

The Complications Associated with Proximal Femoral Nailing in the Trochanteric Fractures of Femur.

T. Ram Prasad¹

¹Department of Orthopaedics, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry

ABSTRACT

Trochanteric fractures are one of leading cause of hospital stay in older age group patients. Conservative methods of treatment results in malunion with shortening and limitation of hip movement as well as complications of prolonged immobilization like bed sores, deep vein thrombosis and respiratory infections. PFN is an excellent implant for the treatment of trochanteric fractures. With a proper technique PFN gives excellent clinical results with almost negligible varus collapse even in unstable trochanteric fractures. Regarding the techniques, reaming the proximal part of femur adequately and observing the nail passage with image carefully are important in placing the nail correctly, while, placement of lag screw in the inferior part of neck in anterior posterior projection and central in lateral projection reduces risk of implant failure. The terms of successful outcome include a good understanding of fracture biomechanics, proper patient selection, good preoperative planning, accurate instrumentation, good image intensifier. The present study shows the functional outcome of proximal femoral nail in trochanteric fractures of femur and the complications associated with proximal femoral nailing in the trochanteric fractures of femur

Keywords:

Trochanteric, Lag screw, Femur, Fractures

1. Introduction

Trochanteric fractures of femur are one of the commonest injuries sustain by the elderly population. The incidence is growing rapidly due to increase in ageing of human population and lifestyle modifications [1,2].It is commonly associated trivial trauma in older age patient, high energy trauma in younger age patient will result in fractures configuration[3].

Non operative is also treatment of choice for trochanteric fractures and there is union which was followed in early 19th century when operative treatment was not evolved enough for stable fixation. Non operative approach includes reduction via traction and immobilization. However it usually resulted in malunion, varus and external rotation deformities resulting in shortlimb gait. Due to prolonged immobilization complications like bedsores, deep vein thrombosis, respiratory infections can happen. Since the fracture is more common in older age patients, the aim of treatment is to prevent malunion, and early mobilization. This leads to recommendation of surgery by internal fixation[4,5]

Since trochanteric fracture is most commonly seen in elderly patients, osteoporosis was taken into consideration. Osteoporosis is defined as reduction bone mass per unit volume. Singh's Grading of osteoporosis is used to evaluate the quality of bone. However for outcome surgery, the combined influence of osteoporosis and fracture pattern is considered. The most stable fracture pattern is the two part fracture in normal (non osteoporotic bone). An intermediate level of instability is seen in four-fragment fracture of normal bone and two part fracture of osteoporotic bone. The four fragment fracture of osteoporotic bone is the least stable among inter-trochanteric fractures [6,7,9].

There are several implants invented for fixation of trochanteric fractures both intramedullary and extramedullary. Several types of compression hip-screws with a plate have been used for treatment of intertrochanteric fractures. They provide stable fixation and controlled impaction over the fracture. But their use in intertrochanteric fractures has not been satisfactory due to

excessive sliding of lag screw and medialization of distal fragment and subsequent fixation failure [6].

To overcome the disadvantage of dynamic hip-screw, new intramedullary fixation device was introduced for treatment of unstable intertrochanteric fractures. Gamma nail is the earliest version of intramedullary fixation device (introduced by Howmedica, Rutherford, New Jersey). Insertion through minimal surgical incision, shorter duration of surgery and improved biomechanics of fracture fixation are the advantages [7,10,11]. The proximal femoral nail (PFN) was introduced in 1997(Mathys Medical, Bettlach, Switzerland) for treatment of unstable pretrochanteric fractures to overcome the limitation of cephalomedullary. The shorter lever arm of proximal femoral nail reduces the tensile strain on the implant by 25-30% and subsequent risk of implant failure reduces. The additional antirotational screw (hip pin) in PFN is placed in the femoral neck and this prevents the rotation of cervicocephalic fragment on weight bearing [8,9,12-16]. The fixation of fracture with PFN offers minimal surgical incision and thus reduces the risk of infection and maintains soft tissue envelope. Blood loss also reduces by this because lesser vessels are damaged.

