

Prolonged Opioid Use after Surgery for Distal Radius Fracture: Who Is at Risk?

William Runge, Matthew Broggi, Corey Spencer, Alex Dawes, Charles Daly, Michael B Gottschalk, Eric R Wagner.

Emory University School of Medicine, Department of Orthopaedics Upper Extremity Center

Introduction

- The impetus is on surgeons to carefully consider every opioid prescription written, due to both the ongoing opioid epidemic and the growing importance of patient satisfaction ratings
- There is tremendous variability in prescribing patterns among orthopaedic surgeons
- Identifying patients who may be at risk for prolonged opioid use and opioid misuse is one target for intervention and expectation management
- Purpose of this study is to identify patients who may be at risk for prolonged opioid use after distal radius fractures
- Hypothesis is that factors such as alcohol or tobacco abuse, depression, and diabetes will increase the risk of additional opioid refills

Methods

- Queried the Truven Marketscan™ database from 2010 through 2016 for all patients who underwent open reduction and internal fixation for distal radius fracture (CPT codes 25607–25609)
- Included patients with continuous enrollment for a minimum of six months preoperatively and twelve months postoperatively; 34,629 total patients included
- Used CPT and ICD-9/10 codes to collect comorbidities
- Prescription opioid data collected using National Drug Codes (NDC)
- Restricted to patients who were “opioid naïve”, having not filled an opioid prescription within six months prior to their injury
- Patients grouped into three separate cohorts:
 1. Patients who did not receive any additional opioid refills after their index prescription
 2. Patients who received at least one additional opioid refill up to six months postoperatively
 3. Patients who received additional refills and continued opioid use extending past six months postoperatively
- Ran one-way ANOVA with post-hoc comparison and multivariate regression for statistical analysis
- Odds ratios with 95% confidence intervals calculated for variables with p value <0.05

Results

Table 1. Adjusted Odds of Risk Factors for Post-Operative Opioid Use¹

Risk Factor	Post-Operative Opioid Use Groups			
	Six Months		One Year	
	Odds Ratio	P-Value	Odds Ratio	P-Value
Age Group				
18-49	[Reference]	-	[Reference]	-
50-64	0.98 (0.92-1.04)	0.516	0.95 (0.85-1.05)	0.310
65+	0.74 (0.68-0.81)	<0.001	0.77 (0.66-0.89)	<0.001
Sex				
Male	[Reference]	-	[Reference]	-
Female	0.91 (0.85-0.97)	0.003	1.05 (0.94-1.17)	0.381
Comorbidities				
Obesity	1.22 (1.07-1.39)	0.003	1.24 (1.01-1.52)	0.039
Renal Disease	0.91 (0.72-1.16)	0.447	1.41 (1.04-1.91)	0.026
Alcohol Abuse	1.44 (1.14-1.82)	0.002	1.83 (1.33-2.52)	<0.001
Tobacco Use	1.63 (1.45-1.82)	<0.001	1.78 (1.50-2.11)	<0.001
Hypertension	1.26 (1.17-1.34)	<0.001	1.20 (1.07-1.34)	0.001
Hyperlipidemia	0.92 (0.85-0.98)	0.016	1.03 (0.92-1.16)	0.569
Coronary Artery Disease	1.00 (0.86-1.16)	0.966	1.33 (1.08-1.64)	0.007
Congestive Heart Failure	0.98 (0.75-1.27)	0.849	1.47 (1.05-2.05)	0.024
Diabetes	1.24 (1.11-1.37)	<0.001	1.31 (1.12-1.53)	0.001
Rheumatic Disease	1.25 (0.98-1.61)	0.078	1.04 (0.69-1.59)	0.840
Depression	1.22 (1.11-1.35)	<0.001	1.75 (1.52-2.01)	<0.001
Anxiety	1.10 (0.96-1.26)	0.188	1.14 (0.92-1.41)	0.228
Surgical Complication				
Acute Infection	1.59 (1.16-2.16)	0.003	1.97 (1.30-2.99)	0.001
Hardware Complication	5.32 (3.73-7.61)	<0.001	5.77 (3.58-9.29)	<0.001
Wound Complication	1.73 (1.26-2.39)	0.001	1.74 (1.09-2.77)	0.021
Medical Complication				
Myocardial Infarction	0.57 (0.23-1.38)	0.210	0.50 (0.14-1.75)	0.280
Pneumonia	1.07 (0.59-1.91)	0.832	1.01 (0.44-2.31)	0.988
Sepsis	1.61 (0.72-3.62)	0.249	0.97 (0.29-3.21)	0.963
Stroke	1.22 (0.90-1.66)	0.194	1.57 (1.05-2.34)	0.028
Thromboembolic Event	1.12 (0.75-1.65)	0.586	1.03 (0.57-1.84)	0.933
ED Visit	1.61 (1.47-1.76)	<0.001	1.75 (1.52-2.00)	<0.001
Readmission	1.92 (1.66-2.23)	<0.001	2.41 (1.97-2.96)	<0.001

¹Compared to patients without any opioid refills; Presented as adjusted odds ratio (95% CI); Significant values highlighted in bold.

Table 2. Univariate Analysis of 90-Day Complications

Complication	Post-Operative Opioid Use Groups			P-Value*
	No Refill	Six Months	One Year	
Surgical				
Acute Infection	122 (0.5)	71 (1.0)	31 (1.4)	<0.001
Hardware Complication	52 (0.2)	80 (1.1)	28 (1.3)	<0.001
Wound Complication	102 (0.4)	68 (1.0)	24 (1.1)	<0.001
Medical				
Myocardial Infarction	20 (0.1)	7 (0.1)	3 (0.1)	0.622
Pneumonia	38 (0.1)	20 (0.3)	8 (0.4)	0.011
Sepsis	12 (0.0)	15 (0.2)	4 (0.2)	<0.001
Stroke	160 (0.6)	63 (0.9)	33 (1.5)	<0.001
Thromboembolic Event	90 (0.4)	39 (0.6)	15 (0.7)	0.009
ED Visit	1,966 (7.7)	935 (13.4)	353 (16.0)	<0.001
Readmission	555 (2.2)	374 (5.3)	167 (7.6)	<0.001

*P-value denotes any statistically significant differences between any group; Presented as n (% of opioid use group)

Table 3. Comparison of Original Opioid Prescription Data by Opioid Use Groups

	Post-Operative Opioid Use Groups		
	No Refill	Up to 6 Months	Prolonged Use
Quantity Prescribed¹	86.17 (84.5-87.9)	109.74 (106.3-113.1)	120.77 (114.7-126.9)
Average Difference	0	23.6 (19.1-28.0)	34.6 (27.9-41.4)
P-Value ²	-	<0.001	<0.001
Total OME¹	656.26 (642.8-669.7)	862.05 (834.7-889.4)	974.35 (921.5-1027.2)
Average Difference	0	205.8 (170.3-241.3)	318.1 (259.8-376.3)
P-Value ²	-	<0.001	<0.001

¹Presented as average (95% confidence interval); ²P-value when compared to no refill group; OME: Oral Morphine Equivalents

Conclusion

- Dose-dependent relationship between original postoperative opioid prescription and number of opioid refills
- Patient factors including obesity, alcohol abuse, tobacco use, depression, and other all increased the risk of prolonged opioid use after ORIF of distal radius
- Surgical complications such as infections, wound complications, and hardware complications, as well as ED visits and readmissions also increase risk for prolonged opioid use