Tonsillectomy

• One of the most commonly performed procedures worldwide
• Approximately 530,000 cases in the U.S. annually
• Majority in children for OSA / UARS
• No real consensus on the best surgical method or extent of removal
Tonsillectomy - Indications

- Obstructive sleep apnea
  - Upper airway resistance syndrome
  - Primary snoring
- Recurrent strep pharyngitis
- Recurrent PTA
- Asymmetry / concern for malignancy
- To rule out post transplant lymphoproliferative disorder (PTLD)
- PANDAS
- PFAPA
Clinical Practice Guidelines: Tonsillectomy in Children

- January 4, 2011
- The American Academy of Otolaryngology- Head and Neck Surgery
- February 2013
- FDA issue a new Boxed Warning regarding administration of Tylenol with Codeine in children with OSA
History of Tonsillectomy

- Dates back almost 2000 years
- 25 A.D. – Celcus describes using a finger or blunt hook for dissection of the tonsil
- 1600 – Peter Lowe describes the use of a snare and ligature for the excision of tonsils
- 1828 – Physick develops the first standard instrument, the tonsil guillotine or tonsillotome
- 1897 – Ballenger – modern cold-steel tonsillectomy
New Techniques - Why?

• Effectiveness
  – Depends on the indication
  – Polysomnogram for OSA (rarely done postop.)

• Pain
  – Days with pain
  – Return to normal diet and/or activity
  – Number of days narcotics are needed
  – Subjective scoring scales

• Bleeding
  – Intraoperative vs. delayed postoperative bleeding
  – Which events qualify? Admission, return to OR, etc.

• Cost
  – Cost to who? Patient, hospital, society, etc.
  – Cost / benefit analysis
Current Techniques - Tonsillectomy

- Cold steel dissection
- Monopolar electrocautery (EC)
- Bipolar EC
- Microdebrider - subcapsular tonsillectomy
- Coblation - subcapsular vs. extracapsular
- Harmonic scalpel
- Others
  - Laser
Subcapsular vs. Extracapsular Tonsillectomy

• Theory that preservation of the tonsillar capsule with a thin rim of tissue may lead to decreased postoperative pain and bleeding

• The differing nature of the various techniques and instrumentation themselves
Current Techniques - Adenoidectomy

- Curette alone
- Monopolar EC (suction Bovie)
- Curette with Monopolar EC
- Microdebrider
- Coblation
ASPO Survey (Walner, 2007)

- **Tonsillectomy** (OSA)
  - Monopolar - 53%
  - Coblation - 16%
  - Cold with monopolar - 10.6%
  - Bipolar - 6.2%
  - Cold with bipolar - 5.3%
  - Harmonic scalpel - < 1%
  - Cold dissection - < 1%
  - MD - < 1%
  - Laser - < 1%

- **Adenoidectomy** (OSA)
  - Monopolar - 25%
  - Curette with monopolar - 22.4%
  - MD with monopolar - 19%
  - Coblation - 6.9%
  - MD alone - 6%
  - Curette alone - 4.3%
Cold Steel Dissection

- Use of forceps and scalpel, scissors or snare
- Hemostasis
  - Classically with suture ligatures
  - Also described with monopolar or bipolar EC
- Largely replaced by newer techniques to limit intraoperative blood loss
- Gold standard for comparison
  - Effectiveness
  - Pain
  - Bleeding
  - Cost
“Cold Steel” Dissection
Monopolar Electrocautery

- Monopolar electrical energy used to burn tissue
- Hemostasis through cauterization
- Temperatures up to 400°C can result in thermal injury to surrounding tissues with potential increase in postoperative pain
Bipolar Electrocautery

- Bipolar electrical energy used to burn tissue
- Hemostasis with bipolar cauterization
- Thermal injury potentially more focused
- Use of guarded bipolar forceps very important!
Bipolar Electrocautery
Microdebrider

