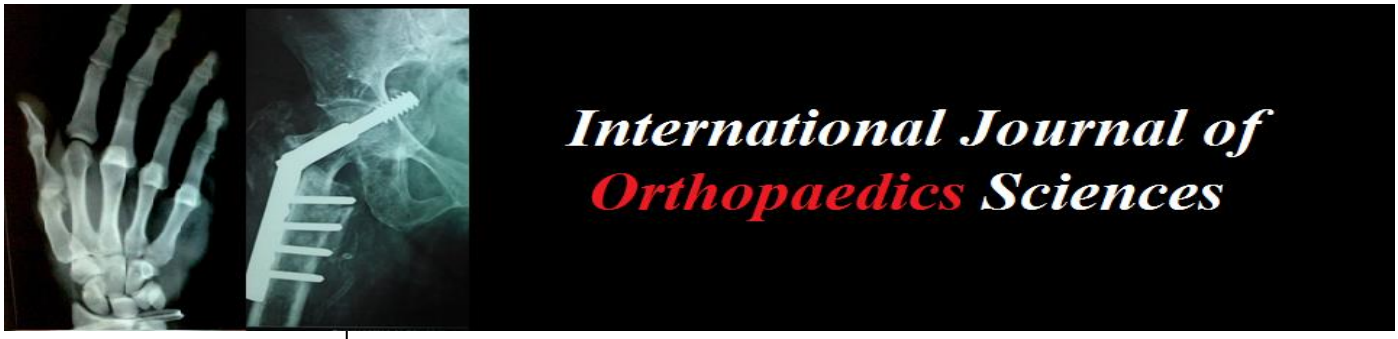

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Dr. Kampa Avinash
Senior Resident, Department of Orthopedics, Adichunchanagiri Institute of Medical Sciences Adichunchanagiri University, Karnataka, India

Dr. CD Deepak
Professor, Department of Orthopedics Adichunchanagiri Institute of Medical Sciences Adichunchanagiri University, Karnataka, India

Corresponding Author:
Dr. CD Deepak
Professor, Department of Orthopedics Adichunchanagiri Institute of Medical Sciences Adichunchanagiri University, Karnataka, India

Comparative study between proximal femoral nailing and dynamic hip screw in management of intertrochanteric fracture of femur

Dr. Kampa Avinash and Dr. CD Deepak

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Abstract
The PFN required significantly shorter incisions, less blood loss and operative times. The DHS group required 16sec less fluoroscopy time. Post operative complication in both group included malunion and infection, 5 malunion in DHS while 1 in PFN, 2 wound infections in DHS while 1 in PFN and 1 screw back out in DHS. Patients treated with PFN had a significantly lower pain score at the sixth month of follow up. Patient treated with DHS had more limb length shortening as compared to those treated with PFN. The outcomes of the stable fractures treated with either DHS or PFN were similar. Unstable intertrochanteric fractures, treated with PFN, had significantly better outcomes with all patients having good results. Though both PFN and DHS have similar functional outcome in stable fracture and PFN has better function outcome with unstable fractures, PFN requires shorter operative time and a smaller incision, it has distinct advantages over DHS even in stable intertrochanteric fractures. Hence, in our opinion, PFN may be the better fixation device for most intertrochanteric fracture.

Keywords: intertrochanteric fractures, DHS, P FN, Malunion, pain, wound infection, post operative walking ability

