More Than Just a Rebound Effect: Regional Anesthesia Increases Early and Late Opioid Demand in Proximal Humerus and Humeral Shaft Fracture Surgery

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Purpose: Regional anesthesia (RA) can be used to reduce pain and opioid use in proximal humerus and humeral shaft fracture surgery. However, the real-world impact of these modalities on inpatient opioid consumption and outpatient opioid demand is unclear. The hypothesis of this study was that RA would decrease inpatient and outpatient opioid demand in patients undergoing proximal humerus and humeral shaft fracture surgery.

Methods: Inpatient and outpatient opioid demand was recorded in all patients ages 18 years and older undergoing proximal humerus or humeral shaft fracture surgery at a single, Level I trauma center from July 2013 to July 2018 (n = 380 patients). Inpatient opioid consumption from 0-24, 24-48, and 48-72 hours and outpatient opioid demand from 1 month preoperative to 2 weeks, 6 weeks, and 90 days postoperative were converted to oxycodone 5-mg equivalents (OEs). Unadjusted and adjusted models were constructed to evaluate the impact of RA and other factors on opioid utilization.

Results: Adjusted models demonstrated increases in inpatient opioid consumption in patients with RA from 48 to 72 hours postoperatively (9.1 estimated OEs without RA vs 12.6 estimated OEs with RA from 48 to 72 hours postoperatively, P<0.05) but no significant differences at other time points. Outpatient opioid demand was significantly higher in patients with RA at all time points (114.8 OEs without RA vs 139.5 with RA from 1 month preoperatively to 2 weeks, 127.6 vs 171.2 OEs to 6 weeks, and 140.3 vs 197.7 OEs to 90 days, all *P* values for RA <0.05).

Conclusion: In proximal humerus and humeral shaft fracture surgery, RA was associated with increased inpatient and outpatient opioid demand after adjusting for baseline patient and treatment characteristics.

Table 1: Adjusted inpatient opioid consumption and outpatient opioid demand in oxycodone 5-mg equivalents in patients with and without RA. Red coloring highlights statistical significance. Simulated estimates from multivariable model (95% CI) displayed. Incident rate ratios and p-values from multivariable model.

Timeframe	Oxycodone without RA (95% CI)	Oxycodone with RA (95% CI)	Incident rate ratios (95% CI, p-value)
Inpatient consumption			
0-24 hours post-op	7.4 (5.9, 9.6)	8.7 (6.9, 11.3)	1.17 (1, 1.38; p=0.05)
24-48 hours post-op	11.5 (7.2, 17.3)	13.9 (8.6, 21)	1.21 (0.94, 1.56; p=0.145)
48-72 hours post-op	9.1 (5.4, 14.3)	12.6 (7.4, 20.1)	1.38 (1.04, 1.84; p=0.025)
Outpatient demand			
1-month pre-op to 2 weeks post-op	114.8 (90.5, 143.1)	139.5 (110.3, 173.8)	1.22 (1.04, 1.41; p=0.009)
1-month pre-op to 6 weeks post-op	127.6 (99.6, 163.7)	171.2 (133.6, 219.7)	1.34 (1.15, 1.56; p=<0.001)
1-month pre-op to 90 days post-op	140.3 (110.5, 176.2)	197.7 (155.2, 248.4)	1.41 (1.21, 1.65; p=<0.001)