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Dimon hughston osteotomy for unstable intertrochanteric fractures done on ordinary operation theatre table using newly developed imaging technique

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Abstract

Background: Intertrochanteric fracture make up 45% of all hip fractures. Trochanteric fractures almost invariably occur as a result of fall, involving both direct and indirect forces. Dimon Hughson Osteotomy procedure have a role in the management of unstable intertrochanteric fractures.

Method: In the present study of 40 patients of unstable intertrochanteric fractures, 20 were operated in standard technique and 20 in modified technique. The data was assessed, analyzed, evaluated and following conclusions were made.

Results: Intertrochanteric fractures common between 50-78 years. In young patients it was due to high velocity trauma. Fall from height being the common mechanism of injury. Slip and fall was common mechanism in elderly. It was more common in females due to post-menopausal osteoporosis. Associated injuries were more common in high velocity trauma. Early reduction and internal fixation increases patients comfort, facilitates nursing care, helps in early mobilization of patients and decreases hospital stay. Early mobilization can be begun in all the cases of Dimon Hughston osteotomy based on the pain bearing capacity with the help of a walker. In both the techniques complications can be avoided with proper patient selection and good preoperative planning, appropriate implant selection, good surgical technique, pre and post-operative physiotherapy and regular follow up.

Conclusion: Dimon Hughston osteotomy is a viable option in unstable fractures with technical expertise. Can be performed on ordinary operation theatre table with comparative results.

Keywords: Intertrochanteric fractures, osteoporosis, dimon hughston osteotomy

Introduction

Intertrochanteric fractures are a major cause of morbidity and mortality in elderly population. The incidence of all hip fractures is approximately 80 per 100,000 persons. Intertrochanteric fracture make up 45% of all hip fractures ^[1]. Unstable intertrochanteric fractures in elderly patients are associated with high rates of morbidity and mortality ^[2] although the results have improved with the use of internal fixation. In these patients however, comminution, osteoporosis, and instability often preclude the early resumption of weight bearing ^[3]. Trochanteric fractures almost invariably occur as a result of fall, involving both direct and indirect forces. Koval ^[4] and Zuckerman postulated that Intertrochanteric fractures constitute almost half of all fractures of the proximal femur. Direct forces act along the axis of the femur or directly over the greater trochanter to result in Intertrochanteric fractures. Indirect forces include pull of the iliopsoas muscle on the lesser trochanteric and pull of the abductor muscle on the greater trochanteric region.

Intertrochanteric fractures are commonly encountered in the practice of Orthopaedic Surgery. Intertrochanteric fractures usually occur in patients over 60 years of age commonly and are three times more frequent in women than men because women tend to be less active and develop postmenopausal osteoporosis. Severe osteoporosis in these age group is responsible for high incidence of trochanteric fractures with minimal to moderate trauma.

Norton and Riska described patients with Intertrochanteric fractures to be 10 to 12 years older than patients with intracapsular femoral neck fractures, the average age reported in these patients in 60 to 75 years ^[5].

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Intertrochanteric fractures frequently occur through bone affected by osteoporosis, the degree of osteoporosis can be determined by Singh's index, this index classifies the severity of osteoporosis by the radiographic evaluation of trabecular pattern [6] of the proximal femur.

Before the introduction of suitable fixation devices, treatment of intertrochanteric fractures was of non-operative, consisting of prolonged bed rest in traction until fracture healing occurred (usually 10 to 12 weeks), followed by a lengthy program of ambulation training. In elderly patients, this approach was associated with high complication rates. Typical problems include decubitus ulcers, urinary tract infection, joint contractures, pneumonia, and thromboembolic complications, resulting in a high mortality rate. In addition, fracture healing was generally accompanied by varus deformity and shortening because of the inability of traction to effectively counteract the deforming muscular forces.

Surgery in trochanteric fractures is important in elderly patients for prevention of complications associated with conservative treatment like pressure sores, pulmonary infection, atelectasis, malunion etc, and aimed at early rehabilitation and mobilization. Internal fixation does provide immediate fracture fixation but in elderly patients with osteoporotic bones, complications like loosening, implant penetration, loss of fixation, cut through of implant are not uncommon, thus, Dimon Hughson Osteotomy and our new procedure have a role in the management of unstable intertrochanteric fractures.

