Regional Versus General Anesthesia in Intertrochanteric Fracture Surgeries: An ACS-NSQIP 2008-2016 Study

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INTRODUCTION: Hip fracture surgeries are costly procedures in the elderly with significant postsurgical morbidity and mortality. This population are more likely to carry multiple comorbidities and therefore more likely to experience anesthesia-related adverse outcomes. Current data is inconclusive about the effect of anesthetic type on postsurgical outcomes. This study examined the 30-day postoperative outcomes of regional versus general anesthesia in the setting of intertrochanteric fracture surgery using ACS-NSQIP 2008-20016 national database.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) 2008-2016 database was queried via CPT codes for intertrochanteric fracture procedures (27244, 27245) These procedures were then categorized into isolated general or regional anesthesia, including spinal or epidural anesthesia. One-to-one propensity score matched controlling for estimated probability of morbidity, age, and gender was performed. Patient demographics, comorbidities, and 30-day postoperative outcomes were collected. Univariate and multivariate logistic regression models controlling for the above covariates were used to determine anesthetic type as risk factor for adverse postoperative outcomes.

RESULTS: A total of 42468 patients underwent intertrochanteric fracture surgeries between 2008 and 2016. 28446 (67.0%) were given general anesthesia and 277 (0.7%) were given regional anesthesia. After one-to-one propensity matching, 162 patients in each group were selected. 76 (23.5%) were male and 248 (76.5%) were female. 249 (91.2%) were white, 13 (4.8%) was African American, 9 (3.3%) were Asian, 1 (0.4%) Native American and 1 (0.4%) Hawaiian Native. The average age was 68.4 years and average BMI was 27.5. The average total length of hospital stay was 14 days. 70 (21.6%) of patients were ASA 1 and 2 and 254 (78.4%) were ASA 3 and 4. 222 (68.5) had hypertension requiring medication, 216 (66.7%) had anemia, 61 (18.8%) had diabetes, 38 (11.7%) were smokers, 40 (12.3%) had COPD, and 37 (11.4%) had bleeding disorders. Postoperatively, 150 (46.3%) experienced any adverse outcomes. 132 (40.7%) had postoperative complications. Wound complications were the most common with 105 (32.4%) of patients experiencing them. Particularly, 103 (31.8%) of patients experienced bleeding requiring transfusion. Other complications include pulmonary complications (16, 4.9%) with pneumonia being most common in this complication group (12, 3.7%), renal complications (16, 4.9%), neuro complications (2, 0.6%), cardiac complications (7, 2.2%), and sepsis-related complications (4, 1.2%). Readmission rate was 9.6% (31). Reoperation rate was 2.8% (9) and mortality rate was 4.9% (16). For 1:1 propensity match group, diabetic patients were more likely to receive general anesthesia compared to regional anesthesia (43, 26.5% vs 18, 11.1%, $p<0.001$). Patients with bleeding disorder was also more likely given general anesthesia (28, 17.3% vs 9, 5.6%, $p<0.001$). No other comorbidities was observed to differ significantly (all, $p=0.282$). Age, gender, race, BMI, and ASA class were not found to differ significantly (all, $p>0.563$). There was no difference between the two groups regarding total length of hospital stay (1.50 days vs 1.63 days, $p=0.687$) or operative time (106.58 min vs 93.77, $p=0.206$). Rates of 30-day mortality, reoperation, and readmission did not differ between the two groups (all, $p>0.124$). General anesthesia was found to be associated with higher rates for any post-operative complications (50.0% vs 31.5%, $p<0.001$) (Table 1). Patients who were given general anesthesia were at higher risk for any post-operative complications (OR = 2.2, 95% CI = 1.4 – 3.4, $p<0.001$) (Table 2).

DISCUSSION AND CONCLUSION: Current literature on the choice of anesthesia for intertrochanteric fracture surgeries lacks consensus. Our results showed that general anesthesia was associated with increased risks of any postoperative complication compared to regional anesthesia. Although further research is still needed to evaluate the effect of these two anesthesia methods on postsurgical morbidity and mortality, we offered further consideration for the use of regional anesthesia in the setting of intertrochanteric fracture surgeries.

Table 1. Rate of Postoperative Outcomes Between the General Anesthesia and Epidural Anesthesia.

