Treatment of Proximal Femur Fractures using an Extended-Short Nail

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The device that is the subject of this study is Food and Drug Administration approved

Introduction

This study retrospectively reports on the 2-year patient outcome of the first 150 consecutive patients undergoing intertrochanteric (IT) fracture fixation with the Extended-Short (ES) nail (Advanced Orthopaedic Solutions, Torrance, CA).

The ES nail is an FDA approved long titanium nail which is locked at the same location as the locking hole of a short intramedullary (IM) nail.

Proximal screw locking at the “ES hole” using the targeting module provides fracture stabilization analogous to short IM nails and eliminates the need to distally lock the nail.

The purpose of this study was to evaluate the effectiveness of the ES nail for the treatment of intertrochanteric fractures.

Retrospective Case Series

- 150 consecutive patients
- Presenting with intertrochanteric fractures
- Admitted through emergency department
- Single community hospital
- Surgeries performed by four surgeons
- Subsequently followed for two-years

Operative Technique for ES Nail

- Use of a fracture table
- Operative closed reduction
- Standard trochanteric-entry nailing
- Lag screw placement across fracture
- Locking screw inserted at “ES hole”

Results

AO Müller fracture classification system:

- Type A1: 44.7%
- Type A2: 40%
- Type A3: 15.3%

Average time from hospital admission to surgery: 1.6 days

Average patient age: 84 years (44 - 101)

Average operative time: 27.4 minutes

Average operative blood loss: 196 mL

No nonunions, implant failures, cutouts, or fixation failures

Average time to union: 11.3 weeks

2 superficial wound infections

3 postoperative hematomas

2 patients fell postoperatively resulting in periprosthetic fractures

Both fractures were stabilized with insertion of 2 distal locking screws

The nail was not removed in either case

At 2 years postoperatively:

- Follow up: 62%
- Mortality rate: 25.3%
- 58.1% of patients regained their prefracture UCLA activity score

Discussion

The hybrid design of the ES nail combines the mechanical advantages of long IM nails with the surgical ease of use offered by short IM nails.

This unique nail type obviates the freehand technique for targeting distal locking screws, leading to reduced operative time and radiation exposure.

The ES nail system’s ease of use, low rate of complication, high rate of union and favorable rate of return to prefracture activity level suggests this nail type to be a viable option in the management of hip fractures.

Figure 1

Top, The ES nail is the same length as the corresponding standard long IM nail. The “ES hole” is at the same distance (155mm) from the proximal tip of the nail as a standard short IM nail. Bottom Left, Lateral view of ES nail demonstrating various screw holes and slight anterior bow. Bottom Right, ES targeting module locking at “ES hole”.

Figure 2

Left, Preoperative IT fracture with subtrochanteric extension (AO Müller classification A3). Right, Postoperative radiograph of fracture treated with ES nail.

Figure 3

Left, Preoperative IT fracture (AO Müller classification A2). Middle & Right, Postoperative AP and lateral radiographs illustrating the canal spanning length and the anterior bow of the ES nail.

Figure 4

Left, Preoperative IT fracture (AO Müller classification A2). Right, Postoperative radiograph of healed fracture with ES nail.
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Table 1. Review of Literature: Intertrochanteric Fractures Treated with Intramedullary Devices

<table>
<thead>
<tr>
<th>Reference</th>
<th>Device</th>
<th>Year</th>
<th>Number of Patients</th>
<th>Mean Patient Age</th>
<th>Unstable Fracture (%)</th>
<th>Mean Operative Time (minutes)</th>
<th>Mean Blood Loss (mL)</th>
<th>Fixation Failure (%)</th>
<th>Cut-out/Varus (%)</th>
<th>Secondary Femur Fracture (%)</th>
<th>Wound Infections (%)</th>
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