



STUDY OF OUTCOME OF TROCHANTERIC FRACTURES TREATED WITH DYNAMIC HIP SCREW

Orthopaedics

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ABSTRACT

Background: Fractures of proximal femur are amongst the most often encountered fractures by orthopaedic surgeon. Many treatment techniques are described in literature but internal fixation with Dynamic Hip Screw is the treatment of choice. **Material and methods:** Total 20 patients with intertrochanteric fracture who got admitted in the department of Orthopaedics at Patna medical college and Hospital patna Bihar. Duration one and half year. were subjected to internal fixation with Dynamic Hip Screw and the results were evaluated with Kyle's criteria. **CONCLUSION:** Internal fixation with Dynamic Hip Screw is the treatment of choice for treatment of intertrochanteric fractures.

KEYWORDS

Dynamic Hip Screw, Kyle's criteria, Intertrochanteric fracture.

INTRODUCTION

extracapsular fracture of the proximal femur have been one of the most difficult and challenging fractures to treat. This is because these fractures occur predominantly in the geriatric age group and both operative and conservative treatment of these patients is plagued by complications. Although trochanteric fractures are predominantly associated with low energy trauma in older patients, high energy trauma in young patients can result in similar pattern of fractures^(1,2). In the present day age of high energy vehicular trauma, comminuted fractures of trochanters are seen at an early age and it remains a challenge to surgeon to return these young people to normal and productive life as early as possible. Intertrochanteric fractures unite readily due to broad fracture surfaces being in contact with blood supply and rarely lead to non-unions. If proper precautions are not taken fractures unite in coxa-vara deformity resulting in shortening, and limits hip movements. Treatment must also consider effective internal fixation to help early mobilization and reduce morbidity⁽³⁾.

While rehabilitation interventions decrease the risk of falls and thus prevent hip fractures, they are of utmost importance as a result which, post fracture rehabilitation care is also crucial. The treatment modalities have come a long way from the early days of conservative treatment by hip spica (Whitmann, 1904) or traction [(John .P.Steinman (1907), Russel (1932), Gordon Buck (1936)] which resulted in high mortality rate due to problems of prolonged immobilization like orthostatic pneumonia, bed sores, embolism, urinary tract infection etc. With improved surgical techniques, better design of implants, open reduction and internal fixation of these fractures, with early mobilization, has become treatment of choice in the recent era.

The operative treatment of these fractures, has also followed a roller coaster path which has been full of controversies. The large numbers of implant designs which have evolved over the years reflect the inadequacy of these implants in providing wholly satisfactory results. From the early days of Smith Peterson's Triflanged Nail (1931) to the present day use of Gamma nails, has been a constant endeavor to improve the design of implants.

However these continue to be plagued by complication like late penetration of head by nail, disruption of internal fixation and loss of reduction, medial migration of distal fragments and persistent deformities due to inadequate reduction. Among the various internal fixation devices used for trochanteric fractures are Dynamic Hip Screws with sliding plate, it is a collapsible fixation devices, which permits the proximal fragments to collapse or settle, seeking its own position of stability. It also allows early weight bearing and lower complications than other implants.

Here is an effort to study the results of Dynamic Hip Screw in the management of intertrochanteric fracture by analyzing the factors which influence post-operative mobility.

OBJECTIVES

To study the outcome of the procedure, with respect to early mobilization and return to prefracture ambulatory status.

Assessment of results based on subjective parameters (like pain, ability to squat or sit cross legged and walking), objective parameters (like deformity, range of movements of hip and limb length) and radiological findings (like fracture union, consolidation, neck shaft angle and position of implant), after clinical and radiological union and comparison with previous studies.

REVIEW OF LITERATURE

Jewett, in 1930, introduced Jewett nail to provide immediate stability of fragments.

The introduction of triflanged nail by **Smith-Peterson** (1931) for treatment of fracture neck of femur has resulted in a great reduction of mortality and improvement in the percentage of union. **Johanson** in 1932 and **West Cot** in 1934 introduced the cannulated hip nail for more accurate placement in the femoral head. This technique was the precursor for the current technique of using guide pins for accurate placements of fixation devices in the stabilization of hip fractures. **Austin T Moore**, in 1934, began to treat intertrochanteric fractures with open reduction and internal fixation. Initially nailing, bolting-protruding pins was used but with inadequate fixation. **Lawson Thornton**, in the year 1937 developed a plate to be attached to the Smith Peterson nail, called the Thornton plate. This was a breakthrough in the history of operative treatment of trochanteric fractures⁽⁶⁾. **Jewett EL** in the year 1941 devised a single piece angled nail plate called Jewett nails and used it for internal fixation of trochanteric fractures⁽⁷⁾.

