

Role of External Fixator in the Management of Trochanteric Fractures of the Femur – Damage Control Orthopaedics

1. Naveed Hussain Syed 2. Naveed Ishaq Malik 3. Fazal ur Rehman Saeed

1. Orthopedic Surgeon, CMH Panoaquil, Sindh 2. Orthopedic Surgeon, CMH Lahore 3. Rehabilitation Medical Specialist, CMH Quetta.

ABSTRACT

Objectives: To compare the Modified AO fixator (MAO) with sliding hip screw (SHS) in the treatment of trochanteric fractures.

Data Source: 68 patients of both genders presenting with trochanteric fractures at Combined Military Hospital Lahore.

Study Design: This was a Prospective, Randomised Study.

Place and Duration of Study: This study was conducted at the in patient surgical Unit at Combined Military Hospital Lahore from 1st June 2006 till 30 November 2007.

Materials and Methods: 68 high risk patients of ASA-IVa-c with a trochanteric fracture were selected.

Results: The mean age was 73 yrs $\pm$. There were 17(28%) males and 45(72%) females. There was no delay between injury and operation when treated by external fixation (mean 3.13 days, 1 to 7). All fractures in group I united clinically and radiologically at 24 weeks. The surgery required lesser time (mean 29.35 minutes, 20 to 45), the blood loss was minimal (mean= 33.33ml) and required a short hospital stay (mean of 3.96 days, range 2 to 7 days) as compared to the group II. At the final follow-up, 03(8%) patients had shortening or malrotation, 02(03%) patients had varus angulation, implant failure (pin breakage) in one patient (1.4%) and pin cut out was observed in one (1.4%).

Conclusion: Our results confirm that the Modified AO fixator is an effective device for treating pertrochanteric fractures and is a useful alternative to conventional fixation with the sliding hip screw.

Key Words: Trochanteric Fractures, External Fixator.

INTRODUCTION

The hip fractures are on the rise in past few decades. The main cause is huge increase in the geriatric population.

Epidemiologic studies show that trochanteric fractures are an increasing problem since compared with cervical fractures their relative number increases progressively with age in women after the age of 60 years.¹⁶ Fractures of trochanteric region are a major geriatric concern. The patients are usually elderly individuals with poor tolerance for major operative intervention. Therefore, fracture of the hip is a leading cause of death and disability in the elderly.^{1,2} The treatment goal for these patients include early operative management, restoration of anatomical alignment, maintenance of fracture reduction and early rehabilitation.³ Closed reduction with external fixation has been accepted as a cost effective way of managing fractures of the hip in developing countries.⁴ The external fixators and the sliding hip screws were first used in 1950s for management of trochanteric fractures. Various studies have suggested that external fixators have been more effective in management of pertrochanteric fractures.².

As far as we know very scanty work has been done and there are no local studies available on this topic. We therefore, conducted a study at Combined Military

Hospital Lahore from 1st June 2006 till 30 November 2007 to assess the role of external fixation of trochanteric fractures of the femur in high risk patients.

MATERIALS AND METHODS

The study was conducted at the in patient surgical Unit at Combined Military Hospital Lahore.

68 high risk patients of ASA-IVa-c with a trochanteric fracture were selected. Patients referred to the OPD with hip fracture were evaluated in detail by one of the authors and after making a diagnosis of trochanteric fracture were enrolled in the study if they fulfilled the following inclusion criteria. The study was carried out over a period of 1.5 yrs.

Inclusion Criteria

- High risk patients of both genders, of all ages having trochanteric fracture ASA-IVs of less than 02 week of duration were included in the study.

Exclusion Criteria

- Pathological fractures
- Bone and joint diseases
- Coexisting other fractures
- Unfit for anaesthesia

The study was approved by the ethical committee of the hospital. Oral informed consent was obtained from the patients at the start of the study and they were randomly

assigned to either of the two groups I and II. Patients in Group 'I' went under surgery, and fractures were fixed with Modified AO external fixator under spinal analgesia. Patients in group 'II' went through surgical procedure of fixation with sliding hip screw. Patients from both the groups were given Intravenous Cefuroxime 1 gram and Amikacin 50mg were administered on table, followed by three doses in post-operative period. Oral Cefuroxime was continued for one week after discharge from the hospital and Injection Diclofenac Sodium 75 mg twice daily and acetaminophen (500 mg tid/ qid) for additional pain relief. Patients were regularly followed up. Fracture healing and alignment was assessed by plain radiographs in AP and Lateral views. The interval between injury and operation, the duration of surgery, the amount of blood loss, the length of hospital stay and the cost of treatment, the time of union, the range of motion of hip and knee joints were recorded. Complications including pin track infections, shortening or mal rotation and death from associated illnesses were documented.

