

A STUDY OF MANAGEMENT OF SUBTROCHANTERIC FRACTURE FEMUR BY PROXIMAL FEMORAL NAILINGD. Venkateswara Rao¹, Chinta Shyam Kumar², Anvesh Sangepu³, Subramanyam Yadlapalli⁴**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Numerous variations of intramedullary nails have been devised to achieve a stable fixation and early mobilisation of pertrochanteric fracture, among which is the proximal femoral nail (PFN). We report here the results of a prospective study carried out at our institute on 60 consecutive patients who had suffered high subtrochanteric fracture between May 2011 and October 2014 and were subsequently treated with a PFN. Close to anatomical reduction of the fracture fragments was achieved in 54 patients, while limited open reduction was required in 3 patients. In the present series, 3.33(2) of cases had superficial infection and no deep infections were recorded. Cut of the anti-rotational screw was noted in 1 patient. Fracture of the shaft with breakage of the nail was noted 1.66% (1) of patients. In the current series, the mean Harris Hip score was 80.76 and it was ranging from 100-29. In this series all the patients between 20–30 years had excellent result irrespective of the type of fracture. Older age group patients had relatively poor results and 50% (5) of them had poor results and another 50% (5) had good to fair results. In this study excellent outcome was not seen in the older age group patients. Our results indicate the necessity of a careful surgical technique and modifications that are specific to the individual fracture pattern in order to reduce complications. Osteosynthesis with the PFN offers the advantages of high rotational stability of the head-neck fragment, an unreamed implantation technique and the possibility of static or dynamic distal locking.

KEYWORDS: Proximal Femoral Nailing, Sub-trochanteric fracture of femur.

INTRODUCTION: Civilization and modernization has brought certain problems along with its own benefits to the citizens of the world over. Fast life styles, rapid and high speed transportation, risky infrastructural projects and modern commando warfare activities have brought in with them morbidity and mortality due to trauma in general and fractures of femur in particular.

Among the femoral shaft injuries upper femoral fractures present a peculiar problem of securing effective neutralization of deforming forces. The mechanical stresses at this level are very high, as they occur at the junction between the trabecular and cortical zone and also because of the deforming forces due to peculiar muscle insertion to the proximal and distal fragments. These factors have made subtrochanteric fractures demand special consideration in orthopaedic trauma, because defective union of this fracture can lead to high disability levels for an individual and thereby loss of valuable man days.

Orthopaedic fraternity is always on the lookout for an effective and suitable method to treat the upper femoral fractures in the best possible way. In this process surgical management of these fractures and the surgical implants used have also gone through an array of changes in their procedures and designs. Various upper femoral devices like dynamic condylar screw, dynamic hip screw with barrel plate, gamma nail, proximal femoral nail etc are being used by various centres and each centre claims reasonably satisfactory results with each type of device.

ORIGINAL ARTICLE

The present study was conducted to assess the utility and effectiveness of Proximal Femoral Nail evolved by AO-ASIF in 1997, for various types of upper femoral fractures.

AIMS & OBJECTIVES: To evaluate the results of internal fixation of Subtrochanteric fractures of the femur with PROXIMAL FEMORAL NAIL – AO Type Design

MATERIAL AND METHODS: The present study consists of the patients admitted to orthopaedic department of Government General Hospital and Royal Hospital, Vijayawada between May 2011 and October 2014. 1267 fracture cases were treated in Department of Orthopaedics, Government General Hospital, Vijayawada during this period. Of these 264 patients were admitted for femoral fractures. Of the 264 femoral fractures 60 patients above the age of 20 years with subtrochanteric fractures were included in this study. Among the 60 patients, 21 were females and 39 were males. The mean age of presentation was 50.8 years. The most common mechanism of injury was a simple fall in females and high velocity injuries (Fall from height, Road traffic accidents) in males. Seinsheimer type IIIA fracture pattern was the most common type to be seen. Pathological fractures and subtrochanteric fractures of femur with ipsilateral femoral shaft or neck fractures were excluded from the study.

Upon arrival the patients were assessed clinically and were stabilized haemodynamically. They were then subjected for radiographs of Pelvis with both hips Antero posterior view and full length thigh Antero posterior and lateral views. Following radiographs patients were admitted to orthopaedic wards and were maintained on skin traction over a Bohler-Braun frame till surgery. Appropriate blood investigations were done and surgical fitness was obtained. All the patients were operated on a fracture table in supine position under image intensifier control using standard techniques.

