

Outcome of Dimon-Hughston Osteotomy in Unstable Intertrochanteric Fractures

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ABSTRACT

Objective: To Evaluate effectiveness of Dimon-Hughston osteotomy using a dynamic hip screw in unstable intertrochanteric fractures in term of union.

Study Design: Descriptive case series

Study Place and Duration: This was a multicenter study conducted at Lahore General Hospital, Surriya Azeem Hospital Lahore and Civil Hospital Quetta for the period of 36 months (Between January 2012-December 2014).

Methods and Materials: Through non-probability purposive sampling, 50 cases of unstable intertrochanteric fractures were included. All fifty patients were managed by Dimon Hughston osteotomy with a 135° dynamic hip screw. During the course of follow up radiographically data for union, nonunion and implant position and clinically data regarding infection was recorded. Data was analyzed by SPSS version 20.

Results: The mean age of all patients was 59.76 years (range 38-80years). There were 28(56%) male and 22(44%) female patients. All patients included in study were AO type A2 fractures. Union occurred in 34 patients 68%, mean union time was 19.88 weeks (Range 18-26 weeks) nonunion and pulling out of plate occurred in 16 patients 32% during course of follow-up. Only 2(4%) patients developed superficial infection later on which settled down with antibiotics.

Conclusion: Dimon-Hughston osteotomy for unstable pertrochanteric fractures may provided immediate stability for early weight-bearing in some patients, but has got high failure rate.

Key Words: Dimon Hughston osteotomy, unstable Intertrochanteric fractures, nonunion, hip screw, osteotomy.

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INTRODUCTION

The intertrochanteric fracture is life threatening injury among elderly patients having fragile bones. These fractures are often highly unstable.¹ Unstable intertrochanteric hip fractures account for approximately one quarter of all hip fractures in the elderly and are increasing in frequency. The goal of treatment of such fractures is stable internal fixation, which helps in immediate mobilization thus limiting complications.² The factors which determine stability of fixation include; bone quality, fragment geometry, reduction, implant design, and implant placement. Of these five elements of stable fixation, the surgeon can control only the quality of the reduction and the choice of implant and its placement.³

The standard procedure for internal fixation of intertrochanteric fracture is with Dynamic Hip screw now a day, but it is not always successful in all types of intertrochanteric fractures. Reoperation rates of 4% to 12% have been reported following fixation with Dynamic hip screw⁴ There is high failure rate in patients with three parts and four parts fractures. To prevent

failure in three-part and four-part intertrochanteric fractures, it is emphasized that restore medial continuity for successful internal fixation, Dimon and Hughston described techniques of osteotomy in the trochanteric area with valgus nailing and medial displacement to improve stability for such type of unstable fractures.⁵ Rationale of this study was to find out effectiveness of Dimon Hughston osteotomy in patient three and four part fracture.

MATERIALS AND METHODS

This descriptive case series study was conducted at Lahore General Hospital, Surriya Azeem Hospital Lahore and Civil Hospital Quetta for the period of 36 months (Between January 2012-December 2014). Through non-probability purposive sampling, 50 cases of unstable intertrochanteric fractures (AO TypeA2) were included. Inclusion criteria was same in all the centers. Demographic information of patients was obtained, Patients were explained about the risks and informed and written consent was taken. All fifty patients were managed by Dimon Hughston osteotomy with a 135° dynamic hip screw.

The surgical technique included following steps:

1. All cases were done in Spinal anesthesia.
2. The operation was performed on a traction table under image intensifier, using the lateral approach.

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3. If it was not fractured, the lateral wall of the greater trochanter (the origin of the vastus lateralis) underwent osteotomy and was elevated anteriorly; hence, the end-on view of the proximal fracture fragment could be used.

4. Guide-pin was inserted into head and neck under image intensifier. pin was aimed at the centre of the femoral head in the Anteroposterior and lateral views; the hip screw was inserted after measuring, reaming, and tapping.

5. The medial metaphysical spike of the proximal fragment was trimmed to jam it into the medullary cavity of the femoral shaft.

6. The level of the traverse osteotomy was located at the shaft where three-quarters of the cortical circumference was intact; the soft tissue attachment of the osteotomised trochanteric fragment was preserved and acted as a bone graft.

