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Functional outcome assessment of trochanteric fractures with a new scoring system

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Abstract
Introduction: Trochanteric fractures are extra capsular fractures resulting commonly among elderly patients due to trivial fall. The complications of the surgeries result in severe life threatening conditions, consequently leading to increased disability, mortality and decreased quality of life. This study was done to assess the surgical outcomes of trochanteric fractures using a composite scoring system.
Methodology: This cross sectional study was carried out among 40 patients with trochanteric fractures who were treated surgically using Dynamic Hip Screw (DHS) or Dynamic Condylar Screw (DCS). A comprehensive scoring system was developed considering clinical, radiological and functional outcomes assessment.
Results: In 40 cases of trochanteric fractures type I and type II were 33 cases constituting an incidence of 82.5% and type III and type IV constituting an incidence of 17.5%. About 36 cases (90%) were operated by dynamic hip screw and plate (DHS) and in 4 cases (10%) dynamic condylar screws and plating (DCS) were deployed. About four participants developed post operative complications. Excellent to good outcomes were obtained in 29 cases (72.5%), fair results in 8 cases (20%) and poor results in 3 cases (7.5%).
Conclusion: Management of trochanteric fractures by DHS technique produces better functional outcomes and also improves the quality of life to pre fracture states, especially among older patients.

Keywords: Dynamic hip screw, dynamic condylar screw, functional outcomes, trochanteric fractures

Introduction

Trochanteric fractures are devastating injuries that commonly affect the elderly and have a tremendous impact on the health care system and society in general. Elderly females are prone for trochanteric fractures even due to trivial injuries like a stumble and fall because of osteoporosis and consequent weakening of the bone. Trochanteric fractures are also becoming common in younger age group, as a result of high energy trauma due to road traffic accidents. Several external factors result in inadvertent road traffic accidents with high velocity injuries and with severe fracture communition.

Trochanteric fractures are located distal to the anatomical limits of the hip joint capsule. The fracture generally involves the region below the greater and lesser trochanter. These fractures are also called extra capsular fractures. The cancellous bone in the trochanteric region is abundant and well vascularized and therefore, one rarely encounters the problem of non union, but however prone for malunion resulting in coxa vara which is more common especially when treated conservatively or in neglected trochanteric fractures. Avascular necrosis of femoral head does not usually occur as a complication of trochanteric fracture.

About three or four decades back, trochanteric fractures were considered as a terminal event of life especially in the elderly because of prolonged immobilization leading to fatal complications like pulmonary embolism, renal impairment and bed sores. Even among the younger age groups, the fractures resulted in gross disability like limp and limitation of movements of hip joint because of the deformity.

Trochanteric fractures are adequately treated by modern surgical modalities with excellent results with hardly any residual deformity in orthopaedic practice. However, Trochanteric fractures consume a potential proportion of our health care resources.

Primary goal in the treatment of an inter-trochanteric fracture is to bring back a considerable quality of life in the patient as early as possible. This can be achieved by accurate anatomical reduction of the fracture and adequate stable internal fixation by surgery.

Objectives

1. To study the functional outcome of treatment of trochanteric fractures using a new scoring system

Methodology

Study setting

This cross sectional study was done in the Department of Orthopedics of our tertiary care hospital, situated in a semi urban area with a rural background. The study was carried out between June 2009 and May 2011.

Study participants

All the participants who underwent surgical management for trochanteric fractures during the study period were included in the study. Participants with associated medical co morbidities involving cardiac, respiratory and renal systems and children below the age of trochanteric maturity were excluded. A total of 40 participants participated in the study.

Ethical approval and informed consent

Approval was obtained from the Institutional Ethics Committee prior to the commencement of the study. Each participant was explained in detail about the study and informed consent was obtained prior to the data collection.

Pre operative evaluation of the participants

All data regarding the mode of injury and other particulars were recorded in a detailed proforma. After admission the participants were put on skeletal (upper tibia) traction. Anteroposterior and lateral roentenographs were taken of the affected hip. Participants were thoroughly evaluated for any associated injuries and treated for the same. Routine blood investigations were carried out. Pre operative anaesthetic assessment was obtained indicating ASA grading. Prophylactic antibiotics were given to the participants preoperatively.

Surgical procedure

Participants were operated for trochanteric fracture mainly by Dynamic Hip Screw and plates (DHS). In few cases Dynamic Condylar Screw (DCS) was deployed when there was a gross communition at the base of the greater trochanter, where DHS cannot be deployed. Both the surgeries were carried out under regional or spinal anaesthesia.

Post Operative Management

Limb elevation was given depending upon the post operative blood pressure. An hourly record of the vitals was maintained for first 24 hours. Blood transfusion was given under supervision when required. Analgesics were administered intramuscularly every 12^{th} hourly. The Romovac suction drain was removed in 48 to 72 hours. Participants were given chest physiotherapy, quadriceps and hip exercises by the physiotherapist during the post operative period. Sutures were removed on 14^{th} post-operative day and participants were routinely discharged from hospital after 3 weeks of surgery, with advice to do non weight bearing ambulation with the help of crutches or walkers.

