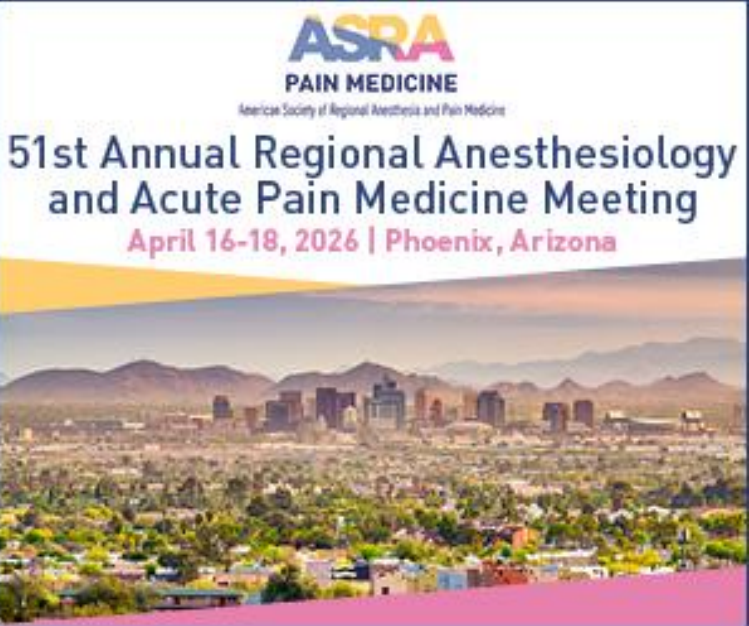


Regional Anesthesia Is Associated With Increased Postoperative Healthcare Utilization After Distal Radius Fracture Repair

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Background

- Distal radius fractures (DRF) are among the most common adult fractures and are often treated surgically ¹
- Anesthetic management typically involves general anesthesia with an analgesic brachial plexus block
- This study examines whether the addition of a brachial plexus block influences perioperative outcomes and postoperative health care utilization in patients undergoing operative repair of DRFs

Methods

- A retrospective cohort study was performed within an integrated United States healthcare system, comparing adult patients who received a brachial plexus block to those who did not for all surgically treated DRFs from 2017-2022
- The primary outcome was return to the emergency department (ED) for pain within 7 days post-operatively
- Secondary outcomes included perioperative opioid consumption, PACU pain scores, postoperative nausea and vomiting (PONV), surgical duration, hospital and PACU length of stay
- Sub-analysis of the block group examined differences in outcomes between single-shot blocks, catheters, and use of liposomal bupivacaine

Results

Table 1: Post-Surgical Utilization, Perioperative, and Duration and Hospital Outcomes by Block Administration

	Block Administration			p-value
	Total	No Block	Block	
	N = 5635 (100)	n = 1895 (33.6)	n = 3740 (66.4)	
Post-Surgical Utilization Outcomes				
Pain ED Visits within 7 days, n (%)	68 (1.2)	9 (0.5)	59 (1.6)	<0.001
Pain ED Visits within 30 days, n (%)	79 (1.4)	12 (0.6)	67 (1.8)	<0.001
Perioperative Outcomes				
Intraoperative Opioid Usage (MME), Median (IQR)	15.0 (0.0-37.5)	35.0 (15.0-60.0)	7.5 (0.0-30.0)	<0.001 ^a
PACU Opioid Usage (MME), Median (IQR)	35.0 (20.0-55.0)	37.5 (20.0-60.0)	30.0 (15.0-50.0)	<0.001 ^a
PACU Maximum Pain Scores, Median (IQR)	2.0 (2.0-7.0)	7.0 (5.0-8.0)	2.0 (2.0-6.0)	<0.001 ^a
PACU PONV, n (%)	154 (2.7)	85 (4.5)	69 (1.8)	<0.001
Duration and Hospital Outcomes				
Surgical Duration (min), Median (IQR)	73.0 (55.0-96.0)	74.0 (58.0-100.0)	71.0 (54.0-95.0)	<0.001 ^a
Length of PACU Stay (min), Median (IQR)	90.0 (65.0 – 129.0)	113.0 (81.0-164.0)	81.0 (61.0-112.0)	<0.001 ^a
Length of Hospital Stay (min), Median (IQR)	388.0 (329.0-468.0)	413.0 (348.0-515.0)	376.0 (320.0-447.0)	<0.001 ^a
30-day Opioid Refill, n (%)	1269 (22.5)	374 (19.7)	895 (23.9)	<0.001

