East Liverpool City Hospital

Incidence of Post-Operative Bleeding after First Tarsometatarsal Arthrodesis with Use of Toradol

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NOMS ANKLE & FOOT CARE CENTERS

Statement of Purpose

The purpose of our study was to determine if use of intravenous ketorolac in the perioperative setting resulted in increased post op bleeding or hematoma formation following a Lapidus bunionectomy.

Introduction

Intravenous ketorolac is commonly used in the post-operative setting for immediate pain control as the literature supports that ketorolac is effective in managing acute pain. Use of intravenous ketorolac in the post-operative setting has been debated as there is concern for post-op bleeding and hematoma formation.

We present a retrospective study looking at bleeding risk and hematoma formation following a Lapidus bunionectomy with use of intravenous ketorolac in the immediate post-operative setting.

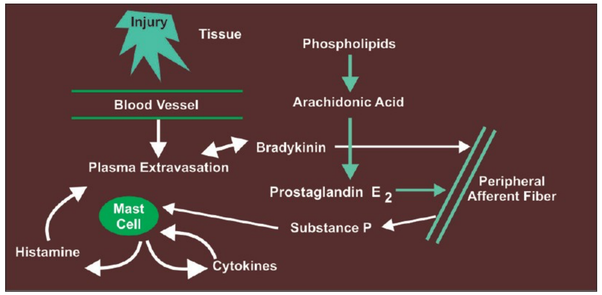


Figure 1. Action of ketorolac (8).

Methods

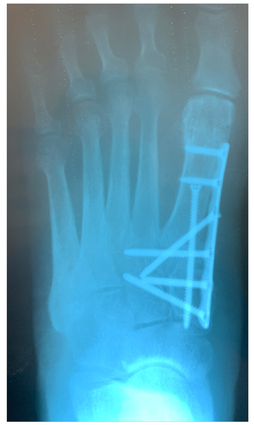


Figure 2. AP Lapidus confirmation

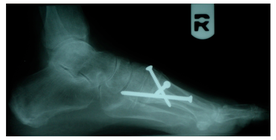


Figure 3. Lateral Lapidus confirmation

All patient information was collected from August 1st of 2013 to August 1st of 2019 from one surgical center. Records of four physicians were collected. 105 records were identified in this time frame in total with the operative CPT codes for first metatarsal-cuneiform fusion and midfoot fusion.

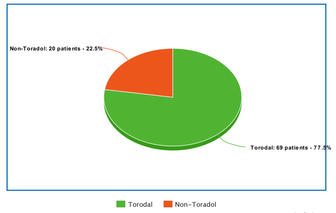
These cases were reviewed radiographically to ensure that Lapidus arthrodesis was the intended procedure to be performed. 16 patients were excluded due to procedures other than isolated Lapidus bunionectomy. Patients were followed retrospectively in the postoperative course for an incidence of wound dehiscence or postoperative bleeds or hematomas using ICD-9 and ICD-10 codes in the outpatient clinics.

89 patients were included in the study after exclusion criteria were applied. 20 of these patients did not receive intra operative Toradol. Of the 69 patients who did receive intraoperative Toradol, 14 were men and 55 women with age ranging from 15-75 years of age. Nine patients were administered 60 mg of Toradol while the other 60 received 30 mg intraoperatively.

Results

There were no documented incidence of post-operative hematoma or bleeding in the Toradol and non-Toradol groups. No patients returned to the operating room for wound complication or bleeding complications.

Chart 1. Toradol vs. Non-Toradol groups



Literature

Ketorolac has been shown to be effective for pain control in the post-operative setting, with literature supporting that it can be as effective as morphine (7). Respiratory depression and other central nervous system adverse reactions are less likely in ketorolac group as compared to opioids. Pain control was found to be superior to acetaminophen in 12 studies and equivalent to opioids in five studies. (4) Cepeda et al showed that Ketorolac in combination with morphine decreased the amount of morphine needed to control pain (7).

