Perioperative Steroids and Antibiotics in Tonsillectomy

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Department of Otolaryngology
Grand Rounds Presentation
April 30, 2008
Historical Perspective

- Tonsillectomy
  - Latin word *tonsilla*
    - “stake to which boats are tied”
  - Greek word *ektome*
    - “excision”
- Aulus Cornelius Celsus
  - *Gives the earliest account of tonsillectomy…using a finger!*

Tonsillectomy Morbitidies

- Most common encountered by patient
  - Nausea and vomiting
    - Reported range of 40-85%
  - Fever
  - Pain
  - Decreased oral intake
  - Dehydration
  - Bleeding
  - Halitosis
  - Trismus
Why Steroids?

“…significant edema and inflammation occur in the operative bed. Steroid medications nonspecifically reduce inflammation, and so it follows that perioperative steroid administration might be useful in decreasing postoperative symptoms in patients undergoing tonsillectomy.”

Diane G. Heatley, MD

Arch Otolaryngol Head Neck Surg. 2001
Corticosteroid Mechanism

Less Inflammation at surgical site

May have effects in area postrema/vomiting center
Use of Steroids in Adult Tonsillectomy
Obj: assess effectiveness of intravenous steroids at induction on PONV and pain

Design: Prospective, randomized, double blind, placebo controlled trial (EBM Level 1)
McKean, *et al*

**Methods**

**Inclusion criteria**
- Age 16-70 yo
- ASA class I
- Weight 50-100kg

**Exclusion Criteria**
- Suspected dx of malignancy
- Pts having unilateral tonsillectomy
- Those with contraindications to NSAIDS
McKean et al
Methods cont’d

• Intervention
  – 2 groups of patients:
    • Those receiving 2mL of normal saline at induction
    • Those receiving 10mg (2mL) of dexamethasone on induction

• Anesthetic, operative technique and post-operative regimen consistent for both groups.
McKean et al
Methods cont’d

• Data collection
  – Pts to record daily PONV on take-home form for POD#0 and 7 days after
  – Recorded pain using visual analog scale for the same duration of time
  – Also documented time take to first po intake post-operatively
McKean et al

Results

In those given dexamethasone:

• 62% decrease in incidence of PONV ($P=0.001$)

• 23% decrease in post-op pain scores for the day of operation ($P=0.016$)

• 17.5% decrease in mean pain score for 7 post-op days ($P<0.001$)

• No adverse effects!
McKean et al
Results: PONV

<table>
<thead>
<tr>
<th></th>
<th>Day of operation</th>
<th>1st day post-op</th>
<th>2nd day post-op</th>
<th>3rd day post-op</th>
<th>4th day post-op</th>
<th>5th day post-op</th>
<th>6th day post-op</th>
<th>7th day post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group [n = 22 (%)]</td>
<td>17 (77)</td>
<td>4 (18)</td>
<td>7 (31)</td>
<td>2 (9)</td>
<td>1 (4.5)</td>
<td>2 (9)</td>
<td>2 (9)</td>
<td>1 (4.5)</td>
</tr>
<tr>
<td>Intervention group   [n = 24 (%)]</td>
<td>7 (29)</td>
<td>4 (16)</td>
<td>3 (12.5)</td>
<td>3 (12.5)</td>
<td>4 (16.5)</td>
<td>6 (25)</td>
<td>4 (16.5)</td>
<td>3 (12.5)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.001</td>
<td>2.11</td>
<td>1.07</td>
<td>1.9</td>
<td>1.64</td>
<td>9.8</td>
<td>9.8</td>
<td>3.27</td>
</tr>
</tbody>
</table>
McKean et al
Results: Time to Ingestion

<table>
<thead>
<tr>
<th></th>
<th>Drink (h)</th>
<th>Food (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n = 22)</td>
<td>2.4</td>
<td>4.1</td>
</tr>
<tr>
<td>Intervention group (n = 24)</td>
<td>2.1</td>
<td>6.5</td>
</tr>
<tr>
<td>P-value</td>
<td>0.439</td>
<td>0.098</td>
</tr>
</tbody>
</table>

Table 3. Post-operative time to ingestion of food and drink
### Results: Pain Scores

