Arthroplasty Today 6 (2020) 668–671

Contents lists available at ScienceDirect

Arthroplasty Today

journal homepage: http://www.arthroplastytoday.org/

Surgical technique

Combating the Opioid Epidemic: Experience with a Single Prescription for Total Joint Arthroplasty

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ARTICLE INFO

Article history:
Received 13 April 2020
Received in revised form
16 June 2020
Accepted 10 July 2020
Available online 23 August 2020

Keywords:
Opioids
Hip
Knee: primary
Revision
Arthroplasty

ABSTRACT

Background: Despite advances in perioperative total joint arthroplasty (TJA) pain protocols, opiates continue to play a major role in postoperative pain control. This brief communication reports our experience with a restrictive opioid protocol allowing patients only a single prescription of low-dose opioids.

Methods: One hundred consecutive elective, primary, and revision TJAs were analyzed. All patients received preoperative counseling and multimodal analgesia. Counseling involved discussion of patient expectations on postoperative pain management, weaning off opioids before surgery, and emphasis that opioid refills were not permitted. Ninety-day outcomes including pain-related phone calls, opioid refill requests, emergency room visits, complications, and readmissions were assessed. Opioid dispensing was tracked using our state prescription monitoring program.

Results: There was a high prevalence of preoperative opioid use, depression, and anxiety (25%, 34%, and 39%, respectively). Sixty-eight percent of chronic opioid users were able to wean off opioids before surgery. The average initial prescription of opioids was equivalent to 48 pills of 5 mg oxycodone. There were only 10 pain-related phone calls from 9 patients; all were using opioids preoperatively, with only one patient requesting a refill. All pain-related phone calls occurred in the first week after surgery. There were no emergency room visits, complications, or readmissions related to pain.

Conclusions: A single prescription of low-dose opioids was sufficient for patients undergoing TJA when using preoperative patient preparation and multimodal analgesia. Standardized guidelines are needed to guide best practices for patient education and pain management, especially in patients on chronic opioid therapy. This information will help implement evidence-based strategies to accelerate the decline of opioid use and hopefully pave the way for opioid-free TJA.

Introduction

The United States is the largest consumer of opioids worldwide with more than 200 million prescriptions dispensed annually [1-3]. Opioids have traditionally played a major role in the management of postoperative pain for total joint arthroplasty (TJA) [4]. Apart from concerns for potential abuse [5,6], there is mounting evidence linking prolonged opioid use with detrimental effects after TJA. Patients on chronic preoperative opioid therapy are likely to experience extended hospital length of stay (LOS), persistent pain, higher complication and reoperation rates, and decreased satisfaction [7-10]. Furthermore, patients receiving chronic opioids before TJA are at a higher risk for prolonged opioid use and overdose postoperatively [7-10].

Over the past few years, the perioperative management of patients undergoing TJA has witnessed tremendous improvements. Preoperative preparation including patient education and medical optimization, multimodal analgesia including perioperative infiltration and nerve blocks, blood conservation techniques including tranexamic acid and spinal anesthesia, and minimally invasive

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https://doi.org/10.1016/j.artd.2020.07.013

surgical approaches have collectively led to improved pain control, shorter hospitalization, enhanced recovery, and decreased consumption of opioids postoperatively [11-13]. These practices have been further reinforced by the growing shift toward outpatient surgery and bundled payment models.

The purpose of this study was to report on our experience using a restrictive opioid-prescribing protocol consisting of only 1-week supply with no refills. A consecutive series of primary and revision TJAs was reviewed. Ninety-day outcomes including pain-related phone calls, opioid refill requests, emergency room (ER) visits, complications, and readmissions were assessed.

Materials and methods

Institutional review board approval was obtained. In fall 2017, the senior author started a new arthroplasty position in a state with restrictive opioid regulations. This study was a retrospective review of the first 100 consecutive patients who (1) underwent elective procedure, (2) underwent total hip arthroplasty (THA) and total knee arthroplasty (TKA) procedures by the senior author, and (3) were admitted to him. Primary and revision cases were included. All patients had 90-day follow-up data.

