Prospective, Observational Study of Opioid Use After Hip Arthroscopy for Femoroacetabular Impingement Syndrome

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Purpose: To provide estimates of postoperative opioid use after hip arthroscopy for femoroacetabular impingement (FAI) syndrome and to identify risk factors for increased postoperative opioid use. **Methods:** All patients aged at least 18 years who were undergoing hip arthroscopy for FAI syndrome performed by 1 of 2 hip-preservation surgeons between November 2015 and August 2016 were eligible for inclusion in this study. Target minimum enrollment was set at 30 patients per surgeon based on an a priori sample size calculation. Enrolled patients completed the International Hip Outcome Tool, visual analog pain scale, Pain Catastrophizing Scale, abbreviated Patient Health Questionnaire, and questions regarding demographic characteristics and opioid and anti-inflammatory use. Opioid consumption was assessed through pill counting at 2- and 6-week postoperative appointments. Of 80 patients enrolled, 67 had complete 2- and 6-week opioid use data. Patient and operative factors were correlated with outcomes in multivariate models. **Results:** Opioid use in the 2 weeks before surgery was significantly associated with higher postoperative opioid use at 2 weeks postoperatively (253.8 additional oral morphine equivalents [OMEs]; 95% confidence interval [CI], 171.2-336.5 additional OMEs; $P < .0001$; n = 73) and 6 weeks postoperatively (385.3 additional OMEs; 95% CI, 241.6-529.0 additional OMEs; $P < .0001$; n = 67). By 6 weeks postoperatively, 41 of 52 patients (79%) without opioid use in the 2 weeks before surgery used 30 or fewer 5-mg oxycodone pills compared with only 2 of 15 patients (13%) with preoperative use (odds ratio, 24.9; 95% CI, 4.2-148.5; $P < .0001$). **Conclusions:** Among patients undergoing hip arthroscopy for FAI syndrome, any opioid use in the 2 weeks preceding surgery was the strongest predictor of opioid use after hip arthroscopy. The impact of preoperative opioid use far exceeded the impact of other baseline patient and operative factors. Assessment of preoperative opioid use could be an important factor in guiding postoperative opioid prescribing. **Level of Evidence:** Level II, prospective observational study.

The United States is in an epidemic of opioid misuse and abuse,[1-4] and orthopaedic surgeons are the third highest prescribers of opioids.[5] Previous studies have reported that patients undergoing routine surgical procedures are overprescribed pain medication after surgery and are left with a substantial amount of opioid pain medication.[6-8] Overprescribing of opioids is likely multifactorial in nature but may stem from inadequate research into tailoring pain medication prescriptions to individual patient needs after specific surgical procedures. To publicly address the opioid misuse and abuse epidemic, the American Academy of Orthopaedic Surgeons and Institute of Medicine have advocated for instituting evidence-based opioid prescription guidelines for specific clinical situations that take into account patient factors that may affect potential abuse.[3,9-11]

Patients aged 20 to 39 years report the highest rate of illicit drug use and are the same age group that most commonly undergoes hip arthroscopy.[12,13] Postoperative pain after hip arthroscopy has been shown to be modulated by several operative factors such as infusion pressures and extent of bony and soft-tissue debridement.[14,15] In other areas of orthopaedics, biopsychosocial factors such as chronic pain, pain

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catastrophizing, psychiatric disease, and sex are related to the development of persistent postoperative pain and opioid use.[16-18] Furthermore, chronic pain medication use before orthopaedic surgical procedures, including hip, knee, and ankle arthroplasty, is associated with increased pain sensitivity (hyperalgesia), persistent postoperative pain, and increased opioid demand.[19-21] Despite increased research into opioid requirements within the operating room[22] and recent advances in local and regional anesthesia aimed at reducing perioperative pain,[15,23,24] patients undergoing hip arthroscopy often still require powerful analgesia in the postoperative period while recovering at home.[7,25,26]

In light of the opioid misuse and abuse crisis, orthopaedic surgeons are in need of evidence-based postoperative opioid prescription protocols and risk factor identification mechanisms to predict increased use so that opioid prescriptions can be titrated to individual patient needs.[5,10] Hip arthroscopy currently has no evidence to guide postoperative opioid prescriptions. The purposes of this study were to provide estimates of postoperative opioid use after hip arthroscopy for femoroacetabular impingement (FAI) syndrome and to identify risk factors for increased postoperative use. This study hypothesized that postoperative opioid use may be driven by biopsychosocial factors such as patient characteristics, psychiatric scores, and prior opioid use.