#### Table 4. Post-operative mean pain scores

<table>
<thead>
<tr>
<th></th>
<th>Day of operation</th>
<th>1st day post-op</th>
<th>2nd day post-op</th>
<th>3rd day post-op</th>
<th>4th day post-op</th>
<th>5th day post-op</th>
<th>6th day post-op</th>
<th>7th day post-op</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n = 22)</td>
<td>7.0</td>
<td>5.4</td>
<td>5.7</td>
<td>6.1</td>
<td>6.9</td>
<td>6.8</td>
<td>6.6</td>
<td>6.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Intervention group (n = 24)</td>
<td>5.4</td>
<td>5.3</td>
<td>5.1</td>
<td>5.2</td>
<td>5.3</td>
<td>5.6</td>
<td>5.2</td>
<td>4.5</td>
<td>5.2</td>
</tr>
<tr>
<td>Relative change (%)</td>
<td>−23</td>
<td>−2</td>
<td>−10</td>
<td>−15</td>
<td>−23</td>
<td>−18</td>
<td>−21</td>
<td>−25</td>
<td>−17.5</td>
</tr>
<tr>
<td>P-value</td>
<td>0.016</td>
<td>0.458</td>
<td>0.161</td>
<td>0.090</td>
<td>0.010</td>
<td>0.029</td>
<td>0.039</td>
<td>0.030</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Study Attributes

Weaknesses

• Poor return rate for the symptom score sheets (64%)
• No control for analgesia or antiemetic use
• Differences in medication intake between the two groups could alter some outcomes.

Strengths

• Large enough sample size to give statistical power to the study
• Lack of control gives true reflection of the subjective feeling of the patient; gives clinical relevance to the trial
McKean et al
Conclusions

• Single dose of 10mg dexamethasone IV at induction can significantly decrease pain scores for the day of operation.

• Mean pain score for the 1st week post-operatively was also significantly decreased.

• Post-op nausea and vomiting also significantly decreased for the day of operation.

• No difference seen in time to first ingestion
“The effect of preoperative dexamethasone on early oral intake, vomiting and pain after tonsillectomy”
Objective: evaluate the effect of preoperative dexamethasone on post-op oral intake, pain and vomiting

Design: prospective, randomized, double-blind, placebo controlled

(EBM level 1)
Kaan et al
Methods

• Inclusion criteria
  – Age 4-12 yo
  – ASA I or II and undergoing tonsillectomy w/wo adenoidectomy

• Exclusion criteria
  – Children who received antiemetics, steroids, antihistamines 24 hrs preoperatively
  – Pts in whom IV induction was indicated
  – Pts in whom steroids are contraindicated
  – DM or mental retardation
• Premedication, induction and maintenance of anesthesia consistent for all patients.
• Pts randomized to receive 0.5mg/kg dexamethasone or equivalent volume of saline (placebo) just before start of surgery.
• Pain, vomiting, oral intake monitored hourly
Kaan et al
Methods cont’d

• Vomiting
  – Retching or vomiting more than once in 3 min = “one vomiting episode”
  – All vomiting episodes and antiemetic requirements documented

• Pain
  – Assessed using five-point “faces” scale

• Oral intake
  – Amount of water and/or clear fluid pt able to drink each hour was recorded.
Kaan et al
Methods cont’d

• Oral intake
  – Scale:
    • 100ml (full)
    • 50ml (half)
    • 10-15ml (little)
    • 0 (none)
  – IV line removed when po fluid total = 150ml

• Discharge criteria
  – Full awake and cooperative
  – Stable
  – Pain score 1-2
  – No tonsillar bleeding
  – Ingestion of 400ml clear liquids or soft diet
Kaan et al

Results

• In pts receiving dexamethasone preoperatively:
  – Pain reduced significantly in first 6h post-operatively ($p<0.05$)
  – Amount of time to oral intake shorter ($p<0.05$)
  – Earlier discharge time ($p<0.05$)

• No difference in vomiting episodes
## Results

<table>
<thead>
<tr>
<th></th>
<th>Dexamethasone (n = 32)</th>
<th>Control (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retching/vomiting (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACU</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Floor</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Overall</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Antiemetic requirement (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metoclopramide</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Analgesic requirement (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meperidine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACU</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Paracetamol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 h</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>3 h</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>4 h</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>5 h</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Time to first oral paracetamol (h) (mean ± S.D.)</td>
<td>3.2 ± 0.8</td>
<td>3.8 ± 0.9</td>
</tr>
</tbody>
</table>

PACU: postanesthesia care unit.
Results: Pain Scores

Postoperative "faces" pain score (mean ± S.D.); *p < 0.05, between two groups.
Kaan et al

Results: Oral Intake

Fig. 2  Postoperative oral intake amounts; *p < 0.05, between two groups.
• Single dose of 0.5mg/kg dexamethasone in pts undergoing tonsillectomy +/- adenoidectomy results in:
  – Decreased post-op pain
  – Improved oral intake as well as increased quality of oral intake
  – No decrease in postoperative vomiting incidence.
“Do Steroids Reduce Morbidity of Tonsillectomy? Meta-Analysis of Randomized Trials”

Laryngoscope 111: October 2001
Steward et al

The Laryngoscope

- **Objective**: Reconcile conflicting reports regarding ability of dexamethasone to reduce post-tonsillectomy morbidity
- **Design**: meta-analysis of 8 studies (EBM level 1)
Steward et al
Methods

• Hypothesis:
  – A single intraoperative dose of dexamethasone reduces post-op morbidity in pediatric tonsillectomy.

