Radiographic and Clinical Outcomes of Traumatic Subtrochanteric Femur Fracture Fixation and Reduction Methods

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INTRODUCTION:
There is debate surrounding optimal reduction methods and implant choices for subtrochanteric femur fractures, given variable complication rates. This study assesses radiographic and clinical outcomes, aiming to discern optimal reduction methods and implants.
METHODS:
A retrospective review of patients aged ≥18 with traumatic subtrochanteric fractures between 2014-2023 at a Level-1 trauma center was conducted. Patient, surgical, and outcome characteristics were collected. Femoral neck-shaft angle (FNSA), maximum sagittal cortical displacement (MSCD), and modified radiographic union score of the tibia (mRUST) were measured on post-operative radiographs.
RESULTS:
Among 64 patients (mean age 56.1, 70.3% male) with one patient with bilateral injuries, 54 received an intramedullary nail (IMN), 8 a plate, and 3 a nail-plate combination. No differences were observed in AO/OTA fracture patterns between groups. Open reduction was performed in 35 cases and closed or percutaneous reduction in 30 cases. Closed reductions had significantly shorter surgery durations and decreased estimated blood loss (EBL) compared to open reductions ($p=0.028$ and $p=0.049$, respectively). Radiographically, maximal cortical displacement on lateral imaging was significantly increased in closed or percutaneously reduced fractures compared to open reductions ($p=0.025$). IMN fixation was utilized in patients with higher BMI ($p=0.017$). IMN fixation resulted in increased maximal cortical displacement on lateral imaging compared to plate and combination nail-plate fixations ($p=0.041$). No differences in mRUST at multiple time points were observed in reduction method or implant type. Post-operatively, no differences existed in pain, independent ambulation, complication or revision rates between implants or reduction methods.
DISCUSSION AND CONCLUSION:
Subtrochanteric fractures treated with open reduction and presence of a plate in the fixation can improve sagittal alignment. Closed/percutaneous reduction decreases surgery duration and estimated blood loss. Regardless of reduction type and implant, adequate reduction, high union rates and successful outcomes are possible. Anatomic reduction and stable fixation are essential in surgical treatment, regardless of approach or implant choice.