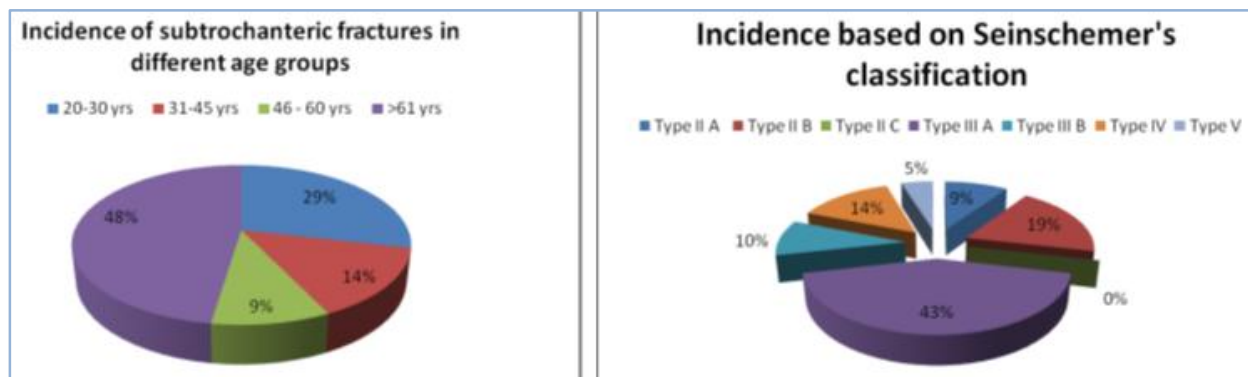
Patients were discharged on the tenth post-operative day following sutures removal, of their post-operative period was uneventful 60 Patients were assessed clinically and radiologically on the 2nd post-operative day, at 6 weeks, 3 months and then between 6 months to 1 year depending upon the fracture union.

These findings are documented according to a protocol that was developed. Healing was judged by both clinical (Pain & motion at fracture site and radiological (Bridging callus filling the fracture site or trabeculations across the fracture site) criteria and functional outcome was reviewed according to the Harris Hip score (Modified).¹

OBSERVATIONS: A total number of 1267 fractures were admitted in our department between May 2011 and October 2014. Of these 46% (583) were lower limb fractures, 28% (349) were upper limb fractures and 26% (335) were other fractures that include spine, pelvis etc. Of the lower limb fractures 45.2% (264) were femoral fractures. Of the femoral fractures 81.81% (216) were upper femoral fractures and subtrochanteric fractures account for 22.72% (60) of these fractures. The youngest patient in our series is 23 years old and the oldest is 80 years. Maximum number of patients in this study are of elderly age group and the mean age is 50.8 years.

In the present study, it is seen that subtrochanteric fractures are slightly more common in females than males. In the present series 80% (31) males sustained this injury because of high velocity injury. Where as in females they are most often caused by low velocity injury compared to their counter parts. In this study 90.9% (19) females sustained injury because of low velocity injury.

ORIGINAL ARTICLE



Average age in males is 36 years and in females is 64.27 years. This also signifies that female patients are older than male patients and so were more predisposed to low velocity trauma.

The mean injury operation interval in the current series is 6.6 days. This increased interval is mainly due to uncontrolled preexisting illness at the time of presentation. Most commonly seen fractures pattern in this study is Seinschmer's type III A.

Intra operatively reduction of the fracture was achieved through closed means in 95.23% (57) of cases. Open reduction was performed in only 3 patient who had high injury operation interval.

Reduction was good in 90% (54) of the cases. Poor reduction was noted in 4 patients. Three of them were of elderly age group and had poor outcome at final follow up. In the present series, 3.33 (2) of cases had superficial infection and no deep infections were recorded. Cut of the anti-rotational screw was noted in 1 patient. Fracture of the shaft with breakage of the nail was noted 1.66% (1) of patients.