• End points
  – Emesis
  – Pain
  – Early return to soft or solid diet
• Inclusion criteria
  – Randomized, double blind, placebo-controlled trials
  – Used a single intraoperative dose of dexamethasone
  – Age $\leq 18$ yo
  – Undergoing tonsillectomy or adenotonsillectomy
### TABLE I.
Studies Included in Meta-analysis.

<table>
<thead>
<tr>
<th>Author</th>
<th>Dexamethasone Dose</th>
<th>Surgery Procedure</th>
<th>Surgery Technique</th>
<th>Anesthetic Technique Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vosdoganis$^7$</td>
<td>0.4 mg/kg, 8 mg</td>
<td>T + T/A</td>
<td>Cold</td>
<td>Yes</td>
</tr>
<tr>
<td>Pappas$^8$</td>
<td>1.0 mg/kg, 25 mg</td>
<td>T + ?T/A</td>
<td>Electrocautery</td>
<td>X</td>
</tr>
<tr>
<td>Splinter$^4$</td>
<td>0.15 mg/kg, 8 mg</td>
<td>T + T/A</td>
<td>Not controlled</td>
<td>X</td>
</tr>
<tr>
<td>Tom$^5$</td>
<td>1.0 mg/kg, 10 mg</td>
<td>T/A</td>
<td>Electrocautery</td>
<td>X</td>
</tr>
<tr>
<td>April$^{11}$</td>
<td>1.0 mg/kg, 16 mg</td>
<td>T + T/A</td>
<td>Electrocautery</td>
<td>X</td>
</tr>
<tr>
<td>Ohlms$^9$</td>
<td>0.5 mg/kg, 12 mg</td>
<td>T + T/A</td>
<td>Cold</td>
<td>X</td>
</tr>
<tr>
<td>Volk$^6$</td>
<td>NA</td>
<td>T + T/A</td>
<td>Cold</td>
<td>X</td>
</tr>
<tr>
<td>Catlin$^{10}$</td>
<td>0.15 mg/kg, 8 mg</td>
<td>T + T/A</td>
<td>Cold</td>
<td>X</td>
</tr>
</tbody>
</table>

NA = not applicable; T = tonsillectomy; T/A = adenotonsillectomy; ? = uncertain.
Steward et al
Methods (cont’d)

• Exclusion criteria
  – Involved adults
  – Not randomized, double-blinded, placebo-controlled
  – Therapy other than corticosteroids
  – Involved procedures other than tonsillectomy/adenoidectomy
  – Not published/translated into English language.
# Excluded Studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Reason Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tewary(^{13})</td>
<td>1</td>
</tr>
<tr>
<td>Carr(^{12})</td>
<td>1</td>
</tr>
<tr>
<td>Liu(^{25})</td>
<td>1,2,4</td>
</tr>
<tr>
<td>Rundle(^{26})</td>
<td>3,4</td>
</tr>
<tr>
<td>Anderson(^{17})</td>
<td>1,4</td>
</tr>
<tr>
<td>Smith(^{31})</td>
<td>3,4</td>
</tr>
<tr>
<td>McKenna(^{28})</td>
<td>3,4</td>
</tr>
<tr>
<td>Schlorhauper(^{29})</td>
<td>4,6</td>
</tr>
<tr>
<td>Papangelou(^{2})</td>
<td>1,2,4</td>
</tr>
<tr>
<td>Williams(^{35})</td>
<td>1,5</td>
</tr>
<tr>
<td>Holt(^{23})</td>
<td>3</td>
</tr>
<tr>
<td>Egeli(^{21})</td>
<td>1,4</td>
</tr>
<tr>
<td>Fuji(^{22})</td>
<td>3</td>
</tr>
<tr>
<td>Stol(^{33})</td>
<td>2,6</td>
</tr>
<tr>
<td>Bonaccorsi(^{18})</td>
<td>3,6</td>
</tr>
<tr>
<td>Alavoine(^{16})</td>
<td>2,6</td>
</tr>
<tr>
<td>Skvirskiaia(^{30})</td>
<td>3,4,6</td>
</tr>
<tr>
<td>Pederson(^{27})</td>
<td>3,4</td>
</tr>
<tr>
<td>Del Villar(^{20})</td>
<td>3,4</td>
</tr>
<tr>
<td>Atherino(^{16})</td>
<td>3,4,6</td>
</tr>
<tr>
<td>King(^{24})</td>
<td>3,4</td>
</tr>
<tr>
<td>Villar(^{34})</td>
<td>3,4</td>
</tr>
<tr>
<td>Splinter '97(^{32})</td>
<td>2</td>
</tr>
</tbody>
</table>

