
<td>0.132</td>
<td>0.405</td>
<td>11.6</td>
</tr>
<tr>
<td>Tunkel DE. et al. 2008</td>
<td>0.929</td>
<td>0.630</td>
<td>0.990</td>
<td>5.9</td>
</tr>
</tbody>
</table>

**AHI<1:** Random-effects model estimate: 60% (95% CI 44-74%)

**AHI<5:** Random-effects model estimate: 66% (95% CI 55-76%)

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<tr>
<td>6. Clinicians should counsel caregivers and explain that SDB may persist or recur after tonsillectomy and may require further management.</td>
<td>Recommendation</td>
</tr>
</tbody>
</table>
Table 7. Tonsillectomy and Sleep-Disordered Breathing (SDB) Caregiver Counseling Summary

1. Hypertrophic tonsils may contribute to SDB in children.
2. SDB often is multifactorial.
3. Obesity plays a key role in SDB in some children.
4. PSG is considered the best test for diagnosing and measuring outcomes in children, but it is not necessary in all cases and access may be limited by availability of sleep laboratories and willingness of insurers and third-party payers to cover the cost of testing.
5. Tonsillectomy is effective for control of SDB in 60%-70% of children with significant tonsillar hypertrophy.
6. Tonsillectomy produces resolution of SDB in only 10%-25% of obese children.
7. Caregivers need to be counseled that tonsillectomy is not curative in all cases of SDB in children, especially in children with obesity.
Case 3

• 7y/o child presents with recurrent tonsil infections (4/year x 3 years)

• PMH/PSH/Meds/All/FH/Soc hx: unremarkable otherwise

• Exam: 3-4+ tonsils, mouth breathing in clinic, BMI 25%ile
Case 3

• You and the Family agree that tonsillectomy is indicated..

  – What do you tell them about subtotal or partial tonsillectomy?
  – Should the tonsils be routinely sent for histologic evaluation?
Recurrent Acute Tonsillitis

- French Guidelines 2012
- Partial tonsillectomy is acceptable for obstructive tonsillar hypertrophy
- Histologic examination of the tonsils is NOT routinely recommended except in suspected malignancy

Tonsillotomy

• Risk of tonsillar regrowth (0.5-17%):
  – 17% (7/42) – Krespi – 1-10 year results (laser)
  – 2-4% cited for symptomatic evaluation only
  – Most studies with low numbers are 1 year follow-up or less
  – Risk factors for tonsil tissue recurrence?
    • Young age at the time of surgery
    • Acute tonsillitis during the recovery period

Tonsillotomy

- Retrospective study
  - 1,731 partial tonsillectomy group vs
  - 1,212 patients traditional tonsillectomy
  - Tonsillotomy
    - Decreased rate of posttonsillectomy hemorrhage (1.1% vs. 3.4%, \( p < 0.001 \))
    - Decreased rates of severe pain or dehydration requiring medical attention (3.0% vs. 5.4%, \( p = 0.002 \))
    - 0.64% required revision completion tonsillectomy for tonsillar hypertrophy
Case 3

• During tonsillectomy your anesthesiologist asks you about medication use and extubation plan.

  – Should you Ent surgeon use steroids for tonsil patients?
<table>
<thead>
<tr>
<th>KAS</th>
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</tr>
</thead>
<tbody>
<tr>
<td>7. Clinicians should administer a single intraoperative dose of intravenous dexamethasone to children undergoing tonsillectomy.</td>
<td>Strong recommendation</td>
</tr>
</tbody>
</table>
Case 3

• During tonsillectomy your anesthesiologist asks you about medication use and extubation plan.
  