Before surgical scheduling, all patients received counseling by the surgeon. Specific details of the surgical procedure, risks, benefits, hospitalization, recovery, pain control, rehabilitation, and expectations were presented. Patients on chronic opioids were advised to either wean off or obtain a letter from their chronic opioid prescribers that they would continue to assume opioid stewardship postoperatively. Chronic opioid use was defined as receiving opioid medications for at least 3 months with at least one refill at the time of surgical consultation. Weaning off was confirmed by laboratory testing. The state's restrictive laws regarding opioid prescription were outlined. All patients were instructed that no opioid refills are permitted and were warned about their potential adverse effects. Patients were informed that pain is an expected and normal part of the recovery process. The pain control strategy was outlined. Unless contraindicated, preemptive analgesia consisting of 200 mg of celecoxib and 1000 mg of acetaminophen was administered in the preoperative holding unit. Spinal anesthesia with intravenous sedation was the preferred technique, but the final decision was made by the anesthesiologist on the day of surgery. A posterolateral approach was used for THAs and a median parapatellar approach for TKAs. A single-shot adductor canal block (administered by either the surgeon or anesthesiologist) was performed. Additionally, ropivacaine-based periarticular infiltration was administered depending on patient's weight. Postoperatively, analgesia consisted of celecoxib (or naproxen) depending on insurance type, acetaminophen, and oxycodone (5mg every 3-4 hours as needed for severe pain for a total of 60 pills). The number of prescribed oxycodone pills was chosen based on our state laws limiting initial opioid prescriptions to a 7-day supply for adults. Some pharmacies dispensed lower quantities depending on their internal guidelines.

Variables collected were the age, gender, body mass index, American Society of Anesthesiologists (ASA) physical classification score, procedure type (primary or revision), history of substance abuse, depression, anxiety, and opioid use within 3 months from decision to proceed with surgery. Operative variables (eg, anesthesia type and blood loss) and initial opioid dose in morphine milligram equivalents were also collected. The outcomes of the study were hospital LOS, 90-day opioid refills (surgeons and outside providers), pain-related phone calls, opioid refill requests, ER visits, and complications. Categorical variables were presented as the frequency and proportion. Continuous values were presented as the mean and standard deviation.

Results

One hundred consecutive TJA procedures (51 THAs, 7 revision THAs, 34 TKAs, and 8 revision TKAs) were included in the analysis. Twenty-four of the 85 (28%) primary cases were classified as complex procedures (eg, conversion THA/TKA, subtrochanteric osteotomy, and takedown of hip ankylosis). The mean age was 62.2 ± 9.5 years, and the mean body mass index was 32.5 ± 6.2 kg/m^2. Fifty-three (53%) patients were females, and 47 (47%) were males. Thirty-four (34%) patients had a diagnosis of depression, and 39 (39%) patients had a diagnosis of anxiety. Ten (10%) patients reported a history of substance abuse (heroin and/or alcohol), and 25 (25%) patients were on chronic opioids before surgery. Seventeen of 25 (68%) patients who were on chronic opioid therapy were able to wean off before surgery. General anesthesia was used in 13 (13%) patients, spinal anesthesia in 16 (16%) patients, and combined spinal and general anesthesia in 71 (71%) patients. The mean estimated blood loss was 194.5 ± 173.3 cc. Table 1 summarizes the characteristics of the study group.

The mean LOS was 0.9 ± 0.7 days. The mean initial opioid prescription was 357.1 ± 98.5 morphine milligram equivalents or the equivalent of 47.6 ± 13.1 oxycodone pills (5 mg). Thirty-eight (38%) patients had less than 60 pills filled as some pharmacies followed internal guidelines when determining the number of pills dispensed. Sixteen patients (5 TKAs, 2 revision TKAs, 4 THAs, and 5 revision THAs) did not fill their initial opioid prescription. In the first 90 days after surgery, only one requested an opioid refill. Eight patients received opioid refills by outside nonorthopaedic providers, all of whom were on chronic opioids preoperatively. There were only 10 pain-related phone calls from 9 patients, all occurring within the first week of surgery. Those patients were on chronic opioids preoperatively, and all underwent primary TJA. Table 2 summarizes the outcomes of the study group.