- Powered rotary shaver with continuous suction
- Results in a partial or “subcapsular” tonsillectomy
- Used primarily for OSA
- No thermal injury
- Potential for recurrent symptoms due to residual tonsillar tissue / tonsil regrowth
Microdebrider
Coblation

- Uses bipolar RF energy to excite the ions within a conductive medium (saline)
- Generates enough energy to break organic molecular bonds in tissue
- 40° to 70° C
- Has some coagulation properties
- No risk of airway fire
Coblation
Harmonic Scalpel

• Uses ultrasonic energy
• The blade, vibrating at 55 kHz, transfers this energy directly to the tissues resulting in simultaneous cutting and coagulation
• Coagulation results from the denatured protein coagulum and secondary heat
• 80°C
Results - Effectiveness

• For OSA, each of the techniques appear to be effective
  – Microdebrider
    • Bitar, 2008, n = 143 (vs. monopolar EC, based on survey data)
    • Reilly, 2009, n = 26 (based on f/u PSG data)
  – Coblation
    • Friedman, 2009, n = 159 (based on f/u PSG data)

• What about tonsillar regrowth with subcapsular tonsillectomy?
  • Derkay, 2006, n = 300 – children microdebrider group 5x more likely to have residual tonsillar tissue on exam at 1 month
  • Colen, 2008, n = 50 – improvement based on OSA-18 remained stable up to 1 yr.
Results - Pain

• Bipolar EC
  • Kulak, 2008, n = 201 - decreased pain in early postop period, but worse after one week vs. cold steel

• Microdebrider
  • Wilson, 2009, n = 156 – 2 less days of pain, similar days requiring pain medication, and earlier return to preoperative diet (4.59 vs. 6.36) in comparison with monopolar EC

• Coblation
  • Wilson, 2009, n = 156 – 2 less days of pain, 2 less days requiring pain medication and earlier return to preoperative diet (4.85 vs. 6.36) in comparison with monopolar EC
  • Chang, 2006, n = 101 – less pain and earlier return to normal activity compared with monopolar EC
  • Burton, 2009, meta-analysis of randomized controlled studies found no significant decrease in postoperative pain
Results - Bleeding

- **Bipolar EC**
  - Kulak, 2008, n = 201 – no difference in comparison to cold steel

- **Microdebrider**
  - Wilson, 2009, n = 156 – no difference in comparison to monopolar EC or coblation

- **Coblation**
  - Ragab, 2005, n = 200 – no difference in comparison to cold steel
  - Wilson, 2009, n = 156 - no difference in comparison to monopolar EC or microdebrider
  - Lowe, 2007, national audit in UK of 40,514 patients
    - 3.5% rate of delayed bleeding overall
    - Significant increase in rate for coblation when used for dissection and cauterization (OR = 2.47)
Results - Cost

• Cost / Benefit analysis
  – Earlier return to school
  – Earlier return to work for primary care giver

• UCLA Hospital
  – Bipolar EC - re-used
  – Microdebrider blade - $107
  – Coblation wand for T&A - $125
  – Bovie and suction EC - approx. $10 each

• Time of procedure
  – Can vary with surgeon and institution

• Wilson, 2009, n = 156
  – Microdebrider < monopolar EC < Coblation
Results - Summary

• Effectiveness appears comparable (for OSA)
• Appears to be potential for decreased postoperative pain with microdebrider and coblation vs. monopolar EC
• Postop bleeding appears to be similar, though primarily when used along with EC for hemostasis
• Procedure / OR time key factor in total cost
• Comfort level with “subtotal” tonsillectomy an important factor
My Current Practice

• **Tonsillectomy**
  - Monopolar electrocautery
  - Intra-operative dose of dexamethasone (1mg/kg)
  - Intra-operative Ampicillin (40mg/kg)
  - No post-operative Abx
  - Lortab elixir for pain

• **Adenoidectomy**
  - Microdebrider
  - Suction monopolar cautery for hemostasis
Adeoidectomy
Tonsillectomy