1. Not limited to children.
2. Not randomized, double-blinded, and placebo-controlled.
3. Not corticosteroid only.
4. Not intravenous route.
5. Not tonsillectomy or adenotonsillectomy only.
6. Not published in or translated into English.
Steward et al
Results

• Emesis
  – Analyzed # of emetic events during first 24 hrs
  – Statistically significant reduction in emetic events

• Diet (day 1)
  – Analyzed # of pts advancing to soft/solid diet by POD#1
  – Statistically significant amount of pts advancing to soft/solid diet by POD#1
Steward et al
Results (cont’d)

• Diet (day 3)
  – Pts advancing to soft/solid diet on POD#3
  – Failed to demonstrate statistical significance

• Pain
  – Could not be analyzed due to missing data and different outcome measures

• Dosing
  – Regression analysis of emesis data
  – Doses varied among studies 0.15-1.0mg/kg
  – Maximum dose range 8-25mg
  – Marginal statistical significance of improved antiemetic effect with increased dose ($P=0.043$)
**Steward et al**

**Results (cont’d)**

<table>
<thead>
<tr>
<th>Study</th>
<th>Emesis—24 hr.</th>
<th>Day 1 Diet</th>
<th>Day 3 Diet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Steroid</td>
<td>Placebo</td>
<td>Steroid</td>
</tr>
<tr>
<td><strong>Emesis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steward</td>
<td>n/N</td>
<td>n/N</td>
<td>n/N</td>
</tr>
<tr>
<td>April</td>
<td>2/41</td>
<td>10/39</td>
<td>17/41</td>
</tr>
<tr>
<td>Catlin</td>
<td>3/10</td>
<td>7/15</td>
<td></td>
</tr>
<tr>
<td>Ohlms</td>
<td>2/34</td>
<td>3/35</td>
<td>6/34</td>
</tr>
<tr>
<td>Pappas</td>
<td>30/63</td>
<td>57/65</td>
<td></td>
</tr>
<tr>
<td>Splinter</td>
<td>25/63</td>
<td>50/70</td>
<td>19/26</td>
</tr>
<tr>
<td>Tom</td>
<td>1/26</td>
<td>15/32</td>
<td></td>
</tr>
<tr>
<td>Vosdoganis</td>
<td>10/22</td>
<td>10/19</td>
<td>22/22</td>
</tr>
<tr>
<td><strong>Pooled</strong></td>
<td>73/259 (29%)</td>
<td>152/275 (55%)</td>
<td>64/123 (52%)</td>
</tr>
<tr>
<td>RR (CI₉₅)</td>
<td>0.55 [0.41,0.74]*</td>
<td>1.69 [1.02,2.79]*</td>
<td>1.22 [0.81,1.86]</td>
</tr>
<tr>
<td>RD (CI₉₅)</td>
<td>−0.24 [−0.38,−0.10]*</td>
<td>0.21 [0.06,0.36]*</td>
<td>0.17 [−0.07,0.41]</td>
</tr>
<tr>
<td>NNT</td>
<td>4.17*</td>
<td>4.76*</td>
<td></td>
</tr>
</tbody>
</table>

* Statistically significant.

n = number of patients experiencing emesis, taking a soft/solid diet; N = number of patients in treatment group; empty spaces = no data (not studied, not reported, or different outcome measure); RR = relative risk; RD = risk difference; CI₉₅ = 95% confidence interval; NNT = number needed to treat.
Study Limitations

Weakness

• Combinability
• Selection bias
  – Exclusion of studies with missing data
  – Exclusion of studies with different end points
  – Exclusion of missed/unpublished studies

Rectification

• Used random-effects model instead of fixed-effects model
• Sensitivity analysis
Steward *et al* Conclusions

