

The Management of Trochanteric Fractures of Hip using Dynamic Hip Screw Fixation

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ABSTRACT

Introduction: The advantage of operative treatment is by an early ambulation and prevention of deformity. Internal fixation has come a long way from pins, nails, screws, or nail plate to the present Dynamic hip screw fixation. The aim of the study was to evaluate indications of the dynamic hip screw fixation for trochanteric fractures and problems encountered in intra-operative, post-operative and treatment period with analysis of our results and most of patients after surgical treatment returning to near normal activity.

Material and Methods: A close follow up of 426 cases was conducted for the purpose of evaluating the overall results of internal fixation with dynamic hip screw.

Results: Results in the present study shows that Dynamic Hip Screw provides better fixation for trochanteric fractures of hip allowing fracture union by dynamic compression over the lag screw and avoids risk of nail penetration during gradual fracture collapse.

Conclusion: The Dynamic Hip Screw fixation for trochanteric fractures results in reduced in complications of prolonged bed rest, lesser hospital stay and better compliance of the patients. With good expertise, pre-operative assessment and strict aseptic precautions, the overall functional results are good with most of the patients returning to near normal activity.

Keywords: Trochanteric fracture, Internal fixation, Dynamic Hip Screw

INTRODUCTION

The fractures around the hip joint are common, which are usually due to trivial trauma. Trochanteric fractures include those occurring between the base of neck and inferior border of lesser trochanter.¹ In trochanteric fractures, the usual history is direct trauma and patients give history of stumbling and striking the trochanteric region onto the ground. Muscular forces are active and do contribute, but it is usually the direct trauma that accounts for a major portion of the injury.²

The trochanteric fractures of the hip were treated before mainly by conservative methods only. Later operative methods were found to have certain advantages over conservative methods. In these fractures union is not a problem because of abundant blood supply and a wide cross sectional area of the fracture site. The advantage of operative treatment is early ambulation and prevention of deformity. The disadvantages of the conservative methods are the economic implications, problems of enforced bed rest i.e.; bed sores, deep vein thrombosis and pulmonary embolism, pin tract infections and varus drift and shortening.^{3,4} Internal fixation has come a long way from pins, nails, screws, nail plate to the present Dynamic hip screw fixation. The expertise in surgery and economy of the implants has led to the rapid increase in the operative treatment of the trochanteric fractures of the hip.

The aim of the study was to evaluate indications of the dynamic hip screw fixation for trochanteric fractures and problems encountered in intra-operative, post-operative and treatment period.

MATERIAL AND METHODS

A close follow up of 426 cases (admitted to the hospital) was conducted for the purpose of evaluating the overall result of internal fixation with dynamic hip screw at M.G.M. Hospital, Warangal, Telangana State. Age, Sex, Occupation and mode of injury were noted. The patients underlying past and present medical conditions were evaluated. In the acute stage the hemodynamic states were stabilized and immobilization done with Buck's skin traction, which prevented further soft tissue damage and gave pain relief to the patient. The analyses of the fracture pattern, geometry and quality of bone were done. All fractures were classified to Boyd and Griffin system.³ All routine investigations of Blood urea, Blood Sugar, Hb%, E.C.G. and complete urine analysis were done.

On contemplating for operative treatment the following factors were assessed for fracture and implant assembly namely. 1. Bone quality; 2. Fragment Geometry; 3. Reduction
Once Anaesthetic fitness was obtained, pre-operative preparation was carried out. Each patient was given antibiotic prophylaxis before surgery. The anaesthesia employed was general or spinal anaesthesia. The surgery was carried out on fracture table under X-ray control. Parenteral antibiotic kept for one week postoperatively. Wound inspection and suction drain removal were done 48 hours postoperatively. Quadriceps exercises and active ankle exercises were begun as soon as possible, in bed exercises were advised from 3rd postoperative day. Patients were discharged on 10th postoperative day after suture removal.

Post operative advice: Patients were allowed non-weight bearing crutch walking or with walker after 4 weeks. Patients were reviewed after 12 weeks and fresh X-rays A.P. and lateral views were taken and fracture union was assessed clinically and radiologically. After conformation of fracture union, they were allowed protected weight bearing with a walking stick and advised to continue physiotherapy. The standard regime

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was delayed in case when fracture was not united especially in comminuted unstable fracture, if medial cortical buttress was in doubt or the fixation was not that rigid, complete non weight bearing for a period of 3 months followed. Patients were evaluated specially for complaints such as pain, tenderness, shortening, deformity and range of hip movements.

