

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
 - o 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)
 - o 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.

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Background

- · Complications of T&A include:
 - o Pain: not really a complication, more of an expectation
 - o Dehydration: 2-5%, often related to poor pain control
 - OPTH: 1-5% typically, 0.5% return to OR (Journal of Pediatrics 2015)
 - o 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)

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Background

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

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STANDARDIZING POSTOPERATIVE DISPOSITION (INCLUDING ICU) AFTER T&A

Definitions

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

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Review of data

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

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WHO NEEDS ADMISSION?

WHO DOES NOT NEED ADMISSION?



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 Based on American Academy of Otolaryngology Clinical Practice Guidelines for pediatric tonsillectomy (2019)*

- o AHI ≥10 on PSG (=severe OSA)
- O2 nadir <80% on PSG (=severe OSA)
- Age <3 y.o
- o Comorbidities according to AAO-HNS practice guidelines:
 - Craniofacial syndromes (eg: trisomy 21)
 - · History of congenital heart disease or kidney failure

Evidenced based admission criteria

- 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

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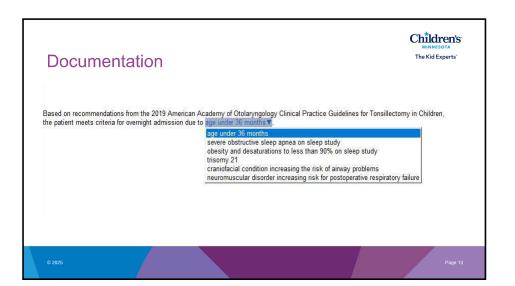


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Specific groups

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

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WHAT "STATUS" SHOULD THESE PATIENTS BE

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Submit prior authorization for inpatient admission postop

- Document PA status in Cerner for surgeon to see and place appropriate orders postoperatively
- · Inpatient vs Observation

Prior authorization



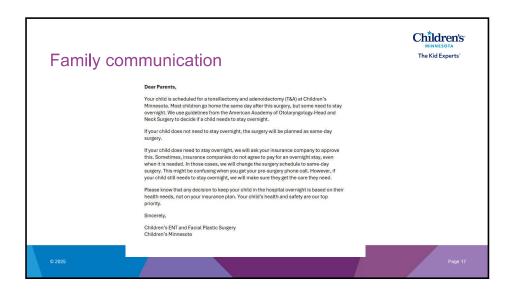
Location of admission

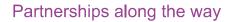
- PICU criteria:
 - Neuromuscular conditions/significant craniofacial abnormalities per surgeon discretion
 - o Children requiring positive pressure preoperatively
 - o PSG ETCO2>60
 - o PSG O2 nadir<70%
 - o AHI is **NOT** an independent indication for PICU admission
 - o BMI or weight *alone* is **NOT**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

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



STANDARDIZING CARE OF PEDIATRIC POST-TONSILLECTOMY **HEMORRHAGE (PTH)**

Goal

• In collaboration with colleagues from hematology and emergency medicine, create and operationalize a treatment algorithm for management of patients who present with post-tonsillectomy hemorrhage, improving the consistency and efficiency of care and potentially increase the proportion of patients who are successfully managed medically without operative intervention.

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Tranexamic acid (TXA)

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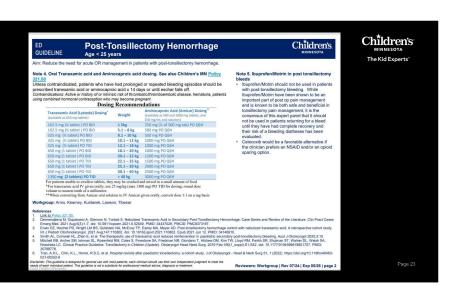
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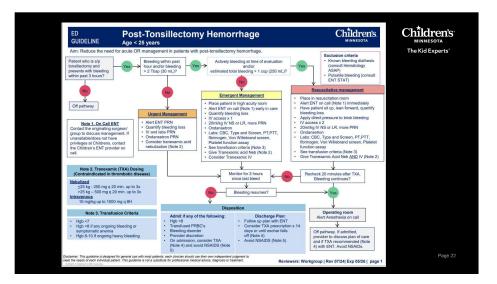
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- Works by inhibiting the breakdown of fibrin thus preventing fibrinolysis, strengthen blood clots and reduce bleeding.
- · Use in craniosynostosis surgery at Children's
 - Escher PJ, Tu A, Kearney S, Wheelwright M, Petronio J, Kebriaei M, Chinnadurai S, Tibesar RJ. Minimizing transfusion in sagittal craniosynostosis surgery: the Children's Hospital of Minnesota Protocol. Childs Nerv Syst. 2019 Aug;35(8):1357-1362. doi: 10.1007/s00381-019-04157-5. Epub 2019 May 30, PMID: 31147744.
 - Escher PJ, Tu AD, Keamey SL, Linabery AM, Petronio JA, Kebriaei MA, Chinnadurai S, Tibesar RJ. A protocol of situation-dependent transfusion, erythropoletin and transmira caid reduces transfusion in fronto-orbital advancement for metipoic and coronal cranicsynosioss. Childs Nerv Syst. 2021 Jan;37(1):269-276. doi: 10.1007/s00381-020-04654-y. Epub 2020 May 9, PMID: 32388812.



