

## Management of inter trochanteric fracture by DHS Fixation

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### Abstract

Hip fractures are devastating injuries that most commonly affect the elderly and have tremendous impact on both the health care system and society in general. Despite marked improvements in implant design, surgical technique and patient care, hip fractures continue to consume a potential proportion of our health care resources. In our study of 20 cases (male 16: female 4), age group (21-80 years), trochanteric fractures were treated using Dynamic hip screw at Government District Hospital and Basaveshwar Teaching and General Hospital, Gulbarga, India from March 2002 to August 2004. In the study, trochanteric fractures were common in old age group as a result of slip or fall with right sided predominance in the present study, particular gender was predominantly affected (80% were males). Trochanteric fractures were common in elderly population following trivial trauma such as slip or fall.

**Keywords:** Trochanteric, Intracapsular, Fractures.

### Introduction

Trochanteric fractures are sustained by elderly from trivial strain such as slipping on stairs, or stumbling in the toilet, but they may occur at any age in patient of either sex. John Buchwald in 1923 said we all come into this world under the brim of the pelvis but quit a few of us will leave through the neck of the femur. This statement, nearly 80 years later is an exaggeration but nevertheless true, as proximal femoral fractures account 30 percent of all hospital admissions with mortality averaging 15 - 20 percent worldwide. It is now almost universally accepted that internal fixation is the best method of treatment of both the intracapsular and extra capsular fractures as it allows early fracture stabilization and patient mobility. Tronzo (1974) catalogued 77 internal fixation devices for internal fixation of proximal femur. This indicated that no device was found suitable. The search for ideal device continues. This study consists of 20 cases of intertrochanteric fractures treated with dynamic hip screws & plate. The main feature of sliding hip screw is its sliding effect which allows fracture site compression and minimizing the dangers of screw cut out and migration associated with non-sliding devices. To study fractures of trochanteric region, surgical anatomy of hip, to compare the results of treatment of intertrochanteric fractures with internal fixation with DHS, to prevent complications associated with conservative treatment such as malunion with coxa vara, limb shortening and limp. Early rehabilitation of the patient and prevention of medical complications like thromboembolism, decubitus ulcer by early mobilization.

### Materials and methods

#### Criteria for selection of cases

All inter-trochanteric fractures were according to Boyd & Griffin (1949) classification. Most of the patients were in the age group of 41-60 years i.e., 9 patients (45%), 30%, of patients (6) were aged from 61-80 years and 5 patients

(25%) were aged between 21-40 years and one of the patients were between 0-20 years. In our study, there was a male preponderance with 16 patients (80%) and female 4 (20%).

As the intertrochanteric fracture is more common in osteoporotic patients, most of the patients in our study who sustained injury are due to slip and fall i.e., 12 patients (60%) and RTA who sustained injury were 8 patients (40%). In our study, right sided preponderance was noted with 14 patients (60%) and left side with 6 patients (40%).

#### Type of fracture

Fractures were classified based on Boyd and Griffin (1949), type of classification. Most of the fractures were type II that is comminuted fracture with 9 patients (45%). Both type I and type III were seen in 5 patients (25%), and type IV in only one patient (5%).

#### Statistics of surgeries

Most of surgeries were operated between 4-7 days (90%) after trauma. The average duration between trauma and surgery was 6 days. Most of the cases were done under spinal and epidural anaesthesia.

**Implant used:** In 80 percent of the cases 75 mm size dynamic hip Screw was used and in 20 % of the cases 85 mm size dynamic screw was being used. In 60 percent of the cases 4 hole barrier plate was used and in 40 % of the cases 6 hole barrier plate was being used. Associated injuries like fracture of right 10<sup>th</sup> rib, colles fracture left, compression fracture D11 were noticed in 5% the study group.

In our study we used 135 barrel plate for all the patients. Out of which 14 patient i.e., 60% we used 4 hole plate and 6 patients (40%) we used 6 hole plates as there was extension of the fracture of the proximal femur.

#### Post-operative mobilization

If general condition permits patient were made to sit up on bed next day. Dynamic quadriceps exercises

started by 5<sup>th</sup> day and followed by flexion extension of knee exercise were done in all 20 patients.

*Commencement of non weight bearing*

Non-weight bearing mobilization with walker was allowed by 10<sup>th</sup> day .17 patient (85%) except 3 patient who had associated injuries (15%) were immobilized later.

