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Dimon and Hughston Osteotomy with D.H.S Fixation in the Management of Unstable Trochanteric Fractures of Hip

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ABSTRACT

Objective: To evaluate the performance of Dimon-Hughston osteotomy using a dynamic hip screw fixation implant in unstable trochanteric fractures of hip among geriatric patients.

Materials and Methods: This study focused on 25 patients who presented to the Department of Orthopaedics, Government General Hospital, Kurnool Medical College, Kurnool. Type AO 2.2 and Type AO 2.3 fractures were selected based on the AO classification. These fractures were managed by Dimon-Hughston osteotomy with a 140s° dynamic hip screw.

Results: All 25 patients (mean age 71.2years) were able to perform full weight-bearing walking after the operation. The mean time needed to achieve union was 16 weeks. One patient experienced hip screw cut-out and 1 patient developed superficial wound infection. All the patients came to follow up every 3 weeks after the operation.

Conclusion: For the geriatric patients in this study, Dimon-Hughston osteotomy for unstable pertrochanteric fractures provided immediate stability for early weight-bearing.

Key Words: osteotomy, geriatric, dynamic, unstable, trochanter

INTRODUCTION

Trochanteric fractures are common among the elderly people following trivial trauma due to slip and fall. Due to increase in the old age group

because of increased life expectancy, the incidence of these fractures has been on the rise^[5]. Union rates in trochanteric fractures has been high because of its cancellous nature and its wider

cross sectional area at the fracture site, its union rates are v high even with conservative methods. However because of hazards of prolonged immobilization complications like Pneumonia, pressure sores and urinary tract infections, hence early mobilization of the old patients by surgical means was preferred.

Trochanteric fractures were classified by various classifications, the most acceptable and management oriented classification is AO type of classification as seen in Figure 1.

Internal fixation with the DHS screrw or dynamic condylar screw was the most widely acceptable standard treatment for trochanteric fractures. In the standard literature the cut out rate of lag screw is less than 5% in the stable AO1 type of fractures. However for unstable fractures, the failure rate is high and ranges from 10% to 25%^[4].

.Several modifications of fixation methods or implant designs have been tried to improve the success rate. Inrtamedullary devices like Gamma nail,Proximal femoral nail were tried because of their superior mechanical advantage and their advantage in terms of duration of surgery, blood loss and immediate weight bearing. However several studies have not shown significant reduction in the mechanical failure in the treatment of unstable fractures by these intramedullary nail screw devices. Dimon – Hughston medialization osteotomy and Sarmiento valgus osteotomy have been tried for the primary treatment of unstable fractures.(Figure2)^[9].

Emphasizing that restoration of medial continuity is essential to successful internal fixation of unstable communited trochanteric fractures.

Dimon-Hughston and Sarmiento described techniques of ostetomy in the trochanteric area with valgus angulation of neck of femur and medial displacement of shaft to improve stability.^[2]

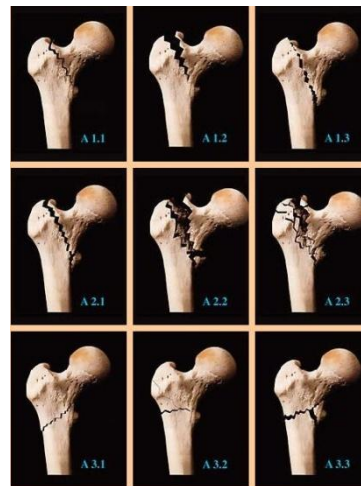


Figure 1. AO classification of fractures.^[13]

