

SURGICAL MANAGEMENT OF INTERTROCHANTERIC FRACTURES: A STUDY USING DYNAMIC HIP SCREW AND PROXIMAL FEMORAL NAILD. Venkateswara Rao¹, Chinta Shyam Kumar², Anvesh Sangepu³**HOW TO CITE THIS ARTICLE:**

D. Venkateswara Rao, Chinta Shyam Kumar, Anvesh Sangepu. "Surgical Management of Intertrochanteric Fractures: A Study Using Dynamic Hip Screw and Proximal Femoral Nail". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 66, August 17; Page: 11440-11445, DOI: 10.14260/jemds/2015/1651

ABSTRACT: OBJECTIVES: The aim of this study was to compare the outcome of intertrochanteric fractures treated with Dynamic Hip Screw and Proximal Femoral nail. **METHODS:** This study was conducted on 80 cases of Intertrochanteric fractures of femur treated by a dynamic hip screw and proximal femoral nail. Patients were operated on standard fracture table under image intensifier control. **RESULTS:** The average age of the patient was 63.2 years. Most common mechanism of fracture was domestic fall. The unstable pattern was more common in old aged patients with higher grade of osteoporosis. The average blood loss was 240 and 320ml in PFN and DHS group respectively. In PFN there were more no. of radiation exposure intraoperatively. The average operating time for the patients treated with PFN was 100min as compared to 80 min in patients treated with DHS. No complications of non-union and infection. In the PFN group the amount of sliding on X-rays was less as compared to DHS. The patients treated with PFN started early ambulation as they had better Harris Hip Score in the early period (at 1 and 3 month). In the long term both the implant had almost similar functional outcomes. **CONCLUSION:** From the study, we concluded PFN is better alternative to DHS in management of intertrochanteric fractures but is technically difficult procedure and requires more expertise compared to DHS.

KEYWORDS: Inter-trochanteric fracture femur, PFN, DHS.

INTRODUCTION: Fractures of proximal femur and hip are relatively common injuries in adults, constituting 11.6% of total fractures. Of these intertrochanteric fractures constitute 53.4%. Male: female ratio is 1:3. Intertrochanteric fractures are commonly seen in patients over 60 years of age, mostly due to trivial trauma. Incidence has increased primarily due to increasing lifespan and more sedentary lifestyle brought by urbanization. In younger population, IT fractures occurs due to high-velocity trauma. Causes of intertrochanteric fractures are fall in standing, fall down stairs, fall from height, direct blow, motor vehicle accidents. Of these, intertrochanteric fractures in younger individuals are usually the result of high-energy injury, such as motor vehicle accidents or fall from height. In elderly 90% of intertrochanteric fractures result from simple falls. Of these pathological fractures constitute 1.3% of total fractures.

This group of fractures from sizeable portion of admissions to trauma ward, their management has created considerable interest in this century. Fortunately for these fractures union is not a problem due to abundant blood supply, cancellous nature of bone in a wide cross sectional area at fracture site. All treatment modalities are aimed at preventing malunion and deformity. Both the methods of non-operative and operative managements have strong advocates. The advocates of the former method believe that the simplicity of conservative treatment minimizes the technical expertise and equipment which is needed for operative management, whereas the advocates of the later believe that early ambulation and ability to work again following surgery overrules the results

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of conservative management. Nonunion is seen in less than 2% of patients, its rare occurrence is largely due to the fact that fracture occurs through well vascularised cancellous bone. Owing to abundant blood supply and wide cross sectional area, conservative treatment yields good results. But necessitates prolonged immobilization of not less than 2 months duration with obvious economic implications, not to mention the pin tract problems and ills of enforced bed rest in the elderly, viz: bedsores, deep vein thrombosis, fracture disease and pulmonary embolism. Another fracture of conservative regime is the possibility of varus drift and shortening in spite of adequate period of immobilization.¹

So now a days, conservative methods of treatment of intertrochanteric fracture have been largely abandoned. Rigid internal fixation of the intertrochanteric fractures with early mobilization is considered as standard treatment. The only exception being a unstable patient, who is an anaesthetic and surgical risk. It has been emphasized that a stable trochanteric fracture will unite with good result irrespective of the type of implant used.

