

**Long versus Short Intramedullary Nails for Trochanteric Hip Fractures:
A Secondary Analysis of the INSITE Trial**

Lauren L. Nowak, MSc, PhD; Emil H. Schemitsch, MD, FIOTA; Mohit Bhandari, MD; Ole Brink, MD; Justin De Beer, MD; Samir Mehta, MD; Rudolf W. Poolman, PhD; Dirk Stengel, PhD; INSITE Investigators Group

Purpose: We aimed to use data from a recent randomized controlled trial (RCT) comparing the sliding hip screw vs intramedullary nailing for trochanteric fractures to examine outcomes between those managed with a short vs long cephalomedullary nail.

Methods: This is a secondary analysis using one arm of an RCT that included ambulatory patients >17 years with AO type 31-A1 or 31-A2 trochanteric fractures. We examined differences in fracture-related (femoral shaft fracture, implant failure, surgical site infection, nonunion, limb shortening, and pain) and medical adverse events (AEs; organ failure, respiratory distress, stroke, deep vein thrombosis [DVT] gastrointestinal upset, pneumonia, myocardial infarction, sepsis, or urinary tract infection [UTI]), and readmission between those managed with a short vs long intramedullary nail (IMN). We used logistic regression to examine the independent association between nail length and outcomes.

Results: We included 412 trochanteric fracture patients managed with an IMN. Of these, 339 (82.3%) received a short (170 mm-200 mm) nail, while 73 (17.7%) received a long (260 mm-460 mm) nail. Patients managed with a short nail were more likely to be admitted from an institution (vs home), while those managed with a long nail were more likely to have comorbidities, and more complex fracture types. Patients in the long nail group had higher rates of fracture-related AE (12.3%) vs the short IMN group (3.5%). Specifically, the unadjusted rates of surgical site infection (SSI) and pain were significantly higher in the long group (SSI: 5.5%, pain: 2.7%) compared to the short group (SSI: 0.3%, pain: 0.0%). Similarly, patients in the long group were more likely to develop DVT (Long: 2.7%; Short: 0.3%), and be readmitted to the hospital (Long: 28.8%; short: 20.7%). Following covariable adjustment, long nails remained independently associated with a higher odds of fracture-related AE (5.11, 1.96-13.33) compared to short nails. We found no association between the odds of readmission and nail length following covariable adjustment (1.00, 0.52-1.94).

Conclusion: Our analyses revealed that trochanteric fracture patients managed with long IMN nails may have a higher odds of fracture-related AEs compared to short nails. While future research is required to validate these findings, the data supports the use of short nails for the majority of intertrochanteric hip fractures.