



Prospective, cohort study of opioid usage after
hip arthroscopy for symptomatic
femoroacetabular impingement syndrome



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- Daniel Cunningham, B.S.
 - I have no financial relationships to disclose
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- Carolyn Hutyra, B.S.
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INTRODUCTION

- The US is in an epidemic of opioid misuse and abuse [1-4]
- Death rates from drug overdoses involving opioids have increased 200% between 2000 and 2014 and are now 1.5 times more common a cause of death as motor vehicle collisions [5]
- Orthopaedic surgeons are the 3rd highest prescribers of opioids [6]
- 70% of people that abuse prescription pain medication divert medications from friends' or relatives' opioid supplies rather than presenting as a "drug seeker" at a clinic or going to a drug dealer [7]
- 67% of patients undergoing urologic surgery had left-over opioids at 2 months after surgery and few had properly disposed of their left-over opioids [8]
- Both the Institute of Medicine and American Academy of Orthopaedic Surgeons have called for evidence-based standardization of opioid prescribing practices [3,7,9,10]
- There is little knowledge about appropriate opioid prescribing patterns after any type of orthopaedic surgery
- Hip arthroscopy for symptomatic femoroacetabular impingement has grown 365% from 2002 – 2009 [11]
- Surgeons need guidance on appropriate prescribing patterns that take into account individualized patient risk factors.

HYPOTHESES

- Many patients use only a small amount of opioid after hip arthroscopy
- Patients' risk for increased post-operative opioid usage can be stratified based on pre-operative risk factors

METHODS

Pre-operative measures

- Patients ages 18 years or older undergoing hip arthroscopy for symptomatic FAI with either of 2 hip arthroscopy specialists at our institution were approached for inclusion in this IRB-approved study.
- Pre-operative risk factors were assessed with validated scoring systems.
 - Pain and function
 - International Hip Outcome Tool, Short Form (iHOT-12) [12]
 - "How difficult is it for you to walk long distances?"
 - "How much of the time are you aware of the disability in your hip?"
 - Visual analog scale (VAS) pain [13]
 - "No pain" to "Pain as bad as it could possibly be"
 - Psychiatric screening
 - Pain Catastrophizing Scale (PCS) [14]
 - "When I'm in pain, I feel I can't go on."
 - "When I'm in pain, I keep thinking about how much it hurts"
 - Patient Health Questionnaire 9 (PHQ-9) abbreviated to exclude suicidality [15]
 - "Little interest or pleasure in doing things"
 - "Feeling tired or having little energy"
 - Pain medication use over the last 2 weeks
 - Opioid medication usage
 - Medication name
 - Dosage
 - Frequency per day over the preceding 2 weeks
 - Anti-inflammatory medication usage
 - Medication name
 - Dosage
 - Frequency per day over the preceding 2 weeks

Post-operative measures

- Daily opioid usage until 2-week post-operative visit
- Cumulative opioid usage by 2-week post-operative visit
- Cumulative opioid usage by 6-week post-operative visit

Statistical analysis

- Univariate significance tests between pre-operative covariates and the following outcomes using chi-square tests for binomial outcomes and Student's t-tests for continuous outcomes.
 - Whether or not patients had a day without opioid usage before their 2-week post-operative visit
 - 2-week opioid usage
 - 6-week opioid usage
- Covariates with univariate p-value less than 0.05 were incorporated into multivariable linear or logistic regression outcome models

RESULTS

Baseline characteristics

Table 1: Pre-operative measures broken down by patients with (n=9) and without (n=35) pre-operative opioid usage. Averages and 95% CI's shown 39 patients completed daily post-operative pain medication diaries.

Covariate	Average or proportion without pre-operative opioid (lower 95% CI, upper 95% CI) (n=35)	Average or proportion with pre-operative opioid (lower 95% CI, upper 95% CI) (n=9)
Pre-operative pain (out of 10 points)	5.0 points (4.2, 5.8)	6.2 points (5.07, 7.41)
PHQ score (out of 24 points)	4.5 points (2.8, 6.3)	6.9 points (3.62, 10.16)
PCS score (out of 52 points)	12.5 points (8.3, 16.7)	23.1 points (14.3, 31.9)
iHOT-12 (out of 100 points)	37.7 points (31.64, 43.68)	17.6 points (11.4, 23.8)
Gender (proportion male)	9 / 35 (25.7%)	3 / 9 (33.3%)
Pre-operative anti-inflammatory (proportion usage)	16 / 35 (45.7%)	5 / 9 (55.6%)

Study Outcomes

Table 2: Outcome measures broken down by patients with (n=9) and without (n=35) pre-operative opioid usage. Averages and 95% CI's shown 39 patients completed daily post-operative pain medication diaries.