  – Should your ENT routinely use intraoperative antibiotics for tonsil patients?
  – Or antibiotics after surgery?
8. Clinicians should NOT routinely administer or prescribe perioperative antibiotics to children under going tonsillectomy.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>8. Clinicians should NOT routinely administer or prescribe perioperative antibiotics to children under going tonsillectomy.</td>
<td>Strong recommendation AGAINST</td>
</tr>
</tbody>
</table>
Case 3

• After tonsillectomy how do you treat pain?
Case 3

• Concerns with...
  – Acetaminophen?
  – Ibuprofen?
  – Acetaminophen with codeine?
  – Oxycodone?
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>9. The clinician should advocate for pain management after tonsillectomy and educate caregivers about the importance of managing and reassessing pain.</td>
<td>Recommendation</td>
</tr>
</tbody>
</table>
• Morbidly obese 13yo with sleep apnea
• T&A, UPPP and turbinate resection 12/9/13
• Planned admission to the PICU
• Narcotic pain medication
• Severe bleeding, transfusions
• Cardiac arrest & anoxic brain death
• Declared dead POD3 - eval that included 2 EEG
• Goldman et al. 2013 M&M after T&A
  – AAO newsletter, 552 respondents
  – 51 mortalities reported
    • 4 with anoxic brain injury

Sales

- Pediatric
- Adult
- Unknown
• Goldman et al. 2013 M&M after T&A

– Mechanism

• Medication 22%
• Pulmonary/CV factors 20%
• Hemorrhage 16%
• Perioperative events 7%
• Progression of underlying disease 5%
• Unexplained (All but 1 outside) 31%
• Goldman et al. 2013 M&M after T&A
  
  – Preop OSA dx NOT associated with increased risk of death or anoxic brain injury
  – Timing
    • 55% in the first 2 days after surgery
  – Events unrelated to bleeding accounted for the preponderance of deaths & anoxic brain injury
• Hill, Hartnick et al. 2011 Risk factors for airway complications in T&A for severe osa
  – N=83 with AHI>10 – all admitted
  – Major complications – 4.8%
    • Increased level of care
    • CPAP/BIPAP use
    • Pulmonary edema
    • Reintubation
  – Minor Complications – 19.3%
    • Oxygen sat < 90%

Hill, Hartnick et al. 2011 Risk factors for airway complications in T&A for severe osa

- Independent predictors of complications
  - Age < 2 years
  - AHI >= 24 events/hour
  - Intraop laryngospasm requiring treatment
  - Oxygen sats <90% on RA in PACU
  - PACU stay > 100 mins

- Any of these factors – 38% complications (v 2%)
• Dalesio, Smith, Ishman et al.
  – CO2 driver of complications
  – Unadjusted Modeling
    • Sat nadir 0.0096
    • Peak CO2 < 0.001
  – Adjusted model
    • Age significant
      – Correlated with sat nadir/peak CO2
    • ? Confounder of the relationship between CO2 and complications
• Gaps:
  – Who needs to be admitted?
  – What level of admission is necessary?
    • Floor, ICU, stepdown
  – What is appropriate and safe pain control in these children?
Case 4

• 4y/o male with OSA diagnosed on PSG, AHI of 6

• PMH/PSH/Meds/all/FH/Soc Hx: Unremarkable

• Exam: 1-2+ tonsils, turbinates non-obstructing, mallampati 2, BMI 50%

– What are your treatment options?
Treatment

– Is T&A first line in all cases for pediatric OSA?

– Any exceptions to this rule?
Treatment

– AAP guidelines suggest that if you do not have adenotonsillar hypertrophy, T&A is not recommended. Thoughts?

– Role of adenoidectomy alone?
Adenoidectomy

– Long-term follow-up (3-5 years)
  • Preoperative: Snoring 88%, Obstructed breathing 44%
  • Adenoid hypertrophy in:
    • 50% (16/32) with no improvement/worsening symptoms
    • 11% (20/174) with improved symptoms

Adenoidectomy

- Likelihood of future tonsillectomy or revision adenoidectomy
  - 38% with SDB underwent subsequent surgery versus 19% of those non-obstructive

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Number of patients requiring subsequent surgery by age category ignoring initial adenoidectomy indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;2 years (n = 31)</td>
</tr>
<tr>
<td>Tonsillectomy (%)</td>
<td>7 (22%)</td>
</tr>
<tr>
<td>Revision adenoidectomy*</td>
<td>11 (35)</td>
</tr>
<tr>
<td>Either procedure</td>
<td>12 (39)</td>
</tr>
</tbody>
</table>

* p = .023 (two-sided Fisher's exact test).