A guide wire was inserted percutaneously at an angle of approximately 130 degrees through the middle of the femoral neck into the head. Self tapping pins (fine-ortho, Lahore, Pakistan) of 4.5 mm in diameter were inserted manually through a drill sleeve on either side of the guide wire, and within the confines of the femoral neck. The pins were advanced to a point 5 mm short of the subchondral bone of the head. Intra-operative time was measures from the time the incision for the implantation of the first pin was made, to when the fixator was completely mounted. The blood loss was measured as the difference in weight between the dry swabs and those soaked in blood.

After surgery all patients had a gradually progressive programme of weight bearing using a walking frame, from 2 weeks of surgery. Appropriate physiotherapy was advised for hip and knee movements. Pin sites were cleaned daily with saline and the families of the patients were given instructions on continuing care after discharge. All fixators were removed at four months, without anaesthesia, in the outpatient clinic. All pins were reviewed at 6, 12, 18 and 24 weeks. The final follow-up was at 06 months, when function of the hip was assessed using a modified Harris hip score¹⁰ and the function of the knee assessed using a modified Western Ontario and McMaster University Osteoarthritis (WOMAC) index.¹¹

Data Analysis

Data analysis was computer based, SPSS version 10.0 was used for analysis. Mean $\pm$ standard deviation was calculated for age of patients in each group. Frequencies and percentages were calculated for gender and side involved in each group. On each visit, relevant tests of significance were applied; paired samples T test to compare results between the two groups. P value of < 0.005 was taken as statistically significant.

RESULTS

Patients included in this study ranged in the ages 60 to 92, with a mean age of $70 \pm$ years. They belonged to both genders. There were 19(27%) males and 49(72%) females. There was no delay between injury and operation when treated by external fixation (mean 3.13 days, 1 to 7).

Table No.1: Patient Details

Details	No. of patients
Age in Years	
(mean; range)	70(60 to 92)
Gender	
M:F	17:45
Mechanism of Injury	
Fall	52
Road Traffic Accident	12
others	4
Type of Injury	
Direct	32
Indirect	22
Unknow	14
Category of Fracture	
Stable	52
Unstable	16
Asa Grading*	
1	32
2	22
3	14

*ASA, American Society of Anaesthesiologists

All fractures in group I united clinically and radiologically at 24 weeks. The surgery required lesser time (mean 29.35 minutes, 20 to 45), the blood loss was minimal (mean= 33.33ml) and required a short hospital stay (mean of 3.96 days, range 2 to 7 days) as compared to the group II. At the final follow-up, 03(8%) patients had shortening or malrotation, 02(03%) patients had varus angulation, implant failure (pin breakage) in one patient (1.4%) and pin cut out was observed in one (1.4%). We excluded all pathological fractures, and any bone and joint disease interfering with rehabilitation.

The fractures were fixed with modified AO fixator. The number of patients showing shortening or mal rotation was seen in only one patient reporting for follow-up. Pin track infection occurred in 01 (1.4%) patient treated with external fixation, which resolved easily on removal of fixator.

DISCUSSION

Sliding hip screws are widely used to treat osteoporotic pertrochanteric fractures, in spite of substantial rates of fixation failure, poor functional outcome and associated

Table No.2: Showing comparison of outcomes in the two groups

Follow-Up (Weeks)	External Fixation (Mean (SD))
Shortening	
6	0.40(0.64)
12	0.40(0.64)
18	0.45(0.72)
24	0.37(0.61)
Malunion in external rotation at 24 weeks	
0 degrees	27
5 degrees	03
Kruskall-Wallis	0.2361
Range of movement of hip (Degrees)	
6	114 (8.94)
12	123.33 (9.22)
18	136.33 (6.14)
24	138.66 (3.45)
Range of movement of knee(Degrees)	
6	85.66 (15.01)
12	96.33 (4.90)
18	118.66 (7.76)
24	127 (5.95)
Varus angulation at 24 weeks	
0 degrees	21
5 degrees	06
10 degrees	03
p-value	0.0050

morbidity.¹³ In a recent study of pertrochanteric fractures treated with newly-developed external fixators showed better results than those reported previously.⁸ Studies using new fixators have also shown that external fixation can provide results that are similar to, or even better than those obtained with conventional internal fixation techniques.^{2,8}

Vossinakis and Badras^{2,8} reported that patients who had trochanteric fracture fixed with the Orthofix external fixator(Intavent Orthofix Ltd, Maidenhead, United Kingdom.) had a better functional result, a shorter operating time, fewer blood transfusions, less pain and a shorter hospital stay than patients with a sliding hip screw.