7. The lateral femoral cortical defect was shaped by a rongeur to accommodate the barrel of the DHS plate (short or standard barrel, depending on the length of the hip screw used).

8. The medial metaphyseal spike was fitted into the medullary cavity of the shaft, and the DHS plate was then fixed to the femur with cortical screws.

10. Greater trochanter was reached with the help of lag screw

11. The wound was irrigated with 3 liters of saline before closure.

12. A suction drain was inserted routinely and the wound was closed.

All Patients were followed regularly i.e. on 1st, 15th, 30th post operative day then monthly. Radiographs were taken monthly until union was achieved. During the course of follow up radiographically data for union, nonunion and implant position and clinically data regarding infection was recorded. This data was collected in a specially designed Performa. Data was analyzed by SPSS version 20.

RESULTS

The mean age of all patients was 59.76 years (range 38-80years). There were 28(56%) male and 22(44%) female patients.

Table No.1: Distribution

Male	Female	Total patients
28	22	50

Table No:2: Showing Mode of Injury

Mode of Injury	Slipped at home	RTA	Fall from stairs	Total patients
	32	14	4	50

Table No. 3: AO Type A2 Fractures Distribution According to Subtypes

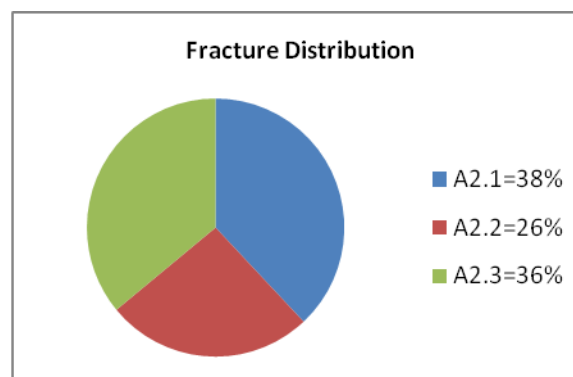
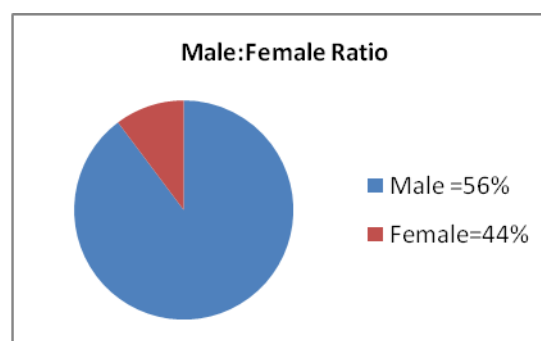
A2.1	A2.2	A2.3	Total patients
19	13	18	50

Table No:4: Showing Distribution of union and Nonunion

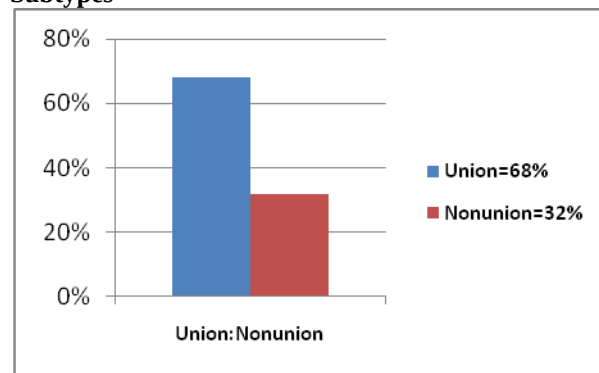
Union	Nonunion	Total patients
34	16	50

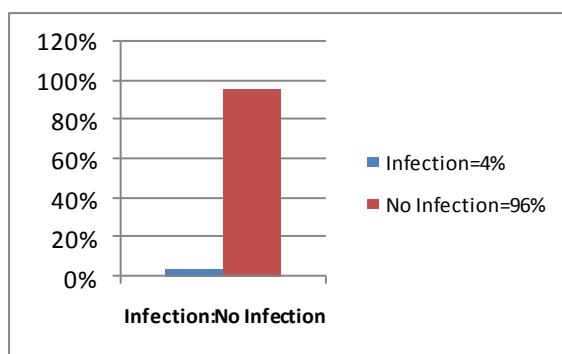
Table No: 5 showing infection rate

Infection	No infection	Total patients
2	48	50



AO Type A2 Fractures Distribution According to Subtypes





Case No:1



Preoperative Radiograph



Postoperative Radiograph (Dimon Hughston Osteotomy and Fixation with 135° DHS)



