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Postoperative follow up in the management of intertrochanteric fractures of femur a comparative study using dynamic hip screw and proximal femoral nail

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Abstract

Background: Intertrochanteric fractures have the highest postoperative fatality rate amongst surgically treated fractures, they have become an important health issue and thus it is very important to study and compare different surgical options available for these fractures. So purpose of the study to compare postoperative follow up in the management of intertrochanteric fractures of femur a comparative study using dynamic hip screw and proximal femoral nail.

Material & Methods: Patients with pathologic fractures, patients with multiple fractures, patients with old neglected, fractures, fractures in paediatric age group, fractures in elderly patient with high medical risk for anesthesia and surgery, reverse intertrochanteric fractures were included in the study. The post-operative pain was also assessed as per the Harris Hip Score criteria at the end of 1 year and the post-operative gait was also assessed at the end of 1 year. Union was decided on the basis of obliteration of fracture line with bridging callus so as to allow unprotected function of the limb.

Observation & Results: At 1 year follow up, 9 patients had no pain, 5 had minimal pain, 6 had moderate pain and only 1 patient had severe pain post operatively in the DHS group, while 12 patients had no pain, 8 had minimal pain and 3 had moderate pain post operatively in the PFN group. The functional outcome was better for PFN than for DHS however, the difference was not statistically significant (p value >0.05).

Conclusion: Thus it was concluded from this study that P.F.N. has the following advantages over D.H.S. in the treatment of intertrochanteric fractures (especially unstable fractures). Lesser operative time, lesser blood loss, early post-operative rehabilitation of the patients, better functional outcome. However, the difference in the functional outcome is not statistically significant and thus we require a larger group of study to prove the significance.

Keywords: Postoperative, intertrochanteric fractures, dynamic hip, proximal femoral

Introduction

Intertrochanteric fractures are those occurring in the region extending from the extracapsular basilar neck region to the region along the lesser trochanter. Intertrochanteric fractures of the femur are the most commonly operated fractures. Due to an increasing life span and sedentary lifestyle the incidence of these fractures is on the rise. Also the geriatric age group has a higher incidence of osteoporosis, with low energy falls from standing height accounting for approximately 90% of the community hip fractures in patients more than 50 years of age, with a higher proportion in women. Higher velocity traumatic intertrochanteric fractures are relatively rare and are more common in men less than 40 years of age^[1].

Factors determining the strength of fracture implant assembly depends on the bone quality, fragment geometry, fracture reduction, implant type and implant placement. Surgeon can control only the quality of reduction, choice of implant and its placement^[2].

D.H.S (Dynamic Hip Screw) with side plate assembly is most commonly used device for fixation of intertrochanteric fractures. It is a fixation device which permits the proximal fragment to collapse or settle on the fixation device seeking its own position of stability^[3].

The latest implant for management of intertrochanteric fracture is the P.F.N (Proximal Femoral Nail). This implant is a cephalomedullary device and has many potential advantages like Being intramedullary, load transfer is more efficient. Shorter lever arm results in less transfer

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of the stress and less implant failures. Advantage of controlled impaction is maintained. Sliding is limited by intramedullary location, so less shortening and deformity. Shorter operative time, less soft tissue dissection and less blood loss. In view of these conditions, this study is taken up to compare the results of D.H.S and P.F.N^[4].

As intertrochanteric fractures have the highest postoperative fatality rate amongst surgically treated fractures, they have become an important health issue and thus it is very important to study and compare different surgical options available for these fractures^[5].

Implants for the fixation of intertrochanteric fractures can broadly be divided into Extramedullary devices, example: D.H.S Intramedullary devices, example: P.F.N

So purpose of the study to compare postoperative follow up in the management of intertrochanteric fractures of femur a comparative study using dynamic hip screw and proximal femoral nail.

