

Adverse Events in Orthopaedic Surgery: Is Trauma More Risky? An Analysis of the NSQIP Data

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Background/Purpose: As we move toward a value-based system of health care, surgeons will increasingly be measured on perioperative complication rates and outcomes. Recently, through an analysis of the American College of Surgeons-National Surgical Quality Improvement Program (ACS-NSQIP) database, studies have demonstrated relatively low perioperative complication rates across the field of orthopaedics. In this study utilizing the NSQIP data, we wanted to better understand the perioperative complication rates and risk factors in orthopaedic trauma and compare them to general orthopaedics. While many insurers group trauma as a subspecialty within orthopaedics (ortho) in terms of adverse events, it is important to evaluate if differences exist, especially in the current payer environment.

Methods: Utilizing the NSQIP database, a total of 1066 ortho procedures with 146,773 patients were identified. Of these procedures, 91 were ortho trauma (upper/lower extremity and hip/pelvis fractures) involving 22,361 patients. The remaining 975 codes represented all other ortho surgeries (hand surgery, arthroplasty, etc) involving 124,412 patients. Perioperative complications were recorded and categorized as minor (MiC) (wound dehiscence, superficial surgical site infection, pneumonia, and urinary tract infection) or major (MaC) (death, deep wound infection, myocardial infarction, pulmonary embolism, sepsis, etc). Using a multivariate analysis controlling for age, medical comorbidities, American Society of Anesthesiologists (ASA) status, operative time, and baseline functional status, perioperative complications were compared between the two groups.

Results: The overall complication rate in the ortho trauma group was 11.4% (2554/22,361) versus 4.1% (5137/124,412) in the general ortho group, $P = 0.001$. Table 1 displays the minor and major complication rates and the differences between ortho trauma and general orthopaedic patients. Similar variables were identified as risk factors for complications in both the ortho trauma group and the general ortho group (age >65, history of CHF [congestive heart failure], ASA >2, and longer operative time) (see Tables 2 and Table 3). When controlling for all variables, trauma was identified as a risk factor for developing any type of complication (odds ratio [OR]: 1.69, 95% confidence interval [CI]: 1.57-1.81).

Conclusion: Utilizing the NSQIP data we demonstrate that orthopaedic trauma patients are almost 2 times more likely than those in the general orthopaedic population to sustain complications, despite showing similar risk factors and controlling for individual patient factors. Furthermore we demonstrate a significant difference between complication rates between the two groups (11.4% vs. 4.1%). Our data suggest that orthopaedic trauma should not be grouped with general orthopaedic surgery when benchmarking for complication rates and adverse events.

Table 1 **Complications** **P* < 0.05

	Major*	Minor*	All*
General	2973 (2.4%)	2733 (2.2%)	5137 (4.13%)
Trauma	1592 (7.1%)	1384 (6.2%)	2554 (11.4%)

Table 2. Risk Factors for Complications in Ortho Trauma **P* < 0.05

Variable	OR	95% CI
Age (>65)	1.96*	1.70-2.26
History of CHF	1.63*	1.26-2.11
ASA >2	2.49*	2.13-2.89
Op time >90 min	1.15*	1.03-1.32

Table 3. Risk Factors for Complications in General Orthopaedics **P* < 0.05

Variable	OR	95% CI
Age (>65)	1.42*	1.32-1.53
History of CHF	2.16*	1.54-3.01
ASA >2	1.71*	1.59-1.85
Op time >90 min	1.69*	1.55-1.92

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