- Statistically significant reduction in postoperative morbidity with single dose of intraoperative dexamethasone
  - Reduction on emesis for first 24 hrs
  - Increase in number of pts advancing to soft/solid diet on POD#1
“The Use of Dexamethasone to Reduce Pain After Tonsillectomy in Adults: A Double-Blind Prospective Randomized Trial”
• Objective
  – Determine ability of dexamethasone to reduce pain after tonsillectomy
  – Ability of dexamethasone to decrease narcotic use by 20%

• Design
  – Prospective, double blind, randomized controlled (EBM level 1)
  – multicentric
Inclusion Criteria
• Ages 18-45
• Undergoing tonsillectomy

Exclusion Criteria
• Osteoporosis
• Uncontrolled HTN
• PUD being treated
• DM/hyperglycemia
• h/o PTA w/i previous month
• Pts on chronic pain regimens
• h/o psychosis or TB
• Corticosteroid dependency
Methods

• Day of surgery:
  – 8mg dexamethasone intraop or a placebo
  – 8mg po dose at home on the day of surgery

• POD#1-3
  – Dexamethasone tapered from 6mg-2mg

• Consistent anesthesia before/during surgery
  – Standardized protocol

• Surgical technique identical throughout
  – Cold technique (hemostasis achieved with cautery)

<table>
<thead>
<tr>
<th>TABLE I. Anaesthetic Protocol.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Induction</strong></td>
</tr>
<tr>
<td>Propofol 2–3 mg/kg</td>
</tr>
<tr>
<td>Rocuronium 0.25–0.5 mg/kg</td>
</tr>
<tr>
<td>O₂/N₂O</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
</tr>
<tr>
<td>Sevoflurane as required</td>
</tr>
<tr>
<td>Succinylcholine 0.5–0.75 mg/kg</td>
</tr>
<tr>
<td>Prostigmine/Robinul as required</td>
</tr>
<tr>
<td>Dexamethasone 4 mg at the end of the surgery</td>
</tr>
<tr>
<td><strong>Postoperative analgesia</strong></td>
</tr>
<tr>
<td>Morphine 0.1 mg/kg in 4 doses as needed</td>
</tr>
</tbody>
</table>

*After induction and before the beginning of the surgery, patients were given the study medication.*
Lachance et al
Methods

• Pain Analysis
  – Pts to evaluate pain using VAS
  – Record daily analgesic use
  – Every pt called on POD#1 and 4 by PI
  – Pt seen in F/u on POD#7
**Lachance et al**

**Results**
- No statistically or clinically significant reduction of pain according to VAS
- No statistical or clinical difference in consumption of hydromorphone between the two groups.

**Conclusion**
- Cannot recommend the use of dexamethasone on a routine basis following tonsillectomy in adults for the reduction of pain or narcotics consumption.
<table>
<thead>
<tr>
<th>Day</th>
<th>Difference of Mean Pain Scores Between Dexamethasone and Placebo Group</th>
<th>Confidence Intervals</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-7.12</td>
<td>-15.96 1.71</td>
<td>.11</td>
</tr>
<tr>
<td>1</td>
<td>-4.04</td>
<td>-12.90 4.81</td>
<td>.37</td>
</tr>
<tr>
<td>2</td>
<td>-9.02</td>
<td>-17.92 -0.11</td>
<td>.047</td>
</tr>
<tr>
<td>3</td>
<td>-3.64</td>
<td>-12.60 5.33</td>
<td>.43</td>
</tr>
<tr>
<td>4</td>
<td>-3.39</td>
<td>-12.39 5.62</td>
<td>.46</td>
</tr>
<tr>
<td>5</td>
<td>3.68</td>
<td>-5.37 12.73</td>
<td>.43</td>
</tr>
<tr>
<td>6</td>
<td>5.11</td>
<td>-4.00 14.22</td>
<td>.27</td>
</tr>
<tr>
<td>7</td>
<td>5.04</td>
<td>-4.19 14.28</td>
<td>.28</td>
</tr>
</tbody>
</table>
Lachance et al
Daily Mean Pain Scores

![Graph showing mean daily pain scores over time for Placebo and Dexamethasone treatments. The graph illustrates a decline in pain scores over days, with a more pronounced drop in scores for Dexamethasone compared to Placebo.]
“Is the Routine use of Antibiotics Justified in Adult Tonsillectomy?”
• The Scottish Intercollegiates Guidelines Network (SIGN) issued a publication, *Antibiotic Prophylaxis in Surgery*, and stated that "There is no evidence of effectiveness of prophylaxis from RCTs. The cited trials are of treatment for seven days after tonsillectomy, not prophylaxis."
O’Reilly *et al*