Four (4%) emergency department visits occurred within the first 90 days after surgery. Two patients presented for medical complications (one for pneumonia and the other for decompensated congestive heart failure). Two presented for evaluation of deep venous thrombosis, which was ruled out by a negative sonographic assessment. Four surgical complications occurred within the first 90 days. One patient (revision TKA) presented with wound dehiscence requiring medial gastrocnemius rotational flap coverage, one patient had failure of the arthrotomy repair after forced knee

Table 1
Baseline demographic characteristics of the study group.

Age (years)	62.2 (±9.5)
The American Society of Anesthesiologists physical classification score	2.3 (±0.5)
Body mass index (kg/m^2)	32.5 (±6.2)
Sex	
Female	53 (54%)
Male	47 (4%)
Procedure	
Primary total hip	51 (51%)
Primary total knee	34 (34%)
Revision total hip	7 (7%)
Revision total knee	8 (8%)
History of substance abuse	10 (10%)
Chronic opioid use	25 (25%)
Depression	34 (34%)
Anxiety	39 (39%)
Anesthesia type	
Combined spinal and general	71 (71%)
General	13 (13%)
Spinal	16 (16%)
Estimated blood loss (cc)	194.5 (±173.3)

Values given as the mean and standard deviation or the frequency and proportion.

Table 2
Outcomes of the study group.

Hospital length of stay	0.9 (±0.7)
Initial opioid dose (morphine equivalents)	357.1 (±198.5)
Initial opioid dose (oxycodone equivalents)	48.1 (±26.1)
Ninety-day opioid refill by the surgeon	0 (0%)
Ninety-day opioid refill by the nonorthopaedic providers	8 (8%)
Ninety-day pain-related phone calls	10 (10%)
Ninety-day opioid refill requests	1 (1%)
Ninety-day emergency room visits	4 (4%)
Ninety-day complications	4 (4%)

Values given as the mean and standard deviation or the frequency and proportion.

flexion during physical therapy, one patient had instability after revision THA, and one patient succumbed to complications of metastatic lung cancer. Table 3 summarizes the reasons for emergency room visits and complications.

Discussion

In this study, we reported on our experience with a restrictive opioid-prescribing protocol in a consecutive series of 100 primary and revision TJAs followed for 90 days. Nearly a third of the primary cases were complex procedures, and there was a common prevalence of chronic opioid use, depression, and anxiety. Despite the wide case mix, only one patient requested refill and there were only 10 pain-related phone calls to the clinic during the study period, all occurring in the first week after surgery. Sixteen percent of patients never filled their opioid prescription, and 68% of patients on chronic opioids were able to wean off before surgery. There were no ER visits, complications, or readmissions related to pain.

The mean number of 5-mg oxycodone pills prescribed in our cohort was 48, which is less than previously reported in the literature. Sabatino et al [14] found that their institution prescribed a median of 90 oxycodone pills (range: 10-200 and 20-330 pills for THA and TKA, respectively). Hernandez et al [15] reported an average of 189 oxycodone pills prescribed after primary TKA, with 83% of patients also receiving a prescription for tramadol. A prospective observational study by Premkumar et al [16] found that, on average, 77.7 oxycodone pills were prescribed after primary TKA. A 2018 survey of members of the American Association of Hip and Knee Surgeons found that the average number of pills prescribed for primary THA and TKA was 44 and 49, respectively, although 48.3% of respondents also prescribed tramadol in addition to oxycodone [4].

The restrictive opioid protocol used in this study heavily relies on patient counseling and multimodal analgesia. Preoperative patient counseling has been shown to positively influence pain ratings, kinesiophobia, and patient satisfaction [17]. Patient reassurance that pain is a normal part of recovery process combined with a clear communication that no medication refills would be provided may explain our ability to prescribe low amounts of opioids at discharge while maintaining a low rate of pain-related phone calls. This is despite the fact that the rates of anxiety, depression, substance abuse, and chronic opioid use in our study population were higher than those in other TJA cohorts [6,18]. In addition, previous studies have reported opioid refill rates as high as 67% for primary TJA [14] and a 23% pain-related phone call rate in the first 7 postoperative days [19]. In contrast, we were able to adhere to the target of zero refills and our pain-related phone call rate was only 10% despite including revision cases and extending follow-up to 90 days.