Introduction
Inter-trochanteric fractures account for approximately half of the hip fractures in elderly, out of this more than 50% fractures are unstable [1]. The goal of treatment of any intertrochanteric fractures is to restore mobility safely and efficiently while minimizing the risk of medical complications and restore the patient to perioperative status. Morbidity and mortality increases with age, hip fractures are 3 to 4 times more common in women than in men but mortality is more in males as compared to females [2]. Incidence of trochanteric fractures is more in female population compared to males due to osteoporosis [2]. The prevalence of these fractures is related to numerous factors including osteoporosis, malnutrition, decreased physical activity, impaired vision, neurological impairment and altered muscle balance. In the young population inter-trochanteric fractures occurs due to high energy trauma. Several classifications have been proposed like Boyd and Griffith, (1949) [3], Evans classification4, and AO classification [5].
They primarily involve cortical and compact cancellous bone because of complex stress configuration in this region and its non-homogenous osseous structure and geometry, fractures occur along the path of least resistance through the proximal femur [6].
The various treatment options for intertrochanteric fractures are operative and non-operative the non-operative method was used to be treatment of choice in early 19th century when the operative technique was not evolved enough to do stable fixation. On operative treatment should only be considered in non-ambulatory patients or chronic dementia patients with pain that is controllable with analgesics and rest, terminal diseases with less than 6 weeks of life expectancy, unresolved medical comorbidities that preclude surgical treatment, active infectious disease that itself is a contraindication for insertion of surgical implant and incomplete per trochanteric fractures diagnosed by MRI.[7] Intertrochanteric fractures can be treated by either DHS or PFN.
The dynamic hip screw (DHS) has gained widespread acceptance and is currently considered as one of the most primary options and the standard device for comparison of outcomes for

stable or minimally displaced per trochanteric fractures. The DHS has been shown to produce good results but complications are frequent particularly in unstable intertrochanteric fractures. However in unstable fractures, the DHS device performs les well with relatively higher incidence of internal fixation failure [8].

The advantage of PFN (Proximal femoral nailing) fixation is that it provides more biomechanically stable construct by reducing the distance between hip joint and implant[9] and it serves as a buttress against lateral translation of the proximal fragment. The intramedullary location of the junction between the nail and lag screw makes the implant stronger at resisting the bending force.[10]An intramedullary device bears the bending load which is transferred to the intramedullary nail and is resisted by its contact against the medullary canal (load sharing device).

The purpose of the present study is to verify the theoretical advantages of the proximal femoral nail over the dynamic hip screw device and also whether it actually alters the eventual functional outcome of the patient.

Objectives of the Study

- To compare the rate of union of intertrochanteric fracture femur internally fixed with PFN and DHS.
- To compare the outcome of these procedures with respect to early mobilization and return to pre fracture ambulatory status.
- To evaluate the results based on subjective parameters like pain ability to sit, squat and walk.
- To also use objective parameters like deformity, range of movements, limb discrepancy, and radiological union to assess the overall results.

Materials and Methods

The study was conducted in Adichunchanagiri Institute of Medical Sciences and Hospital, Bellur cross from June 2018 till December 2020 where 40patients with 40 intertrochanteric fractures were selected.

Adult patient with intertrochanteric fracture attending Adichunchanagiri Medical College Hospital was evaluated preoperatively and functional results were assessed post operatively.

A sample of size 40 was selected using purposive sampling technique.

- 20 patients have undergone proximal femoral nailing.
- 20 patients have undergone dynamic hip screw fixation.

All patients above 18 years of age with fresh intertrochanteric fracture and who were able to walk prior to the fracture were included in the study.

Patient with pathological fracture, active infection unstable medical illness and non-traumatic disorder were excluded from the study.

Results

The functional outcome was assessed based on the postoperative pain, walking ability, hip joint range of motion, and limb length shortening as follows:

Excellent: An excellent result was when there was no postoperative pain, shortening of up to 0.5cm, hip range of motion of more than 80 percent of normal and ability to walk without support

Good: A good result was when there was mild postoperative pain not affecting ambulation, hip range of motion of 60 - 80 percent of normal, shortening of 0.5 - 1.5cm and ability to walk with a cane or minimal support.

Fair: A fair result was when there was moderate postoperative pain affecting ambulation requiring regular analgesics, a hip range of motion of 40 - 60 percent of normal, shortening of 1.5 - 2.5 cm and ability to walk with two canes, crutches or any other living support

Poor: A poor result was when there was severe postoperative pain even at rest requiring stronger analgesics, a hip range of motion of less than 40 percent of normal, shortening of more than 2.5 cm and confined to bed or a wheel chair.