The aim of this study is to do Dimon Hughson osteotomy for unstable inter trochanteric fractures on ordinary operation theatre table, which is an easy and simple technique designed in our institution.

Materials & Methods

The present study consists of 40 adult patients with unstable intertrochanteric fractures of femur who were treated with displacement osteotomy at the Department of Orthopaedics, Santhiram General Hospital. All the patients with unstable intertrochanteric fractures were selected among the admissions in the department of Orthopaedics, Santhiram General Hospital, from October 2011 to September 2013, so that minimum follow up for six months was available.

This study was carried out to compare the results of unstable intertrochanteric fractures treated with Dimon Hughson osteotomy, on traction table and on ordinary table. All the 40 patients were followed up at regular intervals.

After the patient with unstable intertrochanteric fracture was admitted to hospital all the necessary clinical details were recorded in proforma prepared for this study. After the completion of the hospital treatment, patients were discharged and called for follow up at outpatient level, at regular intervals for serial clinical and radiological evaluation.

Inclusion Criteria

All patients with x-ray showing comminuted, unstable intertrochanteric fractures with intact calcar.

Exclusion Criteria

All patient with stable inter trochanteric fractures. Elderly patients with Intertrochanteric fractures who have other medical problems which make them bed ridden or unfit for anaesthesia.

Management of Patient

As soon as the patient with suspected trochanteric fracture was seen, necessary clinical and radiological evaluation was done and admitted to ward after necessary resuscitation and splinted with skin traction.

The following Investigations were done routinely on all these patients preoperatively.

Blood Hb%, Bleeding time, Clotting time, Blood grouping and Cross matching,

Fasting and Post prandial blood sugar, Blood urea and Serum Creatinine

Urine Albumin, Sugar, Microscopic examination.

X-ray Pelvis with both hips (AP view), Chest X ray PA view in necessary patients

All the patients were evaluated for associated medical problems and were referred to respective department and treated accordingly. Associated injuries were evaluated and treated simultaneously. The patients were operated on elective basis after overcoming the avoidable anaesthetic risks.

Pre-Operative Planning

X-Ray of the involved Hip, in AP and Lateral views are taken Singh's index assessed; age of the patient and fracture classification done.

Pre-Operative Treatment

The part was prepared 24 hours before surgery taking care to prevent abrasions

Pre-anaesthetic checkup was done.

The patients were counseled and consent taken for participation in the study. They were informed all the possible complications that can happen during or as a result of surgery prior to their giving unconditional consent.

Post-Operative Protocol

48 hours after surgery, suction drain was removed and primary dressing of the operative wound was done. X-ray of the hip was taken and the patient was made to stand using a walker and was advised to walk bearing weight on the operated limb as much as the pain permits. After 10 days, sutures were removed and the patients discharged and advised to come for follow up every 4 weeks. Patients were specifically instructed at the time of discharge not to walk without using walker, not to squat and not to sit cross legged until further instructions pending osseous union at calcar femoral junction.

Results

It is a non randomised prospective study conducted at Santhiram general hospital, where 40 cases of unstable intertrochanteric fractures were studied.

The average age of patients in our series was 70 years with a range of 53 years to 82 years

Table 1: Age group and patients

Age group	No. of patients	Percentage
50-60	6	15
60-70	16	40
70-80	16	40
80-90	2	5

Out of 40 patients 23 (57.5) were females and 17(42.5) were males. Female predominance was due to post-menopausal osteoporosis and decrease activity than males in elderly age group.

Table 2: Gender and patients

Sex	No. of patients	Percentage
Female	23	57.5%
Male	17	42.5 %

Side Involved

Left side is more commonly involved in our study with 22 patients (54%) than right side 18(46%).

Table 3: Side involved and patients

Side involved	No. of patients	Percentage
Left	22	55%
Right	18	45%

Mode of Injury

In our study commonest mode of injury was due to trivial fall, while walking inside or outside the house. This is probably due to severe osteoporosis in elderly, decreased vision in

Elderly and lack of co-ordination and reaction time.

