

## Study of Functional and Radiological Outcome of Intertrochanteric Fractures of Femur Treated with Ender's Nails and Cannulated Cancellous Screws

Siddhant Shah\*, Mohammed Nawaz Malik\*\*, Sagar Khanpara\*\*\*, Mitesh Patel \*\*\*\*

### Abstract :

**Objectives :** To study the functional and radiological outcome of intertrochanteric fractures of femur treated with ender's nails and 6.5mm cannulated cancellous screws. **Methods :** 50 patients with stable or unstable intertrochanteric fractures of femur were chosen with variable co morbidities and were treated with 2-3 Ender's nail in condylo-cephalic direction and the fixation was augmented with 6.5mm cannulated cancellous screws. **Results :** All the patients showed clinical and radiological healing by the period of 10+or-2 weeks with immediate mobilization on the next day and later complications of knee pain associated with nail back out. **Conclusion :** This method of fixation of intertrochanteric fracture femur is minimally invasive, cost effective, reliable with early mobilisation and prevents complications related to prolonged immobilisation.

### Introduction : <sup>(1)</sup>

Intertrochanteric femur fractures are defined as fractures occurring in the region involving greater and lesser trochanter and are extracapsular. The Intertrochanteric femoral fractures make up approximately 34% of all hip fractures and the largest number of fractures occur in osteoporotic female older than 65 years. Operative management is now the treatment of choice in most of the cases of intertrochanteric femur fractures which provides good functional outcome. The goal of operative treatment is strong, stable fixation of the fracture fragments. The Ender nail for intramedullary fixation of intertrochanteric fractures of the femur was developed by Ender and Simon Weidner and further simplified by Kuntscher. Biological fixation provided by the nail with minimal blood loss and less technically demanding procedure makes enders nailing an important treatment modality for intertrochanteric femur fractures, But enders nail alone had difficulty in providing rotational stability. The cannulated compression screws were added with the Ender's nail in an attempt to maintain fracture reduction. Hence we conducted a study to evaluate the efficacy of a combined fixation procedure using Ender nails and a cannulated compression screw for intertrochanteric fractures in elderly, comorbid patients.

\* Senior Resident

\*\* 3<sup>rd</sup> year Resident

\*\*\* 2<sup>nd</sup> year Resident

\*\*\*\* 1<sup>st</sup> year Resident, Department of Orthopedics, GCS Medical College, Hospital and Research Centre, Ahmedabad, Gujarat, India.

**Correspondence :** Dr. Siddhant R. Shah

**E-mail :** dr.siddhantshah@gmail.com

### Aims and Objectives :

To study the functional outcomes of intertrochanteric fracture treated by ender's nail and 6.5mm cannulated cancellous screws and associated complications.

### Methods: <sup>(1)</sup>

In this study, we included 50 adult patients with stable or unstable/ right or left intertrochanteric fracture femur with or without any associated co-morbidities. Ender's nail of thickness 4 and 4.5 mm with its pre requisite instruments were prepared for the surgery. All the nails were inserted thru medial portal entry and 6.5mm CC screws were inserted from the base of greater trochanter across the fracture into subchondral bone of the head. Post operatively patients were mobilized with full weight bearing from the first post operative day itself with quadriceps strengthening exercises. The stitches were removed after 2 weeks. Sequential x-rays were taken after 6 and 12 weeks.

### Technique of ender's nailing:

After the condition of the patient permitted, patients were planned for surgery –

- Table: fracture table
- Mode of Anaesthesia : spinal anaesthesia or general anaesthesia
- IITV position: lateral to the affected limb
- Surgeon position: medial to the affected limb
- Reduction: traction, adduction and internal rotation before surgery or intra-operative

**Salvati and Wilson hip rating Score**

<b>SCORE</b>	<b>PAIN</b>
0	Constant and unbearable. Frequent strong analgesia
2	Constant but bearable. Occasional strong analgesia
4	Nil or little at rest. With activities
6	Little pain at rest. Pain on activity
8	Occasional slight pain
10	No pain
<b>SCORE</b>	<b>WALKING</b>
0	Bedridden
2	Wheelchair
4	Walking frame
6	One stick, limited distances up to 400 yards
8	One stick, long distances
10	Unaided and unrestricted
<b>SCORE</b>	<b>MUSCLE POWER AND MOTION</b>
0	Ankylosis with deformity
2	Ankylosis with good functional position
4	Poor muscle power. Flexion <60° abduction <10°
6	Fair muscle power. Flexion 60-90° abduction 10-20°
8	Good muscle power. Flexion > 90° abduction > 20°
10	Normal muscle power. Full range of movement
<b>SCORE</b>	<b>FUNCTION</b>
0	Bedridden
2	Housebound
4	Limited housework
6	Most housework, can shop freely
8	Very little restriction
10	Normal activities
<b>GRADING OF RESULTS</b>	
>31	Excellent
24-31	Good
16-23	Fair
<16	Poor

manipulation by internal rotation with preoperative traction and adduction.