Another feature of the opioid protocol used in this study was it allowed for shared decision-making with patients on chronic opioids to either wean off or submit a letter from their original prescribers attesting that they will continue to assume opioid stewardship postoperatively. It was positive to find that a majority of patients were able to completely wean off and not require any refills postoperatively. The findings of this study are encouraging as we seek to tackle the opioid epidemic. Encouraging patients to wean off preoperatively may lead to decreased postoperative utilization and is an important intervention where surgeons can make a tremendous impact, not just clinically but also at a societal level. Brock et al [18] found that cessation of opioids 3 months before surgery in chronic opiate users resulted in a similar postoperative opioid use as opioid-naïve patients. Nguyen et al [20] reported significantly improved postoperative disease-specific and generic measures of health outcomes in patients who halved their opioid consumption before TJA compared with those with no intervention for chronic preoperative opioid use.

An interesting finding of this was that 16% of patients, including non–opioid-naïve and revision patients, never filled their opioid prescription. Although our small sample size limited our ability to draw statistical inferences, the finding gives hope that we may eventually be able to develop opioid-free analgesic protocols for select patients. This would also effectively reduce the number of dispensed opioids that go unused and pose a potential for misuse. Sabatino et al [14] reported a mean of 31.9 unconsumed pills after THA and 28.9 unconsumed pills after TKA. They estimated that approximately 43,216 opioid pills prescribed at their institution went unused during a 6-month period.

Orthopaedic surgeons are major prescribers of opioid medications, and therefore, we must be cognizant of our role in combating the opioid epidemic. Preoperative counseling and engagement of patients and their families have been shown to increase patient satisfaction and decrease opioid consumption [17,21-23]. Limiting the size of opioid prescriptions is not only an effective strategy to protect our patients [19] but also increasingly mandated by state laws and regulatory authorities. Several states have enacted legislative measures limiting the amount of opioid that can be prescribed, and all 50 states have implemented prescription drug monitoring programs [21,24].

There are some limitations for this study. First, it is a retrospective review from a single surgeon operating at a single, tertiary-care academic center. Second, the patient sample is too small to infer statistical associations. Third, the 60-pill opioid prescription amount was chosen to accommodate the use of 1 pill every 3 hours as needed. A lower amount could have been sufficient for most patients as only one patient made a refill request and some pharmacies did not fill the full 60-pill prescription. A refill request is not a huge burden for the prescriber but may be more difficult for the patient to fill. The more important goal should be limiting opioid consumption and not the refill number. Fourth, it is unknown how many pills were actually consumed by patients in the cohort. Nonetheless, we reported on a consecutive series of all incomers (primary, complex, and revision cases) with no exclusions, and all patients underwent a standardized care pathway.

Table 3
Reasons for emergency room visits and complications.

ER visits	N
Decompensated congestive heart failure	1
Pneumonia	1
Lower extremity swelling/ultrasound examination	2
Complications	
Failure of arthrotomy repair secondary to forced flexion	1
Instability after revision total hip arthroplasty	1
Wound dehiscence requiring medial gastrocnemius rotation flap	1
Mortality secondary to metastatic lung cancer	1

In conclusion, a single prescription of low-dose opioids appears to be sufficient for patients undergoing TJA when using preoperative counseling and opioid-sparing multimodal analgesia even in complex primary and revision procedures. As we combat the opioid epidemic, standardized guidelines are needed to guide best practices for pain management in patients on chronic opioid therapy. This information can help accelerate the decline of opioid use and hopefully pave the way for opioid-free TJA.

Conflict of interest

M.A. Harrington is a paid consultant for Zimmer Inc and is a board member for AOA, AAHKS, AAOS, and J Robert Gladden Orthopaedic Society. M.J. Halawi is a board member for AAHKS Publications Committee.

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