Evans criteria for evaluation of patients with trochanteric fractures postoperatively is taken into consideration.⁴ The results were graded into

- I. Excellent: Clinical:** Normal Painless gait; No shortening; Patient returns back to pre-injury status completely; Normal, Complete range of movement. **Anatomical:** Union of fracture in perfect position.
- II. Good: Clinical:** Minimal painless limp; Insignificant shortening of less than 2.5 cm; Near normal range of movement; Patient returns to work within 6 months of surgery. **Anatomical:** Union with less than 10 degrees varus and minimal shortening of the extremity.
- III. Fair: Clinical:** Patient with pronounced limp and cannot walk without the help of Stick; Significant shortening of more than 2.5 cm; Painful restriction of range of movement; Marked delay in returning to work. **Anatomical:** Union with 10-20 degrees varus and Shortening of limb by more than 1 inch.
- IV. Poor: Clinical:** Total inability to work; Severe pain, uncontrollable postoperative infection; Gross unacceptable shortening. **Anatomical:** Severe mal-union; Varus deformity more than 25 degrees; Gross shortening of the limb.⁵⁻¹¹

RESULTS

During the period of two years a total number of 426 cases of trochanteric fractures were admitted. Trochanteric fractures prior to this study were managed surgically by smith Peterson nailing. These devices do not allow for gradual fracture collapse without simultaneous femoral head penetration. Even the fixed angle plate devices had complication of instrumentation. Later trochanteric fractures were managed by dynamic hip screw fixation.

The overall incidence of trochanteric fractures was found to be more in males probably because of their outdoor activity. Beyond the age of 50 years' females were also affected by this fractures almost in par with predisposes to fracture with trivial injury.

The maximum number of patients were in the age of group of 51-60 years. The youngest patient was 30 years and oldest patient was 88 years. The average age was 54 years. Average for males was 51 years and females 58 years. The male and female ratio of incidence was 3:2. The average age incidence according

to Cleveland, Boyd and Dahi was 66-76 years. According to previous studies conducted in India, the average age of the patients was 66 years. The ratio of males and females according to western studies ranges from 1:2 and 1:8, the ratio in India is unity or even reversed.

The incidence of type-II were more than common. After the patients were evaluated in detail they were taken up for surgery. Anaesthesia was general or spinal anaesthesia. The patient

I. Age Incidence	Total Number	Percentage
Range of Years		
1. Less than 30	7	1.64%
2. 31-40	34	7.98%
3. 41-50	13	26.52%
4. 51-60	133	31.22%
5. 61-70	11	2.58%
Total	426	100%

Table-1: Demography of Age Incidence

Sex	Number of Cases	Percentage
Male	253	59.62%
Female	173	40.37%

Table-2: Demography of Sex Ratio

Type	Number of cases	Percentages
I	8	14.54%
II	21	38.18%
III	7	12.72%
IV	19	34.54%
Total	55	100%

Table-3: Classification of Trochanteric fractures: Boyd and Grif-fin⁶

Complications	Number of cases	Percentage
1. Bedsores	2	3.6%
2. Upper GI Bleeding	1	1.58%
3. Urinary tract infection	3	5.4%
4. Wound infection:		
Superficial	2	3.6%
Deep	1	1.8%
5. Cerebrovascular accident	0	0%
6. Aspiration pneumonia	0	0%
7. Medial migration of lag screw	0	0%
8. Cutting of the Nail	1	1.8%
9. Breakage of implant	0	0%
10. Coxa vara	1	1.8%
11. Nonunion	0	0%
12. Death	1	1.8%

