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

***Nina Douglas Fisher, MD**; Rown Parola, MS; Utkarsh Anil, MD; Christopher Gabriel Herbosa, BS; Blake Immanuel Boadi, BA; Nirmal C. Tejwani, MD; Sanjit R. Konda, MD; Kenneth A. Egol, MD*
NYU Langone Orthopedic Hospital, New York, New York, UNITED STATES

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

Methods: A consecutive series of intertrochanteric 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 1 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 FF within 1 year. The FF patients were younger than their non-fixation failure counterparts (77.0 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 2.6 mm, 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 mal-reduction distance correlated with 12% increased odds of FF (odds ratio [OR] 1.12, 95% confidence interval [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).

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.

Table 1. Intraoperative Radiographic Parameters by Fixation Failure Incidence

	No Fixation Failure (n=389)	Fixation Failure (n=18)	Total (n=407)	P value
Posteromedial Cortex Continuity, n (%)	*205 (52.7%)*	*5 (27.8%)*	*210 (51.6%)*	*0.039*
Tip to Apex Distance, mean ± SD, mm	19.0 ± 5.6	19.5 ± 5.9	19.1 ± 5.6	0.938
Tip to Apex Distance Greater Than 25 mm, n (%)	45 (11.6%)	2 (11.1%)	47 (11.5%)	0.953
Angulation, mean ± SD, degrees	5.4 ± 6.6	5.5 ± 6.2	5.4 ± 6.5	0.862
Angulation Greater Than 5 Degrees, n (%)	145 (37.3%)	7 (38.9%)	152 (37.3%)	0.890
Calcar Mal-reduction Distance, mean ± SD, mm	*2.6 ± 3.8*	*4.9 ± 4.1*	*2.7 ± 3.8*	*0.008*
Nail Insertion Point to Greater Trochanter Tip Distance, mean ± SD, mm	3.8 ± 5.4	4.0 ± 5.5	3.8 ± 5.4	0.764

POSTER ABSTRACTS

See the meeting website for complete listing of authors' disclosure information. Schedule and presenters subject to change.