Adenoidectomy

- 515 consecutive patients with AHI > 5
  - Evaluate 17-73 months later with PSQ
  - No difference when T&A vs adenoidectomy
  - 15% with positive PSQ overall
  - Failure after adenoid higher (20% vs 9.8%) with
    - AHI ≥ 10 events/hour
    - Tonsil size ≥ 3

Case 4 Treatment

– Are there children who you would not consider surgical candidates?
Case 5

• 8 y/o child presents with Severe OSA on a sleep study (AHI=16 events/hour) and daytime tiredness

• PMH/PSH/Meds/All/FH/Soc hx: unremarkable except for obesity

• Exam: 3-4+ tonsils, mouth breathing in clinic, BMI 99% (35 kg/m²)
Case 5

• For this obese child with tonsil hypertrophy and OSA...

• Would you recommend T&A?
• Does the obesity affect your decision?
Role Of Obesity

Case 5

• For this obese child with tonsil hypertrophy and OSA... You choose to do tonsillectomy

• Would you recommend hospital admission?
• What patients do you recommend for admission after tonsillectomy?
Postoperative

• Postoperative admission; AAO-HNS Guidelines

• Indications for admission
  – If they are younger than age 3
  – Have severe obstructive sleep apnea
    • Apnea hypopnea index of 10 or more obstructive events/hour oxygen saturation nadir less than 80%
    • Or both

French Guidelines 2012

• Consider ambulatory surgery if:
  - is aged more than 3 years;
  - is ASA class I or II;
  - is free of comorbidity liable to exacerbate the respiratory risks;
  - is free of hemostasis abnormality.

• Consider admission if:
  - clinical criteria for peri-operative respiratory risk;
  - hemostasis abnormality;
  - respiratory difficulty on anesthesia induction or at awakening in the recovery room: cross-over from ambulatory to in-patient surgery is then recommended.

French Guidelines 2012

• Consider admission for:
  – Social reasons
    • Do they have a phone
    • Is there a translator if they need one
    • The patient agrees to ambulatory surgery

Postoperative admission; AAP Guidelines

Indications for admission

- Younger than 3 y of age
- Severe OSAS on PSG:
  - Apnea hypopnea index of 24 or more obstructive events/hour or oxygen saturation nadir less than 80%
- Cardiac complications of OSAS
- Failure to thrive
- Obesity
- Craniofacial anomalies
- Neuromuscular disorders
- Current respiratory infection

Postoperative

- So guidelines agree to admit if young child or if severe OSA. AAP guidelines also recommends ANY child with neuro/cardiac/dysmorphic issues to be admitted

- What about a syndromic child with very mild osa-would you admit for observation?
- Would you do surgery in outpatient setting with a syndromic child even with very mild OSA?
Case 5

- So, postoperative PSG completed in this obese child with severe OSA after T&A. Residual AHI is 4

- What is the role of medical therapy?
American Academy of Pediatrics

• Recommend leukotriene inhibitors for residual mild OSA after T&A

• **Leukotriene Modifiers**
  – Increased leukotriene receptors in tonsils of OSA pts
  – Specific topographic pattern
  – Montelukast daily use x 16 wks in 24 mild OSA pt
    • Improvement in hypercarbia and AHI
    • Decrease in adenoid size

Pharmacotherapy

• Leukotriene Modifiers

Pre

Post

Combo Montelukast/Nasal Steroid

Montelukast daily use x 12 wks in 752 mild osa pts

- Normalization PSG in 62%
- Less likely to work in children > 7 years or obesity

Additional Questions

• Do you ever use codeine for pain control?

• Do you give the patients a disclaimer if you do (given the FDA warning not to use it for children)?
Questions to/from the Audience

• What else do we need to know?

• What are the controversies in your institution?
Practice Change

• Recognize that up to 40% of children may have persistent OSA or SDB after adenotonsillectomy and they should be screened for SDB symptoms after surgery