Varus Malreduction Drives Cut-Out After Cephalomedullary Nailing of Intertrochanteric Fractures

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Purpose: Screw cut-out or cut-through is a highly morbid complication of cephalomedullary nailing. The purpose of this study was to assess the relationship of neck shaft angle and acute fixation failure for a specific cephalomedullary nailing system (Trochanteric Fixation Nail Advanced [TFNA], DePuy Synthes).

Methods: This was a multicenter retrospective analysis of 688 patients with intertrochanteric fractures (AO/OTA 31A1-A3) treated with either the TFNA Blade or Screw between January 2014 and May 2021. Neck shaft angle was measured on immediate postoperative radiographs. The primary outcome was implant failure in the form of cut-out (defined as head perforation associated with a secondary varus displacement of the neck-head fragment) or cut-through (defined as a central perforation of the screw/blade into the hip joint without any displacement of the neck-head fragment). Cut-out and cut-through were compared between patients with low or acceptable neck shaft angles (NSAs) with a $\chi 2$ test and multivariate regression. Acceptable NSA was defined as >128.5°.

Results: The overall incidence of acute fixation failure (cut-out or cut-through) was 3.2%. The rate of cut-out was significantly higher in patients with an NSA ≤128.5° compared to patients with an acceptable NSA (6.9% vs 1.3%, P<0.001). After controlling for confounding variables (age, sex, mechanism, and fracture pattern), an NSA ≤128.5° for the TFNA increased the risk of cut-out and cut-through (odds ratio 4.62 [95% confidence interval 1.74 to 12.29, P = 0.002).

Conclusion: Restoring the NSA to >128.5° appears to be critical to reducing risk for acute fixation failure after cephalomedullary nailing with this system.