Comparative study on evaluation of results of DHS/PFN in management of intertrochanteric fractures femur

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Abstract

Introduction: lntertrochanteric fractures constitute 38-50% of all femoral fractures' and 5-20% of fractures as whole. These fractures are common in elderly population with the incidence of 180/10000. Though dynamic hip screw is considered as a gold standard in the management of intertrochanteric fractures, its role is debatable in the management of unstable intertrochanteric fractures and intramedullary devices such as PFN are considered better implants for these fractures

Materials and Methods: The study was conducted on 100 patients with intertrochanteric fracture femur attending the outpatient and emergency department of M.L.B. Medical College, Jhansi between December 2015 to November 2017. The patients were assessed clinically and radiologically and were divided randomly in two groups A and B, patients of group A were treated by — ORIF with Dynamic hip screw and of group B were treated by closed /open reduction internal fixation with long PFN. Patients personal information, clinical findings, radiological findings and follow-up findings were recorded in the working proforma as below. The results were evaluated and compared.

Results: The mean age in both the groups was 59.88 ± 16.90 years, In DHS group, there were 5(10%) females and 45(90%) males. In PFN group, there were 13(26%) females and 37(74%) males. There was a male preponderance in both the groups in comparison to the females. In PFN group, there were 30(60%) patients who injured because of fall, while 20(40%) were injured due to RTA. In PFN group, higher number of fall patients were there, while in DHS group, higher number of RTA patients were there. The comparison of mean blood loss in both the groups showed a statistically significant difference ($P < 0.0001$), with a higher mean blood loss in DHS group in comparison to PFN group.

In DHS group, there were 4(8%) patients who had blood loss between 50-100 ml, in 6(12%) the blood loss was between 101-200 ml, in 16(32%) patients it was between 201-300 ml, in 16(32%) patients it was between 301-40 ml and in 8(16%) patients it was more than 400 ml. In PFN group, there were 44(88%) patients who had blood loss between 50-100 ml, in 6(12%) the blood loss was between 101-200 ml and none of the patients had a blood loss of more than 200 ml. In DHS group, 46(92%) patients had no complications, 1(2%) had DVT and 1(2%) had cut out of screw, 2(4%) had infection. In PFN group, 1(2%) had infection, 49(98%) shows no complication.

Interpretation and conclusion: In intertrochanteric fractures femur.

PFN helps in achieving biological reduction and imparts stability. PFN prevents excessive collapse and limb shortening. Thus it helps in achieving overall good functional outcome.

PFN is a load bearing device and gives stability of fracture area proximally and shaft distally, therefore biomechanically PFN is better choice of implant for fixation of peritrochanteric femoral fractures.

PFN is better choice of implant than DHS in terms of blood loss during surgery and early rehabilitation.

Therefore we advocate the use of PFN in comparison to DHS in intertrochanteric fractures femure except when trochanteric entry point for the PFN is fractured.

Keywords: It's comparative study.

Introduction

Lntertrochanteric fractures constitute 38-50% of all femoral fractures' and 5-20% of fractures as whole. These fractures are common in elderly population with the incidence of 180/10000, though can occur at any age. With the modern methods of treatment and healthy living, life expectancy of Indian population has almost doubled from 35 years at independence to 66.4 years in 2013 resulting in enormous increase in elderly population. Number of high speed vehicles on roads have also increased tremendously and hence enormous increase in road traffic accidents and these fractures. Though dynamic hip screw is considered as a gold standard in the management of intertrochanteric fractures, its role is debatable in the management of unstable intertrochanteric fractures and intramedullary devices such as PFN are considered better implants for these fractures.

Intramedullary device (PFN) is a load sharing devices, Provide more biomechanical strength than DHS, permit early mobilization, minimally invasive, can be performed with closed procedures without further jeopardizing the vascularity and soft tissue envelop, permits better rotational stability even in osteoprosed bone of elderly'.