AIMS AND OBJECTIVES:

1. To determine the rate of union, complications, operative risk and functional outcomes in intertrochanteric fractures and treated with DHS and PFN.
2. To compare the results obtained.
3. To compare the effectiveness of DHS and PFN in treatment of intertrochanteric fractures.

MATERIALS AND METHODS: The present study consists of 80 adult patients with intertrochanteric fractures of femur who were treated with DHS and PFN at Siddhartha Medical College/Government General Hospital, Vijayawada from May 2012 to April 2015. The study was carried out to study the results of intertrochanteric fractures with DHS and PFN. All the 80 patients were followed up at regular intervals.

As soon as the patient with suspected intertrochanteric fractures was seen, necessary clinical and radiological evaluation was done and admitted to ward after necessary resuscitation and splintage with skeletal traction. All the patients were evaluated for associated medical problems and were referred to respective dept and treated accordingly. Associated injuries were evaluated and treated simultaneously. The patients were operated on elective basis after overcoming the avoidable anaesthetic risks.

Inclusion Criteria:

1. All patients with intertrochanteric fractures femur.
2. Closed fractures.
3. Fracture extending into sub-trochanteric region.
4. Acute fractures.
5. Comminuted fractures.
6. Patients who attained bone maturity that means adult patients.

Exclusion Criteria:

1. Pathological fractures.
2. Patients lost in follow-up.
3. Old fractures.

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4. Open fractures.
5. Patients associated with poly trauma.

RESULTS: The following observations were made from the data collected during the study of 80 cases of intertrochanteric fractures treated by PFN and DHS in department of Orthopedics in Government General Hospital, Vijayawada between May 2012 to April 2015. In our study maximum age was 79 years and minimum age was 36 years. The most of patients were between 30 – 80 years. Mean age was 63.2years. All the cases included in our study group were fresh fractures who underwent surgery at the earliest possible in our setup. The delay was due to associated injuries and medical conditions of patients. All the patients were operated at an average interval of 10.9 days from the day of trauma. In our study we considered various intraoperative parameters like radiographic exposures, duration of surgery, and amount of blood loss. Radiographic exposure was more for PFN where closed reduction was done and for comminuted fractures with difficult reduction. Duration of surgery was more for PFN compared to DHS and for initially operated cases. Blood loss was more for DHS compared to PFN and in PFN there was more blood loss when open reduction was performed.

There were comparatively minimal intraoperative complications encountered during DHS fixation. Reduction was comparatively easier as open reduction was performed in all the cases. However difficulties in reduction were encountered in cases that were delayed and in case of comminuted fractures. In 6 of 40 cases there was improper placement of Richard screw. The screw was placed superiorly. Difficulties were encountered in revers oblique fractures as the site extended to entry point. Screw had to be inserted more proximally which resulted in varus angulation. Comparatively DHS fixation was technically easier and had lesser intraoperative complications. There were iatrogenic fractures of the lateral cortex of proximal fragment in 4 out of 40 PFN.

This was occurred in initial cases probably due to wrong entry point and osteoporotic bone. We had no difficulties in distal locking. All the cases were locked distally with at least one locking bolt. There were no instances of drill bit breakage or jamming of nail. There was no infection among the DHS patients. Screw cut out was seen in 4 cases, where the implant had to be removed. Varus malunion was seen in 4 cases, shortening of more than 1 cm was seen 4 cases with DHS. There were no cases of non-union. With PFN, there were 4 cases of mal-union in patients where the fracture was severely comminuted. There were 4 cases with shortening more than 1 cm with PFN.