Brittain, in the year 1942, introduced low nail in order to eliminate varus and rotator deforming forces. **Harmon et al** (1945) reported a very high mortality of 39 patients treated non-operatively as compared to 11.1 % in patients treated by internal fixation⁽⁸⁾.

MacLaughlin, in the year 1947, introduced the adjustable nail plate combination. He used triflanged nail with its lateral end having a slot to which a plate is fixed with a washer and bolt⁽⁹⁾. **Cleveland et al** (1947) in a survey of treatment of intertrochanteric fractures in traction and by internal fixation found a very high mortality rate of 34% in patients treated by traction as compared to 12.6% in patients treated with internal fixation⁽¹⁰⁾.

MATERIALS AND METHODS

Total 20 patients with intertrochanteric fracture who got admitted in the department of Orthopaedics The material for the present study was collected from patients who attended and were admitted in the Department of Orthopaedics, at Patna medical college and Hospital Patna Bihar, India. with diagnosis of intertrochanteric fracture. A Twenty cases, were taken and the patients were informed about study in all respects and informed written consent was obtained.

collection of data

By interview,
By follow up at intervals of 1, 2, 6 months post operative,
By analyzing case papers

INCLUSION CRITERIA:

Patients more than age of 18 years.
Patients who have been diagnosed as having intertrochanteric fracture.
Sex: Both male and females

EXCLUSION CRITERIA:

Patients below the age of 18 years
Patients with malunited trochanteric fractures
Patients who are medically unstable, at extremely poor anesthesia risk

DHS Instrumentation:

Lag Screw (FIGURE 8): Wide, threaded, blunt nosed lag screw will have good purchase even with severely osteoporotic bone. It is cannulated to permit guide wire along its axis. Length of screw varies from 35mm to 120mm. There is a slot over shaft of the lag screw to lock the barrel plate to prevent rotation and to allow for screw to slide.

DHS Drill: Drill is graduated at increments of 5 mm. It is 8mm in diameter.

Triple Action DHS Reamer: The effective length of the reamer can be adjusted with scale on shaft. It reams head and neck of the femur for the DHS, barrel and lateral cortex of the femur of the junction of barrel and the plate. This is also cannulated.

DHS Taps: There are two types of taps. First type has pointed end (conical). Second tap is cylindrical that has equal dimension and shape of DHS screw. Both are cannulated.

Pre-operative

Patients admitted with trochanteric fractures were examined and X-rays of hip in antero-posterior and possible/need be lateral views obtained. Skin traction was applied routinely in all cases, Oral and parenteral NSAIDs available in the hospital used in most cases to relieve pain. Routine blood investigations, Hemoglobin level, urine routine, bleeding and clotting time, blood urea, serum creatinine, random blood sugar, Electro cardiograph (ECG), chest X-rays were obtained routinely physician opinion regarding fitness was obtained and Echocardiography obtained as per cardiologist opinion if needed.

OPERATIVE PROCEDURE

Type of anesthesia

Spinal anesthesia, Epidural anesthesia

Surgery

Position: Patient was positioned in supine position sand bag was placed underneath the hip to elevate it and correct anteversion.

Postoperative

Patient was initially observed in the recovery room later shifted to ward on or 3rd day. Adequate analgesics, IV antibiotics given upto 7th post operative day. Post OP check X-rays obtained. After Parenteral antibiotics oral antibiotics were administered. Oral antibiotics were continued after discharge if infection was found Drain was removed at end of 24 hours, wound inspected at 2nd post opt day. Alternate suture removal done on 10th day and on 12th day all sutures were removed.

Patient was made to sit up on bed and Static quadriceps exercises started from 2 day. Hip and knee flexion exercises from 6 or 7 day, patient allowed non weight bearing walking from 10th day, partial weight bearing started on when radiological signs of union were present average 6th week post operative, full weight bearing after clinical and radiological union. Cases included in the study were followed up regularly.