A hip fracture is one of the leading causes of morbidity and mortality in the elderly population, in spite of advance surgical options, anaesthesia and nursing care. In view of these considerations, the study of surgical management of trochanteric fracture is taken up to study the functional outcome of proximal femoral nail in trochanteric fractures of femur. To study the complications associated with proximal femoral nailing in the trochanteric fractures of femur.

2. Materials And Methods

This is the Prospective study of 22 patients who had history of trauma to hip and suspected to have a trochanteric fracture came to casualty or Orthopaedic outpatient department from August 2014 to August 2016 were admitted under department of Orthopaedics at Sri Lakshmi Narayana Institute of Medical Sciences. The study was done after getting the clearance from the Ethical Committee and informed written consent from the study participants. Initially patient was given analgesic to relieve pain. Detailed history about mode of injury was taken and recorded, through clinical examination was done and documented. Then patient was sent for the x-rays of both hips in anteroposterior and injured hip in lateral view. Once the diagnosis of trochanteric fracture was confirmed patient was admitted put on to skin traction no initial manipulation was done. Patient was included in this study after satisfying inclusion and exclusion criteria made for this study. Patient was shifted to the ward with traction which was applied to the affected limb after preparation. Foot end was elevated, to provide counter-traction. This was followed by routine pre-operative investigations. After pre-anaesthetic evaluations, patient was taken up for surgery with informed consent on elective basis.

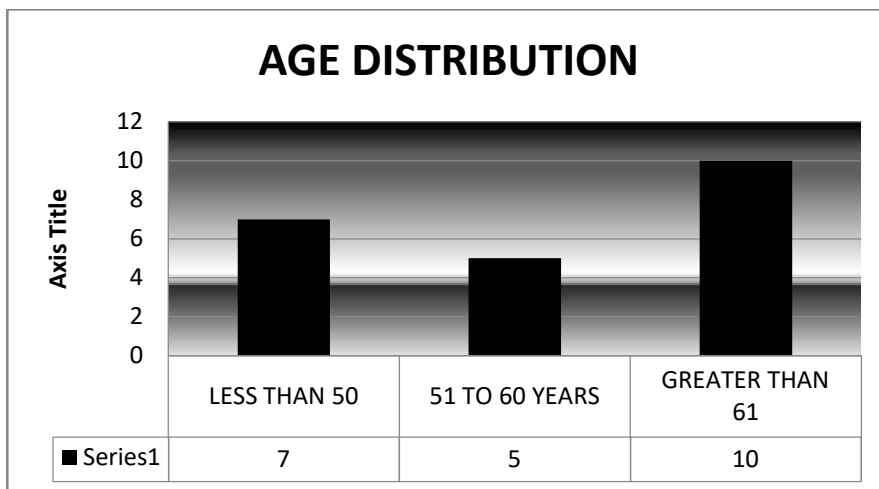
3. Result And Discussion

The following observations were made from the data collected during this study of proximal femoral nail in the treatment of 22 cases of trochanteric fractures of proximal femur in the Department of Orthopaedic Surgery, SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES, Puducherry between AUGUST 2014 to AUGUST 2016.

Age Distribution:

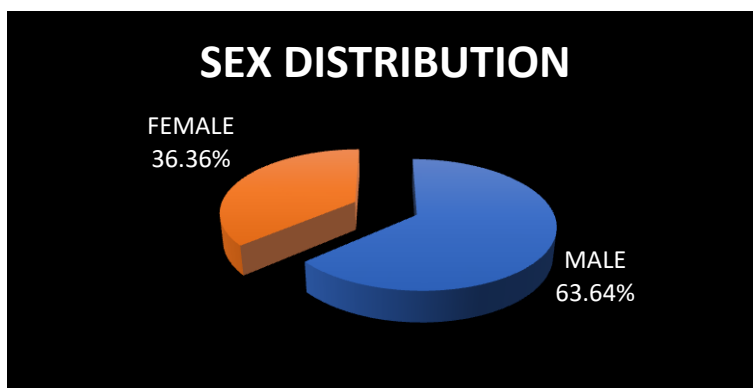
In our series, majority of the cases n=10 (45.45%) were in the age group of >61 years, followed

by seven (32.82%) cases in the age group of < 50 years and remaining five (22.73%) cases in the age group of 51 to 60 years. The youngest patient was 47 years old and eldest patient was 84 years. The mean age was 62.09 years.