However ketorolac carried a black box warning for increased bleeding risk. Strom et al found a slightly increased bleeding risk in patients who took ketorolac more than 5 days post-operatively, (1) Singer et al reported an average increased bleeding time with patients who received 60mg of ketorolac intramuscularly. (2) Similarly, Greer et al reported an increase of bleeding time by 106 seconds. (3) In a randomized double-blind study, Conrad et al found ketorolac transiently inhibits platelet function in healthy individuals, increasing bleeding from 4.9 to 7.8 minutes.

The literature remains mixed on whether increased bleeding time are clinically significant. Chin et al (10) examined bleeding after a single 30mg IV dose of Ketorolac after a single lumbar microdiscectomy. They found no changes in coagulation with use of ketorolac versus the control. A meta-analysis consisting of 27 studies with 2314 patients found no significant difference in bleeding time as compared to the control group while providing equal pain control to opioids (4).
To our knowledge there is no foot and ankle literature indicating the risk of post-operative bleeding in the setting of a Lapidus bunionectomy. We therefore set out to determine if our routine use of ketorolac had any effect on post-operative bleeding specifically with the Lapidus bunionectomy.

Discussion

The results of this study indicate that use of intravenous ketorolac had no clinically significant impact on bleeding in the immediate post-operative setting as there were no incidences of hematoma formation. This can be due to small sample size and would need to be confirmed in a larger multicenter study.

Limitations of our study were small sample size, patients were not randomized to Ketorolac vs opiate use, and single surgical center. Further study would warrant a broader range of foot and ankle surgeries, increase sample size, multicenter study, association with comorbidities such as uncontrolled diabetes, patients currently on blood thinning agents, and would include analysis for kidney and GI complications as well as age of patients in relation to post-operative bleeding.

Conclusion

Use of the intravenous ketorolac is an effective modality for pain control in the perioperative setting, the literature debates whether this carries a clinically significant increased bleeding risk. We conclude that use of ketorolac in the immediate post-operative setting is safe and effective in the vast majority of patients when performing a Lapidus bunionectomy and the benefits afforded by the use of Ketorolac in a high opioid abuse society outweigh the potential risks of post-operative bleeding.

References

1. Cepeda M, Carr D, Miranda N, Diaz A, Silva C, Morales O. Comparison of morphine, ketorolac, and their combination postoperative pain. Anesthesiology. 2005;103(6):1225-1232.
2. Gobble RM, Hoang HL, Kachniarz B, et al. (2014) Ketorolac does not increase perioperative bleeding: a meta-analysis of randomized controlled trials. *Plast Reconstr Surg* 133:741–55
3. Strom BL, Berlin JA, Kinman JL, et al. (1996) Parenteral ketorolac and risk of gastrointestinal and operative site bleeding: A postmarketing surveillance study. *JAMA* 275: 376–382
4. Singer AJ, Mynster CJ, McMahon BJ. The effect of IM ketoro- lac tromethamine on bleeding time: A prospective, interven- tional, controlled study. *Am J Emerg Med.* 2003;21:441–443.
5. Greer IA. Effects of ketorolac tromethamine on hemostasis. *Pharmacotherapy* 1990;10:71S–76S.
6. Conrad KA, Fagan TC, Mackie MJ, Mayshar PV. Effects of ketorolac tromethamine on hemostasis in volunteers. Clin Pharmacol Ther. 1988;43:542–546
7. Chin KR, Sundram H, Marcotte P.(2007) Bleeding risk with ketorolac after lumbar microsdiscectomy. J Spinal Disord Tech. 2007 Apr;20(2):123-6
8. Hungund, Shital. "Effect of Pretreatment with Ketorolac Tromethamine on Operative Pain during Periodontal Surgery: A Case-Control Study." *Medical Journals of India*, 11 Jan. 2011, medind.nic.in/jay/t11/i1/jayt11i1p55.htm.