*Commencement of partial weight bearing*

Depending upon the patient condition and stability of internal fixation, partial weight bearing with walker was allowed by 4-6 weeks for 19 Patients i.e., 95% One patient who had fracture D11 advised bed rest for 2 months. Commencement of full weight bearing observed in 12 weeks (20 %) of the patients, 75 of the patients took 16-20 weeks and rest required more than 20 weeks.

*Secondary procedures*

Secondary Procedures were reimplantation was not done in any our patient.

*Time of union*

The union was the period between the time of operation and full weight bearing without external support with the evidence of healing seen radiographically. Time of the union in weeks was 10-12 weeks in 20% of the patients, 13-24 weeks in 75% of the cases and 25-36 weeks in 5% of the patients.

*Associated injuries*

Out of 20 cases taken for the study, one had fracture 10<sup>th</sup> Rib Rt., one had colles fracture Lt., one had compression fracture of D11 vertebrae.

*Complications*

14 out of 20 Patients had full range of knee and hip movements. 6 patients had terminal restriction of movements.

*Limb length discrepancy*

In our study, shortening was seen in 2 patients out of 20 who had severe communitated fracture.

*Infection*

There was only one superficial infection in our study, which subsided by regular dressing and good coverage of antibiotics.

**Results and discussion**

The present study is based on the observations and results of 20 patients of intetrochanteric fractures of hip treated with dynamic hip screw . For associated diseases, two cases were noticed with hypertension and 2 with diabetes.

It has been widely used that intetrochanteric fractures are caused by direct blow over grater trochanter resulting from falling on the hip. This view has been stated by several authors. Evans (1949, 1951) showed that an energy load of 15-81 lbs applied dynamically to the femoral head produced deformation similar to those produced by static loads up to 715 lbs. In osteoporosis structurally weakened bone where a minor torsional stress precipitates in fracture. The muscle surrounding the hip serves to absorb some of the stresses of trauma

and shear. In our study, 45% of the patients were in 41-61 years age group and 30% of the patients were between 61-80 years of age group and 25% between 21-40 years of age. Ecker Malcolm (1975) treated patients with intetrochanteric fracture with an average age of 75.1 years, Habibs RA (1976) treated intetrochanteric fractures with 75 years in age. He treated 40 cases with good union in all the cases.

Ingemar sernbo (1988) treated unstable fractures in 70 years of age and compared with Ender's pins showed superior rate of healing with fractures treated with dyanamic hip screw. In our present study, most of the patients come in the age group of 60 years. The average life expectancy of an Indian is 10 years less than western. Malunion and osteoporosis go in hand and contribute for the fractures. The average incidence in our study was 60 years of age. This is in contrast to higher age group as reported in western literature.

There was a male preponderance seen in our study due to the following reasons. Indian males are being more active and mobile than the females. Indian females are mainly confined to household activities and are less prone to sustain an extra capsular fracture of hip. Malcolm L Ecker (1975) reported a female preponderance 82 as compared to males i.e., 18% and ingemar sernbo (1988) reported the incidence of 23% in males and 77% in females. In the present study (2000-04), there was male preponderance i.e., 80% as compared to female i.e., 20%. In 1976 Jacobis RR

Table 1. Functional results of 20 treated cases

|                           |            |
|---------------------------|------------|
| Union                     | 20 cases   |
| Good                      | 14 cases   |
| Fair                      | 6 cases    |
| Coxa vara                 | 2 cases    |
| Shortening < 2cm          | 2 cases    |
| Screw cut out             | 0 cases    |
| Non weight bearing        | 10 days    |
| Partial weight bearing    | 4-6 week   |
| Full weight bearing       | 12-16 week |
| Mean range of motion -hip | 0-110      |
| Knee                      | 0-120      |

**Good:** No pain, no deformity and shortening, daily activities are normal and back to pre injury status, able to walk distances without pain, able to sit cross legged and squat without difficulty, evidence of union, no evidence of coxa vara, no extensor lag of knee.

**Fair:** no pain, If present only mild pain which patient can ignore and requires no treatment, shortening of less than 2cm, daily activities.... Minimal restriction and can do outdoor activities , may be some degree of coxa vara , extensor lag of knee 10, ability to walk independently with or without walking aids with some pain after long work, able to sit cross legged and squat with minimal pain and restriction , hip movements terminal movements restriction due to pain

**Poor:** pain cannot be ignored interferes with activities and required treatment periodically, shortening and deformity : more than 2 cm shortening, daily activity restricted, confined to home, In ability to walk and confined to wheel chair, not able to sit cross ,legged or squat, non- union, extensor lag of knee more than 10%.

treated 122 patients with 30% unstable fracture and 70% patients with stable fracture. Dimon and Hughston (1967), Dimon (1973) considered 302 intertrochanteric fractures to assess the value of medial displacement fixation in unstable intertrochanteric fractures. He suggested unstable type should be treated by primary medial displacement fixation with reduction. In our study, 30% were unstable fracture with severe comminution i.e., 10% of our patients had varus deformity.

