Fixation Failure following Operative Repair of Intertrochanteric Fractures: It's Not Just the Tip Apex Distance

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INTRODUCTION: The purpose of this study was to determine predictive post-fixation radiographic parameters for fixation failure to guide intraoperative decision making and assessment of reduction and fixation.

METHODS: A consecutive series of intertrochanteric (IT) hip fracture patients [OTA/AO 31A] undergoing operative repair with a cephalomedullary nail were reviewed. Intraoperative radiographic parameters (posteromedial cortex continuity, tip to apex distance, neck-shaft angulation, calcar malreduction distance, and distance from nail insertion point to greater trochanter tip) were measured by blinded independent reviewers. Radiographic parameters were statistically compared between the fixation failure (FF) and non-fixation failure groups at one-year follow up. Uni- and multivariate logistic regression with Holm correction was performed to determine radiographic parameter correlates of fixation failure.

RESULTS: Of 407 patients identified, 18 (4.4%) developed fixation failure within one year. The FF patients were younger than their non-fixation failure counterparts (77.0 years vs. 81.9 years, p=0.03), however there were no other demographic, fracture classification, or implant hardware differences. The FF group had increased calcar malreduction distance (4.9 vs. 2.6mm, p=0.008) and rates of posteromedial cortex discontinuity (72.2% vs. 47.3%, p=0.04). There were no other differences in radiographic parameters between cohorts. On univariate regression, every 1 mm increase in calcar malreduction distance correlated with 12% increased odds of FF (OR=1.12, 95% CI=1.02–1.24, p=0.01) and posteromedial cortex continuity imparted 65% decreased odds of FF (OR=0.35, 95% CI=0.11–0.93, p=0.047). Multivariate regression demonstrated that every 1 mm increase in translation distance correlated with 13% increased odds of FF (OR=1.13, 95% CI=1.02–1.24, p=0.01).

DISCUSSION AND CONCLUSION:

Posteromedial cortex continuity and calcar malreduction distance should be assessed critically intraoperatively to decrease the risk of failure following cephalomedullary nailing for intertrochanteric fractures.