Material and Methods

This prospective study was done under the guidelines of the ethical committee of the hospital. Patients presenting with recent traumatic history, isolated intertrochanteric, fractures, stable and unstable fractures, the patients willing to give consent to participate in the study were included in the study.

Patients with pathologic fractures, patients with multiple fractures, patients with old neglected, fractures ,fractures in paediatric age group, fractures in elderly patient with high medical risk for anesthesia and surgery ,reverse intertrochanteric fractures were included in the study.

The patients confirming into criteria were included in the study. Clinical diagnosis of intertrochanteric fracture was done with external rotation, shortening and history of trauma. Emergency treatment in the form of analgesics is given. Antero posterior X-ray of pelvis with both hips in 15 degree internal rotation and lateral view of the injured joint were taken. Classification of the fracture was done using the Tronzo's classification. The preoperative neck-shaft angle and the medullary canal diameter was calculated with the help of the radiographs of the normal opposite hip^[6-7].

Injured limb was kept in a Thomas' splint with skin traction with adequate splintage to correct flexion deformity if any and to prevent overriding whenever present.

Preoperative routine blood and urine investigations were done. Informed consent was obtained by patient for both the surgical procedure and participation in the study.

Limb elevation was given. Foot end elevation was given for one day, DVT prophylaxis was given if high risk patient. Post-operative anteroposterior and lateral view x-rays of the operated hip were taken. Post-operative Haemogram and Serum Electrolytes were done immediately and 24 hrs later. Static exercise in bed for glutei, hamstrings, quadriceps and breathing exercises were started next day of surgery^[8-9].

Sitting was allowed on next day of surgery with passive exercises in bed. Drain if inserted was removed after 48

hours. ROM exercises were started actively.

The protocol for weight bearing was, in stable fractures partial weight bearing was started next day after surgery and full weight bearing was started after 6 weeks, while in unstable fractures non-weight bearing walking was allowed on operated side with the help of a walker or crutches next day after surgery, partial weight bearing after 6 weeks and full weight bearing was started after 3 months approximately. However weight bearing was modified as per the type of fracture, stability of the internal fixation, the fracture union and the tolerance of the patient.

Postoperative dressings were done on 2nd and 7th day. Suture removal was done on or after 14 days. The patients were discharged within one week if the surgery was uneventful. Follow up was done at 2, 4, 6 weeks, 3 months, 6 months, and 1 year after the surgery. The patients were assessed functionally on the basis of Harris Hip Score and radiologically in the form of anteroposterior and lateral X-rays of the operated hip. The post operative pain was also assessed as per the Harris Hip Score criteria at the end of 1 year and the post operative gait was also assessed at the end of 1 year. Union was decided on the basis of obliteration of fracture line with bridging callus so as to allow unprotected function of the limb.

Observation & Results

At 1 year follow up, 9 patients had no pain, 5 had minimal pain, 6 had moderate pain and only 1 patient had severe pain post operatively in the DHS group, while 12 patients had no pain, 8 had minimal pain and 3 had moderate pain post operatively in the PFN group. Thus, though the number of patients with none or minimal post operative pain was more in the PFN group (20) than the DHS group (14), the difference was not statistically significant (p value >0.05). Also at 1 year follow up, 10 patients had a normal gait, 3 patients had a limp, 3 patients used a stick for walking, 4 patients used a walker and one patient used a wheel chair in the DHS group while 12 patients had a normal gait, 5 patients had a limp, 4 patients used a stick while walking and 2 patients used a walker for walking in the PFN group. There was no significant difference between the number of patients with a normal gait (10 and 12 respectively) in the DHS and the PFN group (p value >0.05).

At 1 year follow up, in DHS group, 6 patients were graded as excellent, 6 patients as good, 6 as fair, 2 as poor and 1 as failed. 3 patients were lost in follow up and one patient had died. At 1 year follow up in PFN group, 5 patients were graded as excellent, 9 patients as good, 8 as fair and 1 as poor. 1 patient was lost in follow up and one patient had died. Thus in stable fractures the functional outcome for both the modalities of treatment was similar. But in unstable fractures, the functional outcome was better for PFN than for DHS however, the difference was not statistically significant (p value >0.05).