Table 4: Mode of Injury

Mode of injury	No. of patients	percentage
Fall on slippery floor	24	60%
Fall from stair & height	08	20%
RTA	06	14%
Miscellaneous	02	6%

Table 5: Fracture Classification

Fracture type	No. of patients	Percentage
Jensen type 4	08	20
Boyd type 4	10	25
Evan's type 4	16	40
Kyle's type 3	06	15

The average duration of hospital stay was 14 days, with a range of 10-25 days

Table 6: Duration of Hospital Stay

Duration in days	No. of patients	Percentage
10-15 days	25	62%
16-20 days	09	22%
>21	06	16%

Table 7: Average Blood Loss during Surgical Procedure & Full Weight Bearing

Operative Procedure	Dimon Hughston On Fracture table	Dimon Hughston On Ordinary Table
Blood loss	694ml	602ml
Full weight bearing	12 weeks	12 weeks

Table 8: Outcome of Fracture Table Group

Function	6 weeks	10 weeks	14 weeks
Active flexion upto 90 ⁰	8	9	15
Abduction	8	14	19

Table 9: Outcome of Ordinary Table Group

Function	6 weeks	10 weeks	14 weeks
Active flexion upto 90 ⁰	8	10	14
Abduction	8	14	18

Discussion

The treatment of unstable intertrochanteric fracture is still associated with some failures. High stress concentration that is subject to multiple deforming forces, high incidence of complications reported after surgical treatment, compels the surgeon to ambulate the patient as early as possible. The average age in our series was 70 years with a range of 53-82 years. The average age in the reported series is as follows: Casey MD series 2000 was 84.2 years and Heidelberg 2002 was 75.6 years. The age incidence in our series is at lower side, probably due to malnutrition, early onset of senile osteoporosis in our country.

Name of the author	Year	Avg age in years
Casey ^{md [7]}	2000	84.2
Heidelberg ^[8]	2002	75.6
Present study	2009-11	70

The average life expectancy of an Indian is 10 years less than western standards.

Name of author	Year	percentage
Long and knight ^[9]	1980	65.38%
Present study	2011-2013	57.5%

In our series, it was observed that the male to female ratio was 43:57. The sex incidence in our series is almost similar to the reported series. According to Long and knight 1980 females were 65.38%. In our study the unstable intertrochanteric fractures common in elderly females due to hormonal imbalance in post-menopausal age and associated osteoporosis is due to poor hormonal replacement therapy and malnutrition in our country.

18(45%) patients had fracture on right side and 22(55%) patients had fracture on left side. But no specific reasons can be given for the more frequent involvement of left hip.

The average hospital stay was 10 days in our study with a range of 7 to 15 days. Hospital stay in our series comparable to other studies. In our study, we discharged patients usually after suture removal.

In our study. Trochanteric fracture was common due to fall on a slippery surface. We noted one (5%) superficial infection in our study. With regular aseptic dressings and culture directed antibiotics the infection subsided without any complications.

In our study we noted screw cutout in 1 patient in fracture table group and 1 non union in ordinary table group may be due to osteoporosis.

Outcome

At end of 14 weeks follow up	Fracture table group	Ordinary table group
flexion	15	14
abduction	19	18
Excellent result	95%	90%

There is no significant difference between the age groups $p=0.621$ ($p>0.05$). There is a highly significant difference in the time spent in OT chamber $p=0.000$ ($p<0.01$) between the two groups. More time was lost while assembling the fracture table and in reducing the fracture in the fracture table group.

There is a highly significant difference in the Actual surgery time $p=0.000$ ($p<0.01$) between the two groups. Keeping the patient lateral and operating under vision, reduced the actual surgical time in ordinary table group.

There is a significant difference in blood loss $P=0.010$ ($P<0.05$). There is a highly significant difference in No. of C arm exposures $p=0.000$ ($p<0.01$). There is no significant difference between the two groups. $P=0.809$ ($p>0.05$)

Conclusion

Dimon Hughston osteotomy is a viable option in unstable fractures with technical expertise. Can be performed on ordinary operation theatre table with comparative results.

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