

STANDARDIZATION OF TONSILLECTOMY PRACTICES IN PEDIATRIC OTOLARYNGOLOGY

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Outline

- Background
- Review the Children's ENT journey to standardization of care (chronologic order)
 - Standardizing postoperative disposition (including ICU) after pediatric tonsillectomy (T&A)
 - Standardizing care of pediatric post-tonsillectomy hemorrhage (PTH)
 - Standardizing postoperative pain management after T&A
 - Standardizing preoperative and postoperative sleep study practices
- Future directions
- Questions

Background

- T&A is among the most common surgical procedures performed on children in the US
 - Most common indications for T&A are sleep disordered breathing (SDB)/OSA and recurrent tonsillitis
 - Estimated around 500,000 a year
 - Rates decreased by 50% from 2000 to 2014 (JAMA Otolaryngology 2018)
 - Decline likely related to changing medical guidelines that are more conservative, especially for tonsillitis (Paradise criteria)
 - CHAT study (Children's Adenotonsillectomy Trial): showed T&A is an effective treatment for SDB/OSA that leads to better sleep quality, cognitive function and behavior.

Background

- Complications of T&A include:
 - Pain: not really a complication, more of an expectation
 - Dehydration: 2-5%, often related to poor pain control
 - PTH: 1-5% typically, 0.5% return to OR (Journal of Pediatrics 2015)
 - Airway issues: risk factors
 - Infection: very rare (Grisel syndrome even more rare)
 - Mortality: 1 in 100,000 reported incidence but 1 study reported no deaths in cohort of over 400,000 (Archives of Otolaryngology-Head & Neck Surgery 2009)

Background

- What led to the journey to optimize and standardize care of T&A patients?
 - Clear inconsistencies in care that were not necessarily evidence-based
 - Need to be more mindful of resources
 - Bed shortage
 - Staffing shortage
 - Keeping up to date on literature and trends around the country

STANDARDIZING POSTOPERATIVE DISPOSITION (INCLUDING ICU) AFTER T&A

Definitions

- Outpatient
- Outpatient in a bed (OPIB)
- Observation
- Inpatient

Review of data

- 2019-current:
 - 92% were classified as OPIB
 - <3% were classified as observation
 - 5% were inpatient
- 2022 OPIB: 313 T&A patients

WHO NEEDS ADMISSION?

WHO DOES NOT NEED
ADMISSION?

Evidenced based admission criteria

- Based on American Academy of Otolaryngology Clinical Practice Guidelines for pediatric tonsillectomy (2019)*
 - AHI ≥ 10 on PSG (=severe OSA)
 - O2 nadir $< 80\%$ on PSG (=severe OSA)
 - Age < 3 y.o
 - Comorbidities according to AAO-HNS practice guidelines:
 - Craniofacial syndromes (eg: trisomy 21)
 - History of congenital heart disease or kidney failure
 - Presence of bleeding disorder
 - Sickle cell disease

*Mitchell RB, Archer SM, Ishman SL, Rosenfeld RM, et al. "Clinical Practice Guideline: Tonsillectomy in Children (Update)". Otolaryngol Head Neck Surg. 2019 Feb (1_suppl):S1-S42

Specific groups

- **Obese patients:**
 - Should get PSG on obese patients with weight or BMI > 95 th percentile (ideally)
 - Admit patients with weight or BMI > 99 th percentile postoperatively if no PSG
 - If obese patient with weight or BMI > 95 th percentile does not have severe OSA or hypoxemia on PSG and is over age 3, ok to do as outpatient
- **Trisomy 21:**
 - Always admit these patients regardless of age
 - Recommend PSG prior to T&A in trisomy 21 unless mitigating circumstances

Documentation

Based on recommendations from the 2019 American Academy of Otolaryngology Clinical Practice Guidelines for Tonsillectomy in Children, the patient meets criteria for overnight admission due to age under 36 months.

age under 36 months
severe obstructive sleep apnea on sleep study
obesity and desaturations to less than 90% on sleep study
trisomy 21
craniofacial condition increasing the risk of airway problems
neuromuscular disorder increasing risk for postoperative respiratory failure

WHAT "STATUS" SHOULD THESE PATIENTS BE

Prior authorization

- Submit prior authorization for inpatient admission postop
- Document PA status in Cerner for surgeon to see and place appropriate orders postoperatively
- Inpatient vs Observation

Location of admission

- PICU criteria:
 - Neuromuscular conditions/significant craniofacial abnormalities per surgeon discretion
 - Children requiring positive pressure preoperatively
 - PSG ETCO₂>60
 - PSG O₂ nadir<70%
 - AHI is **NOT** an independent indication for PICU admission
 - BMI or weight alone is **NOT** an independent indication for PICU admission

Family communication

Dear Parents,

Your child is scheduled for a tonsillectomy and adenoidectomy (T&A) at Children's Minnesota. Most children go home the same day after this surgery, but some need to stay overnight. We use guidelines from the American Academy of Otolaryngology-Head and Neck Surgery to decide if a child needs to stay overnight.