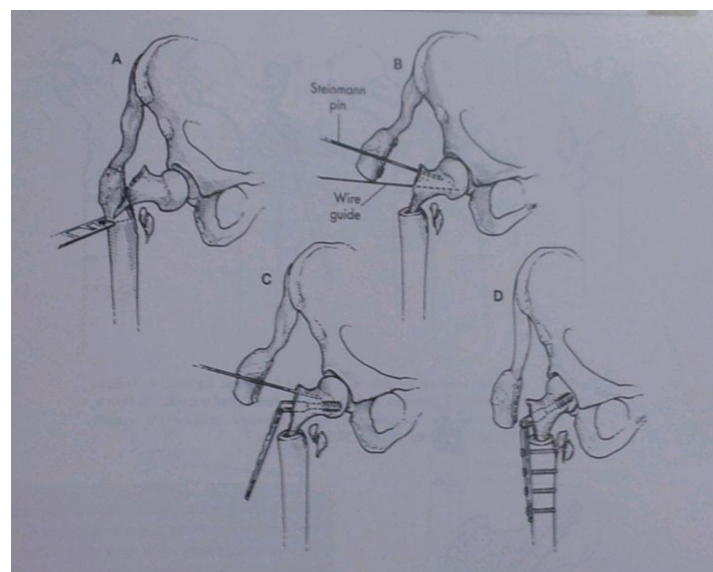


Figure 2: Dimon-Hughston osteotomy^[3]

METHODS AND MATERIALS

We conducted a study on 25 patients from June 2012 to August 2013 ranging from 54 years to 92 years .Of the 25 patients 15 were females and 10 were males. .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., 20 patients (80%),and 5

patients(20%) sustained road traffic accidents. In our study, right sided preponderance was noted with 16 patients (64%) and left side with 9 patients (36%).

Type of fracture: Fractures were classified based on AO type (Figure1) of classification.16 of the fractures were type AO 2.2 (64%) and 9 fractures were AO2.3 type(36%) .

Statistics of surgeries: Most of the surgeries were operated between 3 to 5 days after trauma. The average duration between trauma and surgery was 4 days. Most of the cases were done under spinal and epidural anaesthesia. Operative time was about 90 minutes with 300ml blood loss.

Implant used: In 80 percent of the cases we used 75 mm size dynamic hip Screw and in 20 % of the cases 70mm size dynamic screw was being used. In 60 percent of the cases 4 hole barrier plate was used and in 40 % of the cases 5 hole barrier plate was being used.

Associated injuries in 3 patients like fracture of right 10th rib, colles fracture ,compression fracture D11 were noticed the study group .In our study we used 140 angled barrel plate for all the

patients. Post –operative mobilization. If general condition permitted, patients were made to sit up on the bed next day. Dynamic quadriceps exercises by 5th day, followed by flexion extension of knee exercise were done in all 25 patients. Commencement of Non-weight bearing mobilization with walker was allowed by 7th day in 22 patients, except 3 patients who had associated injuries were immobilized later..Depending upon the patient condition and stability of internal fixation, partial weight bearing with walker was allowed by 4-6 weeks for 24 patients (98%).In 1 patient who had fracture D11 was advised bed rest for 2 months.

Secondary Procedures like re-implantation was not done in any of our patients. The union is the period between the time of operation and full weight bearing without external support with the evidence of callus seen radiographically. We reviewed all the patients for every 3 weeks for fracture union radiologically and clinically. .Clinical criteria taken into account are 1.Relief of pain.2.Range of Movement.3.Shortening of the limb.4.Gait

Table1

| Age range | Females | Males | Total |
|-----------|---------|-------|-------|
| 51-70 | 9 | 5 | 14 |
| 71-90 | 5 | 4 | 9 |
| 91-110 | 1 | 1 | 2 |