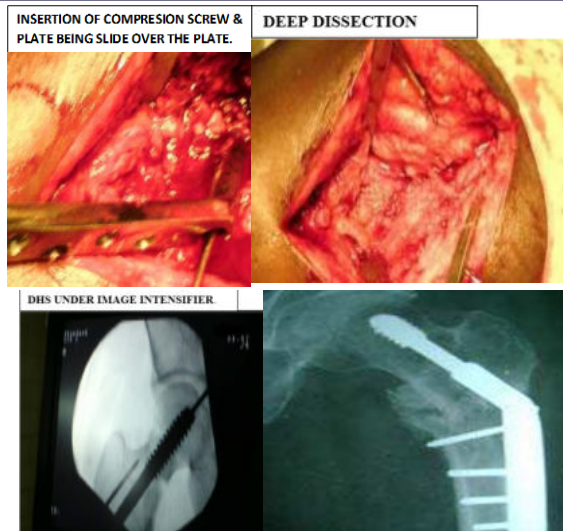


FIG3 Postoperative follow up

Table-1: Distribution of sample by age group

Age group (years)	Total Number of cases	Percentage
<20	0	0.0
20-29	1	5.0
30-39	1	5.0
40-49	8	40.0
50-59	2	10.0
60-69	3	15.0
70-79	3	15.0
>80	2	10.0
Total	20	100.0

Mean and S.D of Age 51.36 ± 16.35

X-RAY OF GOOD RESULT



DISCUSSION

At present it is generally believed that, all intertrochanteric fractures should be internally fixed to reduce the morbidity and mortality by early ambulation, but differences still exist regarding the type of implant to be used, hence in this study results after treatment with DHS are analyzed. In the present study, the average age 51.36 yrs was comparable to those of other Indian authors, and most of the western authors. We had 1.5 times number of male patients as compared to female, like male preponderance in most of Indian authors, female in most western authors. Mode of injury Trochanteric fracture were more common in persons aged above 60 years, mechanism were resulting from trivial fall. RTA was the cause in 4 cases. type II fractures were the most common 60% and type III and IV fractures comprised 15%. These results are comparable with Arun Kurnar Singh et al. in which Type II was common followed by Type III & Type IV. We did not encounter pathological fractures in our study which were seen in other series between 20 to 25% Waddell⁷. Position of implant immediate post operative X-ray In the immediate post operative X-ray the position of the implants were positioned in central position (50%), followed by posterior (35%) and superior (15%). Significant association was observed when implant was position. Superior position was associated with implant failure cut out and other complications.

This observation was similar to those made by Mulholland and Gunn (1972), who recommended central placement of screw.

Pain

Pain is an important criterion for evaluation of hip fractures which

could be due to implant failure, joint penetration, infection, due to avascular necrosis etc.

Most of cases about 70% had occasional pain which subsided by medication, 20% had mild to moderate degree of pain not affecting activities. **Ecker** in their study stated operative treatment is the procedure of choice for intertrochanteric fracture if a skilled anesthetist and surgeon, adequate instruments operation theatre conditions are available and more debilitated patient is, more the need for surgery. The goal of the treatment is to restore the patient to the preoperative status as early as possible with open reduction and stable internal fixation to allow early ambulation. **Marty** in their study Quality adjusted life years and cost of several type hip fracture with various treatment options showed that operative treatment proved cost effective than conservative treatment for extra capsular fractures. In this study all cases were operated. The depth of insertion of the lag screw into the head is critical for maximum purchase on the proximal fragment. Most agree that it should be inserted within 1 cm of the subchondral bone. This principle has been followed in our series. **Sonstegard** studied the influence of type of implant (Jewett nail, DHS implant, Holt nail) and the geometry of reduction and they concluded that geometry of reduction has no effect on fixation. They think that most of the load is borne by the implant rather than the bone and that the strength of the dynamic hip screw appliance exceeds the normal load and results in few incidence of failure compared to other implants. **Gurter** reported a bio-mechanical evaluation of fixation of unstable fractures with Enders pins, Harris condylocephalic nails and compression hip screws. They found that the dynamic hip screw was five times more rigid than condylocephalic nails. Reduction of the intertrochanteric fracture may be carried out either by open or closed means. In either circumstance the objective is to achieve a stable reduction, be it anatomical or non-anatomical in configuration. The common changes of the fracture fragments confirming instability of fracture are, shortening because of posterior collapse and varus of the neck shaft angle, because of increasing retroversion of the neck.

OBSERVATION AND RESULTS

In this series 20 patients with trochanteric fractures admitted in the department of orthopaedics at Patna medical college and Hospital Patna Bihar. During one and half years. Following are the observations which were made.

Age and Sex Incidence:

The average age for the whole group was 51.36 years. The youngest patient was 25 years. In this study, 12 cases were males and 8 were females. Male to female ratio for the whole series was 3:2. The age and sex incidence is shown in table no. 1 & table no 2.

Table-1: Distribution of sample by age group

Age group (years)	Total Number of cases	Percentage
<20	0	0.0
20-29	1	5.0
30-39	1	5.0
40-49	8	40.0
50-59	2	10.0
60-69	3	15.0
70-79	3	15.0
>80	2	10.0
Total	20	100.0

Mean and S.D of Age 51.36 ± 16.35

Table-2 : Sex wise distribution of cases

Gender	Number of cases	Percentage
Male	12	60.0
Female	08	40.0
Total	20	100.0

TECHNIQUE OF FIXATION

All the fractures were fixed with Dynamic Hip Screw.