Trochanteric fractures were common in persons aged above 40-60 year the mechanism was a direct trauma with twisting force such as missing a step, fall from bicycle or road traffic accident. These direct forces act along the axis of femur or directly over greater trochanter, which results in a trochanteric fracture. In our series, 40% of patients had sustained injuries due to road traffic accident and 60% due to slip or fall. 2 patients i.e., 10% had shortening of less than 2 cm, which was seen in type III and IV due to displacement of the shaft because of severe comminution. It was handled easily as shortening less than 2 cm was present, who did functionally well with heel raise. Hardy *et al.* (1998) in his prospective study of 60 patients noted that intramedullary hip screw device was associated with significantly less sliding of lag screw with subsequent shortening of limb in region of thigh. Olsson and Cedel (1991) compared 60 patients treated with compression hip screw. They found femoral shortening and concluded that biaxial dynamization allowed by DHS is less.

Frew (1972) noted shortening in 36.16% patients treated conservatively. In our study, mean range of movements at hip was 0-110° and knee was 0-120°. In the present study, pain deformity, daily activities, ability to squat and sit cross-legged, walking distance was good in 60% of the patients. 40% of patients who had mild restriction of movement and on prolonged walking, few complaints of pain. As compared to Chacko & Mohanty (1984) treated patients with 53 cases and he found that simple non-operative method were less superior than dynamic hip screw. In our study, 90% of cases were operated both between 4-7 days, 2 patients had delayed fixation in 3 weeks. There was no evidence of non-union fat embolism or pulmonary embolism in our study. Frew (1972) noted pulmonary embolism in 6 patients treated conservatively. The average time of walking with the help of walker with partial weight bearing was 4 weeks when compared to 10 weeks treated conservatively. The average time of consolidation of fracture in our study was 20 weeks. It was 9 months in conservative method with deformity as seen by Frew (1972).

So, dynamic hip screw is a better implant for the treatment of trochanter fracture. This is because of sliding screw, which gives compression at the fracture site. Due to its sliding mechanism, the fracture union rate and movement at hip joint were good in most of our cases.

### Summary

Most of the trochanteric fractures were type II. surgery was done at the earliest possible date with an average interval of 6 days from the date of admission. In our study 2 patients were diabetic and 2 were hypertensive, which was adequately controlled before the patient was taken for surgery. In one patient inadequate fixation was optioned and patient was advised strict bed rest. Average hospital stay for the whole procedure took about 3 weeks. Male range of movements at hip was 0-110 and Knee was 0-120. Post operative complication like, non-union was not found in our study group. But shortening of less than 2cm was found in 2 cases. Superficial infection of wound was found in one case which was treated accordingly as per culture and sensitivity report with appropriate antibiotic coverage with uneventful recovery. In our study group of 20 cases of trochanteric fractures, all patients need one bag blood transfusion during operation or post-operatively good to fair results were obtained in most of the cases. Overall good results were 70% and fair results were 30%.

### Conclusion

Boyd and Griffin (1949) type I & II were found to be stable fractures and type III & IV unstable. In intertrochanteric fractures, the abundant callus makes union a certainty but subsequently varus may be a problem. In our study the incidence of coxa vara was 10%, mainly found in grade III&IV fractures. All the patients had shortening less than 2cm but did functionally well with heel raise. In our series of 20 patients belonged to Boyd and Griffin (1949) type III & IV. Through our experience was limited to only 20 patients it led us to believe that morbidity and mortality associated with type III & IV fractures was high and requires further evaluation. Kaufer *et al.* (1974) in lab studies studied the influence of the type of implant and geometry of reduction. They concluded that geometry of reduction had no effect of fixation. Dynamic hip screws and plate is an implant which is cheap and easy to assemble and use intra-operatively unlike fixed angle nail plate which requires great deal of accuracy for insertion. The degree of barrel plate allows for compression at fracture site and decreases stress concentration and hence there is increase rate of union with less incidence of implant failure. We conclude that DHS is a good modality of treatment for internal fixation of intertrochanteric fractures. Boyd and Griffin's (1949) type I & II. However good medial cortical opposition either by close reduction or open reduction with/without medial displacement of distal femoral fragment is mandatory for good result especially in unstable fractures and requires a great deal of surgical experience.

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