OBSERVATION AND RESULTS**Table 2:**

| S.No. | Age | Fracture classification | Time of Radiological union | Duration of follow up |
|-------|-----|-------------------------|----------------------------|-----------------------|
| 1 | 54 | AO2.2 | 3-4 months | 6 months |
| 2 | 57 | AO2.2 | 3-4 months | 6 months |
| 3 | 59 | AO2.3 | 4-5 months | 9 months |
| 4 | 62 | AO2.2 | 3-4 months | 8 months |
| 5 | 64 | AO2.2 | 3-4 months | 7 months |
| 6 | 65 | AO2.3 | 4-5 months | 12 months |
| 7 | 65 | AO2.2 | 3-4 months | 9 months |
| 8 | 65 | AO2.3 | 4-5 months | 9 months |
| 9 | 66 | AO2.2 | 3-4 months | 6 months |
| 10 | 67 | AO 2.3 | 4-5 months | 9 months |
| 11 | 67 | AO 2.2 | 4-5 months | 9 months |
| 12 | 67 | AO2.2 | 4-5 months | 10 months |
| 13 | 68 | AO2.2 | 4-5 months | 11 months |
| 14 | 69 | AO2.2 | 4-5 months | 10 months |
| 15 | 72 | AO2.3 | 4-5 months | 9 months |
| 16 | 73 | AO2.2 | 3-4 months | 7 months |
| 17 | 76 | AO2.3 | 4-5 months | 8 months |
| 18 | 76 | AO2.2 | 4-5 months | 7 months |
| 19 | 77 | AO2.2 | 3-4 months | 6 months |
| 20 | 78 | AO2.3 | 4-5 months | 11 months |
| 21 | 82 | AO2.2 | 4-5 months | 9 months |
| 22 | 85 | AO2.3 | 4-5 months | 11 months |
| 23 | 87 | AO2.2 | 4-5 months | 9 months |
| 24 | 91 | AO2.2 | 4-5 months | 12 months |
| 25 | 94 | AO2.3 | 4-5 months | 7 months |

Table 3 :

| S.No. | Age | Pain | Gait | Range of movement | Shortening in cms | Over all functional result |
|-------|-----|---------------------|--------------------|----------------------|-------------------|----------------------------|
| 1 | 54 | Nil | Normal | Normal | Nil | Good |
| 2 | 57 | Mild occasional | Normal | Normal | Nil | Good |
| 3 | 59 | Nil | Mild painless Limp | Near normal | 2 | Fair |
| 4 | 62 | Mild occasional | Normal | Normal | Nil | Good |
| 5 | 64 | Nil | Normal | Near normal | Nil | Good |
| 6 | 65 | Nil | Normal | Near normal | 2 | Fair |
| 7 | 65 | Nil | Normal | Normal | 1.5 | Fair |
| 8 | 65 | Mild occasional | Mild painless limp | Mild Restriction | 2.5 | Fair |
| 9 | 66 | Nil | Normal | Mild restriction | 2 | Fair |
| 10 | 67 | Moderate | Painless limp | Mild restriction | 2 | Good |
| 11 | 67 | Nil | Normal | Near normal | 2.5 | Fair |
| 12 | 67 | Nil | Normal | Normal | Nil | Good |
| 13 | 68 | Nil | Normal | Near normal | | Good |
| 14 | 69 | Mild | Painless limp | Moderate restriction | 4 | Poor |
| 15 | 72 | Nil | Normal | Near normal | 2.5 | Fair |
| 16 | 73 | Moderate | Painless limp | Mild restriction | 2 | Fair |
| 17 | 76 | Mild | Normal | Near Normal | 1.5 | Fair |
| 18 | 76 | Nil | Normal | Normal | 1.5 | Fair |
| 19 | 77 | Nil | Painless limp | Mild restriction | 3 | Poor |
| 20 | 78 | Mild | Painless limp | Normal | Nil | Good |
| 21 | 82 | Moderate occasional | Painless limp | Moderate restriction | 2 | Fair |
| 22 | 85 | Mild | Painless limp | Mild restriction | 2 | Fair |
| 23 | 87 | Moderate occasional | Painless limp | Moderate Restriction | 1 cm | Good |
| 24 | 90 | Mild | Painless limp | Moderate Restriction | 3 | Poor |
| 25 | 92 | Moderate | Painless limp | Mild Restriction | 1 | Good |

Twenty five patients were studied at our centre. The mean age was 71.2 years (range from 54 to 92 years) Table 1 summarizes age distribution. The main interval between injury and surgery was 4 days. The mean follow up time was 9 months, and the mean operation time was 90 minutes and the

mean operative blood loss of 300 ml observed. 10 patients needed blood transfusion.