Table-4: Various complications seen in the study

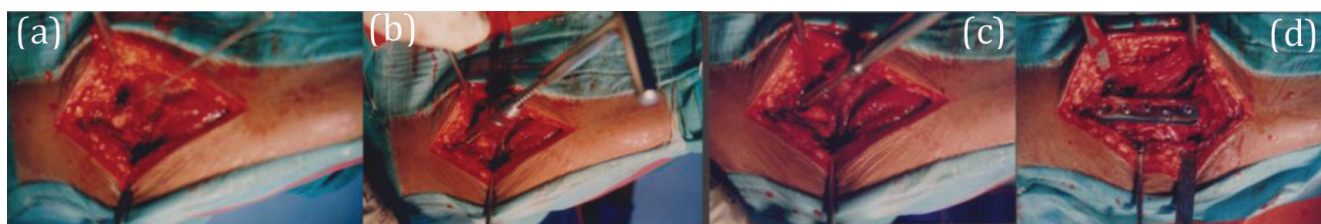


Figure-1: Management of Trochanteric Fracture of Hip using Dynamic Hip Screw Fixation. (a) Passing the Guide Wire; (b) Lag Screw Fixation; (c) Applying Compression; (d) DHS in situ

was put on fracture table, reduction done and fixation done with dynamic hip screw under X-Ray control, on an average patients were operated within one week and average duration of hospital stay was 18 days. The patients were given II Generation cephalosporins postoperatively for 1 week.

The 2 cases of superficial wound infection were treated with cephalosporin for additional one week, and alternate day dressings, one case of deep infection postoperatively was managed by wound debridement and implant removal. A case of cut through of the implant which was removed and it was treated conservatively by skeletal traction. There was one case of death postoperatively due to uremia.

DISCUSSION

Trochanteric fractures constitute a large portion of lower limb fractures in old age. In the present study the average age was 54 years, male : female ratio was 3:2. Of the 55 cases taken up for study, an analysis of the pre injury functional status of the patients reveal, most of them were sedentary. The history of having slipped and fell down was the commonest mode of injury. Fractures sustained in road traffic accident or due to fall from height were more comminuted and unstable. Osteoporosis was a significant problem in old aged patients. All fractures were classified on basis of Boyd and Griffin systems.^{6,12-15}

Both conservative and operative regimes yield comparable results and each has its own advantages. Conservative treatment leads to union in an unacceptable position in addition to prolonged bed rest with all its accompanying ills i.e.; bed sores, knee stiffness, disuse osteoporosis, late drift into varus, increased cost of hospital stays and loss of working days of the patient.^{5,16}

Patients were taken up for surgery with in 1 week after admission on an average. The surgery was done under X-ray control and average time for surgery 1 ½ to 2 hours. Most of the patients were comfortable postoperatively due to greater freedom in mobility and decreased pain. Much of the delay in surgery was consumed in controlling underlying medical conditions like hypertension and diabetes. Dynamic hip screw fixation was done with 130°, 135°, 4-6 holed plate and 80 mm, 85 mm lag screw in most of the cases. In few cases with comminuted subtrochanteric extensions, a long plate was used.^{13,17}

Various complications that developed during hospital stay were treated accordingly. Bedsores were managed by frequent turning in bed and with water beds. Old aged patients particularly with history of acid peptic disease were restricted strictly on NSAIDS and put on antacids and antihistaminics. Incidence of wound infection was negligible on our study due to meticulous aseptic precautions.^{18,19}

Most of the patients were discharged with advice of partial weight bearing with walker or axillary crutches after 4 weeks and range of movements in bed from 3rd postoperative day. The average time for union was 3 months. Healing of fracture was rarely a problem due to good vascularity.^{20,21}

Patients were followed up for an average duration of 10 months. Functional assessment of most of the patients at 6 months postoperatively revealed that shortening and limp were seen. Most of the cases of shortening were negligible, (<2.5cm) and needed only heel raise. Limp was due to shortening and coxavara with resulting abductor weakness and relative stiffness

in joint. Such patients were advised vigorous physiotherapy and heel raise to reduce the limp to a certain extent. Loss of internal rotation was found to be the most common in patients, through it did not have effect on the overall functional results.

Most of the young patients returned back to their preinjury level of activity within 7 months postoperatively. In the overall functional results of our study, 25% excellent, 75% good and 0.0% fair, was seen in our follow up of the fractures treated with dynamic hip screw fixation.

CONCLUSION

Trochanteric fractures of hip constitute one of the commonest fractures of lower limb in old age. Surgical management with Dynamic Hip Screw allows early weight bearing and overcomes the problems of immobilization as in conservative management. The Dynamic Hip Screw fixation for trochanteric fractures results in reduced in complications of prolonged bed rest, lesser hospital stays and better compliance of the patients. With good expertise, pre-operative assessment and strict aseptic precautions, the overall functional results are good with most of the patients returning to near normal activity.

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