MATERIALS & METHODS
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This study was conducted in the Department of Orthopaedics, M.L.B. Medical College Jhansi. The patients for this study were selected from those attending the outpatients department of Orthopaedics and from those arriving at emergency department of M.L.B. Medical College, Hospital, Jhansi from Dec 2001 to Aug 2003.

All the patients were subjected to detailed history, clinical examination, necessary radiological and pathological investigations.

CRITERIA FOR SELECTION OF CASES

Criteria for selection was as follows:

- All the cases of unstable inter-trochanteric or sub-trochanteric fractures
- All the cases of Comminuted inter-trochanteric fractures
- Stable, oblique and undisplaced intertrochanteric fractures above the age of 60 years

The young and the elderly patients below the age of 60 years, with undisplaced oblique stable fractures were treated conservatively, to reduce the load on the operation theatre, as this being the government hospital with limited resources.

Fracture were classified as Stable & Unstable types.

Stable - Boyd & Griffin type I & II were considered stable types.

Unstable - Boyd & Griffin type III & IV were considered unstable types.
Evaluation of patients

1 **History**: Name, age, sex, side of fracture, mode of injury, duration of injury, associated injury, past history of major illness

2 **Clinical Assessment of patients**: general condition of patients, vital signs, examination of cardiovascular system and respiratory system for fitness for anaesthesia

3 **Local Examination**: Examination of the injured hip, assessment of neurovascular status of distal limb and associated injuries.

4 **Initial Management**: Shock, if present, was managed by intravenous fluid, plasma expander and blood transfusion as required

   Buck’s traction was applied immediately and limb was immobilized on Thomas splint

   After general condition of patients was stabilized, radiological and routine investigations were carried out

5 **Radiological Examination**: Antero-posterior view of x-ray pelvis with both hip with both limb in full internal rotation and lateral view of injured hip to assess the type of fracture and bone quality.

6 **Routine Investigation**:

   Hb gm%,
   TLC, DLC, ESR
Urine (R/E), (M/E)
Blood urea
Blood Sugar
Serum Creatinine
ECG and X-Ray chest-PA in relevant cases
Blood group and cross matching

INTERNAL FIXATION BY DHS

Implant and Instruments

For internal fixation of Intertrochanteric fractures following instruments were used

(A) Implants:
1. DHS lag screw
2. Compression screw
3. 135° DHS barrel plate.
4. 4.5 mm cortical screws

(B) Special Instruments:
1. Guide wire of 2.5mm diameter
2. Angle guide of 135°
3. Direct measuring device
4. Traction reamer
5. DHS Tap
6. DHS Wrench
7. Centering sleeve for tap
8. Centering sleeve for D.H S wrench
9. Coupling screw for removal
10. Guide shaft
11 Impactor
12 Quick-coupling T-Handle

(C) General Instrument:
1 A O clamp
2 Drill
3 3.2mm drill bit
4 Depth gauge
5 4.5mm tap with tap sleeve
6 4.5mm screw driver
7 B.P. handle with surgical blade No.23
8 Bone lever
9 Artery forcep

Technique

Anaesthesia: Patients were given anaesthesia usually spinal, epidural or general.

Patient Positioning: Patients were positioned supine on fracture table. The uninjured lower extremity was held in wide abduction by a foot plate or boot attached to one of the leg extensions of the fracture table. The injured lower extremity is held by a foot plate or boot attached to the other leg extension of the fracture table.

Draping: The skin over hip was prepared after ten minutes soap scrub and application of the usual antiseptic solutions. The lateral aspects of the hip from the iliac crest to the distal thigh was squared off with towels and drapes.
Reduction Techniques: Closed reduction of the fracture was performed by applying traction to the injured lower extremity in neutral or slight internal rotation and slight abduction. Check the reduction by anteroposterior and lateral roentgenograms, paying special attention to cortical contact medially and posteriorly.

Exposure: Lateral approach to the proximal femur from the greater trochanter extending distally was used. The length of incision depended on length of the implant set.

