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Preoperative Chronic Opioid Users in Total Knee Arthroplasty—Which Patients Persistently Abuse Opiates Following Surgery?

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ABSTRACT

Background: Chronic opioid users pose a unique challenge for orthopedic surgeons, as they often report suboptimal outcomes following total knee arthroplasty (TKA). We aim at identifying risk factors associated with patients who were preoperative chronic opioid users and continued to use 6 months following TKA.

Methods: All preoperative chronic opioid users among 338 consecutive TKA cases performed at our institution between February and June 2016 were identified and divided into 2 cohorts: patients who (1) persistently used opioids and (2) discontinued use by the 6-month time point following surgery. Baseline characteristics were compared between cohorts in order to determine risk factors for persistent opioid use following TKA.

Results: Of the 338 patients, 53 (15.7%) were identified as preoperative chronic opioid users. Of these, 23 (43.4%) continued chronic opioid use 6 months following surgery, whereas 14 (4.9%) previously non-chronic users were identified as new chronic users at 6 months. Characteristics that were predictive of persistent opioid use included male gender, prior injury or surgery to the ipsilateral knee, current tobacco smoking status, and a history of psychiatric disorder. Opioid dose consumption of ≥ 12 mg/d morphine-equivalents over the 3 months leading up to surgery had an increased risk of persistent chronic opioid use by a factor of 6.

Conclusion: TKA candidates who have complicated medical, social, and surgical histories are at an increased risk of chronic opioid abuse postoperatively. By better understanding the risk factors associated with persistent chronic opioid use, targeted opioid reduction programs may be appropriately implemented to manage this high-risk population.

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In an effort to maximize value-based care in total joint arthroplasty, emphasis has been placed on preoperative patient selection and medical optimization. Chronic opioid use has been identified as a preoperative risk factor associated with poor postoperative outcomes [1,2]. As a result, curbing the preoperative and postoperative

use of opioids is of increasing importance. Historically, opioid use has been limited to acute pain management and diseases associated with chronic pain [3]. However, the threshold for opioid administration has decreased since, resulting in major concerns regarding issues with overprescribing and opioid dependence, especially in the younger patient population [4–6]. This matter is of particular concern in today's era of quality improvement initiatives as opioid use has been associated with perioperative adverse events, longer lengths of stay, and increased, not decreased pain levels [1,7,8]. The magnitude of the opioid epidemic has been reflected in recently passed national healthcare reforms, which have focused on improving the management of affected individuals and researching the most effective methods to prevent dependency [9,10].

Total knee arthroplasty (TKA) is well known to successfully provide pain relief and significant improvements in quality of life

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and function [11]. However, despite vast improvements in surgical outcomes, there have been concerns regarding a high prevalence of chronic opioid abuse, particularly within the postoperative setting. In fact, one study recently reported that 22% of all patients and 64% of patients identified as opioid abusers continue filling prescriptions 1 year postoperatively demonstrating the magnitude of the problem [12]. There currently is no definitive time point at which patients are expected to be weaned off their analgesic medications following TKA surgery, although 3 months has been cited as an acceptable window [13]. Thus, a better understanding of which patients are at increased risk of opioid abuse is crucial for the optimization of TKA candidates. The aim of our study is to identify characteristics associated with preoperative chronic opioid use and determine which variables increase the risk of chronic opioid use following TKA. We hypothesize that younger patients with complicated social, surgical, and medical histories are at a higher risk of persistent chronic opioid use after TKA surgery.

Materials and Methods

Data Collection

Following approval from our institutional review board, a retrospective chart review was conducted on 338 consecutive patients who underwent primary TKA at our institution between February 2016 and June 2016. Morphine-equivalent doses of each patient were obtained by querying the New York State's Internet System for Tracking Over-Prescribing-Prescription Monitoring Program (I-STOP/PMP) [14]. The I-STOP PMP is a statewide registry that mandates the documentation of all opioid medications prescribed to patients by providers. The opioid doses were collected during a perioperative time interval we defined as 3 months before

surgery until 6 months postoperatively. Given that the registry only reports data taken within the past calendar year, the authors felt that this time frame would allow the maximum number of patients to be studied while providing enough time during the preoperative and postoperative stages to adequately assess the opioid-use habits of each patient.