Statistical Analysis

The collective data analysed by the Z-test, Student t -test, Chi-square test (2), Wilcoxon signed rank sum test and the Mann Whitney U test using SPSS software to evaluate the results.

Discussion

The goal of the study was to compare the functional outcome of patient with intertrochanteric fractures treated by two different fixation devices, the extramedullary dynamic hip screw fixation and the intermedullary proximal femoral nail. Our study consists of 40 patient with 40 intertrochanteric fractures out of which 20 was treated with DHS and 20 with PFN.

Age Distribution: The age of the patient ranged from 32 to 86 years with an average of 62.6 years. In case of Dynamic hip Screw fixation it was 62.4 years and in cases of proximal femoral nailing it was 62.8 years.

All the fractures that occurred in patients younger than 58 years were either due to a fall from height or a road traffic accident. This supports the view that bone stock plays an important role in the causation of fractures in the elderly, which occur after a trivial fall. No attempt was made to measure the degree of osteoporosis by the Singh index, as it involves a great inter-observer variability and depends on good quality x-rays. In addition, the accuracy of the Singh index has been questioned by authors such as Koot *et al*.

White and colleagues did a study of rate of mortality for elderly patients after fracture of the hip in the 1980's and they concluded that the average age for trochanteric fractures is 75.4 years.

The average age in our study nearly correlates to that of White and his colleagues.

Sex Distribution: In our study there were 15 males and 25 females showing female preponderance. Dahl and colleagues, in their study 65% of patients were females, explained by the fact that female are more prone for the osteoporosis after menopause. Sex distribution in our study correlates with that of other studies.

Fracture Classification: Our series consisted of 22 stable and 18 unstable intertrochanteric fractures as classified according to BOYD AND GRIFFIN classification. The distribution of stable and unstable fractures in both groups was similar. Out of the 22 stable fractures, 10 were in the DHS group and 12 in the PFN group. Out of the 18 unstable fractures, 10were in the DHS group and 8 in the PFN group.

Blood loss: The DHS patients had significantly more blood

loss intra-operative compared to PFN group (average 235ml). This is similar to the series by Baumgaertner and associates [25] who also found a significant difference in the intra operative blood loss in their series, with 150ml higher for the DHS group.

Complication: Results of treatment of stable and unstable fracture have usually been reported together in the literature, and it is generally accepted that with increasing security of fracture pattern (stable to unstable), there is a higher risk of complication and poor outcome.

The occurrence of femoral shaft fractures does not seem to be a major problem with the PFN due to a narrower distal diameter as compared to other intramedullary nails. Also, rotational control is inherent in the nail design and is not dependent on multiple parts that are likely to increase the risk of mechanical failure. Due to the smaller diameter lag screws in these intramedullary nails, the proximal aspects of the nail do not need to be flared to prevent mechanical failure of the nail and hence requires less reaming of the proximal femur, thereby reducing the risk of iatrogenic proximal femoral fracture. Other studies have also reported femoral shaft fracture rates of 0 -2.1 per cent. We did not encounter any intraoperative complication in this study.

The only complications we encountered in this series were malunion, screw back out and wound infection. There was no significant difference between the two groups with regards to time of fracture union as all fracture united at 12weeks in case of DHS and 12.15 weeks in case of PFN. 5 patients (25 percent) in the DHS group had malunion whereas 1 patient (5%) in the PFN group had malunion. There was statistically significant difference between the two groups regarding malunion.

In our series 2 patients of the DHS group had wound infections as compared to single patient in the PFN group, which was not statistically significant. We attributed the higher number of wound infections in the DHS group to the longer incisions and subsequently more soft tissue handling in this group as compared to the PFN group. However all were only superficial wound infections and healed without any further surgical intervention.

