Efficacy of Ketorolac for Postoperative Pain Management in Hip Arthroscopy: A Preliminary Analysis of a Prospective Randomized Controlled Trial

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INTRODUCTION:

Hip arthroscopy is increasingly utilized to treat conditions such as femoroacetabular impingement (FAI) and labral tears, however there is no consensus on postoperative pain regimen. Opioid medications are a common component of a multimodal analgesic strategy after hip arthroscopy, however opioid use is associated with well documented adverse effects, including nausea, constipation, sedation, and the risk of dependency, leading to a growing interest in opioid-sparing pain management strategies in orthopedic surgery. This study aims to compare a ketorolac-based, opioid-sparing protocol to the current standard postoperative pain management following hip arthroscopy.

METHODS:

A total of 159 patients undergoing primary hip arthroscopy were assessed for participation. We performed a prospective, randomized controlled trial in accordance with the CONSORT (Consolidated Standards of Reporting Trials) 2010 statement. The study arms were an opioid sparing analgesic protocol (loading dose intravenous ketorolac, oral ketorolac, diazepam) and a standard opioid multimodal regimen (hydrocodone-acetaminophen and diazepam), and the primary outcome was postoperative visual analog scale (VAS) pain scores for 5 days and opioid medication usage recorded in pain journals. Secondary outcomes included patient-reported outcomes, achievement of minimally clinical important difference (MCID) and adverse effects. The observers were blinded, and the patients were not blinded to the intervention.

RESULTS:

A total of 40 patients were randomized with 19 patients in the experimental cohort and 21 in the control cohort. Median age of patients was 33.0 (24.5, 40.0) years, 22.5% of patients were male, 40% underwent surgery on the left side, and 92.5% were white. 100% of patients received a labral repair, acetabuloplasty, femoroplasty, and capsular plication. At postoperative (POD) day 1, the experimental cohort had a significantly lower median VAS score compared to the control cohort (36.7 [30.0, 40.0] vs. (53.3 [38.3, 66.7]; P= 0.0425). No significant differences were found between median VAS scores from POD 2-5. Significantly fewer hydrocodone-acetaminophen pills were taken in the experimental cohort compared to the control cohort (0.0 [0.0, 3.0] vs. 7.0 [4.0, 14.0]; P=0.0004). A total of 57% (11/19) patients in the experimental group did not require any opioid medication compared to 5% (1/21) in the control cohort. No differences were found in adverse effects. Similar patient recorded outcomes and achievement of MCID were reported postoperatively.

DISCUSSION AND CONCLUSION:

This study found similar postoperative pain control and significantly less opioid use with a ketorolac based opioid sparing pain protocol compared to the standard of care. Minimal adverse events were found in both cohorts and time from surgery was significantly associated with postoperative pain improvement.

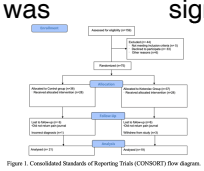

Figure 1. Consolidated Standards of Reporting Trials (CONSORT) flow diagram.

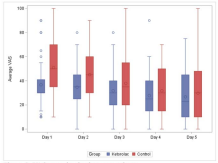

Figure 2. VAS score by day between cohorts

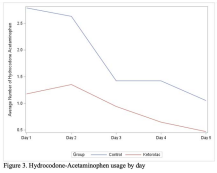

Figure 3. Hydrocodone-Acetaminophen usage by day

Table 1. Patient Demographics , Surgical Details, Preoperative Patient Recorded Outcomes

	Group		
	Control (N=21)	Ketorolac (N=19)	Total (N=40)
Race, n (%)			
White	18 (85.7%)	19 (100.0%)	37 (92.5%)
Black/AA	1 (4.8%)	0 (0.0%)	1 (2.5%)
Other	1 (4.8%)	0 (0.0%)	1 (2.5%)
Unknown	1 (4.8%)	0 (0.0%)	1 (2.5%)
Sex, n (%)			
Male	4 (19.0%)	5 (26.3%)	9 (22.5%)
Female	17 (81.0%)	14 (73.7%)	31 (77.5%)
Age			
N	21	19	40
Median (IQR)	35.0 (25.0, 41.0)	29.0 (24.0, 38.0)	33.0 (24.5, 40.0)
Laterality, n (%)			
Left	10 (47.6%)	6 (31.6%)	16 (40.0%)
Right	11 (52.4%)	13 (68.4%)	24 (60.0%)
Labral Repair , n (%)			
Yes	21 (100.0%)	19 (100.0%)	40 (100.0%)
Number Of Anchors, n (%)			
3	8 (38.1%)	7 (36.8%)	15 (40.5%)
4	12 (57.1%)	11 (57.9%)	23 (57.5%)
5	0 (0.0%)	1 (5.3%)	1 (2.5%)
Acetabuloplasty, n (%)			
Yes	21 (100.0%)	19 (100.0%)	40 (100.0%)
Femoroplasty, n (%)			
Yes	21 (100.0%)	19 (100.0%)	40 (100.0%)
Capsular Plication, n (%)			
Yes	21 (100.0%)	19 (100.0%)	40 (100.0%)
Post-loss Traction Time in Minutes			
N	21	19	40
	Group		
	Control (N=21)	Ketorolac (N=19)	Total (N=40)
Median (IQR)	39.0 (37.0, 43.0)	41.0 (38.0, 45.0)	39.5 (38.0, 44.0)
Blood Loss in CC , n (%)			
10	21 (100.0%)	19 (100.0%)	40 (100.0%)
Pre-Op VAS			
N	20	15	35
Median (IQR)	40.0 (30.0, 68.0)	40.0 (20.0, 60.0)	40.0 (30.0, 60.0)
Pre-Op PROMIS PF			
N	20	18	38
Median (IQR)	44.0 (39.0, 47.0)	41.5 (39.0, 47.0)	42.5 (39.0, 47.0)
Pre-Op PROMIS PI			
N	21	19	40
Median (IQR)	60.0 (37.0, 65.0)	61.0 (53.0, 63.0)	61.0 (57.0, 64.0)

Table 2. Adverse Effects

Double-click to show white space			Ketorolac	
	(N=21)	(%)	(N=19)	%
None	5	24%	7	37%
Nausea	5	23%	4	21%
Fatigue	2	10%	1	5%
Drowsiness	7	33%	7	37%
Headache	4	19%	3	16%
Lightheadedness/Dizzy	4	19%	1	5%
Constipation	6	29%	5	26%
Dry mouth/Dehydration	8	38%	9	47%
Itching	3	14%	1	5%
Anemia	2	10%	1	5%
Abdominal Pain	1	5%	2	11%
Other	6	29%	7	36%
Diarrhea	0	0%	1	5%

Other: allergy to adhesive, gassiness, metallic taste in mouth, sweatedness, frequent urination, cough