

Timing of Complications following Surgery for Distal Femur Fractures in Older Adults

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INTRODUCTION:

Fragility fractures of the lower extremity are a substantial source of morbidity and mortality for the US aging population. The management of distal femur fractures can be challenging. The fractures are often comminuted, intraarticular, periprosthetic, and involve osteoporotic bone. The high incidence of comorbidities in the older adult population may also impact operability, recovery, and survival. Most previous studies involving distal femur fractures have focused on the technical aspect of patient care with limited data on perioperative complications. In particular data are scarce regarding the timing of common local and systemic complications of operative-managed distal femur fractures in older adult patients.

This study aims to determine the timing and rates of perioperative complications in older patients with isolated low-energy distal femur fractures. By analyzing complication timing, providers can optimize care strategies and improve patient outcomes.

METHODS: The ACS NSQIP database was queried for adults aged 65 and older who received surgical treatment for a distal femur fracture between 01 January 2015 and 31 December 2021. Cox regression models and risk tables adjusted for baseline clinical characteristics were created for 14 complications (Superficial Surgical Site Infection (SSI), Deep SSI, Organ/Space SSI, Pneumonia, Pulmonary Embolism (PE), Deep Venous Thrombosis (DVT), Urinary Tract Infection (UTI), Stroke/Cerebrovascular accident (CVA), Myocardial Infarction (MI), Renal Failure, Cardiac Arrest (CA), Reoperation, Sepsis, and Death within 30 days of surgery). Model summaries were used to identify significant variables with a Bonferroni correction applied.

RESULTS: A total of 3,956 patients met inclusion criteria and were included in the study. Most of the patients were female (82.0%), independent before surgery (78%), and in the age group of 70-79 years (35.0%). The most common complication was urinary tract infection (UTI) (5.2 %), followed by death (4.1%) and pneumonia (3.4%). Most complications were diagnosed within 14 days after surgery, except for surgical site infections (SSI) (superficial SSI median of 16 days, deep SSI median 20 days). The median days from surgery to discharge were 4.0 days. The five most common postoperative complications diagnosed before discharge was renal failure (78.3%), stroke/CVA (69.2%), cardiac arrest (68.8%), pulmonary embolism (67.9%), and pneumonia (61%), while SSI (superficial and deep) were primarily diagnosed following discharge. For superficial surgical site infections, bleeding disorders ($p=0.002$) and CPT 27514 ($p<0.002$) were significant risk factors. Pneumonia was linked to septic shock ($p=0.001$) and disseminated cancer ($p<0.001$). Pulmonary embolism was associated with male gender ($p=0.002$) and disseminated cancer ($p=0.002$). Septic shock ($p=0.002$) was a risk factor for UTI. Poor functional status (totally dependent) ($p=0.001$) and systemic inflammatory response syndrome (SIRS) ($p=0.001$) were linked to sepsis. Preoperative (within 48 hours) septic shock ($p<0.001$) was a significant risk factor for postoperative septic shock. Smoking ($p=0.002$) was a risk factor for reoperation. Poor functional status (totally dependent) ($p<0.001$) and congestive heart failure (CHF) ($p<0.001$) were significant risk factors for death.

DISCUSSION AND CONCLUSION:

Distal femur fractures in older adults pose significant challenges for management. Despite extensive research on distal femur fractures, comprehensive evaluations of perioperative complications and mortality rates are still lacking. Using a large-scale national surgical database, the current study characterizes the timing of common complications following distal femur fracture surgery in geriatric patients.

This study found that complications primarily manifested within 14 days post-surgery, except for SSIs (superficial and deep), which presented later in the postoperative course. Close patient follow up during this vulnerable period may help identify these adverse events and enable timely interventions by providers. Additionally, our results suggest that septic shock may be a common risk factor for both UTI and sepsis, which is supported by previous research. Concerning pulmonary embolism, individuals with disseminated cancer were identified as high-risk groups. Patients with disseminated cancer are associated with a hypercoagulable state, which increases the likelihood of DVT and pulmonary embolism. Overall, identifying risk factors for postoperative complications can aid in developing targeted interventions to improve patient outcomes. Our findings underscore the need for comprehensive preoperative risk assessment and patient management strategies to mitigate the impact of identified risk factors. Our study reported a 30-day mortality rate of 4.1%, within previously reported 30-day mortality ranges of 2% to 4.5%. The risk factors for high mortality included totally dependent pre-fracture function status and history of CHF.

In conclusion, this study characterized the timing of the most common complications following distal femur fracture repair in older patients. The findings provide important information for healthcare teams that treat these patients to be aware of the highest risk periods for complications after distal femur fracture surgery to prevent adverse events.

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