

End Stage Renal Disease and Orthopedic Surgery: An Analysis of Wound Complications.

Gabriel Hanna, MD¹, Eli Bryk, MD², Emily E. Wild, MD¹, Paul S. Pipitone, DO¹
¹Brookdale University Hospital, Brooklyn, NY, ²Weill Cornell Medical College, NY

Email of Presenting Author: Gh221@scarletmail.rutgers.edu

Disclosures: None

INTRODUCTION:

Patients living with End Stage Renal Disease (ESRD) are prone to a wide spectrum of wound complications. It is known, from basic science studies, that renal impairment disrupts the process of keratinization and leads to lower rates of granulation. The effect of ESRD on postoperative wound complications has not been well studied in surgical patients, especially patients undergoing orthopedic surgeries.

METHODS:

The Nationwide Inpatient Sample database was used to identify patients 18 years old and older who underwent Open Reduction and Internal Fixation (ORIF) in the United States from January 2002 to December 2014 for various types of fractures. Inpatient outcomes such as wound complications were analyzed.

RESULTS:

There were 867,378 patients who underwent ORIF recorded in the database from January 2002- December 2014. A total of 0.81% (7,055/867,378) had ESRD. Patients with ESRD had higher rates of wound complications compared with their non-ESRD counterparts (1.0% vs. 0.4%; $p < 0.05$). Stratifying by the type of wound complication, ESRD patients were more likely to develop wound dehiscence (0.2% vs. 0.1%; $p < 0.05$) and non-healing wounds (0.1% vs. 0.03; $p < 0.05$). Multivariate analysis controlling for multiple confounding factors, including age, sex, race, fracture location, number of operations, smoking status and comorbidities, demonstrated a higher rate of wound complications (OR, 1.55; 95% CI, 1.2-2.05; $p < 0.001$), wound dehiscence (OR, 2.11; 95% CI, 1.3-3.5; $p = 0.003$), and non-healing wounds (OR, 2.57; 95% CI, 1.3-5.1; $p = 0.007$) in patients with ESRD. Stratifying by fracture location, ESRD patients undergoing ORIF at the femur (0.8% vs. 0.4%; $p < 0.05$) and the tibia/fibula (1.9% vs. 0.4%; $p < 0.05$) were more likely to develop postoperative wound complications.

DISCUSSION/CONCLUSION:

Orthopedic surgeons should be aware of the significantly increased risk of postoperative structural wound complications in patients with ESRD and special measures should be instituted to help maintain the integrity and healing process of such wounds.

CLINICAL RELEVANCE: This study illustrated that patients with ESRD are at high risk of developing wound complications especially when undergoing ORIF at the femur and the tibia/fibula and special measures should be instituted postoperatively to prevent such complications.

Table 1. Demographic measurements for patients with ESRD in the United States who had ORIF: 2002-2014 combined, Nationwide Inpatient Sample.

Category	Total patients included in the analysis.	Patients with ESRD	Patients without ESRD	P value ¹
Number of admissions (N[%])	867,378 (100)	7,055 (0.8)	860,323 (99.2)	
Mean age (yr)	62.12±21.2	67.7 ±13.7	62.1 ±21.2	<0.001
Sex (N[%])				
Male	335,738 (38.7)	3,026 (42.9)	332,712 (38.7)	<0.05
Female	528,924 (61.0)	4,029 (57.1)	524,895 (61.0)	<0.05
N/A	2,716 (0.3)	0 (0)	2,716 (0.3)	
Race (N[%])				
White	552,769 (58.1)	3,557 (50.4)	549,212 (59.4)	<0.05
Black	55,355 (6.4)	1,160 (16.4)	54,195 (6.3)	<0.05
Hispanic	61,168 (7.1)	923 (13.1)	60,245 (7.0)	<0.05
Asian or Pacific Islander	10,846 (1.3)	202 (2.9)	10,644 (1.2)	<0.05
Native American	3,954 (0.5)	110 (1.6)	3,844 (0.4)	<0.05
Other	19,228 (2.2)	174 (2.5)	19,054 (2.2)	<0.05
N/A	164,058 (18.9)	929 (13.2)	163,129 (19.0)	
Fracture location (N[%])				
Humerus	73,443 (8.5)	485 (6.9)	72,958 (8.5)	<0.05
Ulna & Radius	77,970 (9.0)	322 (4.6)	77,648 (9.0)	<0.05
Carpals & Metacarpals	5,990 (0.7)	8 (0.1)	5,982 (0.7)	<0.05
Phalanges of Hand	8,739 (1.0)	18 (0.3)	8,721 (1.0)	<0.05
Femur	368,591 (42.5)	4,370 (61.9)	364,221 (42.1)	<0.05
Tibia & Fibula	309,211 (35.6)	1,786 (25.3)	307,425 (35.6)	<0.05
Tarsals & Metatarsals	22,210 (2.6)	61 (0.9)	22,149 (2.6)	<0.05
Phalanges of Foot	1,224 (0.1)	5 (0.1)	1,219 (0.1)	<0.05
Elixhauser comorbidity index (N[%])				
0	226,245 (26.1)	0 (0)	226,245 (26.3)	<0.05
1	180,343 (20.8)	32 (0.5)	180,311 (20.9)	<0.05
2	166,968 (19.2)	302 (4.3)	166,666 (19.4)	<0.05
≥3	285,952 (33.0)	6,721 (95.3)	279,231 (32.5)	<0.05
N/A	7,870 (0.9)	0 (0)	7,870 (0.9)	<0.05
Smoking status				
Yes	151,848 (17.5)	766 (10.9)	151,082 (17.6)	<0.05
No	715,530 (82.5)	6,289 (89.1)	709,241 (82.4)	<0.05

N/A: missing data

¹Comparisons were conducted using the z-test with p-values adjusted using the Bonferroni method.