

Intraoperative Ketorolac after Achieving Hemostasis in Pediatric Tonsillectomy Improves Perioperative Analgesia Outcomes without Increasing Post-tonsillectomy Bleeding



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ABSTRACT

- Background: Ketorolac use in pediatric tonsillectomy is controversial.
- Methods: We retrospectively analyzed peri-operative records at our institution for post-operative hemorrhage, opioid administration, duration of post-anesthesia care unit (PACU) stay.
- Results: Ketorolac use was associated with shorter PACU stays, less opioids, and no difference in postoperative bleeding. Age of the patient was the strongest predictor of post-operative hemorrhage.
- Conclusion: After adequate surgical hemostasis, ketorolac may be used for pain control in pediatric tonsillectomies without increasing the risk of post-surgical hemorrhage.

METHODS

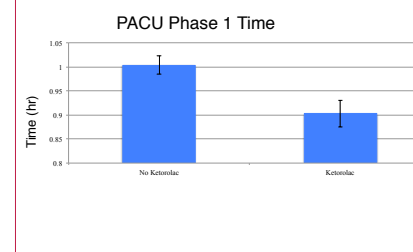
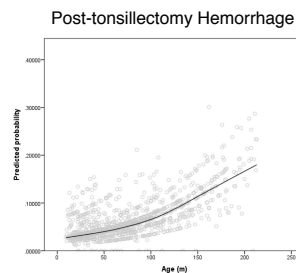
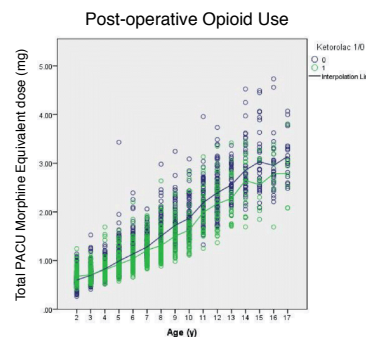
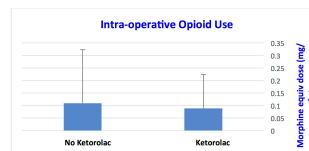
- After obtaining IRB approval, children undergoing tonsillectomy, aged 4 -18 years, between 2013 and 2017 were included in this retrospective study.
- Otolaryngologists, based on hemostasis following tonsillectomy, requested the anesthesia team to administer or not to administer intravenous ketorolac (0.5 mg/kg) intra-operatively.
- Peri-operative records, including intra-operative anesthesia and post-anesthetic care unit (PACU) records were reviewed.
- Demographic characteristics, medical history, post-operative hemorrhage, medication administration, and oral intake were reviewed.
- Post-tonsillectomy hemorrhage, inpatient oral intake, analgesia and opioid administration were examined.

BACKGROUND

- Ketorolac is a non-steroidal anti-inflammatory drug that has been shown to be effective at reducing post-operative pain without the sedation, vomiting, and respiratory depression common with opioids.
- Use of intra-operative ketorolac for tonsillectomy is controversial due to possible increased risk of post-tonsillectomy bleeding. Consensus is lacking on the risk of post-tonsillectomy hemorrhage, as well as optimal timing of intra-operative ketorolac to minimize bleeding risks and improve post-operative analgesia.
- The aim of this retrospective study was to evaluate the post-operative bleeding risk from administration of ketorolac intra-operatively after achieving hemostasis following tonsillectomy in children.

RESULTS

- Between 2013 and 2017, 1322 children who had tonsillectomy were included in the study. There were 733 boys and 589 girls with an average age of 6.2 ± 3.8 years. Patients were divided among those who received (K+, N=669) and did not receive (K-, N=653) intra-operative intravenous ketorolac.
- Between the two groups, no statistical difference was found in: post-operative hemorrhage (K+ 5.7% v K- 6.9%, RR 0.82, P=0.37); operative intervention for hemostasis (K+ 62.1% v K- 58.7%, RR 1.06, P=0.75); and time to hemorrhage (K- 5.6 v K+ 6.2 d., p=0.55).
- Age of the child was significantly predictive of post-operative hemorrhage (p<0.001).
- K/+ patients received less intra-operative opioids (K+ 0.089 v K- 0.11 mg/kg, p<0.05). K/+ patients had less post-operative opioid doses (K+ 1.59 v K- 1.86, p<0.05) and overall dose (0.035 v 0.041 mg/kg, p<0.05).



CONCLUSIONS

- Intra-operative, intravenous administration of ketorolac after satisfactory hemostasis following tonsillectomy did not increase risk of post-operative hemorrhage.
- By timing administration of intra-operative ketorolac after satisfactory hemostasis, we demonstrated no higher risk of post-tonsillectomy bleeding while providing opioid-sparing analgesic benefits.
- Surgical-decision based timing of intraoperative ketorolac after satisfactory hemostasis may be a better analgesic strategy than avoiding intraoperative ketorolac all together or giving intraoperative ketorolac for all children undergoing tonsillectomy.

REFERENCES

- Lewis SR, Nicholson A, Cardwell ME, Siviter G, Smith AF. Nonsteroidal anti-inflammatory drugs and perioperative bleeding in paediatric tonsillectomy. Cochrane Database of Systematic Reviews 2013, Issue 7. Art. No.: CD003591.
- Chan DK, Parikh SR. Perioperative ketorolac increases post-tonsillectomy hemorrhage in adults, but not children. Laryngoscope, 124 (2014), 1789-1793.
- Riggin L, Ramakrishna J, Sommer DD, Koren G. A 2013 updated systematic review & meta-analysis of 36 randomized controlled trials; no apparent effects of non steroidal anti-inflammatory agents on the risk of bleeding after tonsillectomy. Clin Otolaryngol, 38 (2013), 115-129.