- **Objective:**
  - Determine the effect of amoxicillin on posttonsillectomy pain and secondary hemorrhage
O’Reilly et al

• **Design**
  – Randomized, double-blind, placebo-controlled prospective (EBM level 1)

• **Inclusion**
  – Age >16yo
  – Elective tonsillectomy for non-malignant disease

• **Intervention**
  – Pt given 250mg amoxicillin or placebo at induction
  – 7 day course of amoxicillin or placebo

• **Consistent post-op analgesia for all pts**
O’Reilly et al

• 2 week f/u appt scheduled for all pts:
  – Discussed post-op pain
  – Bleeding
  – GP consultation
  – Additional analgesics used
O’Reilly et al
Assessment of Post-op Bleeds

• (1) Primary hemorrhage/bleeding within 24 hours of the operation.
• (2) Minor secondary hemorrhage; bleeding after 24 hours but not requiring treatment.
• (3) Intermediate secondary hemorrhage; bleeding requiring hospital treatment short of surgery or blood transfusion.
• (4) Major secondary hemorrhage; bleeding requiring transfusion or surgery.
O’Reilly et al
Results

• None of the patients had primary hemorrhage

• 11/46 (23.9%) of active group and 12/49 (24.5%) of placebo group had secondary hemorrhage.
  – 2 intermediate hemorrhages in each
  – 2 major hemorrhages in the active group
O’Reilly et al

Results: Pain assessment

• Post-op pain assess on a linear scale of 1-5 on each of the 10 days.
  – The best potential sum of daily scores was 10 and the worst, 50 for any individual patient
  – Mean sum score for active group = 32.59
  – Mean sum score for placebo = 31.89

No Significant Difference
O’Reilly *et al*

Results: GP consultation

- > ½ of patients consulted GP due to post-op pain.
  - Active group sought treatment marginally more frequently

- Additional analgesics obtained by 41 patients
  - 19 active, 22 placebo
O’Reilly *et al*  
Conclusions  

- No evidence that routine amoxicillin prescription is justified in adult tonsillectomies  
  - Failed to measurably impact:  
    - secondary hemorrhage  
    - Post-op pain  
    - Frequency of GP consultation
“Antiobiotics for Reduction of Posttonsillectomy Morbidity: A Meta-Analysis”
• **Objective**
  – Reconcile conflicting reports regarding clinical efficacy of postoperative abx for reduction of posttonsillectomy morbidity.

• **Null Hypothesis**
  – Postoperative abx are no better than placebo in reducing posttonsillectomy morbidity

• **Study End Points**
  – Postoperative pain
  – Time to return to normal diet
  – Time to return to normal activity
Inclusion criteria
• Randomized, controlled trials comparing post-op oral abx to placebo

Exclusion criteria
• Trials using therapy other than abx
• No randomization
• No placebo control
• Studies not collecting data on the primary outcomes
## Included Studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Population</th>
<th>n</th>
<th>Oral Antibiotic</th>
<th>Control</th>
<th>Duration (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telian</td>
<td>Pediatric</td>
<td>85</td>
<td>Amoxicillin</td>
<td>Placebo</td>
<td>7</td>
</tr>
<tr>
<td>Colreavy</td>
<td>Pediatric</td>
<td>78</td>
<td>Amoxicillin/Clavulanate</td>
<td>No treatment</td>
<td>7</td>
</tr>
<tr>
<td>Grandis</td>
<td>Adult</td>
<td>101</td>
<td>Amoxicillin/Clavulanate</td>
<td>Placebo</td>
<td>7</td>
</tr>
<tr>
<td><em>Mann</em></td>
<td>Adult</td>
<td>18</td>
<td>Amoxicillin</td>
<td>Placebo</td>
<td>7</td>
</tr>
<tr>
<td>O’Reilly</td>
<td>Adult</td>
<td>95</td>
<td>Amoxicillin</td>
<td>Placebo</td>
<td>7</td>
</tr>
<tr>
<td>Khan</td>
<td>Adult &amp; Pediatric</td>
<td>80</td>
<td>Amoxicillin</td>
<td>No treatment</td>
<td>1</td>
</tr>
<tr>
<td>Lee</td>
<td>Pediatric</td>
<td>95</td>
<td>Amoxicillin</td>
<td>No treatment</td>
<td>5</td>
</tr>
</tbody>
</table>

*Two additional groups used antibiotics topically.

n = total number of patients in study.
### TABLE II.
Studies Excluded from Meta-Analysis.

