

Implant Cut-out Following Cephalomedullary Nailing of Intertrochanteric Femur Fractures: Are Helical Blades to Blame?

*Ishaq Ibrahim, MD; Paul T. Appleton, MD; John J. Wixted, MD; Edward Rodriguez, MD
Beth Israel Deaconess Medical Center, Boston, MA, United States*

Purpose: Implant cut-out remains a common cause of cephalomedullary nail (CMN) failure and patient morbidity following surgical treatment of intertrochanteric femur fractures. Recent studies have suggested an increased rate of CMN cut-out with helical blades as opposed to lag screws. We compared rates of overall cut-out between helical blades and lag screws and used bivariate and multivariate analysis to determine the role of proximal fixation method among other variables on risk for cut-out. Subgroup analysis was performed on the basis of failure mechanism; superior migration versus medial perforation.

Methods: 313 patient charts were retrospectively reviewed over an 8-year period; 245 patients were treated with helical blades and 68 with lag screws. Radiographs were reviewed for fracture pattern, tip-apex distance (TAD), Parker's ratio (PR), and reduction quality. Rate of implant cut-out was compared between groups and multiple logistic regression was used to analyze the ability of several independent variables to predict implant cut-out.

Results: 20 cut-outs occurred: 15 with helical blades and 5 with lag screws. No difference in the rate of cut-out was observed between the 2 groups ($P = 0.45$). Poor fracture reduction was found to be a significant predictor of implant failure via bivariate and multiple logistic regression analysis ($P < 0.01$, odds ratio [OR] 23.573). Helical blade fixation, fracture instability, $TAD \geq 25$, and $PR \geq 0.45$ were not predictive of implant cut-out during multivariate analysis. Similarly, patient smoking status and surgeon trauma fellowship training did not significantly increase the odds of implant cut-out. Failure by medial perforation occurred in 12 instances, all involving helical blades. Failure by superior migration occurred at a significantly higher rate with lag screws than helical blades ($P = 0.02$).

Conclusion: CMN cutout is likely multifactorial. A direct association between helical blade fixation and implant cut-out was not observed in our study. Among modifiable risk factors for implant failure, poorer fracture reduction was predictive of failure by cut-out. Subgroup analysis highlights differing modes of failure between lag screws and helical blades that warrants further investigation. Ideal TAD during helical blade fixation remains unknown.