Table 1: Average harris hip score at the end of 1 year:

Harris Hip Score	PFN - cases		DHS - cases		Unpaired t	P
	Mean	SD	Mean	SD		
At week-2	57.44	13.76	50.36	16.71	1.635	0.109
At week-4	62.67	13.58	58.04	15.78	1.098	0.278
At week-6	71.79	10.17	69.61	11.93	0.676	0.503
At Month-3	78.48	9.70	76.95	10.51	0.495	0.623
At Month-6	81.04	9.13	80.10	10.03	0.323	0.749

The average Harris Hip Score at the end of 1 year in stable fractures (type 1 and 2) for PFN was 88.73 and for DHS was 89.20 (p value >0.05). In unstable fractures (type 3 and 4) the score for PFN was 79.36 and for DHS was 69.09 (p value

>0.05). Thus the functional outcome with respect to the average Harris Hip Score was better in PFN group than DHS group for unstable fractures but was not significant

Table 2: PFN group and DHS group

Harris Hip Score at 1 yr	PFN - cases		DHS - cases		Unpaired't	P
	Mean	SD	Mean	SD		
Stable	88.73	4.338	89.20	3.584	0.271	0.790
Unstable	79.36	6.56	69.09	17.75	1.801	0.086
Overall	83.96	7.23	78.67	16.41	1.430	0.159

The average rate of fracture union in PFN group was 11.21 weeks (range 6 to 36 weeks) and in DHS group was 12.38 weeks (range 6 to 24 weeks). Thus the difference between the time required for fracture union for both the modalities was not significant (p value >0.05).

Discussion: The treatment of intertrochanteric fracture is still associated with some failures. High stress concentration that is subject to multiple deforming forces and high incidence of complications reported after surgical treatment compels the surgeon to give a second thought regarding selection of proper implant. A large number of fixation implants has been devised and discarded. The treatment still merits the type of fracture and condition of the patient.

The study comprised of 50 patients as per the inclusion criteria and two groups were made, one operated with DHS while other operated with PFN with 25 patients in each group. Of the 50 patients there were 32 females and 18 males. The youngest patient in our series was 17 years and the oldest was 82 years. The average age of the patient for DHS was 46.96 years and for PFN was 47.72 years. 24 patients had stable type of fracture and 26 had unstable type of fracture. 47 patients were community ambulatory pre operatively and 3 were house hold ambulatory. 21 patients were operated within 3 days, 15 in 4-7 days, 8 in 8-11 days and 6 required more than 11 days to get operated due to co morbidities.

One patient of DHS group developed a superficial infection which settled down with 2 weeks of intravenous antibiotics. Another patient developed a deep infection which required a debridement procedure at 2 weeks followed by a 2 weeks course of intravenous antibiotics after which the infection subsided. One patient in the DHS group developed excessive shortening (>2.5 cm) during the follow up due to increased collapse at the fracture site^[10, 11].

One patient in the DHS group developed a bed sore, the patient was household ambulatory pre operatively and was bed ridden post operatively for some time due to medical reasons. One patient in DHS group had an implant failure due to the cut out of the DHS screw, the patient was later on treated by implant removal and hemiarthroplasty. One patient in PFN the group developed non union which was treated by bone grafting at 6 months post surgery and later followed up with signs of fracture union. No peri implant fracture or loosening of the implant was noted. Thus we concluded from this study that P.F.N. has the following advantages over D.H.S. in the treatment of intertrochanteric fractures (especially unstable fractures). Lesser operative time, lesser blood loss, early post operative rehabilitation of the patients, better functional outcome. However, the difference in the functional outcome is not statistically significant and thus we require a larger group of study to prove the significance.

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