

ADAPT Navigation System Improves Tip-Apex Distance During Gamma Nailing Of Intertrochanteric Fractures: Results Of A Monocentric Randomized Controlled Trial

Trauma / Hip & Femur Trauma / Surgical Treatment

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Background

Intertrochanteric fractures are a commonly treated with closed reduction and intramedullary nail osteosynthesis using implants having a lag screw for the femoral head. The tip-apex-distance (TAD) of the lag screw should not exceed 25mm to avoid implant failure.

Objectives

We aimed to determine whether a fluoroscopy-based navigation system would improve TAD compared to the conventional technique in a teaching hospital setting.

Study Design & Methods

Design: Randomized controlled trial.

Setting: Level 1 trauma center at a university hospital.

Patients: A total of 161 patients were screened for inclusion in the study. After meeting exclusion and exclusion criteria, 31 patients were randomized (n = 18 navigated vs. n = 13 control group), with the patient blinded to the result and the surgeon not being told until inside the operating room.

Intervention: Fluoroscopy-based navigated guidance of lag screw length and position.

Main outcome measures: Average TAD and the proportion of TAD over 25 mm.

Results

TAD was lower in the navigated group compared to the control group (mean = 17.5 mm vs. 24.2 mm; P = 0.0018). No navigated cases exceeded the 25 mm TAD threshold, compared to 39% of conventional cases (P = 0.0076). Navigation resulted in fewer drilling attempts compared to the conventional technique (median = 1 vs. 4 attempts; P < 0.0001). We detected no significant differences in operation time or total number of fluoroscopic images (P > 0.05).

Conclusions

Fluoroscopy-based computer navigated Gamma nailing for intertrochanteric fractures improved tip-apex distance and reduced the number of drilling attempts without increasing operation time compared to the conventional fluoroscopy-guided technique in a teaching hospital setting.