Our results show that external fixator can be applied under regional anaesthesia, and is therefore appropriate for patients who are not fit for general anaesthesia. It also shows that external fixator is an excellent device for pertrochanteric fractures of neck of femur in regard to delay to surgery, the duration of surgery, blood loss and hospitals stay. These advantages are of significant importance given the co-morbidity associated with these fractures. The technique is available to the patient at significantly less cost.¹⁴ Malunion in the form of shortening and external malrotation were negligible. The range of movement of the hip was initially limited but at 24 weeks the groups were comparable. The range of movement of the knee was limited in initial 12 weeks

but with physiotherapy, it improved significantly. All fractures united by 12 weeks.

Vossinakis and Badras² reported that pin track infection developed in 15 of their 50 patients (30%) treated with Orthofix external fixator using standard pins. In a similar study, 18 of 41 patients (45%) had pin-track complications.¹ In our study, grade I pin track infection was observed in 35 (70%) cases, resolving with the removal of pins. Devgan and Sangwan¹⁵ reported pin track infection and knee stiffness as a major complication of external fixation. This was not seen in our study, possibly owing to more proximal placement of the femoral shaft schanz pins. Moroni et al⁵ reported less varus angulation using external fixation with hydroxyapatite-coated pins, compared with the sliding hip screw. In our study we found varus angulation in one patient only.

CONCLUSION

This study has shown that external fixation with modified AO fixator is an excellent option for high risk patients as it can be done under regional block, with less operative time, minimal blood loss and hospital stay. Moreover it costs less, gives good union rates and functional outcomes with minimal complications.

REFERENCES

1. Christoduolou N, Sdrenias CV. External fixation of select intertrochanteric fractures with single hip screw. Clin Orthop 2000;381:204-11
2. Vossinakis IC, Badras LS. The external fixator compared with the sliding hip screw for pertrochanteric fractures of the femur. J Bone Joint Surg (BR) 2002;84-B:23-9.
3. Baumgaertner MR. The pertrochanteric external fixator reduced pain, hospital stay and mechanical complications in comparison with sliding hip screw. J Bone Joint Surg 2002;84-A:1488.
4. Kamble KT, Murthy BS, Pal V. External fixation in unstable intertrochanteric fractures of the femur. Central Institute of Orthopaedics, Safdarjang Hospital, New Delhi, India PMID: 8730390.
5. Moroni A, Fadini C, Pegreff F, et al. Dynamic hip screw compared with external fixation treatment of osteoporotic pertrochanteric fractures: a prospective, randomized study. J Bone Joint Surg 2005;87-A:753-9.
6. Parker MJ, Handoll HHG. Extramedullary fixation implants and external fixations for extracapsular hip fractures (Cochrane Review). The Cochrane Library;2003.
7. Stoehling R, Miller RD. Pre-operative evaluation and choice of anaesthetic techniques. Basics of Anaesthesia. 4th ed. 108-18.
8. Vossinakis IC, Badras LS. Management of pertrochanteric fractures in high-risk patients with an external fixation. Int Orthop 2001;25:219-22.

9. LaVelle DG. Fractures of hip. In: Canale ST, editor. Campbell's operative orthopaedics 10th ed. p.2873-938.
10. Harkess JW. Arthroplasty of hip. In: Canale ST, editor. Campbell's operative orthopaedics. 10th ed. p.315-482.
11. Das SK, Sajwan N, Srivastava R, et al. KGMC index: a modified WOMAC index to evaluate response in Indian patients with osteoarthritis knee. JIRA 1998;6:46-9.
12. Rockwood CA. External fixation. Rockwood and Green's Fractures in adults 4th ed. Lippincott (New York): Williams and Wilkins;250-2.
13. Larsson S. Treatment of osteoporotic fractures. Scand J Surg 2002;91:140-6
14. Adams CL, Robinson CM, Court-Brown CM, McQueen MM. Prospective randomized controlled trial of an intra-medullary nail versus dynamic screw and plate for inter-trochanteric fractures of the femur. J Orthop Trauma 2001;15:394-400.
15. Devgan A, Sangwan SS. External fixator in the management of trochanteric fractures in high-risk geriatric patients: a friend to the elderly. Indian J Med Sci 2002;56:385-90

Address for Corresponding Author:

Dr Naveed Ishaq Malik

Orthopedic Surgeon, CMH, Lahore

Cell No. 0321-4523241