<table>
<thead>
<tr>
<th>Not Meeting Inclusion Criteria</th>
<th>Reason Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Kindy^{10}</td>
<td>1</td>
</tr>
<tr>
<td>Jones^{11}</td>
<td>2,3</td>
</tr>
<tr>
<td>Cannon^{9}</td>
<td>3</td>
</tr>
<tr>
<td>Linden^{12}</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Not randomized or controlled;
2. Not placebo/nontreatment controlled;
3. Single dose intravenous antibiotic;
4. Method of antibiotic delivery not reported.
### TABLE III.
Outcome Methods of Included Studies Qualifying and not Qualifying for Specific End Point Analysis.

<table>
<thead>
<tr>
<th>Author</th>
<th>Postoperative Pain</th>
<th>Return to Normal Diet</th>
<th>Return to Normal Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telian²</td>
<td>Days of pain</td>
<td>Days</td>
<td>Days</td>
</tr>
<tr>
<td>Colreavy³</td>
<td>VAS (7 days)</td>
<td>Days</td>
<td>Data not reported</td>
</tr>
<tr>
<td>Grandis⁴</td>
<td>VAS (5 and 7 days)</td>
<td>Dietary score</td>
<td>Activity score</td>
</tr>
<tr>
<td>Mann⁵</td>
<td>VAS (5 days)</td>
<td>Data not reported</td>
<td>Data not reported</td>
</tr>
<tr>
<td>O'Reilly⁶</td>
<td>VAS (5 and 7 days)</td>
<td>Data not reported</td>
<td>Data not reported</td>
</tr>
<tr>
<td>Khan⁷</td>
<td>Days of pain</td>
<td>Days</td>
<td>Days</td>
</tr>
<tr>
<td>Lee⁸</td>
<td>Data not reported</td>
<td>Data not reported</td>
<td>Data not reported</td>
</tr>
</tbody>
</table>

*Studies qualifying for particular end point analysis in bold.*

*VAS = visual analogue scale.*
Burkhart & Steward
Results

• Postoperative Pain
  – No significant effect of antibiotic therapy

• Time to Return to Normal Diet
  – Statistically significant earlier return to normal diet
    • 3.5 days for treatment group, 4.5 days for placebo

• Time to Return to Normal Activity
  – Statistically significant return to normal activity
    • 6 days for treatment group, 7 days placebo group
TABLE IV.  
Meta-Analysis Results for Postoperative Pain Over First 5 Days.

<table>
<thead>
<tr>
<th>Study</th>
<th>n_t</th>
<th>Treatment VAS Mean (SD)</th>
<th>n_c</th>
<th>Control VAS Mean (SD)</th>
<th>†Difference in Means (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grandis⁴</td>
<td>51</td>
<td>5.20 (2.20)</td>
<td>50</td>
<td>5.60 (2.20)</td>
<td>-0.40 (-1.26, 0.46)</td>
</tr>
<tr>
<td>Mann⁵</td>
<td>8</td>
<td>6.60 (2.20)</td>
<td>10</td>
<td>6.90 (2.20)</td>
<td>-0.30 (-2.35, 1.75)</td>
</tr>
<tr>
<td>O’Reilly⁶</td>
<td>46</td>
<td>8.00 (2.20)</td>
<td>49</td>
<td>6.30 (2.20)</td>
<td>1.70 (0.81, 2.59)</td>
</tr>
<tr>
<td>Pooled*</td>
<td>105</td>
<td></td>
<td>109</td>
<td></td>
<td>0.41 (-1.18, 2.00)</td>
</tr>
</tbody>
</table>

*Hypothesis test for overall effect: P = .61.
†Weighted mean difference using random effects model.

n_t = number of patients in antibiotic group; n_c = number of patients in control group; VAS = visual analog scale 0–10; SD = standard deviation; 95% CI = 95% confidence interval where inclusion of 0 demonstrates nonsignificant difference between groups.
TABLE V.
Meta-Analysis Results for Postoperative Pain Over First 7 Days.

