

Comparative analysis of the functional outcome in intertrochanteric fractures between dynamic hip screw and proximal femoral nailing

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Abstract

Background: Femur is the most important weight bearing bone of the lower limb. Two main mode of operative management are dynamic hip screw and intramedullary nailing mainly proximal femoral nailing. study mainly to analyse the functional outcome of dynamic hip screw and proximal femoral nailing in intertrochanteric fractures. **Aim and objective:** To compare the functional outcome in intertrochanteric fractures between dynamic hip screw and proximal femoral nailing. **Material and methods:** Present study was a prospective study carried out on patients with intertrochanteric hip fracture. In group 1, 30 patients were treated with DHS and group 2, 30 patients were treated with PFN. Both the groups were compared for duration of surgery, clinical outcome and functional outcome. **Results and discussion:** Harris Hip score was excellent in group 2 patients (PFN) 66.67% than in Group 1 patients (DHS) 40%. Good score was observed in 50% and 26.67% patients in Group 1 and Group 2 respectively. Fair score was observed in 6.67% patients in both the groups. Poor outcome was seen in 1 (3.33%) patient of group1. None of the patient in group 2 had poor outcome. In our study, PFN group (0.78 ± 0.5 hours) had significantly less time for duration of surgery than DHS group (1.35 ± 0.3 hours) ($p < 0.05$). Time of union in group 1 (2.47 ± 0.4 months) was significantly higher in group 1 (DHS) than Group 2 (2.1 ± 0.3) (PFN).

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INTRODUCTION

Intertrochanteric fracture showed increased incidence in last few years due to increased age of modern human population.^{1,2} It is most commonly seen in elderly population with osteoporosis.³ Previous studies had predicted that the total number of hip fractures will reach 2.6 million by 2025 and 4.5 million by 2050.⁴ These fractures are associated with complications like hypostatic

pneumonia, catheter sepsis, cardio respiratory failure and decubitus ulcer. Elderly patients with morbidities like diabetes, hypertension, pulmonary, renal and cardiac diseases add to morbidity and mortality of the fracture. Urgent surgical treatment and early rehabilitation and mobilization of the patient is important for prognosis of the patients.⁵ Various modalities are available for treatment. Intramedullary fixation and extramedullary fixation are important treatment modalities. The dynamic hip screw (DHS), commonly used in extramedullary fixation, has become a standard implant in treatment of these fractures.^{5,6} Intramedullary fixation is achieved by Proximal femoral nail (PFN) and Gamma nail. DHS has good results but is associated with complications especially in particularly in unstable inter-trochanteric fracture. PFN is biomechanically more stable than DHS due to reduced distance in hip joint and implant.^{7,8} Present study was conducted to compare the functional outcome in intertrochanteric fractures between dynamic hip screw and proximal femoral nailing.

Aim and objective: To compare the functional outcome in intertrochanteric fractures between dynamic hip screw and proximal femoral nailing.

MATERIAL AND METHODS

Present study was a prospective study carried out in orthopaedic department at tertiary health care centre. Study population was patients with intertrochanteric hip fracture.

Inclusion criteria: 1. Patients with intertrochanteric hip fracture 2. Patients willing to participate in the study

Exclusion criteria: 1. Bilateral fractures 2. Pre-existing femoral deformity 3. Fractures extending 5 cm distal to the inferior border of the lesser trochanter 4. Pathological fractures 5. Polytrauma

Data was collected with pre tested questionnaire. Data collected was sociodemographic data, clinical history, clinical examination and functional outcome of the surgery. We studied total 60 patients in 2 groups with 30 patients each. In group 1 patients were treated with DHS and group 2 patients were treated with PFN. The decision for the type of the operation was based on surgeon’s preference and availability of the implant. All patients underwent preanaesthetic check up. Radiographs of the pelvis with both hips antero-posterior view and traction-internal rotation view was obtained to confirm the diagnosis. All surgeries were performed on the traction table under spinal anaesthesia. Closed reduction confirmed with fluoroscopy on two different planes. All patients in our study underwent a similar rehabilitation protocol. Rehabilitation included mobilization, static quadriceps, knee and ankle mobilisation exercises. All drains were removed by 48 hrs. Stitches were removed between 10th-14thday. Clinical outcome was analysed in terms of complications. Intra operative, early (within first month after hip fracture repair) and late (after first month hip fracture repair) complications were noted. Functional outcome was assessed with Harris Hip Scores. Harris Hip score was graded as 90-100 points – Excellent, 80-89 points – Good, 70-79 points – Fair and < 70 points – Poor. Patients were followed up at 4 weeks, 8 weeks, 12 weeks, 6 months and one year. Data was entered in excel sheet and analysed with SPSS version 20.0.