If your child does not need to stay overnight, the surgery will be planned as same-day surgery.

If your child does need to stay overnight, we will ask your insurance company to approve this. Sometimes, insurance companies do not agree to pay for an overnight stay, even when it is needed. In those cases, we will change the surgery schedule to same-day surgery. This might be confusing when you get your pre-surgery phone call. However, if your child still needs to stay overnight, we will make sure they get the care they need.

Please know that any decision to keep your child in the hospital overnight is based on their health needs, not on your insurance plan. Your child's health and safety are our top priority.

Sincerely,

Children's ENT and Facial Plastic Surgery
Children's Minnesota

Partnerships along the way

- Utilization management committee
- Case management personnel
- Prior authorization team
- Periop staff

STANDARDIZING POSTOPERATIVE PAIN MANAGEMENT AFTER T&A

Our standard pain management plan

INPATIENT POST-OP PAIN MANAGEMENT AFTER T&A:

- Acetaminophen Q6H PRN (some surgeons schedule)
- Ibuprofen Q6H PRN (some surgeons schedule)
- Oxycodone Q6H PRN for breakthrough pain
- Morphine IV Q6H PRN for breakthrough pain if not taking PO intake (some surgeons order)
- Acetaminophen suppository Q6H PRN is available if not taking PO acetaminophen.
- +/- PO post operative dexamethasone (surgeon dependent).

OUTPATIENT POST-OP PAIN MANAGEMENT AFTER T&A:

- Acetaminophen Q6H
- Ibuprofen Q6H
- Oxycodone Q6H PRN for breakthrough pain
- +/- PO post operative dexamethasone (surgeon dependent).

Of note, every child is given IV dexamethasone by anesthesia in the operating room

Motivations for change

- Patient safety #1 concern
- Side effects of narcotics (ex: nausea and constipation)
- Opioid crisis—how are we contributing to circulation of opioids?
- Children's is in the minority prescribing narcotics for all children post- T&A
 - Morocco et al. Current pediatric tertiary care practices following adenotonsillectomy: An update. Laryngoscope, 134:2931–2936, 2024.
 - Survey of large pediatric ENT practices across US
 - All programs give acetaminophen and ibuprofen
 - 31/53 (58%) prescribe narcotics, 84% of these have an age restriction (>5 most common)
 - 22/53 (31%) prescribe no narcotics

Supporting evidence in literature

- **Opioid dose and postoperative respiratory adverse events after adenotonsillectomy in medically complex children** (Tsampaliero, et al. 2022)
 - Association between opioid dosing, OSA, and postop respiratory adverse events
- **Sustaining standardized opioid prescribing practices after pediatric tonsillectomy** (Cordray, et al. 2022)
 - Quality improvement project that provided an electronic order set for weight-based dosing and default to non-opioid analgesics for pain control. Ages 0-5 received non-opioids only (ibuprofen and acetaminophen). Ages 7-18 received non-opioid medications as first-line treatment, with hydrocodone-acetaminophen manually added by provider as needed for break through pain. Opioid prescriptions and quantity were reviewed pre- vs post-standardization.
 - Standardized post-operative pain protocol utilizing age-based and weight-based non-opioid analgesics reduced post-tonsillectomy opioid use without an increased return for post-operative complaints
- **Reducing Pediatric Post-Tonsillectomy Opioid Prescribing: A Quality Improvement Initiative** (Shaunak, et al. 2023)
 - Six months of post-operative opioid prescriptions were reviewed prior to and following opioid education sessions to surgeons, studying opioid prescribing habits and implementation of a standardized prescription protocol of 2 doses per patient. Specific measures evaluated included: initial number of opioid doses prescribed, need for refills, 7-day emergency department visits and readmission. Ibuprofen and acetaminophen were also scheduled, with opioids to be used PRN.
 - Interventions resulted in a statistically significant decrease in number of opioids prescribed, rate of refills requested, 7-day ED visits, or readmission.