Anatomical Results	Number of Cases	
	PFN	DHS
Shortening more than 1cm	4	4
Varus deformity	4	4
Restriction of hip movement	2	0
Restriction of knee movement	0	0

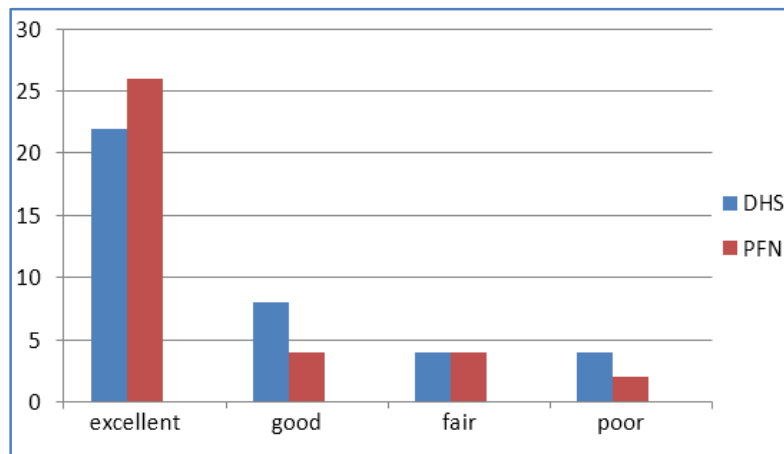
Comparison of Results Between PFN & DHS

There were no cases of screw cut out and nail breakage with PFN. There were no cases of femoral shaft fractures or non-union with PFN. In our study the average duration of hospital stay was 26.13 days for DHS patients and 26.8 days for PFN patients. The mean time of full weight bearing was 10.6 weeks for PFN and 14.8 weeks for DHS. All patients enjoyed good, Hip and knee range of motion

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except for 2 patients of PFN who had extensive lateral cortex comminution during surgery and had to be immobilized for prolonged period. All the patients except 2 cases of PFN were ambulatory with or without walking aid at 6 weeks follow up. All patients were followed up at 2 weeks interval till fracture union, at 12 weeks and 6 months post-operatively. At each follow up radiographs of upper femur and hip were taken.

Anatomical results were assessed by shortening, hip and knee range of movements and varus deformity. In our series of 80 patients 6 cases were lost for follow up.



FUNCTIONAL RESULTS

DISCUSSION: The treatment of intertrochanteric fracture is still associated with some failures. The high incidence of complications reported after surgical treatment, compels the surgeon to give a second thought regarding selection of proper implant. DHS, the most commonly used method of fixation is sliding screw system.

PFN: The AO ASIF in 1966 therefore developed the PFN with an anti-rotation hip pin together with a small distal shaft diameter with which reduces stress concentration to avoid failures. From mechanical point of view an intramedullary device inserted by means of minimally invasive procedure seems to be better in elderly patients. Closed reduction preserves the fracture hematoma, an essential element in consolidating process. Intramedullary fixation allows the surgeon to minimize soft tissue dissection, thereby reducing surgical trauma, blood loss, infections and wound complications. Menez and Daniel conducted a study on 155 cases of intertrochanteric fractures treated with PFN and found 2% of failure of fixation. In our study, no such complications.² A study of 20 patients of unstable intertrochanteric fractures treated with DHS and PFN by Bharathi and Arshad was conducted in 2004.

They found duration of stay for PFN and DHS were 14 and 22 days, blood loss was 275 and 475ml, persistent hip pain was seen in 3% and 9% respectively. In our study, hospital stay was 26 days in both cases, blood loss was 240 and 320 ml, persistent hip pain was seen in 2 and 4 cases of PFN and DHS. In study by, Pajarein and Linda,³ of 108 patients of pertrochanteric fractures treated with DHS and PFN, found PFN allowed faster restoration of post-operative walking ability compared to DHS. In our study, mean time for full weight bearing for DHS was 14.05 weeks, while for PFN was 11.4 weeks.

