

The Effect of Multidisciplinary Approach to Opioid Reduction for Geriatric Hip Fracture Patients

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INTRODUCTION: The opioid epidemic is a growing problem in the United States, with an average of 130 overdose deaths per day. Approximately 35% of opioid-related deaths are caused by prescription opioids, and the number of postoperative opioid prescriptions has been associated with long-term use. Orthopaedic surgeons prescribe more opioids than any other surgical specialty due to the substantial pain associated with musculoskeletal injuries and surgical procedures. However, there remains no clear consensus on appropriate postoperative opioid usage, and previous prescribing patterns were often based on individual physician experience, resulting in significant variability. As such, orthopaedic surgeons must prioritize the development of evidence-based best practices for effectively managing pain while minimizing long-term opioid use. Recent literature suggests that a multimodal approach to pain management is safer and more effective for patients. The purpose of this study was to determine if a multidisciplinary approach to opioid reduction in geriatric hip fracture patients reduced inpatient opioid consumption during postoperative days 1-4 and opioid prescriptions within 90 days of discharge while maintaining satisfactory pain control.

METHODS: A retrospective comparative study was conducted investigating inpatient and outpatient opioid use at an academic level 1 trauma center before and after implementation of a multidisciplinary opioid reduction protocol. The main components of the protocol included changes to standardized order sets, consistent language regarding pain management, implementation of a new functional pain scale, and educational computer-based training modules for providers. Over a 3-year period, patients >60 years of age admitted to the inpatient orthopaedic unit who underwent surgical treatment of a hip fracture (as identified by CPT codes 27130, 27235, 27236, 27244, and 27245) were included in this study. For patients with two hip fractures treated operatively during the study period, the most recent hospitalization was included in the study, and earlier hospitalizations were excluded. Inpatient and outpatient opioid utilization was determined by converting inpatient opioid dosages to morphine milligram equivalents (MMEs). Visual Analog Scale (VAS) pain scores were recorded by nursing staff, and average VAS scores for each post-operative day were calculated. Inpatient and outpatient opioid usage were compared between patients treated in calendar year 2018 (the year prior to implementation of the protocol) and calendar year 2020 (the year after full implementation). Comparisons between pre- and post-implementation groups utilized ANOVA for continuous variables and logistic regression for binary variables. All models controlled for age, sex, American Society of Anesthesiologists (ASA) score, and primary procedure.

RESULTS: A total of 162 patients in 2018 and 167 patients in 2020 with operatively treated hip fractures at our institution were identified. There were no significant differences in patient demographics between the pre-implementation and post-implementation groups (Table 1). Total inpatient opioids administered during postoperative days 1-4 significantly decreased between 2018 and 2020 ($p < 0.021$). This was driven in large part by a significant decrease in opioid use on postoperative day 1 (median: 17.4 MMEs prior to the protocol vs. 12.4 MMEs ($p < 0.019$) after protocol implementation). There was no significant difference in average pain scores for the first 4 postoperative days before or after implementation of this multidisciplinary opioid reduction protocol. Similarly, no significant differences were identified in opioid prescriptions at discharge or within the first 90 days post-discharge (Table 2).

DISCUSSION AND CONCLUSION: A multidisciplinary approach to opioid reduction for geriatric hip fracture patients decreased postoperative inpatient opioid use without increasing subjective pain scores. This successful program included changes to standardized order sets, use of consistent language regarding pain management, implementation of a new functional pain scale, and educational training modules for providers. Future research investigating the expansion of this multidisciplinary protocol to a broader orthopaedic trauma population, along with its implementation among elective orthopaedic surgery patient populations, is warranted.

Variable	2018 (n=159)	2020 (n=166)	P-value
Age	73.1 (17.1)	73.9 (15.8)	0.651
Gender - Female	100 (62.9%)	110 (66.3%)	0.603
BMI	26.0 (6.8)	25.7 (5.4)	0.658
Smoking Status			0.87
Never	71 (50.0%)	78 (53.1%)	
Former	55 (38.7%)	53 (36.1%)	
Current	16 (11.3%)	16 (10.9%)	
ASA Class			0.931
Healthy	8 (5.1%)	7 (4.2%)	
Mild Disease	53 (33.5%)	59 (35.5%)	
Severe Disease	90 (57.0%)	91 (54.8%)	
Life Threatening	7 (4.4%)	9 (5.4%)	
Anxiety	33 (20.8%)	34 (20.5%)	1
Depression	28 (17.6%)	33 (19.9%)	0.703
Primary Procedure Number			0.618
27235	18 (11.3%)	22 (13.3%)	
27236	51 (32.1%)	59 (35.5%)	
27244	22 (13.8%)	16 (9.6%)	
27245	68 (42.8%)	69 (41.6%)	
Length of stay (days)	5.0 (4.0 - 6.0)	5.0 (3.0 - 7.0)	0.506

Table 1. Patient demographics in 2018 and 2020, reported as mean (SD), median (IQR) or N (%). *American Society of Anesthesiologists

Variable	2018 (n=159)	2020 (n=166)	P-value	P-value*
Days 1-4 Post-op Total MME	33.8 (7.5 - 103.2)	24.1 (3.8 - 60.8)	0.016	0.028
Day 1 Post-op Total MME	15.9 (3.8 - 45.1)	12.3 (3.8 - 28.1)	0.04	0.035
Day 2 Post-op Total MME	11.2 (3.8 - 37.5)	11.2 (0.0 - 30.0)	0.152	0.106
Day 3 Post-op Total MME	11.2 (1.0 - 30.0)	7.5 (0.0 - 15.0)	0.042	0.133
Day 4 Post-op Total MME	6.8 (0.0 - 21.9)	3.8 (0.0 - 15.0)	0.379	0.327
Post-Discharge Days 1-30 Opioid Use - Yes	73 (45.9%)	65 (39.2%)	0.263	0.272
Post-Discharge Days 30-60 Opioid Use - Yes	33 (20.8%)	28 (16.9%)	0.45	0.371
Post-Discharge Days 60-90 Opioid Use - Yes	18 (11.3%)	16 (9.6%)	0.753	0.6
Day 0 Average Pain	4.3 (2.6)	4.2 (2.5)	0.926	0.835
Day 1 Average Pain	4.0 (2.3)	4.0 (2.5)	0.941	0.746
Day 2 Average Pain	3.5 (2.1)	4.0 (2.5)	0.14	0.135
Day 3 Average Pain	3.1 (2.5)	3.4 (2.5)	0.501	0.755
Day 4 Average Pain	3.3 (2.2)	3.5 (2.2)	0.649	0.408

Table 2. Inpatient opioids, post-discharge opioids, and average pain scores between 2018 and 2020, reported as mean (SD), median (IQR), or N (%). *Multivariate p-value when controlling for age, sex, ASA, and primary procedure. In multivariate analysis, MME was log-transformed to meet regression model assumptions.