Supporting evidence in literature

- **The effect of postoperative steroids on post-tonsillectomy pain and need for postoperative physician contact** (Redmann, et al. 2018)
 - Retrospective medical record review to examine the effects of post-tonsillectomy steroid utilization on postoperative physician contact and rate of hemorrhage.
 - Post-operative steroid use following tonsillectomy decreased post-operative phone calls by 9% and decreased post-operative tonsillar hemorrhage by 7%.
- **Parental assessment of pain control following pediatric adenotonsillectomy: Do opioids make a difference?** (Adler, et al. 2020)
 - Postoperative survey assessing parental assessment of pain control following adenotonsillectomy of 324 patients, ages 1-17. Pain regimens included ibuprofen and acetaminophen, or ibuprofen and hydrocodone/acetaminophen, depending on surgeon prescribing preference.
 - Non-opioid regimen was not associated with decreased parental satisfaction, or increased assessment of poor/ inadequately managed pain post-operatively.

Supporting evidence in literature

- **Impact of Ketorolac on Reoperation for Hemorrhage After Pediatric Tonsillectomy: A Single-Center Retrospective Propensity-Matched Study** (Feldman, et al. 2024)
 - Retrospective propensity-matched study to determine if perioperative ketorolac is associated with an increased rate of reoperation for hemorrhage at 48 hours and 30 days post-operatively, (5873 pts in full cohort; 4694 pts in propensity – matched cohort)
 - Post-operative ketorolac is not associated with increased risk of reoperation for hemorrhaging at 48 hours and 30 days.
- **Effect of perioperative ketorolac on postoperative bleeding after pediatric tonsillectomy** (Shaikh, et al. 2024)
 - A TriNetX electronic medical record query for patients under 18 yo who underwent tonsillectomy, with or without adenoidectomy, and did not have a bleeding disorder. Patients were split into two cohorts based on whether they received post-operative ketorolac on the day of surgery. Out comes assess were rate of primary post-operative hemorrhage (first day) and secondary post-operative hemorrhage (first month).
 - Ketorolac used following tonsillectomy, with or without adenoidectomy, increased the risk of post-operative primary and secondary tonsillar hemorrhaging requiring surgical intervention.
- **Dose-Related Effects and Bleeding Risk of Ketorolac in Pediatric Tonsillectomy** (Kim, et al. 2024)
 - Meta-analysis of 18 studies with 11,729 patients
 - 0.9 to 1 mg/kg of ketorolac significantly increases risk of primary PTH (OR = 2,3200) but not secondary PTH
 - 0.5 mg/kg ketorolac did not increase bleeding risk
 - Both 0.9-1 and 0.5 mg/kg led to a significant decrease in postoperative pain (2-24 hours), nausea, and vomiting compared to the control group.

Standard pain management plan

INPATIENT POST-OP PAIN MANAGEMENT AFTER T&A:

- Acetaminophen Q6H PRN (some surgeons schedule)
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OUTPATIENT POST-OP PAIN MANAGEMENT AFTER T&A:

- Acetaminophen Q6H
- Ibuprofen Q6H
- Oxycodone Q6H PRN for breakthrough pain
- +/- PO post operative dexamethasone (surgeon dependent).

Of note, every child is given IV dexamethasone by anesthesia in the operating room

New pain management plan (Go Live January 2025)

- Schedule PO every 6 hours
- Can use suppository (age 3y.o or younger) or IV* (age 4y.o or older) if PO medication administration is difficult.

- Schedule PO every 6 hours
- Can use IV Toradol if PO medication administration is difficult*.

- Dose is standardized at 4mg
- Administer on post op day 1, 3, & 5.

- Given every 6 hours as needed for breakthrough pain.
- Prescribed **only** for patients **7 years of age or older**.

Acetaminophen and ibuprofen can be given together every 6 hours or alternated every 3 hours

*inpatients

Adjuvant measures to pain control

- Honey can help reduce the requirement of analgesics (Swain 2021)
- Warm/cold packs
- Distraction measures
- Parental presence

Logistics of roll-out

- Key elements
 - ENT staff education (especially triage RNs)
 - Patient and family counseling in clinic
 - Revise all patient and family education materials
 - Meeting with periop staff at all 3 OR locations
 - Meeting with inpatient unit staff, including PICU, at both hospital campuses
- All of this was done **PRIOR** to roll out on January 1
 - All parties had a chance to ask questions, express concerns, etc

STANDARDIZING PREOPERATIVE AND POSTOPERATIVE SLEEP STUDY PRACTICES

Who should get a preop sleep study (PSG)?