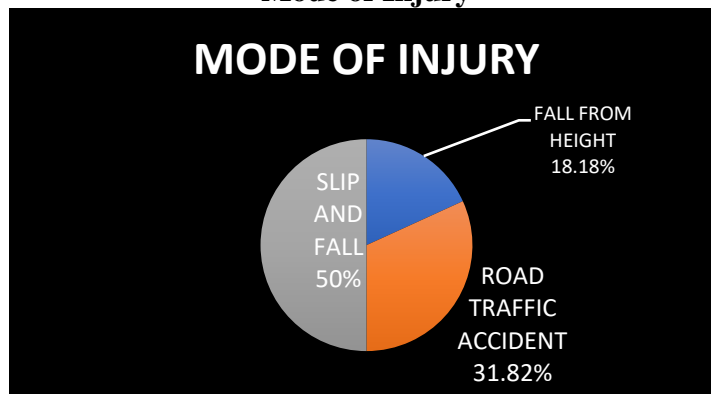


Sex Distribution:

In the present series, males were more commonly involved. Majority of the patients were males – 14 cases (63.64%) and 8 (36.36%) were females.

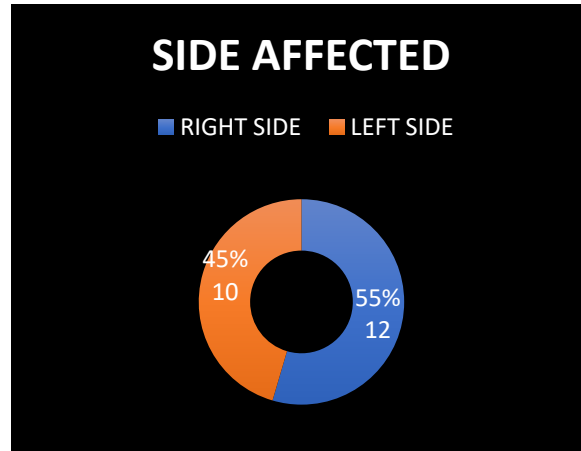


Mode of Injury



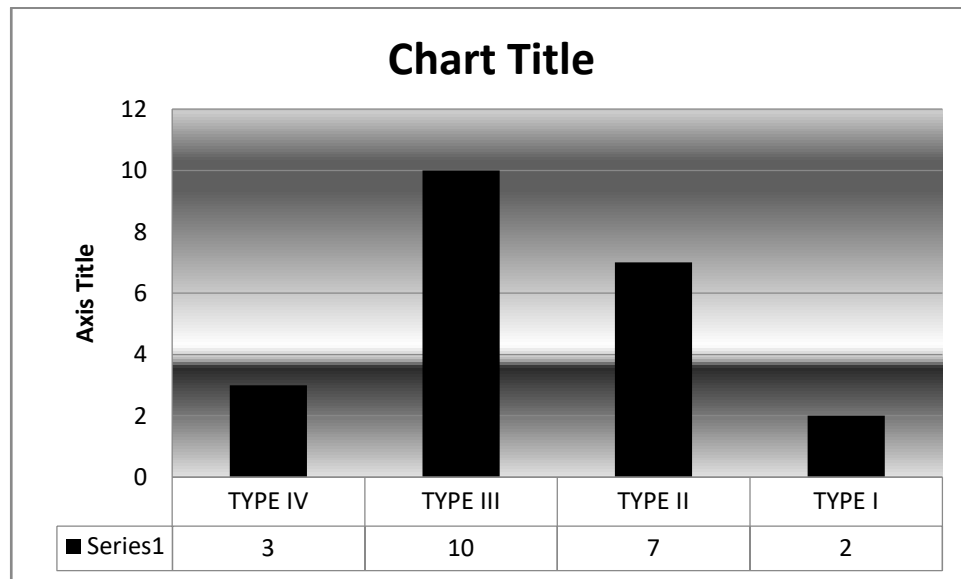
Side Affected:

Right side was involved in 12 (54.54%) cases and left in 10 (45.45%), Right side was more commonly involved than Left side.



