Identification of Fracture-Related Infections following Operative Repair of Rotational Ankle Fractures

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INTRODUCTION: The purpose of this study was to identify risk factors for fracture-related infection (FRI) following ankle fracture surgery.

METHODS:

Retrospective chart review was performed on a consecutive series of ankle fracture surgery patients treated operatively between January 1, 2010 and June 1, 2022 who were identified from a prospective institutional review board (IRB) approved trauma database. Included patients met the following criteria: 1) open or closed rotational ankle fracture definitively treated with internal fixation, 2) development of a suggested or confirmed FRI based on the AO consensus statement, and 3) age ³18 years. Baseline demographics, medical history, and injury information including classification and wound complication type were collected. A control cohort was matched at a 2:1 ratio to the FRI cohort as a comparison group, and the two groups were statistically compared. Binary logistic regression analysis was performed to determine risk factors for developing an ankle FRI.

RESULTS: Out of 1,678 patients who were treated operatively for a rotational ankle fracture, 47 (2.80%) had suggestive or confirmed FRI at an average of 19 days postoperatively. Compared to the control cohort, FRI patients were more likely to be older (43.58 ± 17.01 years non-FRI vs. 53.45 ± 16.57 years FRI, p=0.001), of white race (32% non-FRI vs. 60%, FRI, p = 0.002), have diabetes (6% non-FRI vs. 23% FRI, p = 0.003), be a current or former smoker (24% non-FRI vs. 51% FRI, p = 0.001), and have a current or history of any drug use (6% non-FRI vs. 23% FRI, p = 0.002). Binary logistic regression demonstrated that being of white race (OR= 2.78, 95% CI=1.03-7.49, p=0.043), having a history of diabetes (OR=3.737, 95% CI= 0.99-14.10, p=0.052), prior or current smoking or drug use (OR= 2.76, 95% CI=1.07-7.10. p=0.036; OR= 5.49, 95% CI= 1.41-21.36, p=0.014 respectively), and history of open fracture (OR=6.45, 95% CI=2.00-20.83, p=0.002) were independently associated with the development of FRI after ankle fracture surgery.

DISCUSSION AND CONCLUSION:

Rotational ankle fracture patients of white race, a history of diabetes, smoking or drug use, or who have an open fracture at initial presentation are at increased risk of developing an FRI in the postoperative period.

Demographics & Injury Information	FRI n (%)	Non-FRI n (%)	*P-Value*
N	47	94	
Variables			
Age (years; *mean ± std)*	53.45 ± 16.57	43.58 ± 17.01	**0.001**
ASA	2.06 ± 1.09	2.04 ± 0.72	0.890
Body Mass Index	31.01 ± 8.39	28.97 ± 6.58	0.119
Gender			
Male	16 (49%%)	14 (49%%)	1.00
Female	15 (51%)	17 (51%)	1.00
Comorbidities			
Diabetes	11 (23%)	6 (6%)	**0.003**
Current or Former Smoker	24 (51%)	23 (24%)	**0.002**
Current or Former Drug User	11 (23%)	6 (6%)	**0.002**
Current ETOH User	20 (42%)	32 (34%)	0.328
Injury Information			
Open Fracture	15 (32%)	7 (7%)	**<0.001**
Classification B	31 (66%)	62 (66%)	0.968
Classification C	16 (34%)	32 (34%)	0.968
Dislocation with Fracture	18 (38%)	36 (38%)	0.943
Ex-Fix Prior to Definite Fixation	10 (22%)	6 (6%)	**0.007**

Table 1: Demographics and Injury Information

Binary Logistic Regression Analysis				
Development of FRI	*Odds Ratio*	*Standard Error*	*95% Confidence Interval*	*P Value*
Diabetes	4.437	0.671	1.190-16.538	**0.026**
White Race	3.61	0.454	1.483-8.788	**0.005**
Current or Former Smoker	3.446	0.477	1.353-8.781	**0.010**
Current or Former Drug User	5.202	0.655	1.440-18.789	**0.012**
Ex-Fix	2.455	0.755	0.559-10.785	0.234
Open Fracture	6.265	0.613	1.885-20.828	**0.003**

Table 2: Logistic Regression Analysis for Development of FRI