Descriptive characteristics including demographics, baseline patient characteristics, surgical and social histories, comorbidities, and preoperative morphine-equivalent doses collected were obtained for each patient. Baseline characteristics included age, gender, body mass index (BMI), American Society of Anesthesiologists score, insurance type, prior injury or surgery to the knee, and discharge disposition. Social history pertaining to tobacco, alcohol, and illicit drug abuse were extracted (Table 1). Finally, a comprehensive account of patients' medical comorbidities was collected and presented in Table 2. These patient characteristics were then comparatively evaluated among the 2 cohorts in effort to isolate risk factors associated with persistent opioid use at 6 months postoperatively.

Study Cohorts

Patients were defined as chronic preoperative opioid users if they were found to have consumed ≥ 20 mg/d morphine-equivalents for a minimum of 30 consecutive days within 3 months of surgery. The 30-consecutive day threshold was chosen based on a study by Chu et al [15] which demonstrated that opioid-induced hyperalgesia, a phenomenon in which patients who chronically consume opioids become paradoxically hypersensitive to pain, occurs within this time interval. After separating the preoperative chronic opioid users from the total cohort of consecutive TKA cases, the chronic opioid user group was again separated into

Table 1
Demographics and Patient Baseline Characteristics of Total Preoperative Chronic Opioid Users (Left) and Preoperative Chronic Opioid Users Stratified by Postoperative Chronic Opioid Use Status 6-mo Following TKA.

Descriptive Characteristics	Preoperative		Postoperative		P Value
	Chronic Opioid Users (N = 54)		Cured of Chronic Use (N = 31)	Persistent Chronic Users (N = 23)	
Baseline characteristics					
Age (SD)	62.4 (11.1)		63.8 (11.7)	60.9 (10.1)	.348
Gender, F:M	31:23		20:11	11:12	.220
BMI (SD)	32.9 (6.9)		32.9 (6.9)	33.8 (6.6)	.636
ASA					.243
1	1 (1.9)		0	1	
2	25 (46.3)		17	8	
3	28 (51.9)		14	13	
Average (SD)	2.5 (0.5)		2.5 (0.5)	2.5 (0.6)	
Insurance types (%)					.523
Medicare	19 (35.2)		13 (41.9)	6 (27.3)	
Medicaid	21 (38.9)		12 (38.7)	9 (40.9)	
Commercial	9 (16.7)		3 (9.7)	5 (22.7)	
Worker's compensation	5 (9.3)		3 (9.7)	2 (9.0)	
Principal diagnosis (%)					.094
Primary OA	42 (79.2)		27 (87.1)	15 (68.2)	
Post-traumatic OA	11 (20.7)		4 (12.9)	7 (31.8)	
Discharge disposition (%)					.220
Home with healthcare services	46 (85.2)		27 (87.1)	18 (81.8)	
Home with self-care	0		0	0	
Skilled nursing facility	6 (11.1)		2 (6.5)	4 (18.2)	
Rehab facility	2 (3.7)		2 (6.5)	0	
Social history					
Current tobacco smokers (%)	6 (11.3)		1 (3.2)	5 (22.7)	.117
Alcoholism (%)	1 (1.9)		1 (3.2)	0	—
Illicit drug use (%)	7 (13.2)		4 (12.9)	3 (13.6)	.938
Average preoperative morphine-equivalents (mg/d)					
3 mo to 6 wk before DOS (SD)	38.2 (68.7)		22.0 (29.9)	71.8 (98.1)	.010
Within 6 wk before DOS (SD)	57.3 (89.0)		24.6 (38.9)	99.9 (54.4)	<.001

TKA, total knee arthroplasty; SD, standard deviation; F, female; M, male; BMI, body mass index; ASA, American Society of Anesthesiologists; OA, osteoarthritis; DOS, day of surgery.

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