On the other hand, dynamic hip screw is load sparing device, needs extensive soft tissue stripping which further jeopardize, the vascularity of periosteum and bone, but its biomechanical properties like short liver arm, greater implant strength additional antirotation screw in the femoral neck and possibility of anatomical reduction have their own advantages making it gold standard in the management of intertrochanteric fractures.

Materials and Methods

The study was conducted on 100 patients with intertrochanteric fracture femur attending the outpatient and emergency department of M.L.B. Medical College, Jhansi between December 2015 to November 2017.

The patients were assessed clinically and radiologically and were divided randomly in two groups A and B, patients of group A were treated by — ORIF with Dynamic hip screw and of group B were treated by closed /open reduction internal fixation with long PFN.

Patients personal information, clinical findings, radiological findings and follow-up findings were recorded in the working proforma as below. The results were evaluated and compared.

Inclusion Criteria

1. All intertrochantric fractures of <3 week old.

Exclusion Criteria

1. Open fracture.
2. Pathological fracture.
3. Old/neglected fracture of more than 3 weeks old/ or associated fractures in same limb.

Patient not giving consent for any of these modalities of treatment.

Follow up Protocol

Patients were called for follow up every month, on each follow up following aspects were noted
Complaints of pain if any.
Range of hip and knee movements.
Shortening.
Whether the patient assumes his/ her occupation to previous injury state.
Able to sit cross-legged, squat.
Walking ability with or without support.

Results

In our study in DHS group, there were 5(10%) females and 45(90%) males. In PFN group, there were 13(26%) females and 37(74%) males. There was a male preponderance in both the groups in comparison to the females In DHS group, there were 34(68%) patients who injured because of RTA, while 16(32%) were injured due to fall in PFN group, we used long PFN rather than conventional PFN, because conventional PFN has disadvantages of mid thigh pain and stress fracture. In PFN group, there were 30(60%) patients who injured because of fall, while 20 (40%) were injured due to RTA. In PFN group, higher number of fall patients were there, while in DHS group, higher number of RTA patients were there. The comparison of mean blood loss in both the groups showed a statistically significant difference (P < 0.0001), with a higher mean blood loss in DHS group in comparison to PFN group.

In DHS group, there were 4 (8%) patients who had blood loss between 50-100 ml, in 6(12%) the blood loss was between 101-200 ml, in 16(32%) patients it was between 201-300 ml, in 16(32%) patients it was between 301-40 ml and in 8(16%) patients it was more than 400 ml.

In PFN group, there were 44(88%) patients who had blood loss between 50-100 ml, in 6(12%) the blood loss was between 101-200 ml and none of the patients had a blood loss of more than 200 ml.

In DHS group, 46 (92%) patients had no complications, 1(2%) had DVT and 1(2%) had cut out of screw, 2(4%) had infection.

In PFN group, 1(2%) had infection, 49(98%) shows no complication. In DHS group, in 2(4%) patient the union time was 2-3 months, in 26(52%) it was 3-4 months and in 22(44%) it was more than 4 months. The mean time for union in DHS group was 4.16 ± 0.47 months.

In PFN group, in 26 (52%) patients the union time was 1-2 months, in 22(44%) patient the union time was 2-3 months and in 2(4%) it was 3-4 months. The mean time for union in PFN group was 2.20 ± 0.50 months.

The difference in mean union time was significant (P < 0.0001) with a higher union time in DHS group in comparison to PFN group.