Insertion of Guide wire

Point of Entry: Point opposite the tip of lesser trochanter, two centimeter distal to vastus lateralis ridge on the lateral surface in the midline of the shaft of the femur.

Angle of Anteversion: Anteversion guide wire was inserted by hand onto the anterior surface of femoral neck till it impacts the flare of head.

Insertion of final guide wire

1. 3 2mm drill bit was used to perforate the lateral cortex at the appropriate site of entry.

2. A 2.5mm threaded tip guide wire (230mm) was inserted through 135° angle guide so that it was parallel to the version guide wire in the axial plane.

3. The guide wire was inserted till it reached the subchondral bone. The position of guide wire was confirmed by an anteroposterior and lateral
roentgenogram. In case this guide wire was not found in the ideal position a 2nd guide wire passed, using the 1st wire as a reference wire in corrected position.

Reaming of Femur

Direct measuring device was used to read-off the depth of wire within the bone. The reamer was set 10 mm short of the depth of guide wire within the bone. A quick coupling T-Handle was used for manual reaming. The 'Triple' reamer is designed to accurately and simultaneously ream for the lag screw, the barrel and plate barrel junction. If guide wire was inadvertently pulled out with the reamer, it was reinserted using short centering sleeve and DHS lag screw used in reverse which allowed exact relocation of the central axis of the reamed tract.

Tapping: Tapping was not done in osteoporotic bone, but in young patients tapping was done to avoid excessive torque on the insertion wrench and to minimize the risk of inadvertent malrotation of the femoral head fragment during final seating of screw.

Tap was slide into short centering sleeve and mounted onto the quick coupling T-handle. The completed tap assembly was slide onto the guide wire and used to tap the threads for DHS lag screw.

Insertion of DHS screw

The coupling screw was inserted through the guide shaft and threaded onto the selected DHS screw. The entire assembly was then slide into the insertion wrench. The insertion wrench
was used with long centering sleeve. The DHS screw was inserted up to 5 mark of the insertion wrench. The T-handle of wrench was parallel to the femoral shaft at the end of screw insertion. The guide wire was then withdrawn by turning it anticlockwise.

**Insertion of barrel plate**

The insertion wrench was pulled out and the selected barrel plate was slid over the guide shaft onto the lag screw, the coupling screw and guide shaft were then uncoupled and the nylon tipped impactor was used to seat the barrel plate.

**Fixation of plate to femur**

The barrel plate was then fixed to the femur using 4 5mm cortical screws.

**Insertion of compression screw**

The compression screw was inserted after the plate was fixed to bone after loosening of the traction. It was tightened against the rim of the barrel plate to achieve compression.

Finally the wound was closed in layers over suction drain. No external splintage was done.

**Post operative care**

1. The patient was allowed to sit a day or two after surgery and quadriceps setting & knee bending exercise were started for muscle strengthening as per the pain tolerance of patient.
2 Prophylactic antibiotics were given till sutures were removed
3 Drain was removed after forty eight hours
4 Anteroposterior and lateral check x-ray of operated hip was taken to see quality of reduction, neck shaft angle and placement of lag screw and barrel plate
5 Stitches were removed at twelve to fourteen days
6 Graduated weight bearing was permitted as per the stability of fixation and educational status of the patient
7 Full unsupported weight bearing was started after radiological union of fracture

Follow up: Follow up was done regularly upto six months after surgery. During follow up patients were evaluated clinically and radiologically for assessment of progress of union and complication if any.

All relevant data were collected and tabulated so as to evaluate the final result

Evaluation of the results

The results were evaluated and graded as excellent, good and poor as per criteria of Kyle (1979).

a) Excellent: No pain, minimum limp, normal range of motion, can walk without support, can squat and sit cross legged, no shortening.

b) Good: Occasional mild pain, noticeable limp, acceptable range of motion, can walk with help
of cane, squat and sit cross-legged, shortening less than two cm

Poor

Moderate pain, marked limp, limited range of motion, can’t walk, can’t squat and sit cross-legged, shortening more than two cm