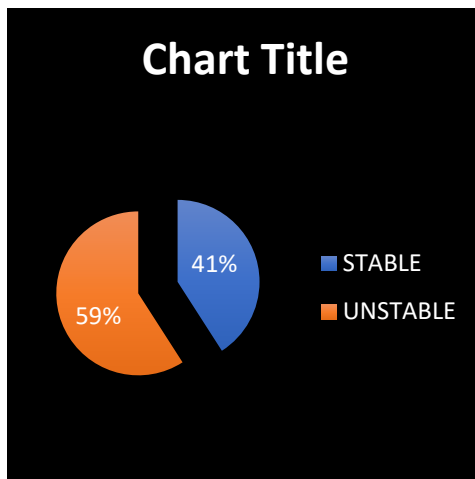
Intertrochanteric Fractures:

In our study out of the 22 Intertrochanteric fractures, majority were Type 3 n=10(45.45%) ,Type 2 are seven (31.82%) and Type 4 was three (13.64%) and Type1 was two(9.09%) according to boyd and griffin classification.



Stable vs unstable intertrochanteric fracture

In our study of 22 intertrochanteric fractures, stable fractures are nine and unstable fractures are n=13 according to boyd and griffin classification



All patients included in this study were discharged on 14th – 16th post operative day. They are advised to come for follow up on 6th ,8th week, then every month for upto months. At each follow up, detailed clinical examination was done systematically. Patients were examined for gait, pain, tenderness, movements, deformities and length discrepancies[19,20]. The distance the patient could cover following surgery was questioned and compared to pre fracture state. The x-ray of the operated hip was taken whenever it was felt necessary and on 4th week, 8th week, 12th week and at 6th month.

We encountered one cases of delayed union and one case of mal union (varus <10 degree).Two case had shortening more than 1 cm who were treated with shoe raise. one patient had knee stiffness on operated limb on 6th week follow up which improved after rigorous physiotherapy on 18th week follow up . We had one case of delayed deep wound infection was happened at 12th week, patient came with complain of pain over the proximal screw site scar. Through clinical, radiological and laboratory investigations was done and diagnosed to have proximal screw site bursitis[17,18,19,21]. Then patient was managed with wound debridment, appropriate i.v antibiotics and regular dressing. Screws backout was seen in one patient which was probably due to early mobilization and severe osteoporosis due Post Polio Residual Paralysis.

COMPLICATIONS	NUMBER	PERCENTAGE
Delayed union	1	4.5%
Non union	0	0%
Varus malunion	2	9%
Implant failure	1	4.5%
Shortening	2	9%
Knee stiffness	1	4.5%
Infection	2	9%

In our study the average duration of hospital stay was 15.4days.partial weight bearing was started on 4 weeks for stable fractures and on 6 weeks for unstable fractures. Full weight bearing was encouraged from 6-8 weeks for stable fractures and 10- 12weeks for unstable fracture.

Radiological measures:

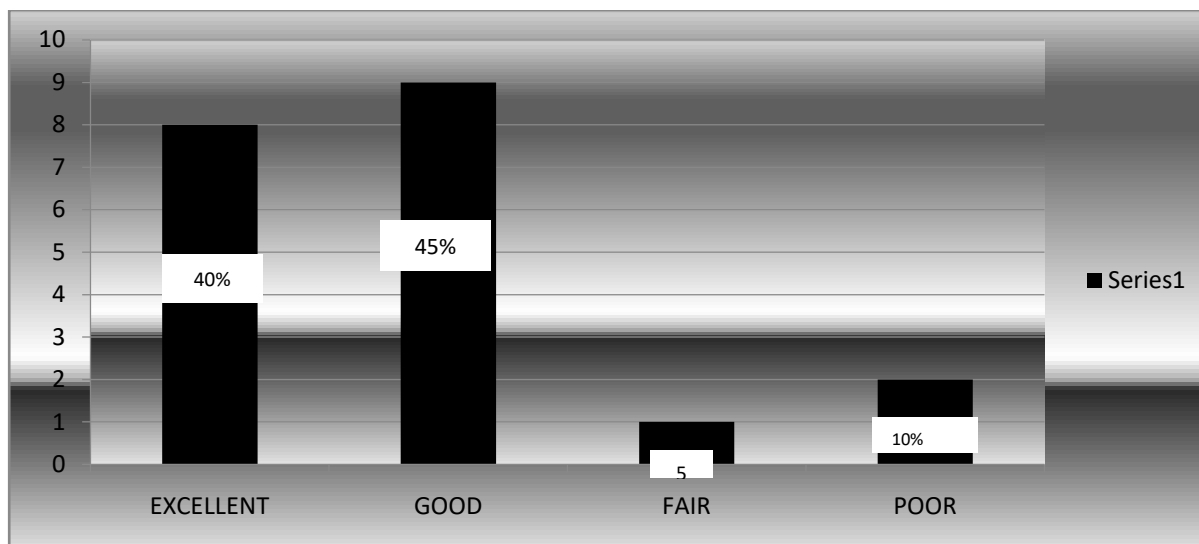
In our study of 22 patients x-ray assessment was done at 6 weeks, 12 weeks, 6 months and whenever necessary. For all patients bridging callus was seen at 6 weeks except one patient which was seen at 14 weeks and another one lost follow up .Obliteration of fracture line was seen at end of 12 weeks for 19 patients, at 20weeks for 1 patient and 2 patients lost follow up. Complete fracture union was seen at end of 24 weeks for 19 patients, and at end of 32 for 1 patients.

RADIOLOGICAL FEATURES	APPERANCE	NUMBER OF PATIENTS
BRIDGING CALLUS	6 WEEKS	20
	14 WEEKS	1
OBLITARTION OF FRACTURE LINE	12WEEKS	19
	20 WEEKS	1
COMPLETE FRACTURE UNION	24WEEKS	19
	32 WEEKS	1
VARUS MALUNION	24 WEEKS	1

Functional results:

In our series of 22 operated cases, 2 cases were lost for follow up. Functional results are assessed taking the remaining 20 cases into consideration using Harris Hip Scoring System (Modified) (66).

FUNCTIONAL RESULT	NUMBER	PERCENTAGE
Excellent	8	40%
Good	9	45%
Fair	1	5%
Poor	2	10%



Trochanteric fractures are one of leading cause of hospital stay in older age group patients. Conservative methods of treatment results in malunion with shortening and limitation of hip movement as well as complications of prolonged immobilization like bed sores, deep vein thrombosis and respiratory infections[22,23]. This Thesis work is done to analyze the Functional outcome of trochanteric fractures using Proximal Femoral Nail and its was taken up in the Department of Orthopaedics, Sri lakshmi narayana institute of medical sciences.

From this sample study, we consider that PFN is an excellent implant for the treatment of trochanteric fractures. With a proper technique PFN gives excellent clinical results with almost negligible varus collapse even in unstable trochanteric fractures[21,24,25,26]. Regarding the techniques, reaming the proximal part of femur adequately and observing the nail passage with image carefully are important in placing the nail correctly, while, placement of lag screw in the inferior part of neck in anterior posterior projection and central in lateral projection reduces risk of implant failure. The terms of successful outcome include a good understanding of fracture biomechanics, proper patient selection, good preoperative planning, accurate instrumentation, good image intensifier.

4. Conclusion

Since the trochanteric fractures are more common in the elderly, early reduction and internal fixation increases patient comfort, facilitates nursing care, helps in early mobilization of the patient and decreases the duration of hospitalization. Out of the different type of implants PFN has the advantage of collapse at fracture site and is biomechanically sound as it is done by closed technique and it is an intra-medullary device. Other advantages are minimal incision and less blood loss. Post-operatively early mobilization can be begun as the fixation is rigid and because of the implant design. Most important steps while doing a PFN nailing are proper anatomical reduction of the fracture, determination of the entry point which is the tip of the trochanter and central placement of neck screws all these should be checked with both antero-posterior and lateral view in the image intensifier. With good understanding of fracture biomechanics, good preoperative planning, accurate instrumentation and surgical technique, PFN is an excellent implant in the management of trochanteric fractures.

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Conflict Of Interest

The authors declare no conflict of interest.

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