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Risk Factors in Traumatic Injury with Periprosthetic Fracture

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Introduction

- Rising global life expectancy contributes to an increase in recurrent injury, and thus orthopedic surgical revision.
- One such injury is periprosthetic fracture, which are fractures that occur at locations containing previous orthopedic hardware.
- Previous research suggests that the incidence rate of periprosthetic fracture is about 0.3%-2.5% in patients undergoing total knee arthroplasty¹.

Objectives

- While previous literature has indicated patient mortality rates are increased post periprosthetic fracture, other complications have not been studied²⁻⁶.
- The objective of this study is to investigate the risk factors that lead to adverse outcomes with periprosthetic fracture to improve patient care.

Methods

Demographics and outcomes data was collected for tibia and femur fracture patients seen at the Lehigh Valley Health Network Trauma Center between 1/1/2020 and 12/31/2021.

Data for isolated periprosthetic fracture and isolated non periprosthetic fracture patients was analyzed and compared for statistically significant differences.

We hypothesized that isolated periprosthetic fracture patients will have worse outcomes when compared to isolated non-periprosthetic fracture patients.

Data was compared using the Chi-Square Test for categorical data and the Mann-Whitney U for continuous data; A p-value less than 0.05 was deemed statistically significant.

Results

Variable	Nonperiprosthetic (n=485)	Periprosthetic (n=79)	P-value
Age	67	78	0.001
Gender (# of Males)	205 M (42.3%)	18 M (22.8%)	0.001
Wound/Surgical Site Infection(SSI)	0	1 (1.3%)	0.013
Sepsis	0	1 (1.3%)	0.013
Urinary Tract Infection (UTI)	0	3 (3.8%)	0.001
Deep Vein Thrombosis (DVT)/ Pulmonary Embolism (PE)	5 (1%)	3 (3.8%)	0.054
Pressure Ulcer	21 (4.3%)	6 (7.6%)	0.207
Delirium	32(6.6%)	8 (10.1%)	0.257
Mortality	4 (0.8%)	2 (2.5%)	0.17
Osteoporosis	80 (16.5%)	23 (29.1%)	0.007
Time to Operating Room (min)	1140	1080	0.976
Time to Weight Bearing as Tolerated (weeks)	0.285	6	0.001

Figure 1: Demographic and Outcomes Variables between Nonperiprosthetic and Periprosthetic Fracture Patients

- Patients who suffered periprosthetic fractures were statistically more likely to be older, female, and have a longer time to weight bearing as tolerated (WBAT).
- Results suggest that periprosthetic fracture patients had higher rates of Wound/SSI, Sepsis and UTI, however this may be due to the small sample size.

Conclusions

- The increased incidence rate of osteoporosis in periprosthetic patients indicates that osteoporotic individuals have a heightened risk for developing periprosthetic fractures.
- Females made up 77.2% of periprosthetic fractures, however it is unclear if that is directly due to their sex, as females are also statistically more likely to have osteoporosis⁷.
- While certain outcomes appear to be significantly different among the two samples, it is unclear if this is representative of the population.
- The significantly longer time to WBAT for the periprosthetic group suggests that periprosthetic fractures require a more cautious recovery protocol.

Limitations and Future Directions

- Only 566 patients, including 79 periprosthetic patients over the two-year span met the qualification for inclusion.
- We hope to add more patients through expanding the collection time period. This allows for a more representative sample, and thus a more powerful study.

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