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A Comparative Study, Proximal Femoral Nailing(Pfn) and Dynamic Hip Screw(Dhs) in Intertrochanteric Fracture Femur

Orthopaedic

KEYWORDS : - Intertrochanteric Fracture; Dynamic Hip Screw (DHS); Proximal Femoral Nail (PFN); P **Value; unstable fracture.**

Ravi Ranjan Kumar	Assistant professor,Dept. of Orthopaedic, MGM Medical college & LSK,Hospital,Kishanganj,Bihar
Manoj Kumar	Associate professor,Dept. of microbiology,RIMS,Ranchi,Jharkhand.
Saurabh Kumar	Junior resident, Dept. of Orthopaedic, MGM Medical college & LSK Hospital,Kishanganj,Bihar.

ABSTRACT

Background: operative treatment is appropriate for most intertrochanteric fractures. Optimal fixation technique is based on the fracture pattern & stability of fragments. The mainstay of treatment of intertrochanteric fracture is fixation with a sliding screw plate device or intramedullary device. Method: A prospective randomized and comparative study of 1 years duration was conducted on 64 patients admitted in the Department of Orthopedics MGM Medical College & LSK Hospital,Kishanganj,Bihar with intertrochanteric femur fracture. They were treated eighter by dynamic hip screw(DHS) and proximal femoral nail(PFN). Operations were done under image intensifier control. The parameters studied were functional outcome of Harris hip score, total operation time, rate of union, amount of collapse. These values were statistically evaluated and two tailed p-values were calculated and both groups were statistically compared. Result: The average age of our patient is 73.84 years. The average blood loss was 150ml and 350 ml in PFN and DHS group respectively. The average operating time for PFN was 59.27 min as compared to 89.78 min in patients treated with DHS. The patients treated with PFN started early weight bearing as the implant construct was more stable and had better Harris Hip Score in the early postoperative period (at 1 and 3 months). In the long run both the implants had almost similar functional outcomes. Conclusion: In our study we have concluded that the unstable fracture(3-4 pices) as well as reverse oblique fracture when treated by PFN had a better outcome. PFN group has less blood loss and less operating time compared to DHS group. In PFN group patients have started early ambulation compared to DHS group.

INTRODUCTION;

The stability of the trochanteric fracture depends on the amount of contact between the proximal and distal main fragments. Trochanteric fractures with comminution of posteromedial buttress exceeding simple lesser trochanteric fragment or with subtrochanteric extension are termed as unstable. In 3-part fractures stability is inversely proportional to the size of the lesser trochanteric fragment. Instability occurs when more than 50% of the calcar is involve, allowing the proximal fragment to collapse into varus with shortening. Reverse obliquity fracture is unstable fracture in which major fracture line extends outward and downward from the lesser trochanter. Unstable trochanteric fractures are technically much more challenging to treat than stable fractures. Stable reduction of an intertrochanteric fracture requires medial and posterior cortical contact between the major proximal and distal fragment to resist varus and posterior displacing forces. For unstable fractures intramedullary implants are (biomechanically) superior. Lag screw cut-out failure following fixation of unstable intertrochanteric fractures in osteoporotic bone remains an unsolved challenge.The double screw construct provides significantly greater resistance against varus collapse and neck rotation in comparison to a standard DHS lag screw implant. Less sliding of the femoral neck screws was noted with two femoral neck screw configuration. This study was conducted to assess the suitable implant for stable fixation of unstable trochanteric fracture with less intra and postoperative complications and good functional outcome which should be the goal of every orthopaedic surgeon treating these fractures.