Observations and Results

Table 1: Distribution of patients according to type of fixation (N=100)

Type of Fixation	Number	Percentage
DHS	50	50%
PFN	50	50%
Total	100	100%

Table 2: distribution of patients according to age group in both the groups (n=100)

Age Group	DHS Group (n=50)		PFN Group (n=50)	
	No.	%	No.	%
<21 years	0	0%	0%	0%
21-50 years	03	06%	07	14%
51-70 years	43	86%	42	82%
71-80 years	04	08%	01	02%
>80 years	00	0%	00	00%

Table 3: Distribution of patients according to gender in both the groups(n=100)

Gender	DHS Group (n=50)		PFN Group (n=50)	
	No.	%	No.	%
Female	05	10%	13	26%
Male	45	90%	37	74%
Total	50	100%	50	100%

Table 4: Distribution of patients according to mode of injury in both the groups(n=100)

Mode of Injury	DHS Group (n=50)		PFN Group (n=50)	
	No.	%	No.	%
RTA	34	68%	20	40%
Fall	16	32%	30	60%
Total	50	100%	50	100%

Table 5: Distribution of patients according to duration of surgery in both the groups (N=100)

Duration of Surgery	DHS Group (n=50)		PFN Group (n=50)	
	No.	%	No.	%
<= 60 min	45	90.00%	23	46.00%
61-120 min	05	10.00%	27	44.00%
>120 min	00	00	00	00
Total	50	100%	50	100%
Mean ± SD (min)	51.88 ± 9.09		73.34 ± 16.27	
P Value	0.0001			

Table 6: Distribution of patients according to blood loss in both the groups (N=100)

Blood Loss	DHS Group (n=50)		PFN Group (n=50)	
	No.	%	No.	%
50-100 ml	4	8%	44	88%
101-200 ml	6	12%	6	12%
201-300 ml	16	32%	0	0%
301-400 ml	16	32%	0	0%
>400 ml	8	16%	0	0%
Total	50	100%	50	100%
Mean ± SD (in ml)	260.8 ± 91.60		69.68 ± 17.84	
P Value	0.0001			

Table 7: Distribution of patients according to complications in both the groups (N=100)

Complications	DHS Group (n=50)		PFN Group (n=50)	
	No.	%	No.	%
Nil	46	92%	49	98%
Infection	2	4%	1	2%
DVT	1	2%	0	0%
Cut out of screw	1	2%	0	0%
Cut-out of stabilizing screw	0	0%	0	0%

Table 8: Comparison of mean harris HIP score at 3 months, 6 months and 12 months in DHS group (N=50)

Time Period	Mean ± SD
6 weeks	74.36 ± 0.48
12 weeks	77.62 ± 0.49
3 months	78.44 ± 0.50

Table 9: Comparison of mean harris HIP score at 3 months, 6 months and 12 months in PFN group (N=50)

Time Period	Mean ± SD
6 weeks	80.4 ± 0.49
12 weeks	84.5 ± 4.50
3 months	88.56 ± 0.50

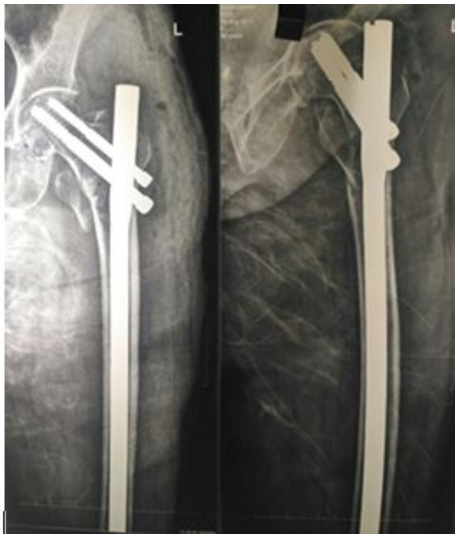
Table 10: Comparison of mean harris hip score at 3 months, 6 months and 12 months between DHS and PFN groups (N=100)

Time Period	DHS Group [Mean ± SD]	PFN Group [Mean ± SD]	P Value
3 months	74.36 ± 0.48	80.4 ± 0.49	0.0001
6 months	77.62 ± 0.49	84.5 ± 4.50	0.0001
12 months	78.44 ± 0.50	88.56 ± 0.50	0.0001