Depending upon the fracture geomentry, stability of the fixation, age of the patient, quality of the bone, participants were made to stand. Gradual ambulation with partial weight bearing was started around 6-8 weeks when the participant could do active straight leg rising.

Post operative assessment

Clinical, radiological and functional assessments of the outcomes were carried out. Clinical outcomes were assessed using the straight leg raise test, clinical union and presence of clinical complications. Radiological outcomes were assessed using x-rays taken at 6 weeks, 12 weeks and at 6 months follow up. Functional assessment was done using hip and knee function, walking distance of the patient, functional ability of the patient in respect of ambulatory status, ability to squat, sit crossed legged and ability to perform physical activities similar to pre-injury levels were assessed.

A composite scoring was develop to measure the outcome of the surgery, as follows:

Excellent

- No pain on ambulation.
- Can walk any distance consistent with his age and co-morbidities.
- Can squat and sit crossed legged on the floor
- Sound clinical union
- Complete radiological union
- No complication

Good

- No pain on ambulation.
- Can walk reasonable distance consistent with his age and co-morbidities.
- Mild restriction with difficulty in squatting, sitting crossed legged.
- Sound clinical union
- Complete radiological union
- No complication

Fair

- Mild pain on walking long distance, however can walk reasonable distance, mild limp may be there.
- Cannot squat or sit crossed legged on the floor, will need a commode for toilet purpose and sit on chair.
- Clinically united.
- Radiological union in progress.
- Complication like mild coxa vara, limb length discrepancy may be there.

Poor

- Can walk only aided with a help of a crutch / stick.
- Cannot squat or sit crossed legged on the floor.
- Clinically united / ununited.
- Radiologicaly united / ununited.
- Complication like infection, cutting out of implant, coxa vara, limb length discrepancy etc.

Pre testing

The scoring system was pilot tested on a sample of 5 participants for validation purpose. The results of the pilot study were not included in this analysis.

Data analysis

Data was entered and analyzed using Microsoft Excel spreadsheet 2007. The outcome assessment was expressed as percentages.

Results

This study was conducted in our institution, from June 2009 till May 2011, for a period of two years. A total of 48 cases of trochanteric fractures were selected for the study out of which three cases were considered unfit for surgery due to risk factors and five of the participants went against medical advice refusing operative treatment. Therefore, 40 cases of trochanteric fractures were included in the study.

In this study there were 6 participants between the age group of 21-30 (15%), 1 participant between the age group of 31-40 2.5%, 11 participants between the age group of 41-50 (27.5%), 13 participants between the age group of 51-60 (32.5%). The mean age of the participants was 58.1 years. In this Study, there were 28 males constituting 70% and 12 females constituting 30%. Moreover, there were 25 Cases of road traffic accidents, 10 cases of trivial fall and 5 cases of fall from height. The background characteristics of the study participants are given in table 1.

Table 1: Background characteristics of the study participants.

S. No	Parameters	Frequency N=40	Percentage (%)
1	Age (in years)		
	21-30	6	15
	31-40	1	2.5
	41-50	11	27.5
	51-60	13	32.5
	61-70	6	15
	71-80	2	5
	>81	1	2.5
2	Sex		
	Male	28	70
	Female	12	30
3	Mode of Injury		
	Road Traffic Accident	25	62.5
	Trivial Fall	10	25
	Fall From Height	5	12.5

The particulars regarding the trochanteric fractures and its associated complications are given in table 2. In 25 (62.5%) of the participants, the side of injury was right, and 22(55%) sustained type II stable fractures. About 15% of the participants had associated musculoskeletal injuries and 15 participants had medical illnesses like diabetes mellitus and hypertension.

Table 2: Particulars related to trochanteric fracture among the study participants.

S. No	Particulars	Frequency N=40	Percentage (%)
1	Side of injury		
	Right	25	62.5
	Left	15	37.5
2	Type of fracture		
	Stable		
	Type I	11	27.5
	Type II	22	55
	Unstable		
	Type III	6	15
	Types IV	1	2.5
3	Medical complications		
	Present	15	37.5
	Absent	25	62.5
4	Musculoskeletal injuries		
	Present	6	15
	Colle's fracture	2	5
	Inferior Pubic ramus fracture	2	5
	LI compression fracture	2	5
	Absent	34	75

Particulars regarding the surgical outcomes are given in table 3. In this study, 36 Participants were operated with dynamic hip screw and 4 participants were operated with dynamic condylar screw. In this study, Two Participants had superficial infection, Two Participants had Implant cut out and one patient had coxa vara deformity. Two participants on follow up had implant cut out and they went elsewhere for various surgery and did not return to us for assessment. In this study there were 11 participants with excellent results comprising 27.5%, 18 participants with good results comprising 45%, 8 participants with fair results comprising 20%, 3 participants with poor results comprising 7.5%.