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In this study, intertrochanteric fractures were common due to slip and fall, age ranged between 36-79 years, mean age of 63.2 years. Males were common contributing to 55%. Right sided fractures were common accounting for 52.5%. Type II Boyd and Griffin⁴ fractures were common, consisted of 50%. Type I and Type III were 12.5% and 22.5% respectively. Mean frequency of radiation exposure were 70 and 40 times, mean duration of operation 100 and 80mins. Mean blood loss was 240 and 320ml for PFN and DHS respectively.

Among DHS, intraoperatively had fewer complications, which included improper placement of screw in 6 cases. Varus angulation in 4 cases. None of the cases have got infected. Hospital stay was 26 days in both cases. Mean time of full weight bearing was 11.4 and 14.05 weeks in PFN and DHS. All patients were mobile at the end of 6 weeks except for 2 cases of PFN. Excellent results were seen in 57.8% and 72.2%, good in 21% and 11.1% cases of DHS and PFN respectively.

CONCLUSION: In the present study of 80 patients of intertrochanteric fractures 40 cases were treated with PFN and 40 were treated with DHS. The data was analyzed, evaluated and following conclusions were drawn:

1. **Age:** Intertrochanteric fractures common between 40-60 and 20-40 years.
2. **Etiology:** In our patients it was due to high-velocity trauma, fall from height, slip and fall.
3. **Sex:** More common in females due to post-menopausal osteoporosis.
4. **Associated Injuries:** Common in high-velocity trauma.
5. **Treatment:** early reduction and internal fixation increased patients comfort, facilitates nursing care, helps in early mobilization of patients and decreased hospital stay.
6. Reduction in fracture can be achieved by open or closed means and fixed by extra-medullary and intramedullary devices.
7. PFN has following advantages:
 - Can be done by closed means.
 - Prevents excess collapse at fracture site, thus maintaining neck length.
 - Two screws placed in neck provides rotational stability:
 1. Early mobilization begun in case of PFN as it is a load sharing device.
 2. Results: fracture union and functional results are better in PFN.
 3. Complications: Both PFN and DHS can be avoided with proper patient selection and good pre-operative planning.
 4. With experience gained from each case operative time, radiation exposure, blood loss and intraoperative complications can be reduced in case of PFN.

Thus we concluded PFN is better alternative to DHS in management of intertrochanteric fractures but is technically difficult procedure and requires more expertise compared to DHS.

SUMMARY: intertrochanteric fracture is a leading cause of hospital admissions in elderly people. The no. of such admissions is on a raise because of increasing lifespan, sedentary habits and RTA s. Conservative methods of treatment results in mal-union with shortening and limitation of hip movements as well as complication of prolonged immobilization like bed-sores, DVT and RIs. This study is done to compare the results of surgical management of intertrochanteric fractures with proximal femoral nail and dynamic hip screw.

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In our series of 80 patients, 44 were male and 36 were female. Minimum age was 36 yrs and maximum age was 79 years with mean age of 63.2 years. Most of the people were between 31-70 years. Slip and fall accounted for 62.5% of cases. Right side was more common accounted for 52.5% of cases. Boyd and Griffin type II fractures accounted for 50% of cases. Mean duration of hospital stay was 26 days in both PFN and DHS. Mean time of full weight bearing was 11.4 for PFN and 14.05 weeks for DHS. Good to excellent results were seen in 83.3% in PFN and 78.8% in DHS.

From the study, we concluded PFN is better alternative to DHS in management of intertrochanteric fractures but is technically difficult procedure and requires more expertise compared to DHS.

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FINANCIAL OR OTHER

COMPETING INTERESTS: None

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Date of Submission: 08/08/2015.
Date of Peer Review: 09/08/2015.
Date of Acceptance: 12/08/2015.
Date of Publishing: 14/08/2015.