

Radiographic Comparison of Compression Hip Screws and Cephalomedullary Nails in Stable Femoral Trochanteric Fractures

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Purpose: Both compression hip screws (CHS) and intramedullary nails (IMN) are used for stable intertrochanteric femur fractures. In Japan, medial cortical support is highlighted as a factor reducing postoperative cut-out risk. However, no study has compared postoperative femoral offset (FO) changes based on implant and reduction differences. This study aimed to compare postoperative femoral neck-shaft angle (NSA), FO, and lower limb length discrepancy (LLD) between CHS and IMN.

Methods: This single-center retrospective cohort study included patients with AO/OTA 31A1 intertrochanteric fractures treated at our institution from October 2020 to March 2024. Exclusion criteria were followed up less than 3 months, contralateral fracture history, and inadequate radiographs. Patient demographics, fracture type, surgery time, and reduction quality were evaluated. Preoperative radiographs measured contralateral FO and CCD. Postoperative and final follow-up radiographs measured FO, CCD, LLD, and telescoping. X-ray magnification was adjusted using femoral head diameter, and femoral rotation was corrected based on Lechler et al's implant-specific CCD. Postoperative ambulatory ability was also compared. Statistical analysis used the Mann-Whitney U test and Fisher's exact test (significance: $p < 0.05$).

Results: The study included 27 IMN and 32 CHS patients (mean age: 83.8 years, 11 men, 48 women). Mean radiographic follow up was 9.0 months. There was no significant difference in preoperative contralateral FO or CCD. Postoperative CCD was 125.7° (IMN) versus 131.6° (CHS). LLD was -3.58 mm (IMN) versus 1.08 mm (CHS), showing significance (CCD: $p = 0.003$, LLD: $p < 0.001$). FO showed no significant difference (38.9 mm vs 41.1 mm). At final follow up, CCD remained significantly different ($p = 0.013$), but FO, LLD, and telescoping (4.0 mm vs 4.3 mm) did not. From the non-fractured side, CHS preserves femoral offset over IMN, but not significantly (IMN 104.9% vs CHS 102.3%). No difference in postoperative ambulatory ability was observed.

Conclusion: The IMN group had significantly greater varus fixation and LLD than the CHS group. Although ambulatory ability did not differ, radiographic findings suggest CHS may be more advantageous for stable intertrochanteric fractures.