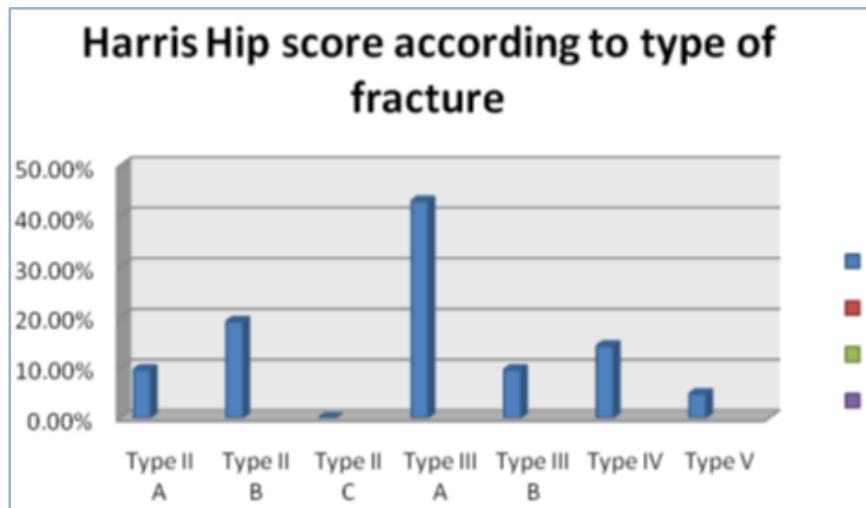
Majority of the patients (80%) in this study had either no pain or slight pain which did not affect their activities. Only 3 patients had severe pain. 15% (9) of patients had mild pain which was relieved with analgesics. In the current study majority of patients had no or slight limp that did not affect their activities. 15% (9) had moderate limp which was mainly due to shortening. In our study 70% (42) patients did not require any support for walking and 26.66% (16) of patients required cane for long walks. Only 2 patients was mobilizing with the help of crutch.

The requirement of the cane is primarily because of old age of the patients and associated osteoarthritis. In this series, 38.33% (23) of patients could climb stairs without any support but 56.66% (34) required the support of railing. 3 patients was unable to climb the stairs. This difficulty was commonly seen in geriatric age group patients. Squatting was possible in 33.33% (20) with ease and with difficulty 47.6% (29). 11 patients were not able to squat.

The difficulty in squatting was primarily seen in old age patients with osteoarthritis. Of the 60 patients in this series, 4 patients had shortening of more than 2cms which required shoe raise. 3 patients had less than 2cms of shortening and it did not require any treatment. In the current series, the mean Harris Hip score was 80.76 and it was ranging from 100 - 29.

In this series all the patients between 20–30 years had excellent result irrespective of the type of fracture. Older age group patients had relatively poor results and 50% (5) of them had poor results and another 50% (5) had fair to good results. In this study excellent outcome was not seen in the older age group patients.

ORIGINAL ARTICLE



DISCUSSION: Fractures of the long bones are a major social and economic problem. Of the long bone fractures Subtrochanteric fractures of the femur have peculiar anatomic and mechanical characteristics which poses problems in their management. Closed intramedullary devices have a mechanical advantage that effectively addresses these factors.

The benefit of minimal surgical exposure, more efficient load transfer through calcar femorale and decreased tensile strain on the implant because of its shorter lever arm makes proximal Femoral Nail a good choice of implant for subtrochanteric fractures of the femur. Various studies have considered Proximal Femoral Nail as an acceptable minimally invasive implant for Subtrochanteric fracture.

The incidence of subtrochanteric fracture is relatively low. In our study 60 subtrochanteric fractures accounted for 22.72% of all proximal femoral fractures. In other studies 7%-34% of all femur fractures occurred in the subtrochanteric region.^{2,3} Most of our patients were of the elderly age group, the average age being 50.8 years. This is significantly lower compared to that quoted by other authors in literature, boldin et al.⁴ 73yrs, i.b.schipper series.⁵ 82.2 years.

Slight female preponderance of 52.3% was noted in our patients and it was also reported by boldin et al.⁴ (70%) and i.b.schipper.⁶ (82%). 61.9% of the subtrochanteric fractures involved the right femur in this series as compared to 52% in i.b.schipperseries.⁶ and 38.09% involved the left as compared to 48% in i.b.schipperseries.⁶

In 57.14% of patients fracture is a result of trivial fall and majority of them are elderly age group patients especially females. High velocity injuries like road traffic accidents and fall from heights accounted for 42.85% of these fractures and most of them were males.