Table 3: Surgical outcomes among the study participants:

S. No.	Parameters	Frequency N=40	Percentage (%)
1	Type of surgery		
	DHS	36	90
	DCS	4	10
2	Post operative complications		
	Superficial Infections	1	2.5
	Implant Cutout	2	5
	Coxa Vara Deformity	1	2.5
3	Outcome assessment		
	Excellent	11	27.5
	Good	18	45
	Fair	8	20
	Poor	3	7.5

Discussion

In this study, it was observed that very elderly patients were often denied proper treatment by their relatives and in some instances relatives refused surgery since they do not want to bear the expenses involved. Very elderly participants because of their associated medical illness preclude anesthesia and surgery.

The operative management consists of fracture reduction and stabilization of the fractures allowing early mobilization thereby minimizing the complications of recumbence. Such early mobilization following surgical fixation is preferred by most of the authors in preference to conservative treatment which increase the morbidity and mortality.

In the present study of 40 operated cases there was no mortality. However there are reports of mortality rate of 0.5 – 1% in larges series and mortality rate is even more in the conservative series as reported in literature.

In the present study, the average age for trochanteric fractures is 58.9 yrs ranging from 51-60 yrs, which is similar to S.S. Babhulkar *et al*. [1] In our study of 40 participants, there were 28 Males comprising 70% and 12 Females comprising 80% This is comparable to the Indian series that show a male a male preponderance as in K.A Pathak, S.P Mohanty and Chacko [2] (1984), T.S Sethi *et al*. [3].

In the reported series by T.S. Sethi *et al*. [3] the percentage of trivial fall has been as high as 77% indicating probably that elderly people comprise the majority of cases in their study. In our series only 25% of cases had sustained trochanteric fractures due to trivial fall. In our series, road traffic accidents were the main cause of injury comprising 62.5% of cases.

In this study there were 2 Participants with Colle's Fracture, of which 1 participant was treated with closed reduction and pop plaster application and other participants was treated with ligamentotaxis. 2 participants who add inferior pubic ramus fractures, they were treated conservatively with analgesics. 2 participants having L1 compression fracture with no neurological deficits were also treated conservatively.

In the present study, 7 participants had hypertension and 8 participants had diabetes mellitus. About 25 participants were not associated with any medical diseases. In our study, type II fractures comprised the majority of cases with an incidence of 55% (22 cases). In our study, out of 40 cases taken up for surgery, the average time interval between injury and surgery was 9 days. This time was taken to correct the co-morbid conditions or the lack of operation dates.

In our study of 40 cases, 36 participants were operated with dynamic hip screw comprising an incidence of 90% and 4 participants were operated with dynamic condylar screw comprising an incidence of 10%. Various other methods of fixation was used by other authors as described in the literature.

There was 1 case with superficial infection (2.5%) which responded to antibiotics, there were 2 cases with implant cutout (5%). One participant had coxa vara deformity (2.5%). N.D. Chatterjee *et al*. [4] Reported superficial infection rate of 9% and coxa vara deformity in 3 participants in his series.

In the present study, the over all excellent and good result were obtained in twenty nine cases out of total of forty cases comprising an incidence of 72.5%. Fair and poor results were obtained in eleven cases with an incidence of 27.5%. Poor results were obtained in three cases out of forty cases with an incidence of 7.5%. Results of our study are consistent with that of other authors. Babhulkar *et al* has showed excellent and good results, in more than 90% of cases in a series comprising of 70 cases. Our results have been inferior compared to Babhulkar *et al* Series because participants from our series have come from a rural background and have come for surgery after trying other modalities of treatment thereby delaying the definitive treatment [1].

Results of other foreign authors as recorded in literature are far superior then our study. Sitting and squatting for toilet purposes are activities of daily living in our participants which vitiates excellent to good results in our study.

Conclusion

To conclude, following observations were made in the present study.

1. Road traffic accidents are also becoming a common cause of trochanteric fractures especially in the younger age group.
2. Operative treatment is the best modality in managing trochanteric fractures
3. Participants from rural background come late for surgery and their expectation levels following surgery are very high because of the need to squat for toilet purpose and sit crossed legged for sitting on the floor.
4. Participants are often unwilling for surgery with severe morbidity and even mortality as reported in literature by various Indian authors.

References

1. Bhabulkar SS. Management of trochanteric fractures. Indian Journal of Orthopaedics. 2006; 40(4):210-218.
2. Chacko V, Mohanty SP. Comparative analysis of operative and non operative management of trochanteric fractures. Indian Journal of orthopedics. 1984; I8(1):19-24.
3. Sethi TS, Farooo M *et al*. Dynamic Hip Screw in Trochanteric fractures. Indian Journal of Orthopaedics. 1993; 27(2):161-165. [CrossRef]
4. Chaterjee ND, Goutham Bhattacharya, Thirthankar Bhattacharya. dynamic hip screw and sliding plate for trochanteric fractures of femur- Review. Indian Journal of Orthopedics. 2000; 34(3):153-155.