

Fellowship Trained Orthopaedic Trauma Surgeons Achieve Better Postoperative Radiographic Parameters after Intramedullary Nailing of Intertrochanteric Femur Fractures when Compared to Non-Trauma Trained Surgeons

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INTRODUCTION:

Intertrochanteric femoral fractures are common orthopaedic injuries.. Since many factors predictive of failure are related to technical aspects of the surgery, the purpose of this study was to compare radiographic parameters after fixation, comparing fellowship trained orthopaedic trauma surgeons to surgeons who did not complete an orthopaedic trauma fellowship. Our hypothesis is that fellowship-trained trauma surgeons will achieve better immediate postoperative radiographic parameters.

METHODS:

We identified 100 consecutive patients treated by five fellowship-trained orthopaedic traumatologists and 100 consecutive patients treated by community surgeons. Patients were then stratified based on their surgeon's subspecialty training (Trauma vs. Community). Primary outcome variables were time to surgery after presentation to the hospital, operative time (time from incision to closure), operative room time (total time in the operating room), postoperative neck shaft angle (NSA), a comparison of the repaired NSA to the uninjured side, tip-apex distance (TAD), and reduction quality. Reduction quality was assessed based on the Baumgaertner reduction quality criteria (good, acceptable, poor) (Figure 1). All postoperative radiographs were randomized, and all measurements were made by a fellowship-trained orthopaedic trauma surgeon.

RESULTS:

One-hundred patients were included in each group. The mean age in the community group was 77 compared to 79 in the trauma group ($p = 0.95$). There were 63 females and 37 males in the community group compared to 57 females and 43 males in the trauma group ($p = 0.39$).

In the trauma group, on average, patients underwent fixation within 24 hours (range 0-2 days; standard deviation (SD) 0.4 days) compared to 34 hours in the community group (range 1-9 days; SD 1.0 days) ($p < 0.001$) (Table 1). The mean time in the operating room for the trauma group was 88 minutes compared to 100 minutes for the community group ($p = 0.002$). The mean operative time for the trauma group was 46 minutes compared to 55 minutes in the community group ($p = 0.008$).

The mean tip-apex distance for the trauma group was 10 mm compared to 21 mm for the community group ($p < 0.001$). Over one-fourth (27%) of patients in the community group had a tip-apex distance of over 25 mm compared to none in the trauma group ($p < 0.001$).

In the trauma group the lag screw was placed in a center-center position in 90 patients (90%) compared to 37 patients (37%) in the community group ($p < 0.001$). In the trauma group, 8 (8%) were placed in an inferior/central position compared to 13 (13%) in the community group. This has been found to be an acceptable biomechanical position. When combining these values, the trauma group placed the lag screw in an acceptable position in 98% of patients compared to 50% in the community group ($p < 0.001$).

The mean postoperative NSA for the trauma group was 133° compared to 127° for the community group ($p < 0.001$). The mean difference of the NSA of the repaired side compared to the uninjured side was 2.5° of valgus in the trauma group compared to 5° of varus for the community group ($p < 0.001$). According to the reduction criteria of Baumgaertner, there were 93 good reductions in the trauma group compared to 19 in the community group ($p < 0.001$). There were 7 acceptable reductions in the trauma group and 32 acceptable reductions in the community group. Finally, there were 0 poor reductions in the trauma group and 49 in the community group ($p < 0.001$). There were 11 patients (11%) in the community group with a good reduction, an accurately placed lag screw, and a TAD of less than 25 mm compared to 91 patients (91%) in the trauma group ($p < 0.001$).

DISCUSSION AND CONCLUSION:

Overall, we have shown that fellowship trained orthopaedic trauma surgeons achieve better reductions with more accurate implant placement when treating intertrochanteric femur fractures with intramedullary nails.

Figure 1:

Baumgaertner Reduction Quality Criteria

Criteria

I. Alignment

- a. AP view: normal or slight valgus neck-shaft angle
- b. Lateral view: less than 20° of angulation

II. Displacement

- a. AP view: less than 4 mm of displacement of any fragments
- b. Lateral view: less than 4 mm of displacement of any fragments

Reduction quality

- Good: both criteria met
- Acceptable: only one criterion met
- Poor: neither criterion met



Good

Acceptable

Poor

Mean Parameter	Trauma	Community	p value
Time to surgery (hours)	24	34	< 0.001
Operating Room Time (minutes)	88	100	0.002
Operative Time (minutes)	46	55	0.008
TAD (mm)	10	21	< 0.001
Post-operative NSA (degrees)	133	127	< 0.001
Difference of NSA (degrees)	2.5° valgus	5° varus	< 0.001
Good Reductions	93	19	< 0.001
Acceptable Reductions	7	32	
Bad reductions	0	49	< 0.001

Table 1:

Table demonstrating primary outcome variables of trauma surgeons compared to community surgeons.