Adequate painting and draping was done with exposing the affected thigh

- Incision : longitudinally along the medial aspect of

the knee taken just proximal to adductor tubercle distally approx. 3-4cm

After incision of skin, subcutaneous tissue and fascia along the line of skin incision, fascia is retracted and superior genicular vessels are identified and cauterised (landmark- intersection of a vertical line between

anterior and posterior border of femur medially and a horizontal line over the superior pole of patella). Entry with the awl is taken just above the condyles and site of cauterization. 4 or 4.5mm enders nail after appropriate length confirmation are taken and prebent as follows

1. The eyed proximal tip is bent posterior to prevent proximal migration.
  2. The distal portion is bent to match the neck shaft angle.
  3. The mid shaft is bent to accommodate the nail into the shaft and crossed through the fracture site and achieve the three point fixation.
- The nail is inserted from the entry site up to the head and rotation is controlled by the device under IITV guidance. 2 or 3 or 4 nails are inserted until the canal gets jam fit.
  - After this, 1-2 6.5mm CC screws are inserted from the base of the greater trochanter across the fracture site up to the head of the femur after sequential guide pin insertion and predrilling.

In few patients, the nail back out was treated by fixing

cross k wired across the eyes of the nails, but unfortunately, it bent and had to be removed along with the nail.

Follow up of the patients were carried out at 2 weeks for stitch removal and then two visits consequently at 6 weeks interval for radiographic evaluation.

The patients were further evaluated by SALVATI AND WILSON ASSESSMENT score as follows<sup>(2)</sup>

### Results :

Total 50 no. of patients, in which 31 were male and 19 were female patients, whose average age was 50-60 years, with trivial trauma with fall commoner than road traffic accident as a cause of injury were enrolled in study. Out of 50 patients, 30 had stable and 20 had unstable fracture, of which 2 patients had associated distal radius fracture, 1 patient had olecranon fracture, and 1 patient had neck of fibula fracture. 40 patients had hypertension, 32 had diabetes mellitus and 29 had ischaemic heart disease. Few patients had overlapping diseases too. Patients were operated within average 2 days from the day of admission. Average operating time was 20-25 minutes from the incision to closure and

### Discussion :

Complication	Ender's nail	PFN	DHS
Osteomyelitis <sup>(3)</sup>	--	--	+
Implant cut thru <sup>(3)</sup>	--	+	+
Implant backout	+	--	--
Device fatigue failure <sup>(4)</sup>	-	+	+
Blood loss <sup>(5)</sup>	-	+	+
Soft tissue stripping <sup>(5)</sup>	--	+	+
Z effect	--	+	--
Hip arthritis <sup>(3)</sup>	--	= (screw penetration)	+
Femoral diaphyseal fracture <sup>(3)</sup>	--	+(short PFN)	+
Abductor lurch	--	+	--
Varus collapse <sup>(3)</sup>	--	+	+
Screw breakage <sup>(3)</sup>	+	+	+
Rotational instability	+(avoided by 6.5mm cc screws)	-	-

average 2-3 ender's nail and 1-2 6.5 mm cannulated cancellous screws were inserted. Immediate mobilization done from the next day in all fracture; 4 patient compensated by heel raise for shortening. 2 patients had internal rotational deformity and 1 patient had external rotation deformity.

Clinical healing observed in 6-8 weeks; and after average 10-12 weeks radiologically healing seen. 13 patients developed knee pain due to back out of ender's nail and in these patients removal of only ender's nail were done and screws were kept in situ.

**Salvati and Wilson assessment score** was found Excellent in 18, Good in 20, Fair in 10 & Poor in 2 patients.

### **Conclusion :**

Hence with all these considerations, we can conclude that ender's nailing and 6.5mm cannulated cancellous screw in intertrochanteric fracture femur although conventional, is

1. Minimally invasive
2. Less time consuming
3. Minimal amount of blood loss
4. In case of very high risk patients with co-morbidities, it can be done under local anaesthesia
5. Rapid mobilization can be achieved immediately on the next day preventing further co-morbidities associated with immobilization

The only side effect that needs to be taken into consideration is the knee pain due to nail back out due to fracture collapse which might need removal at a later stage.

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