Notes: All p-values are calculated using the chi-square test unless otherwise specified
^a Wilcoxon rank sum test used to calculate p-value

Table 2: Unadjusted and Adjusted Odds Ratios and Betas for Post-Surgical Utilization, Perioperative, and Duration and Hospital Outcomes by Block Administration

	Unadjusted Point Estimate (95% CI)	p-value	Adjusted Point Estimate (95% CI) ^a	p-value
Post-Surgical Utilization Outcomes				
Pain ED Visits within 7 days, aOR	3.36 (1.67-6.79)	<0.001	3.36 (1.65-6.86)	<0.01
Pain ED Visits within 30 days, aOR	2.86 (1.54-5.30)	<0.01	2.88 (1.54-5.38)	<0.01
Perioperative Outcomes				
Intraoperative Opioid Usage (MME), Beta	-22.48 (-23.88, -21.08)	<0.001	-22.23 (-23.72, -20.92)	<0.001
PACU Opioid Usage (MME), Beta	-5.03 (-8.39, -1.68)	<0.01	-6.39 (-9.56, -3.21)	<0.001
PACU Maximum Pain Scores, Beta	-2.59 (-2.74, -2.44)	<0.001	-2.59 (-2.74, -2.44)	<0.001
PACU PONV, aOR	0.40 (0.29-0.55)	<0.001	0.37 (0.27-0.52)	<0.001
Duration and Hospital Outcomes				
Surgical Duration (min), Beta	-4.26 (-6.53, -1.99)	<0.001	-3.69 (-5.94, -1.44)	<0.01
Length of PACU Stay (min), Beta	-41.32 (-46.20, -36.44)	<0.001	-40.74 (-45.69, -35.79)	<0.001
Length of Hospital Stay (min), Beta	-127.77 (-210.23, -45.30)	<0.01	-125.36 (-205.97, -44.74)	<0.01
30-day Opioid Refill, aOR	1.28 (1.12-1.47)	<0.001	1.23 (1.06-1.42)	0.01

Notes: Multivariable logistic and linear regression were used to calculate the adjusted odds and betas of outcomes.
^aAll models adjusted for age, sex, race/ethnicity, BMI, CCI score, history of chronic pain, history of anxiety, history of depression, average preoperative pain score, history of antidepressant use, history of psychopharmacology medication use, smoking status, neighborhood median education level, and neighborhood deprivation index.

- 8,052 patients underwent surgical repair of a DRF during the study period; **5,635 patients met eligibility criteria**
- 3,740 patients (66.4%) received a brachial plexus block (continuous catheter or single shot block), and 1895 patients (33.6%) received no block
- Block patients had lower intraoperative and PACU opioid consumption (MME), lower PACU pain scores (VAS), lower PONV, surgical duration, and length of stay (Table 1)
- Patients who received a block were more likely to present to the ED within 7 days due to pain compared to those who did not receive a block (Table 1; Table 2)**
- Most pain related ED visits in the block cohort occurred on post-operative day 1 (Figure 1)
- Trend toward decreased 30-day opioid refill for patients who had a catheter-based block or liposomal bupivacaine compared to single shot block