<table>
<thead>
<tr>
<th>Study</th>
<th>n_t</th>
<th>Treatment VAS Mean (SD)</th>
<th>n_c</th>
<th>Control VAS Mean (SD)</th>
<th>†Difference in Means (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colreavy⁵</td>
<td>44</td>
<td>2.80 (6.25)</td>
<td>34</td>
<td>6.30 (6.25)</td>
<td>-3.50 (-6.30, -0.70)</td>
</tr>
<tr>
<td>Grandis⁴</td>
<td>51</td>
<td>4.80 (6.25)</td>
<td>50</td>
<td>5.00 (6.25)</td>
<td>-0.20 (-2.64, 2.24)</td>
</tr>
<tr>
<td>O’Reilly⁰</td>
<td>46</td>
<td>7.80 (6.25)</td>
<td>49</td>
<td>6.20 (6.25)</td>
<td>1.60 (-0.91, 4.11)</td>
</tr>
<tr>
<td>Pooled*</td>
<td>141</td>
<td></td>
<td>133</td>
<td></td>
<td>-0.64 (-3.46, 2.18)</td>
</tr>
</tbody>
</table>

*Hypothesis test for overall effect: P = .66.
†Weighted mean difference using random effects model.
n_t = number of patients in antibiotic group; n_c = number of patients in control group; VAS = visual analog scale 0–10; SD = standard deviation; 95% CI = 95% confidence interval where inclusion of 0 demonstrates nonsignificant difference between groups.
# TABLE VI.
Meta-Analysis Results for Time to Return to Normal Diet in Days.

<table>
<thead>
<tr>
<th>Study</th>
<th>n&lt;sub&gt;t&lt;/sub&gt;</th>
<th>Treatment Days Mean (SD)</th>
<th>n&lt;sub&gt;c&lt;/sub&gt;</th>
<th>Control Days Mean (SD)</th>
<th>†Difference in Means (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telian²</td>
<td>45</td>
<td>1.30 (1.72)</td>
<td>40</td>
<td>2.30 (1.72)</td>
<td>-1.00 (-1.73, -0.27)</td>
</tr>
<tr>
<td>Colreavy³</td>
<td>44</td>
<td>2.20 (4.00)</td>
<td>34</td>
<td>4.60 (4.00)</td>
<td>-2.40 (-4.19, -0.61)</td>
</tr>
<tr>
<td>Khan⁷</td>
<td>40</td>
<td>7.30 (13.60)</td>
<td>40</td>
<td>7.70 (13.60)</td>
<td>-0.40 (-6.36, 5.56)</td>
</tr>
<tr>
<td>Pooled*</td>
<td>129</td>
<td>114</td>
<td></td>
<td></td>
<td>-1.22 (-1.97, -0.48)</td>
</tr>
</tbody>
</table>

*Hypothesis test for overall effect: P = .001.
†Weighted mean difference using random effects model.
n<sub>t</sub> = number of patients in antibiotic group; n<sub>c</sub> = number of patients in control group; SD = standard deviation; 95% CI = 95% confidence interval where exclusion of 0 demonstrates significant difference between groups.
**Burkhart & Steward**

**Return to Normal Activity**

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**TABLE VII.**

Meta-Analysis Results for Time to Return to Normal Activity in Days.

<table>
<thead>
<tr>
<th>Study</th>
<th>$n_t$</th>
<th>Treatment Days Mean (SD)</th>
<th>$n_c$</th>
<th>Control Days Mean (SD)</th>
<th>†Difference in Means (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telian²</td>
<td>45</td>
<td>4.20 (1.92)</td>
<td>40</td>
<td>5.20 (1.92)</td>
<td>-1.00 (-1.82, -0.18)</td>
</tr>
<tr>
<td>Khan⁷</td>
<td>40</td>
<td>8.80 (14.80)</td>
<td>40</td>
<td>8.90 (14.80)</td>
<td>-0.10 (-6.59, 6.39)</td>
</tr>
<tr>
<td>Pooled*</td>
<td>85</td>
<td>8.80 (14.80)</td>
<td>80</td>
<td></td>
<td>-0.99 (-1.80, -0.17)</td>
</tr>
</tbody>
</table>

*Hypothesis test for overall effect: $P = .02$.  
†Weighted mean difference using random effects model.

$n_t$ = number of patients in antibiotic group; $n_c$ = number of patients in control group; SD = standard deviation; 95% CI = 95% confidence interval where exclusion of 0 demonstrates significant difference between groups.
Burkhart & Steward
Conclusions

• No difference in posttonsillectomy pain with use of postoperative antibiotics
• Statistically significant reduction in time needed to return to normal diet and activity
The Bottom Line

• Perioperative dexamethasone use in children has significant effect in reducing morbidity, especially nausea/vomiting.

• There have been studies (although few) that illustrate that a single dose of intra-op dexamethasone can reduce morbidity in adults
  – Post-op course of dexamethasone in adults seems to be void of benefit

• Perioperative antibiotics in both children and adults result in earlier return to normal diet and activity but less effect on post-op pain.
**BIBLIOGRAPHY**


..
Bibliography (cont’d)