MATERIAL & METHODS;

Between May 2014 to July 2015, 64 patients with trochanteric fracture were treated at our institute.Patients were randomised into two groups to be treated with PFN or DHS. Institutional ethical committee was informed and clearance was taken for the study. All the patients admitted to our hospital with trochanteric fracture were in the age group of 25-66 years. Random allocation to the group (PFN and DHS) was done after taking informed consent from the patients. Polytrauma patients, pathological fracture, patients who had other significant co-morbidities before the injury and patients who refused to give consent were excluded from the study.After admission appropriate blood investigations and plain radiographs of the both hips AP view and involved hip lateral view were taken. Fracture classification was done according to Arbeitsgemeinschaft für Osteosynthesefragen (AO)/ Orthopaedic Trauma Association (OTA) classification.Patients were taken for surgery within 48 hours of admission after clearance from the anesthetist. All the patients were operated by same surgical team.All the patients received preoperative antibiotics. Operation was done by standard approach using DHS and PFN. All surgeries were done under the guidance of image intensifier. Lateral approach was used for DHS. PFN was done by standard cephalomedullary approach through the modified medial trochanteric portal. Physiotherapy was started on first postoperative day. Partial weight bearing was started as and when patient is comfortable with walker support. Full weight bearing was allowed after radiological union of fracture.Follow up study included clinical examination with functional assessment according to Larson's hip evaluation chart 2 (higher the score better the functional outcome). 1st evaluation was carried out at 6 weeks postoperatively. Subsequent follow up evaluation was carried out at 3 months, 6 months and and 9 month.Final assessment was done 1 year post surgery.

Results & Observations;

The Study involved 64 patients of intertrochanteric fractures, which were operated at Department of Orthopedics MGM Medical College & LSK Hospital,Kishanganj.32 patients were treated by a sliding hip screw with plate & 32 were treated by Proximal Femoral Nail(PFN). The age distribution of total 64 patients was from 58 to 84 years. The average age 50.16 years in PFN group and average age 52.46 years in DHS group . In our study out of 64 patients 44 patients had intertrochanteric fracture involving right side while 20 patients had fracture of left side. The Study involved 45 males and 19 females. The more complex

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fracture patterns A-1 types & A-3 types were seen more commonly in females, with fractures patterns A3-2 & A3-3 seen exclusive in females All the fractures were classified as per the AO/OTA classification shown in (table 1) The average blood loss in the PFN Group was 150 ml & in the DHS group was 300 ml. this data was statically significant (P<0.05) indicating more blood loss in the DHS group. The amount of blood transfusions were accordingly more with 24 out of 32 (75%) requiring blood transfusions in the DHS group as compared to 13 out of 32 (40%) in the PFN group. Also the amount of blood transfused exceeded one unit in 14 out of 32 (43%) patients in the DHS group as compared to no patient in the PFN Group requiring more than one unit of blood. All patients were subjected to the Harris hip score at the one month, three months, six months,9 months & one yearly follow ups. In the DHS group the one month hip score (Avg.25.4) was less than that of the PFN group (Avg.37.4), p<0.05 however this difference diminished with time for the two group on the sixth monthly & yearly follow up with both scores being almost same. (DHS-93.78 & PFN-94.32) . The duration of surgery as calculated from the time of incision to skin closure was counted in each case. The average duration of the two group was compared & it was noted that the DHS (Avg. time 89.78 min) required a statistically significantly more time as compared to the PFN (Avg 59.27min). The *Comparision Of Dynamic Hip Screw And Plate With Proximal Femoral Nail In…* DOI: 10.9790/0853-14487382 www.iosrjournals.org 76 | Page

Average time to bear weight in PFN group was 5.02 week while this was 7.99 weeks in DHS group.Sliding of screws in both groups was compared at the end of one year on the X – rays, there was an average 0f 5.6.mm of sliding in the PFN group as compared to 7.9mm in the DHS group (P<0.05). The average limb shortening in the PFN group was 1.01cm as compared to 1.61cm in the DHS group, though there was more shortening in the DHS group, it was not very significant, as it did not cause any functional impairment. In the DHS group there was only 2 (6.25%) case of screw cut out. In the PFN group there were no cases of non union/delayed union. In the DHS group there was one case of nonunion, which was due to non sliding of screw(screw placed at fracture site) and in this patient union occurred finally after exchange of a screw with different length. There were 2 cases of superficial infection seen in the DHS group. They were seen within 3 weeks of surgery & were treated by local debridement & did not require implant removal. There was no infection in PFN group. There was no death in any group.

