

Predictors of Excessive Lag Screw Sliding and Cutout After Cephalomedullary Nail Fixation of Intertrochanteric Fracture

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Purpose: The vast majority of intertrochanteric fractures treated with cephalomedullary nailing (CMN) will heal. Occasionally, even though bony union occurs, excessive lag screw sliding can cause persistent pain and soft-tissue irritation and require return to surgery for hardware removal. The purpose of this study was to evaluate if fracture stability, lag screw tip-apex distance (TAD), and quality of reduction have any impact on excessive lag screw sliding and potential cutout.

Methods: As part of our Level-I trauma center's institutional hip fracture registry, a retrospective analysis identified 199 intertrochanteric fractures fixed with CMN between 2009 and 2015 with a minimum follow-up of 3 months. The mean follow-up was 22 months (range, 3-94 months). Mean patient age was 75 years (range, 50- 97 years) and 72% were women. Postoperative radiographs were used to measure the TAD, quality of reduction, neck-shaft angle (NSA), and lateral lag screw prominence. Follow-up radiographs were reviewed to assess fracture union, displacement, and progression of lateral lag screw prominence. Complications and reoperations were recorded.

Results: The average lag screw sliding was 5 ± 5 mm. Excessive lag screw sliding (defined as >10 mm; 1 standard deviation above the mean) was present in 12% of patients. Lag screw sliding was more common in unstable fracture patterns (21% vs 5%, $P < 0.01$) and patients with calcar fracture gapping >4 mm (26% vs 4%, $P < 0.01$). Lag screw sliding was not associated with age ($P = 0.9$), sex ($P = 0.4$), TAD ($P = 0.3$), implant ($P = 0.8$), distal interlocking screws ($P = 0.3$), or NSA ($P = 0.2$). There were 7 patients (3%) with prominent lag screws that required removal. These patients experience more lag screw sliding than those that did not require removal (9 mm vs 5 mm, $P < 0.01$). There were 2 cutouts (1%). The average TAD was larger in the cutout group (26 vs 17 mm, $P < 0.01$). 15 patients (7%) had TAD of 25 mm or more.

Conclusion: Excessive lag screw sliding was associated with unstable fracture patterns, calcar fracture gapping, and more reoperations for symptomatic hardware. Careful attention to calcar fracture reduction may minimize excessive lag screw sliding. The incidence of cutout was low and associated with a larger TAD.