ANAESTHESIA

All the patients were operated on spinal anesthesia or epidural anesthesia.

The average hospital stay in the study group was 19.8 days. In most of the cases delay occurred due to associated medical illness, for

arrangement of blood, & because of strictly allocated days to operate the patients in general ward Patient is allowed to sit up on bed on 2nd and 3rd day, static quadriceps exercises started from 2nd day, hip and knee flexion exercises from 6 or 7 day, patient allowed non weight bearing walking from 10th day, partial weight bearing started on when radiological signs of union were present average 6" week post-operative, full weight bearing after clinical and radiological union.

Deep infection in one case and superficial infection in another case. Infection was treated by repeated debridement.

CRITERIA FOR EVALUATION AND RESULTS

All patients after union of fracture or after 20 weeks were grouped and the anatomical and functional results evaluated as follows. Excellent, Fracture united.

No pain., No infection. Full range of motion at hip. No shortening. Patient able to sit crossed legged and squat. Independent gait Good, Fracture united. Occasional pain. No infection. Terminal restriction of hip movements. Shortening up to half inch. Patient able to sit crossed legged and squat.

Use of cane back to full normal activity. Fair, Fracture united. Moderate pain in hip. No infection

CONCLUSION

Intertrochanteric fractures are essentially fracture of middle age and elderly, with osteoporotic bones. Most of the fractures belong to grade II classification of Boyd and Griffin. Dynamic hips crew is the operative treatment of choice for the intertrochanteric fractures.

REFERENCES

- Wolters kluwer, Lippincott Williams and Wilkins, Rockwood and Green's Fractures in adults 2006; 4(6): 1608
- S. Terry Canale, James H. Beaty, Campbell's Textbook of Operative Orthopaedics 2008; 3(1): 3237
- Cummings SR, Keisley JL, Nevitt MC, et al. "Epidemiology of osteoporosis and osteoporotic fractures". Epidemiol Rev 1985; 7: 178-208
- Evans, E.M.: Trochanteric fractures, J Bone Joint Surg 1951; 33B: 192-204
- Desjardins A.L., Roy A et al: Unstable intertrochanteric fracture of the femur. J Bone Joint Surg 1993; 75B No. 3: 445-447
- Thornton, L: The treatment of trochanteric fractures of the femur, two new methods. Piedmont Hospital. 10, 21-27, 1937
- Jewett E.L.: One-piece Angle Nail for Trochanteric fractures; Journal of Bone and Joint Surgery, 1941, 23: 803-810
- Harmon PH. The fixation of fractures of the upper femur and hip with threaded, hexagon-headed, stainless-steel screws of fixed length. J Bone Joint Surg Am 1945; 27: 128-37
- Watson-Jones: Fractures and Joint Injuries; edited by J.N. Wilson; Sixth Edition 1992, B.I. Churchill Livingstone, Volume 2, Chapter 29: 878-973
- Cleveland M, Bosworth DM, Thomson FR. Intertrochanteric fractures of the femur: a survey of treatment in traction and by internal fixation. J Bone Joint Surg Am 1947; 29: 1049-82
- Leonard. Fracture in adults. In: Jesse C, DeLee, Editirs. Rockwood and Green's. Volume 2, 4th edition Philadelphia: Lippincott Williams and Wilkins; 1996. p 1637
- Olsson O, Ceder L, Hauggard A. Femoral shortening in intertrochanteric fractures, a comparison between the Medoff sliding plate and the compression hip screw. J Bone Joint Surg. 2001; 83: 572-8
- Evans E.M.: Trochanteric fractures, J Bone Joint Surg. 1951; 33B: 192-204
- Evans E.M.: The treatment of trochanteric fractures of the femur. J Bone Joint Surg. 1949; 31B: 190
- Moore, Cram, Parker. Intertrochanteric fractures. In: Bucholz RW, Heckman JB, Editors. Rockwood and Green's Fractures in Adults. Vol 2. 4th edition Philadelphia: Lippincott, Williams and Wilkins; 1996. P 1637-1639
- Pugh W.L.: "A Self-Adjusting Nail Plate for Fractures About the Hip Joint"; J Bone Joint Surg. 1955; 37A: 1085-1093
- Boyd HB, Anderson LD. Management of unstable trochanteric Fractures. Surg Gynecology Obstetric 1961; 112: 633