- Based on American Academy of Otolaryngology Clinical Practice Guidelines for pediatric tonsillectomy (2019)* children with sleep disordered breathing should have polysomnography (PSG) prior to T&A if:
 - <2 years of age
 - Morbid obesity (weight or BMI >95th percentile)
 - Down syndrome
 - Craniofacial abnormalities
 - Neuromuscular disorders
 - Sickle cell disease
 - Mucopolysaccharidoses.
- Consider PSG prior to T&A for sleep disordered breathing (SDB) if need for tonsillectomy is uncertain or there is discordance between the exam and the reported severity of SDB

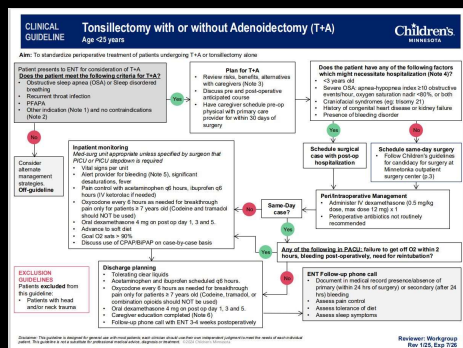
*Mitchell RB, Archer SM, Inman SL, Rosenfeld RM, Coles S, Finestone SA, Friedman NR, Giordano T, Hildrew DM, Kim TW, Lloyd RM, Parkh SR, Shulman ST, Walker DL, Walsh SA, Nnaecheta LC. Clinical Practice Guideline: Tonsillectomy in Children (Update). Otolaryngol Head Neck Surg. 2019 Feb;160(1_suppl):S1-S42. doi: 10.1177/0145569818801737. PMID: 30793778.

Who should get a postop PSG?

- Sleep team recommends PSG post-op for moderate and severe OSA.
- Sleep team has a protocol in place to flag these kids post surgery (they are made aware of surgical date so they can schedule the postop PSG proactively)
- If ENT does not see a postop PSG is scheduled at the time of surgery, message is sent to sleep clinic to reach out to family to schedule

Key partnership with Sleep Clinic

- Sleep team is running at full capacity given the limitations they have in staffing and space (4-6 sleep studies/night)
- We developed a collaborative workflow for the new patient seen in ENT that needs T&A but should have PSG prior to surgery. This ensured that surgery was scheduled shortly after the PSG was scheduled.
- Separate protocol for children who need an urgent sleep study
- Bidirectional collaboration: Standardized path for sleep providers to get kids with urgent T&A needs into ENT clinic for eval and expedited surgery



FUTURE DIRECTIONS

CITA

- Pick procedure all children's hospitals perform multiple times per day (TONSILLECTOMY)
- Improve outcomes in all six Institutes of Medicine (IOM) quality domains
 - Patient Safety
 - Effectiveness (Efficacy)
 - Patient-Centeredness
 - Timeliness
 - Efficiency
 - Equity



CONSORTIUM FOR IMPROVEMENT
TONSILLECTOMIES AND ADENOIDECTOMIES

Potential Tonsillectomy Quality Outcomes

Patient Safety	
Return to OR	Same-day (< 0.5%); 30-day (< 2%)
Hospital readmission < 30 days	< 2%
Effectiveness	
PACU opioid use rate	< 10% (multimodal analgesia approach)
PACU PONV medication use rate	< 2%
Patient/Family Centeredness	
Maximum pain score (0-10) in PACU	< 4
Opioid Free Analgesia	> 90%
Home opioid prescription dose count	50% reduction from baseline or ≤ 6 doses
Timeliness	
All Case On-Time Start Rate	> 80%
PACU length of stay	< 90 minutes
Prolonged stay (>120 minutes) rate	< 5%
Efficiency	
In room (wheels in to wheels out) time	< 30 minutes
Room turnover (wheels out to wheels in) time	< 20 minutes
Equity	
Pain scores & PONV treatment	no racial disparity
Hospital readmission < 30 days	no racial disparity





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Participating & Potential Centers

- Confirmed:
 - Seattle Children's (Drs. Sanjay Parikh and Aaron Low)
 - Children's Minnesota (Drs. Abby Meyer, Asha Nookala, and Ben Kloesel)
 - Nemours Delaware (Drs. Nicole Aaronson, Libby Elliot, and Susmita Nesargi)
- Interested:
 - Many centers

Hope to add 5-10 additional centers

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Thank you!

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