In w.m.gadegone'sseries.⁷ 75% of the fractures were due to domestic falls and this can be explained by the higher mean age group of the patients in this study. Vehicular accidents resulted in the remaining 25% of subtrochanteric fractures in their study. Fractures were classified according to Seinsheimer's classification and type III A fracture pattern constituted the highest percentage 42.85% (26) of all fracture patterns. Seinsheimer.⁸ In his original study also noted high incidence of type III A fracture pattern (38.29%) than other fracture patterns. Admission-operation interval in our study varied from-26 days. Mean interval was high in our series. It was 6.6 days which is more when compared to i.b.schipper'sseries.⁶ where it was 2 days.

ORIGINAL ARTICLE

Most of the patients with delayed injury – operation interval had pre-existing uncontrolled medical problems. These medical co morbidities especially in elderly age group patients with associated degenerative joint disease of the knee significantly affected their final functional outcome. The mean duration of hospital stay in our series was 19.09 days which is at par with i.b.schipper's series (19 days). Intra operatively fracture reduction was achieved by closed means in 95.23% (57) of patients and 3 patients with delayed injury–operation interval required open reduction. The result of the reduction was considered good in 90% (54) of the patients and acceptable in 1.66% (1) of patients. Poor reduction was noted in 6.66% (4) of patients and it was associated with poor outcome.

In i.b.schipper's series, reduction was good to acceptable in 96.2% of their patients and poor reduction was seen only in 2.9% of their patients. Post operatively 2 patients in this study had superficial infection (3.33%) and this settled with parenteral antibiotics. I. B. Schipper noted 4.1% superficial infections and 2.5% deep infections. We did not encounter any deep infections in our series.

Cut out of hip screw was noted in 1 patient (1.66%) and it was following a fall in the post-operative period. 6% of patients in i.b.schipper's series had this problem. The average time for radiological union was 3 months in the present study whereas in I. B. Schipper series it was approximately 4 months. 80(48) of the patients in our series had no or slight pain that did not affect their activities.

Only 1 patient who had cut out of the anti-rotational screw had severe pain that restricted her activity significantly. 85.7% (18) of these patients had no or slight limp. 70% (42) of the patients mobilized without any walking aids. Cane was required for long walks in 26.66% (16) of patients and most of the time in 19.04% (4) of patients. Only 2 patients required crutch for mobilization. Difficulty squatting and sitting cross legged noted in 47.6% (29) of patients. Most of these patients were of geriatric age group who had associated degenerative disease of the knee. Limb length discrepancy was noted in 7 patients of which 4 of them had shortening of more than 2 cms. They were patients with Seinsheimer's type IV and type V fracture patterns. Final outcome was good to excellent in 61.9% (37) of patients. It was fair in 14.28% (9) of patients and poor in 23.8% (14) of patients. Younger age group patients irrespective of their fracture pattern had excellent outcome in our series. Most of the poor results were seen in the elderly age group patients with associated Osteoarthritis of the knee. The mean Harris Hip score was in our series was 80.76% which was higher than I. B. Schipper series where the mean was 77.6.

SUMMARY AND CONCLUSION: The incidence of Subtrochanteric fractures of the femur is on the raise because of fast and high speed automobiles and modern lifestyles and increased life expectancy of the elderly age group patients. The deforming forces, high mechanical stresses and morbidity of the fractures in this region have always challenged the ingenuity and skills of the orthopaedic surgeon.

Various devices have evolved in an attempt to effectively neutralize these forces. Closed insertion technique, shorter lever arm decreasing the tensile strain on the implant and increased purchase of the proximal fragment are the added advantages of Cephalomedullary nails over other fixation devices in subtrochanteric fractures. This study was conducted to analyze the results of Subtrochanteric fractures treated with this Proximal Femoral Nail–AO Type.

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In our series of 21 cases of Subtrochanteric fractures treated with Proximal Femoral Nail, 14 patients had Excellent to good outcome at their final follow up. Poor outcome was seen in 4 patients. 3 of these 4 patients had poor reduction intraoperatively.

All these patients also belonged to geriatric age group who had associated degenerative joint disease of the knee affecting the final functional outcome. The mean Harris Hip score at their final follow up was 80.76 which is comparable to international publications in the literature.

From this sample study, we conclude that Proximal Femoral Nail is a good implant for the treatment of Subtrochanteric fractures of femur provided optimal reduction of the fracture and good positioning of the nail and screws are achieved.

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