RESULTS

In our study, we studied 60 patients. Group 1 patients were treated with dynamic hip screw and group 2 patients were treated with proximal femoral nailing. Mean age in Group 1 was 71.24±2.4 years and 70.13±3.1 years in Group 2. Out of 30 patients in group 1 18 were male and 12 were female. In Group 2 17 patients were male and 13 were female. Fracture type was confirmed by AO/OTA classification.^{9,10} A1 fractures were simple, two-part fractures, A2 fractures had multiple fragments and A3 fractures included reverse oblique and transverse fracture patterns. In our study, Group 1 had 15 patients with A1 type, 11 patients with A2 type and 4 patients with A3 type. In Group 2, patients with A1, A2 and A3 type were 5,12 and 13 respectively. For functional outcome, we analysed patients according to Harris Hip score. Harris Hip score was excellent in group 2 patients (PFN) 66.67% than in Group 1 patients (DHS) 40%. Good score was observed in 50% and 26.67% patients in Group 1 and Group 2 respectively. Fair score was observed in 6.67% patients in both the groups. Poor outcome was seen in 1 (3.33%) patient of group1. None of the patient in group 2 had poor outcome. Functional outcome was significantly more in group 2 than group 1 (P<0.05). (table 2) Table 3 shows Comparison of patients of intertranchteric fracture hip according to duration of surgery, time to union and treatment modality. In our study, mean duration of surgery in Group 1 was 1.35± 0.3 hours and 0.78 ± 0.5 hours in Group 2. This difference was statistically significant (p<0.05). Time of union in group 1 (2.47± 0.4 months) was significantly higher in group 1 (DHS) than Group 2 (2.1±0.3) (PFN). In our study, Group 1 patents had (09) more complications than Group 2 (04) patients. Early complications like hematoma was more in group 2 patients. superficial infections were seen more in group 1 patients than group 2 patients. Prolonged drainage was observed in 3 patients in group 1 while 1 patient in group 2. DVT was seen in 1 patient in each group. Late complications observed were reduction loss and non union. Reduction loss was seen in 2 patients in group1, but not seen in Group 2 patients. Non union was seen in only group 1 patients only. Thus overall 9 patients in group 1 had complications and 4 patients in group 2 had complications. This difference was statistically significant (p<0.05). (table 4)

Table 1: Comparison of patients of intertranchteric fracture hip according to sociodemographic factors and fracture type and treatment modality

Sr no	Parameters	Group 1	Group 2	P value
1	Mean Age (years)	71.24±2.4	70.13±3.1	>0.05
2	Male/Female	18/12	17/13	>0.05
3		Fracture type		
4	A1	15	05	>0.05
5	A2	11	12	
6	A3	04	13	

Table 2: Comparison of patients of intertrochanteric fracture hip according to Harris Hip score and treatment modality

Sr no	Harris Hip Score	Group 1	Group 2
1	Excellent	12(40%)	20(66.67%)
2	Good	15(50%)	08(26.66%)
3	Fair	02(6.67%)	02(6.67%)
4	Poor	01(3.33%)	00(0%)

Table 3: Comparison of patients of intertrochanteric fracture hip according to duration of surgery, time to union and treatment modality

Parameters	Group 1	Group 2	P value
Duration of surgery (hours)	1.35± 0.3	0.78 ± 0.5	<0.05
Time to union (months)	2.47± 0.4	2.1±0.3	>0.05

Table 4: Comparison of patients of intertrochanteric fracture hip according to complications and treatment modality

Sr no	Complications	Group 1	Group 2
1	Early Complications		
2	Hematoma	00	02
3	Superficial infection	02	00
4	Prolonged Drainage	03	01
5	DVT	01	01
6	Late complications		
7	Reduction loss	02	00
8	Non union	01	00
9	Total	09	04

DISCUSSION

In our study, we studied 60 patients. Mean age in Group 1 was 71.24±2.4 years and 70.13±3.1 years in Group 2. Both the groups were comparable with respect to age, male to female ratio ($p < 0.05$). Similar to our study, Sarmiento *et al.* in 1963 observed mean age of 71.9 years. Gallagher *et al.* (1980) reported an eight fold increase intertrochanteric fractures in men over 80 years and women over 50 years of age.¹¹ As hip joint is major weight bearing joint; it gets weak due to continuous abnormal stress of body and trabecular space is enlarged and loaded with fat, and calcaris atrophied. Trochanteric region is the most common site of senile osteoporosis. So most of the patients were elderly in our study. Group 1 had 15 patients with A1 type, 11 patients with A2 type and 4 patients with A3 type. In Group 2, patients with A1, A2 and A3 type were 5, 12 and 13 respectively. In our study, Majority of the patients (66.67%) in PFN group had Excellent Harris hip score and majority of the patients (50%) in DHS group had Good score. None of the patient in group 2 had poor outcome. Functional outcome was significantly more in group 2 than group 1 ($P < 0.05$). In a study by Ventakesh Gupta *et al.*, The outcome of stable fractures treated with either DHS or PFN were similar, unstable inter-trochanteric fractures treated with PFN has significantly better outcomes with all having good results.¹² PFN has shown to be more biomechanically stronger because they can withstand higher static and several fold higher cyclical loading than dynamic hip screw. The implant compensates for the function of the medial column. Proximal femoral nail also acts as a buttress in preventing the medialization of the

shaft.^{13,14} Recent data suggests intra-medullary devices have been very good with union rates up to 100% compared with other extra-medullary devices which show union up to 80% only.^{15,16} Contrast to our study, In a study by Cyril Jonnes *et al.*, there was not much significance between the two groups.¹⁷ In our study, PFN group (0.78 ± 0.5 hours) had significantly less time for duration of surgery than DHS group (1.35± 0.3 hours) ($p < 0.05$). Time of union in group 1 (2.47± 0.4 months) was significantly higher in group 1 (DHS) than Group 2 (2.1±0.3) (PFN). In our study, Group 1 patients had significantly (09) more complications than Group 2 (04) patients ($p < 0.05$). In a study by Venkatesh Gupta *et al.*, A comparison of intra-operative, early and late complication rates revealed no statistically significant differences between study groups ($P = 0.324$ for intra-operative complications, $P = 0.223$ for early complications, and $P = 0.357$ for late complications).¹²

CONCLUSION

PFN is better than DHS with respect to functional outcome, duration of surgery, union time and post operative complications.

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