DISCUSSION;

These days surgical fixation is the preferred mode of treatment for unstable/stable trochanteric fracture as itdecreases the complications and morbidity associated with these fractures.DHS being the implant of choice inthe surgical management of trochanteric fractures gives good results in stable trochanteric fractures as compared to unstable(3-4 parts) fractures. PFN being an intramedullary device gives better fixation of the trochanteric fracture by restoring the anatomy of the hip. PFN gives biomechanically stable construct allowing early weight bearing in unstable trochanteric fractures. Many studies recommended PFN for the surgical treatment of unstable trochanteric fractures as controlled compression of fracture occurs without rotational malalignment of the fracture fragments. The patients treated with PFN were able to walk earlier than those treated by DHS as reported by many studies. This finding was also seen in our study.

Unstable trochanteric fractures treated with DHS were associated with higher incidence of complications. Unstable fractures treated with DHS results in greater impaction of the fracture with shortening of the femoral neck,screws cut out,fixation failure,delayed weight bearing.Many

studies reported longer duration of surgery and greater blood loss in DHS group. In our study shortening was more and weight bearing was started late in patients treated with DHS as compared to patients treated with PFN. DHS is associated with a higher incidence of complications when used in unstable trochanteric fractures. Functional score in patients treated with PFN was better than DHS in the first 3 months. Patients who were treated by PFN restored walking ability earlier as compared to those treated by DHS. Our study results were similar to above study findings. Restoration of function is better with PFN when compared with DHS. In

our study Functional outcome was better in patients treated with PFN compared to the patients treated with DHS in the initial 6 months of postoperative period. The follow up period in our study ranged from 6 months to 12 months because of the non-compliance from the patient side for long follow up. Patients were reluctant to come for follow up once they did not experience pain in the operated hip and have started walking independently.

CONCLUSION;

Our study results suggest PFN as better implant for the treatment of unstable trochanteric fractures when compared to DHS. PFN being an intramedullary implant gives stable fixation to these types of fractures and helps in earlier mobilisation of patients thus, minimizing the complications associated with unstable trochanteric fractures. Further studies with greater number of patients and longer follow up are required to conclude on the long term outcome of unstable trochanteric fractures.

Table;1 Demographic data of Patients

Variables	Total (n=64)	PFN (n=32)	DHS (n=32)
Mean age±SD	73.84±8.65	50.16±9.86	52.46±10.61
Sex of the patients			
Male	45(70.31%)	25(78.12%)	20(62.50%)
Female	19(29.68%)	07(21.87%)	12(37.50%)
Affected Side			
Right	44(68.75%)	20(62.50%)	24(75.00%)
Left	20(31.25%)	12(37.50%)	08(25.00%)
Mode of injury			
Fall during walking	25(39.06%)	09(28.12%)	16(50.00%)
Road traffic accident(RTA)	24(37.50%)	13(40.62%)	10(31.25%)
Fall from height	14(21.87%)	10(31.25%)	04(12.50%)
Other mode of injury	01(01.56%)	--	02(06.25%)
Fracture Type(OA/OTA)			
31A2.2	16(25.00%)	08(25.00%)	08(25.00%)
31A2.3	35(54.68%)	17(53.12%)	18(56.25%)
31A3.1	07(10.93%)	03(09.37%)	04(12.50%)
31A3.3	06(09.37%)	04(12.50%)	02(06.25%)

Table 2: Comparison of PFN with DHS.

	PFN (n=32)	DHS (n=32)	P value(Kruskal-Wallis test)
Mean duration of surgery(min)	59.27±10.19	89.78±8.84	P<0.001
Mean duration after which patient Started weight bearing(weeks)	05.02±1.59	07.99±2.58	P<0.001

Mean shortening of the limb(cms)	01.01±0.39	01.61±0.43	P<0.001

Fig.1 PFN Fixation showing Preop and immediate Postop X ray

Fig.2 PFN Fixation showing Preop and immediate Postop X ray

Fig.3 DHS(6 weeks post op)

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Conflict of interest

The authors declare no conflict of interest.

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