Decreased Complications But a Distinctive Failure of Fully Threaded Headless Cannulated Screw (FTHS) Fixation for Femoral Neck Fractures: A Prospective Cohort Study with Historical Controls

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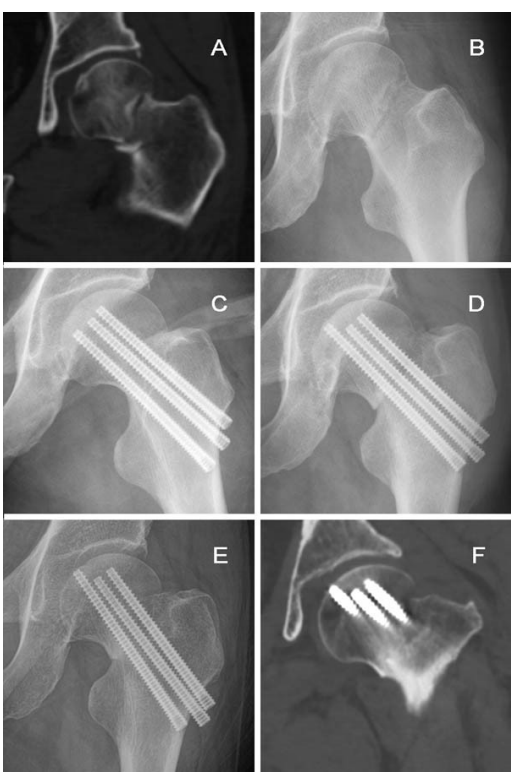
Purpose: Our objective was to investigate complication rates and failure mechanisms of the FTHS fixation for femoral neck fractures (FNFs) versus the partial threaded cannulated screw (PTS) and to identify predictors of failure.

Methods: A total of 75 FNF patients (18-65 years) were prospectively treated by closed reduction and internal fixation (CRIF) with 3 parallel FTHSs. After at least 2 years of follow-up, the clinical results were compared to the parameters obtained in a historical control case-matched group (75 patients) treated by PTS fixation from the same institution, a Level-I trauma center. The demographic, follow-up information, and radiological images were assessed by independent blinded observers. The complication rates, especially fixation failure, defined by screw loosening (including screw migration, penetration, or withdrawal), varus collapse, obvious fracture displacement, or shortening were compared between the 2 groups based on different classifications and fracture morphologies.

Results: The overall complication rate of fixation failure, nonunion, and head necrosis was 21.3% (16/75) in the FTHS group and 50.6% (38/75) in controls, respectively. Six atypical screw migrations with varus collapse (8%) contributed significantly to the overall failure rate of FTHS fixation. Four screw "medial migrations" resulted from the lateral migration of the femoral head and subsequent medial penetration of the construct, while 2 resulted from screw superior cutout.



Conclusion: The results showed that FTHS fixation could significantly reduce the complication rate and supported use of FTHS fixation, especially for high-energy FNFs (Garden III-IV, Pauwels III, or VN angle [angle between the fracture line and the vertical of the neck axis] ≥15°). In addition, some atypical modes of failure, screw "medial migration" and superior cutout, which were apparently different from screw withdrawal in PTS, have been confirmed.