Radiograph Showing nonunion and Implant Failure

Most common mode of injury was slip at home 32 (64%) and in others Road traffic Accident 14(28%) fall from stairs 4(8%). All patients included in study were AO type A2 fractures(A2.1, 19 (38%) A2.3 18 (36%) A2.2 13(26%). Right hip was involved in 27 (54%)

patients and left in 23 (46%) patients. Union occurred in 34 patients 68%, mean union time was 19.88 weeks (Range 18-26 weeks) nonunion and pulling out of plate occurred in 16 patients 32% during course of follow-up. Only 2(4%) patients developed superficial infection later on which settled down with antibiotics.

Case No:2



Showing and Lateral Radiograph (Dimon Hughston Osteotomy and Fixation with 135° DHS)



Anteroposterior View, Radiograph showing Union

DISCUSSION

Intertrochanteric fractures comprise approximately 50% of all hip fractures. The incidence is more in female population compared to males due to osteoporosis.⁶ Intertrochanteric fracture is life threatening injury among elderly patients having fragile bones. These fractures are often highly unstable.¹ Internal fixation and early mobilization of patients with trochanteric fractures of the femur is generally accepted, not only to reduce the morbidity/mortality rates associated with the prolonged immobilization, but also to improve the functional result in terms of malunion and mobility.⁷

In stable intertrochanteric fractures, osteosynthesis using dynamic hip screws (DHS) provides good results, but for unstable intertrochanteric fractures, the best treatment method is still a matter of controversy.⁸ Implant failure is a major problem in the treatment of intertrochanteric fractures. The major problem has been cutting out from head superiorly (with in or through the femoral head superiorly or neck confinement), bending breakage of plate, pulling off plate from shaft, disengagement of screw within femoral head.⁹

The strength of fracture fragments implant assembly is determined by 5 variables i.e. bone quality, fracture geometry, fracture reduction, implant design and implant placement. Out of these five, bone quality and fracture geometry are beyond the surgeon's control.¹⁰

Dimon and Hughston described techniques of osteotomy in the trochanteric area with valgus nailing and medial displacement to improve stability for such type of unstable fractures.⁵

In this study, 50 patients were treated with Dimon-Hughston osteotomy and additional valgus alignment using a 135° DHS plate for unstable pertrochanteric fracture (AO type A2) of the femur. This techniques of osteotomy in the trochanteric area with valgus nailing and medial displacement was done to improve stability for such type of unstable fractures.

The mean age of all patients was in our study was 61.76 years (range 38-80years). In one study by, Laghari MA, the mean age of patients presented with intertrochanteric fracture was 63.9 years (range 25-71)¹¹

In our study there were 28(56%) male and 22(44%) female patients and the male-to-female ration was 1:1.2. In study by Butt-et-al¹² ratio was 0.44:1 and IN Study by Saeed Akhtar et-al¹³ the male female ratio was 2.2:1.

In our study all patients were AO type A2 fracture A2.1, 19 (38%) A2.3 18 (36%) A2.2 12(26%)

In our study union rate was 68% (34 patients), mean union time was 19.88 weeks (Range 18-26 weeks) mean union time in study by Yiu HW was 10.6 weeks.¹⁴ In our study nonunion and pulling out of plate and breakage of screw occurred in 16 patients(32%). In study by Butt et-al failure rate was 12.5 %.¹²

In our study Only 2(4%) patients developed superficial infection later on this settled down with antibiotics. Infection rate in studies conducted by Desjardins infection rate was 3.5 %¹⁵, and Butt et-al was 4.5%.¹².

CONCLUSION

Dimon-Hughston osteotomy for unstable pertrochanteric fractures may provided immediate stability for early weight-bearing in some patients, but has got high failure rate.

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