Femoral Shaft Fragility Fractures: Peri-Implant Fracture Risk Mitigated by Femoral Neck Protection

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INTRODUCTION:
The study objectives were (1) to determine the cumulative incidence of proximal peri-implant femur fracture following femoral shaft fragility fractures and (2) to determine whether fixation protecting the proximal femur is associated with a lower cumulative incidence of proximal peri-implant femur fracture.
METHODS:
Multi center retrospective cohort study at four Level 1 trauma centers of patients aged 50 years or older treated with reduction and fixation of a low energy femoral shaft fracture from 2005 to 2024. Cases were categorized by whether fixation protected the proximal femur. Descriptive statistics were reported, and Kaplan Meier survival analyses assessed associations of patient, injury and treatment characteristics with the cumulative incidence of proximal peri-implant fracture. Statistical significance was considered for $p < 0.05$.
RESULTS:
There were 245 patients with median age 75 years old with interquartile range (IQR) 65 to 83, 192 (78.4%) women, median Charlson Comorbidity Index 4 (IQR 3 to 6). AO/OTA classification included 32A (193), 32B (34), 32C (18). The overall rate of proximal femur fracture was less with fixation that protected the proximal femur (0/119, 0%) than without (6/126, 4.8%), $p = 0.030$. Without fixation protecting the proximal femur the cumulative incidence of proximal femur fracture quickly climbed to 6.9% within 10 months of femoral shaft fracture and was significantly greater than a sustained 0% incidence when fixation protected the proximal femur, log-rank $p = 0.015$. Proximal femur fracture was not associated with age, sex, comorbidity burden or AO/OTA classification ($p > 0.05$ for all).
DISCUSSION AND CONCLUSION:
Without fixation protecting the proximal femur, approximately 1 in 15 patients treated for a femoral shaft fracture sustained a proximal femur fracture within months of fixation of their shaft fracture. Protecting the proximal femur greatly reduces this risk and should be considered when possible.