In this study the average limb length shortening of patient in DHS group was 1.25cm as compared to 0.575cm in PFN group which was significant. This could be due to sliding of the lag screw in the DHS group, allowing greater fracture impaction, as compared to the PFN[72].Four of the ten patients in DHS with fair or poor results had 2 cm or more shortening, while 1 patient in PFN with fair result had 2cm or more shortening.

One patient (5 percent) in our study had a hip screw backout. This was seen in the DHS group involving an unstable intertrochanteric fracture. However these patients were relatively mobile and hence re - operation was not necessary. There was no implant cut out in the PFN group which was similar to the series by Menezes and co-workers (0.7per cent).

Functional Outcome: The overall functional outcome of patient treated PFN was significantly better compared to DHS (P=0.152). However when we compared the stable and unstable fractures separately, we found that there was no significant difference in the outcomes of the stable fractures in the two groups (p=0 .198). While comparing the unstable fractures in the two groups we found that the functional outcome of the patients in the PFN group was significantly better than the outcome of the patients in the DHS group with good results for 87.5% of the unstable fractures treated with PFN compared to only fair and poor results for 90% of the unstable fractures treated with DHS. In our series, only 5 of the 20 patients (25 percent) in the DHS group regained their pre - injury mobility level as compared to 14 of the 20 patients (70 percent) in the PFN group at the fourth month of follow up. Similar findings were seen in the series by Pajarinenand group. This suggests that the use of PFN may be favored in stable fracture when compared to DHS. There is some amount of shortening seen in the DHS group which can be explained as due to significantly greater impaction of the fracture in the DHS group.

The smaller incisions, shorter operative times, relatively less blood loss and less postoperative pain with the PFN indicate that the PFN has an advantage over the DHS even in the treatment of stable intertrochanteric fractures where the functional outcomes are similar. In addition, with unstable intertrochanteric the PFN has a definite advantage over the DHS in terms of less limb length shortening, earlier restoration of pre-injury walking ability and a better overall functional outcome.

Conclusion

We conclude that in stable intertrochanteric fractures, both the PFN and DHS have similar outcomes. However, in unstable intertrochanteric fractures the PFN has significantly better outcomes in terms of earlier restoration of walking ability. In addition, as the PFN requires shorter operative time and a smaller incision, it has distinct advantages over DHS even in stable intertrochanteric fractures. Hence, in our opinion, PFN maybe the better fixation device for most intertrochanteric fracture and is a technically more demanding procedure and requires more expertise as compared to DHS.

Reference

1. Gupta SKV, Valisetti VS. Comparative study between hip screw vs proximal femoral nailing in intertrochanteric fractures of the femur in adults. IJOS 2015;1(1):07-11
2. Naushad hussain AR, Sanil G, Kamat. Comparative study of proximal femoral nailing versus dynamic hip screw fixation for unstable and complex intertrochanteric fractures of the femur. J cont Med A Dent May-August 2017;5(2)
3. Boyd HB, Griffin LL. Classifications and treatment of Trochanteric fractures. Arch Surg1949;58:853-866.
4. Evans E. The treatment of trochanteric fractures of the femur. JBJS 1949;31B:190-203
5. AO classification Marsh, JL MD Journal of Orthopaedic Trauma: September 2009;23(8):551.
6. Khateeb MKN *et al*. Int J Res Orthop. 2017;3(3):602-606
7. Ujjal Bhakat, Ranadeb Bandyopadhayay Open Journal of Orthopedics 2013;3:291-295
8. Kish B, Sapir O, Carmel A, Regev A, Masrawa S. Full weight bearing after unstable per and subtrochanteric fracture using proximal femur nail. J Bone Joint Surg (Br) 2001;83:289.
9. Ely Steinberg L, Nehemia Blumberg, Shmuel Deke. The fixion proximal femur nailing system: biomechanical properties of the nail and a cadaveric study" Journal of biomechanics 2005;38:63-68.
10. Parker MJ, Handoll HH. Gamma and other cephalon condylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults. Cochrane Database Syst Rev 2008;(3):CD000093