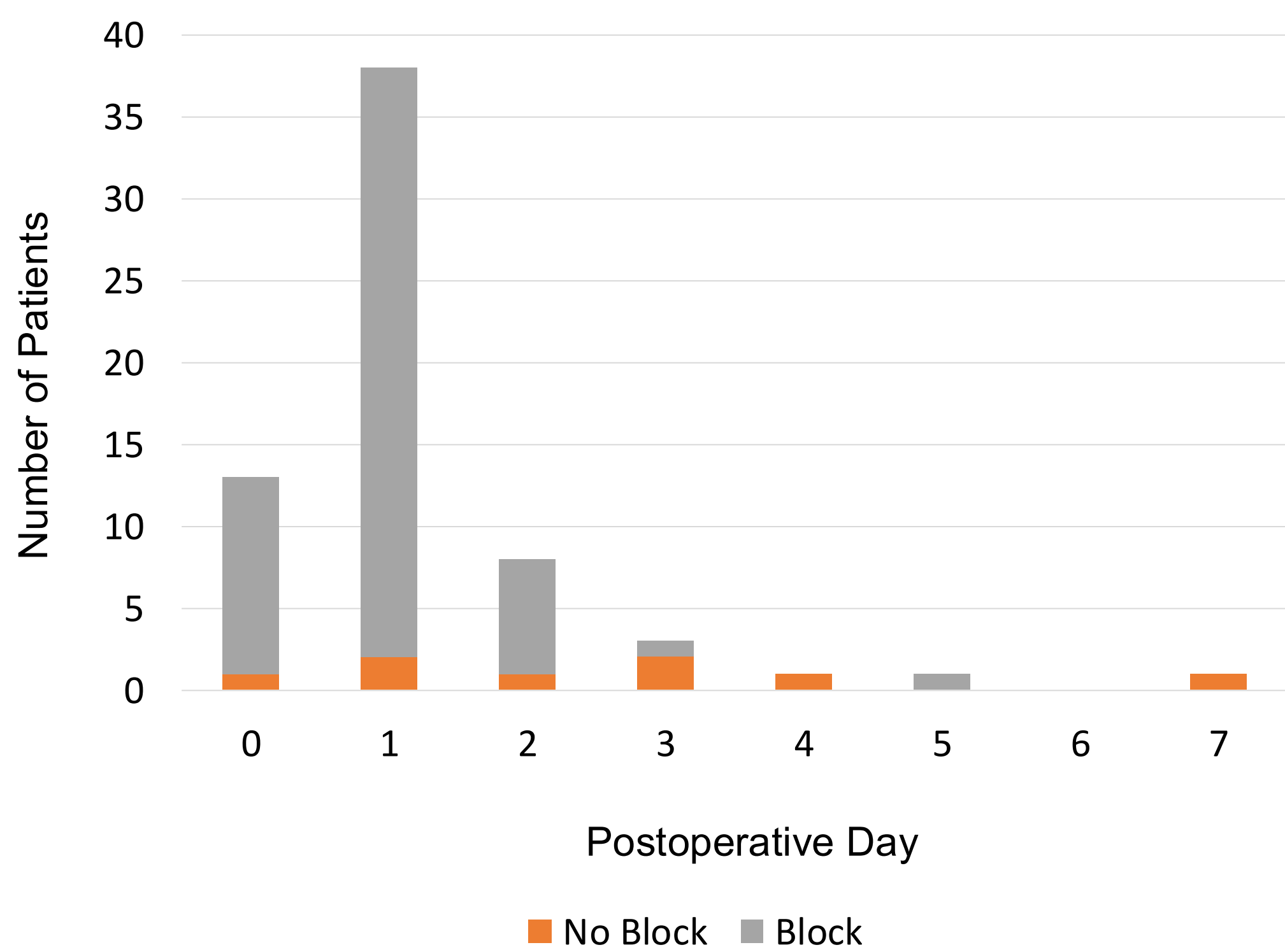


Figure 1. Emergency department visits for surgical pain within 7 days postoperatively.

Discussion

- Utilization of a regional anesthetic technique was associated with improved early perioperative outcomes in a large cohort of patients who underwent surgical DRF repair, consistent with prior studies ^{2,3}
- Patients who received a catheter-based or single-shot block showed higher unplanned healthcare utilization and greater need for opioid refills
- These findings highlight the need to investigate mitigation strategies for rebound pain, including injectate adjuncts, catheters, extended-duration local anesthetics, and patient education

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