Postoperative Outcomes	Regional Anesthesia N (%)	General Anesthesia N (%)	P-value
Adverse Events	62 (38.3%)	88 (54.3%)	0.005
Any Postoperative Complication	51 (31.5%)	81 (50.0%)	<0.001
Wound Complications	44 (27.2%)	61 (37.7%)	0.057
Superficial SSI	1 (0.6%)	2 (1.2%)	0.562
Deep SSI	0 (0.0%)	1 (0.6%)	0.317
Wound Dehiscence	0 (0.0%)	0 (0.0%)	1.000
Bleeding Requiring Transfusion	44 (27.2%)	59 (36.4%)	0.074
Pulmonary Complications	6 (3.7%)	10 (6.2%)	0.443
Pneumonia	3 (1.9%)	9 (5.6%)	0.078
Pulmonary Embolism	1 (0.6%)	1 (0.6%)	1.000
Failure to Wean (Ventilator >48 hours)	3 (1.9%)	2 (1.2%)	0.652
Unplanned Intubation	2 (1.2%)	3 (1.9%)	0.652
Renal Complications	5 (3.1%)	11 (6.8%)	0.199
Progressive Renal Insufficiency	0 (0.0%)	0 (0.0%)	1.000
Acute Renal Failure	1 (0.6%)	1 (0.6%)	1.000
Urinary Tract Infection	4 (2.5%)	10 (6.2%)	0.101
Neuro Complications (CVA/Stroke)	1 (0.6%)	1 (0.6%)	1.000
Cardiac Complications	1 (0.6%)	6 (3.7%)	0.121
Cardiac Arrest	1 (0.6%)	2 (1.2%)	0.562
Myocardial Infarction	0 (0.0%)	1 (0.6%)	1.000
DVT/Thrombophlebitis	0 (0.0%)	3 (1.9%)	0.082
Sepsis-Related Complications	2 (1.2%)	2 (1.2%)	1.000
Sepsis	1 (0.6%)	1 (0.6%)	1.000
Septic Shock	0 (0.0%)	1 (0.6%)	1.000
Organ/Space SSI	1 (0.6%)	0 (0.0%)	1.000
Readmission	13 (8.0%)	18 (11.1%)	0.345
Reoperation	5 (3.1%)	4 (2.5%)	0.735
Mortality	5 (3.1%)	11 (6.8%)	0.124

Table 2. Risk of Postoperative Outcomes Between the General Anesthesia and Epidural Anesthesia.

Postoperative Outcomes	Univariate OR (95% CI)	P-Value	Multivariate OR (95% CI)	P-value
Adverse Events	2.0 (1.3 – 3.2)	0.003	1.232 (1.2 – 3.0)	0.004
Any Postoperative Complication	2.3 (1.4 – 3.6)	<0.001	2.2 (1.4 – 3.4)	<0.001
Wound Complications	1.6 (1.0 – 2.7)	0.041	1.6 (1.0 – 2.6)	0.044
Superficial SSI	-	-	2 (0.2 – 22.4)	0.570
Deep SSI	-	-	-	-
Wound Dehiscence	-	-	-	-
Bleeding Requiring Transfusion	1.6 (0.97 – 2.5)	0.070	1.5 (0.96 – 2.5)	0.074
Pulmonary Complications	1.8 (0.6 – 5.2)	0.271	1.7 (0.6 – 4.8)	0.310
Pneumonia	3.4 (0.9 – 13)	0.076	3.1 (0.8 – 11.7)	0.093
Pulmonary Embolism	1.2 (0.06 – 24)	0.916	1.0 (0.06 – 16.1)	1.000
Failure to Wean (Ventilator >48 hours)	0.67 (0.1 – 4.3)	0.672	0.7 (0.1 – 4.0)	0.654
Unplanned Intubation	1.9 (0.3 – 13)	0.523	-	-
Renal Complications	2.35 (0.8 – 7.0)	0.124	2.3 (0.8 – 6.7)	0.133
Progressive Renal Insufficiency	1.2 (0.07 – 22)	0.885	1.5 (0.25 – 9.2)	0.654
Acute Renal Failure	-	-	1.0 (0.06 – 16.1)	1.000
Urinary Tract Infection	2.7 (0.8 – 8.7)	0.107	2.6 (0.8 – 8.5)	0.113
Neuro Complications (CVA/Stroke)	1.1 (0.1 – 19.8)	0.961	1.0 (0.06 – 16.1)	1.000
Cardiac Complications	8.0 (0.9 – 76)	0.069	6.2 (0.74 – 52)	0.093
Cardiac Arrest	3.0 (0.2 – 44)	0.423	1.0 (0.6 – 16.1)	1.000
Myocardial Infarction	-	-	2.0 (0.2 – 22)	0.570
DVT/Thrombophlebitis	-	-	-	-
Sepsis-Related Complications	1.0 (0.1 – 7.3)	0.989	1.0 (0.14 – 7.2)	1.000
Sepsis	0.9 (0.6 – 15.6)	0.968	1.0 (0.06 – 16.1)	1.000
Septic Shock	-	-	-	-
Organ/Space SSI	-	-	-	-
Readmission	1.4 (0.68 – 3.0)	0.344	1.4 (0.7 – 3.0)	0.347
Reoperation	0.86 (0.2 – 3.4)	0.830	0.8 (0.2 – 3.0)	0.736
Mortality	3.2 (0.9 – 11)	0.075	2.3 (0.8 – 6.7)	0.133