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Outcomes

- Protocol developed and published to Children's clinical guideline site in May 2023.
- Protocol was shared with personnel from ED and ENT and was in widespread use by start of Q3 2023.
- To better assess utilization and eliminate season as a variable, we looked at Q3 2022 vs Q3 2023.
 - In Q3 2022, 14 patients returned to the ED for PTH and 21% of them received TXA.
 - In Q3 2023, 19 patients returned to the ED for PTH and 89% patients received TXA per protocol.
 - o Return to OR went from 57% in 2022 to 42% in 2023
 - o Readmissions went from 71% in 2022 to 47% in 2023.

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STANDARDIZING POSTOPERATIVE PAIN MANAGEMENT AFTER T&A

Our standard pain management plan



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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

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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
 - Moroco 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



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- 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 0-6 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 Z 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 refi
 requested, 7-day ED visits, or readmission.

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Supporting evidence in literature



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- · 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 <u>decreased post-operative phone calls</u> by 9% and <u>decreased</u> post-operative tonsillar hemorrhage by 7%.
- Parental assessment of pain control following pediatric adenotonsillectomy: Do opioids make a difference? (Adler, et al. 2020)
 - Post-operative 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



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- 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
- o Effect of perioperative ketorolac on postoperative bleeding after pediatric tonsillectomy (Shaikh, et al. 2024)
 - A TriNetX electronic medical record query for patients under 18 y.o 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.
- o Dose-Related Effects and Bleeding Risk of Ketorolac in Pediatric Tonsillectomy (Kim, et al. 2024)
 - Meta-analysis of 18 studies with 11,729 patients
 - o 0.9 to 1 mg/kg of ketorolac significantly increases risk of primary PTH (OR = 2.3200) but not secondary PTH
 - o 0.5 mg/kg ketorolac did not increase bleeding risk

compared to the control group.

Standard pain management plan



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INPATIENT POST-OP PAIN MANAGEMENT AFTER T&A:

· Acetaminophen Q6H PRN (some surgeons schedule)

- Ibuprofen 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
- +/- PO post operative dexamethasone (surgeon dependent).

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

Children's New pain management plan (Go Live January 2025) The Kid Experts 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. Acetaminophen and Schedule PO every 6 hours ibuprofen can be given · Can use IV Toradol if PO medication administration is difficult*. together every 6 hours or alternated every 3 hours 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. *inpatients

Adjuvant measures to pain control

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

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Logistics of roll-out

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

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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 <u>should have</u> polysomnography (PSG) prior to T&A if:
 - <2 years of age</p>
 - Morbid obesity (weight or BMI >95th percentile)
 - Down syndrome
 - o Craniofacial abnormalities
 - o 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

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Mitchell RB, Archer SM, Ishman SL, Rosenfeld RM, Coles S, Finestone SA, Friedman NR, Glordano T, Hidrew DM, Kim TW, Lloyd RM, Pankh SR, Shuhnan ST, Walher DL, Walsh SA, Nnacheta LC, Clinical Practice Guideline: Tonsillectomy in Chibral (Optate), Olichryngol Head Neck Surg. 2019 Feb;180(1_suppl):51-542, dor. 10.1177/0149599818801757. PMD: 30799778.

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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

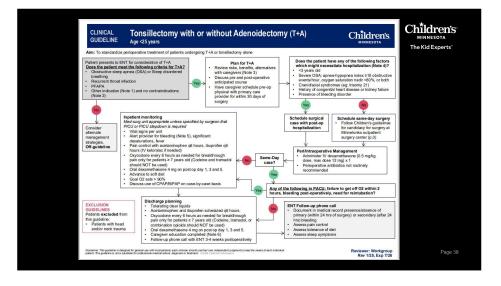
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Key partnership with Sleep Clinic

- 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

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FUTURE DIRECTIONS

