High Surgical Complication Rate for Ballistic Proximal Femur Fractures Regardless of Fracture Location

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INTRODUCTION: Outcomes of ballistic proximal femur fractures are not well documented and reported complications are high. These fractures are often difficult to treat, and evidence regarding management and clinical results remains scarce. This study reports the outcomes following operative management of low-velocity ballistic OTA 31 (A/B/C) proximal femur fractures. We hypothesized that outcomes would vary based on fracture location, with inferior outcomes occurring for intracapsular (OTA 31 B/C) versus extracapsular (OTA 31A) injuries.

METHODS: A retrospective review of 44 patients, age >18 years, treated operatively for low-velocity ballistic proximal femur fractures (AO/OTA Type 31) at a single Level I Trauma Center between 2011-2021 was performed. Demographics, injury characteristics, and complications (infection, nonunion, reoperation, implant failure) were recorded. Patients with intracapsular (31 B/C) and extracapsular (31A) injuries were compared, with univariate analysis and multivariate cox regression performed to examine associations.

RESULTS: There were 26 extra-capsular and 18 intracapsular ballistic proximal femur fractures with a mean age of 26.5 years (range 19.1–77). In the extra-capsular group, 80.8% of fractures were stabilized with an intramedullary nail and in the intra-capsular group 33.3% were stabilized with screws and 22.2% by intramedullary nail or plate fixation. The overall surgical complication rate was 22.7%, with no significant difference between the groups (31A: 19.2%; 31B/C: 28%, p=0.74). This included an 11.4% implant failure rate, 9.1% nonunion rate and 9.1% reoperation rate. There was an 11.1% reoperation rate in the intracapsular cohort and 7.7% in the extracapsular group. Intracapsular fractures had twice the rate of implant failure as extracapsular fractures (16.7% vs. 7.7%). There were 4 nonunions, 2 per group. There was 1 malunion and 1 case of avascular necrosis, both in the intracapsular group. There were 2 infections, both in the extracapsular group.

DISCUSSION AND CONCLUSION: We found that more than 20% of ballistic proximal femur fractures had a major surgical complication. There was no significant difference between intracapsular and extracapsular injuries. Complications differed between the two groups with intracapsular injuries having twice the rate of implant failure and extracapsular injuries developing more infections.