Partial weight bearing was allowed on 10th postoperative day with a walker frame. The patients were discharged with a partial weight bearing using a walker frame. Patients who were

ambulatory before fracture were subjected to rehabilitation from 5th post-operative day.

For all patients, radiological evidence of callus formation was seen on x-ray in the 6th week of follow up. Evidence of radiological union was defined by the presence of bridging callus at the fracture. Union rate was observed at a mean time of 14 weeks.

Complications: One female patient had a lag screw cut out, one patient had a superficial infection which was controlled by regular dressing and appropriate antibiotic.

Statistical analysis: Table 2 summarizes the the age wise fracture type and also shows the duration of callus formation. .

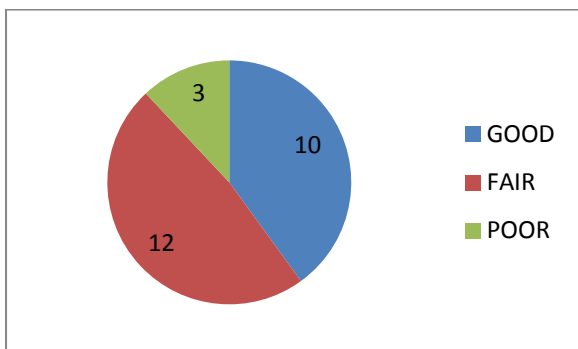
Table 2 summarizes the clinical efficacy of the treatment and improvement of range of movement

of the affected hip as the time progresses. The average shortening of the limb was about 2 cm, which is acceptable .About 12(48%) patients had a painless limp.

The clinical recovery was graded as

- 1.Good: The patients have shortening less than 1cm,no deformity and can walk long distances with no pain.
- 2.Fair: The patients have less than 2cm shortening with mild limp.Can walk for moderate distance without trouble.
- 3.Poor: The patients have shortening of more than 2.5 cm, they have deformity and cant walk much distance..

We have GOOD in 40%,FAIR in 48% and Poor in 12%.



Pre op X ray.



Post op.X ray



X-ray of cut out screw.

DISCUSSION

In this study of 25 patients with Unstable trochanteric fractures, we treated with Dimon-Hughston osteotomy using Dynamic Hip Screw fixation of 140 degree angled barrel plate. In the method we used: optimal hip screw position ,medial cortical contact, and mechanically advantageous valgus alignment. All these were addressed to convert unstable fracture configuration into a stable one. Valgus realignment required a 140 degree barrel plate to support the intact medial cortical rim. The valgus realignment technique also helps to compensate the limb shortening that occurs secondary to the osteotomy at the level of posteromedial defect.7mm of lengthening is achieved for every 10 degree of valgus. The loose bony fragments are left in situ which act as bone grafts. For geriatric patients in this study,the Dimon-Hughston osteotomy for unstable trochanteric fractures has proved an immediate stability to allow early weight bearing.

CONCLUSION

Trochanteric fractures constitute one of the commonest fractures encountered in old age.Unstable trochanteric fractures occur mostly in old age ,especially more in females because of osteoporsis.

AO classification provides is now most widely used for practical application of trochateric fractures. Effective treatment for a patient with unstable trochanteric fractures regardless of advancing age is surgery for early mobilization to prevent bed ridden complications.

Stable fixation of unstable intertrochanteric fractures could be achieved by medial displacement osteotomy as advocated by Dimon-Hughston osteotomy and fixation with dynamic hip screw.

Even they blood loss and operative time were more when compared to other modalities of treatment, stability of fracture site is achieved effectively with Dimon-Hughston osteotomy,the implant used is also cheap when compared to intramedullry nail devices.

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