Methods

Study Design

This prospective, observational study underwent institutional review board approval and evaluated opioid use after arthroscopic treatment of FAI syndrome. The study was conducted between November 2015 and July 2016; patients were enrolled from the clinics of 2 established hip-preservation surgeons (S.O., R.M.) with standardized operative and postoperative treatment protocols at a high-volume, academic, tertiary care center. Target enrollment was set at 30 patients per surgeon based on an a priori sample size calculation described further in the "Study Size" subsection. The study was designed and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for cohort studies, which provides guidance for strengthening observational studies.[27]

Usual Practice

Patients with FAI syndrome were considered surgical candidates if they had minimal evidence of pre-existing osteoarthritis and if conservative management consisting of at least 6 months of treatment, including physical therapy, corticosteroid injection, rest, and anti-inflammatory medication, had failed. Patients were not routinely prescribed opioid analgesia by their surgeon as part of conservative treatment, although some patients received opioid prescriptions from outside providers. Surgical treatment was dictated by intraoperative findings and included labral repair, acetabular rim trimming, femoral osteochondroplasty, and/or microfracture (Table 1).

Consistent with usual practice regarding perioperative and postoperative anesthesia, anesthesiologists dictated acute pain medication administration surrounding surgery, including the use of perioperative nerve blocks. All patients received general anesthesia with analgesia provided by intravenous (IV) fentanyl. Patients stayed in the hospital for a 23-hour observational period, during which they could receive oral and/or IV analgesia. All patients received prescriptions for 5-mg oxycodone orally unless they had pre-existing opioid preferences. The prescription amount was decided on a case-by-case basis. All patients received prescriptions for 500-mg naproxen for heterotopic ossification prophylaxis. Other standardized discharge medications are listed in Appendix Table 1 (available at www.arthroscopyjournal.org, "Postoperative medications" section). One surgeon prescribed the use of a continuous passive motion (CPM) device (Kinetec

Table 1. Baseline, Operative, and Postoperative Factors in Entire Sample (n = 73)

Baseline Characteristics	Data
Age, yr	36.5 (11.3)
Female sex	55 of 73 (75.3%)
White race	63 of 73 (86.3%)
BMI	27.1 (5.6)
ASA	1.8 (0.5)
Opioid use in 2 wk before surgery	16 of 73 (21.9%)
Anti-inflammatory use in 2 wk before surgery	37 of 73 (50.6%)
Preoperative pain (out of 10)	5.4 (2.3)
iHOT-12 (out of 100)	30.7 (18.5)
PHQ (out of 24)	5.8 (5.5)
PCS (out of 52)	16.3 (14.7)
Prior ipsilateral hip surgery	5 of 73 (6.8%)
Nerve block	22 of 73 (30.1%)
Procedure duration, h	2.2 (0.5)
Acetabular rim trimming	61 of 73 (100%)
Labral repair	72 of 73 (99%)
Femoral osteochondroplasty	68 of 73 (93%)
Additional procedure	5 of 73 (6.8%)
Acetabular microfracture	3 of 73 (4%)
Hamstring repair	1 of 73 (1%)
Trochanteric bursectomy	1 of 73 (1%)
CPM, compressive icing, and hip brace (vs active ROM and ice packs)*	38 of 73 (52%)

NOTE. Data are presented as average (standard deviation) or proportion (percentage).

ASA, American Society of Anesthesiologists; BMI, body mass index; CPM, continuous passive motion; iHOT-12, International Hip Outcome Tool; PCS, Pain Catastrophizing Scale; PHQ, Patient Health Questionnaire; ROM, range of motion.

*Surgeon-dependent factors.