Outcome	Average or proportion without pre-operative opioid (lower 95% CI, upper 95% CI) (n=35)	Average or proportion with pre-operative opioid (lower 95% CI, upper 95% CI) (n=9)
Patients taking opioids everyday until 2-week visit (booklet)	2 / 33 (6.1%)	5 / 6 (83.3%)
2-week opioids used	11.7 (7.6, 15.9)	55.4 (40.0, 70.9)
6-week opioids used	17.1 (9.4, 24.8)	83.3 (62.1, 104.5)
Remaining opioids	41.9 (32.0, 51.8)	6.9 (1.5, 12.3)

Table 3: Pre-operative predictors of never achieving a day without opioid usage before the 2-week post-operative visit (n = 39). Univariate p-values for each covariate shown. Covariates with univariate p-value less than 0.05 were included into a multivariable outcome model. Adjusted estimates display the additional pills used over baseline after multivariable analysis.

Never reached a day without opioids before 2-week visit	Univariate p-value	Adjusted odds ratios (lower 95% CI, upper 95% CI)	Multivariable p-value
Pre-operative opioids (proportion usage)	<0.0001	75.4 (5.7, 3462.9)	0.0004
iHOT-12 (out of 100)	0.0499	1.0 / point (0.9, 1.1)	0.9727

Table 4: Pre-operative predictors of opioid usage by 2 weeks (n=44). Univariate p-values for each covariate shown. Covariates with univariate p-value less than 0.05 were included into a multivariable outcome model. Adjusted estimates display the additional pills used over baseline after multivariable analysis.

2-week opioid usage	Univariate p-values	Adjusted estimate (lower 95% CI, upper 95% CI)	Adjusted p-value
Pre-operative opioids (proportion usage)	<0.0001	20.4 (13.9, 26.9)	<0.0001
PCS score (out of 52)	0.0108	0.8 / point (-0.6, 2.28)	0.2553
iHOT-12 (out of 100)	0.0059	-0.0 / point (-0.3, 0.3)	0.9575

RESULTS, Continued

Table 5: Pre-operative predictors of opioid usage by 6 weeks (n = 44). Covariates with univariate p-value less than 0.05 were included into a multivariable outcome model of the number of opioids used by 6 weeks post-operative. Adjusted estimates display the additional pills used over baseline after multivariable analysis along with 95% CI's and adjusted p-values.

6-week outcomes	Univariate p-value	Adjusted additional pills used (lower 95% CI, upper 95% CI)	Adjusted p-value
Pre-operative opioids (proportion usage)	<0.0001	59 (38, 81)	<0.0001
PCS score (out of 52 points)	0.0033	1.2 / point (-1.55, 3.91)	0.3860
PHQ score (out of 24 points)	0.0365	1.8 / point (-3.10, 6.65)	0.4652
Pre-operative pain (out of 10 points)	0.0455	1.5 / point (-3.28, 6.27)	0.5303
iHOT-12 (out of 100 points)	0.0015	0.02 / point (-0.72, 0.76)	0.9608

Table 6: Pre-operative predictors of opioid usage by 2 weeks and 6 weeks with the subset of patients that did not have pre-operative opioid usage (n = 35). No factors other than the PCS score achieved statistical significance in univariate analysis. The effect estimate displays only the additional pills used over baseline correlated to the PCS score.

Outcomes in patients without pre-operative opioid usage	Univariate p-values	Effect estimate (lower 95% CI, upper 95% CI)
PCS score on 2-week opioid usage (out of 52)	0.0121	1.4 pills / point (0.32, 2.42)
PCS score on 6-week opioid usage (out of 52)	0.0295	2.2 pills / point (0.23, 4.19)

CONCLUSIONS

- Pre-operative opioid usage in the 2 weeks preceding surgery is the most important risk factor for elevated post-operative opioid usage
- 95% of patients without pre-operative opioid usage used less than 25 pills compared to 105 pills for patients with pre-operative opioid usage
- Patients with pre-operative usage consume about 5x more than patients without pre-operative usage by the 2-week and 6-week marks
- 83% of patients with pre-operative usage consumed opioids every day after their surgery at least until the 2-week post-operative visit compared to only 6% of patients without pre-operative usage
- None of the pre-operative psychiatric, pain, or functional scores remained significantly associated with outcomes in multivariable analysis when pre-operative opioid usage was considered
- Patients with pre-operative opioid usage reported higher pain, depression score, and pain catastrophization score along with lower function. The pre-operative opioid usage metric may account for these other pre-operative variables and is easier to measure
- For patients without pre-operative opioid usage, pain catastrophization positively correlated with increased opioid usage
- First evidence to guide post-operative opioid prescriptions after hip arthroscopy
 - Potential to reduce left-over un-used opioids that may be diverted
- Other surgical indications should be studied

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