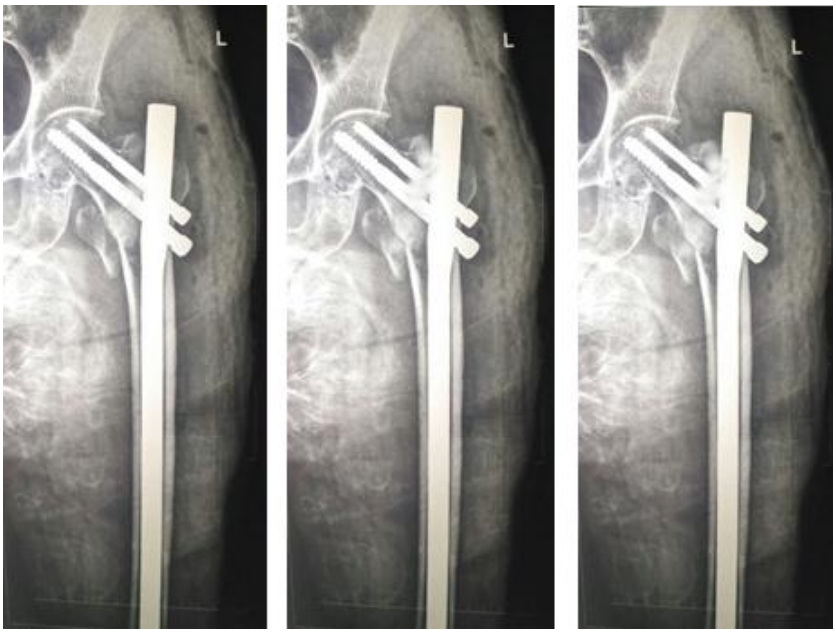
Case 1

Bhagwati age -60 years sex –female

Pre-op x-ray



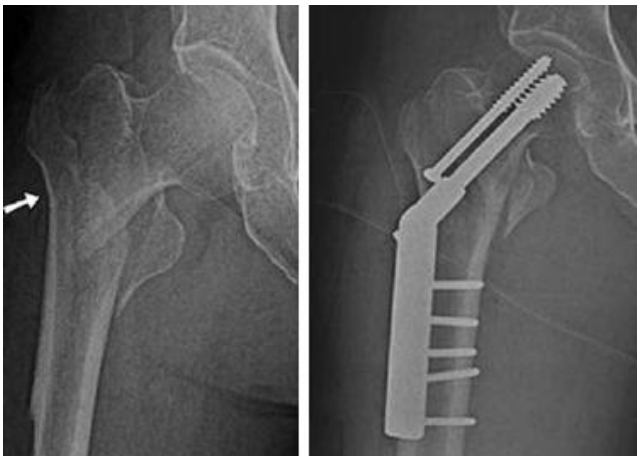
Immediate post-op



6 weeks post-op 3 months post-op 6 months post-op

Fig A **Fig B** **Fig C**

Case 2
Lalluram Age - 57 Years Sex – Male



Pre-op x-ray **Immediate post-op**

6 weeks post-op 3 months post-op 6 months post-op

Discussion

Pertrochanteric hip fractures still are a major orthopaedic challenge, and those that are unstable have the poorest prognosis

Despite the fact that union rates are high in intertrochanteric hip fractures, functional outcomes tend to be disappointing.

Peritrochanteric fractures AO type 31-A2.2 – A3.3 are unstable & have poorest prognosis. This extremely unstable fracture results in a severe and prolonged period of postoperative disability. Fracture collapse is one of the postoperative complications reported in association with these fractures.

Duty of every orthopaedic surgeon is to get the patient up and out of bed with little pain as soon as possible while causing minimal surgical trauma to the already traumatized patients. In DHS group, there were 34(68%) patients who injured because of RTA, while 16(32%) were injured due to fall.

In PFN group, we used long PFN rather than conventional PFN, because conventional PFN has disadvantages of mid thigh pain and stress fracture.

In PFN group, there were 30(60%) patients who injured because of fall, while 20(40%) were injured due to RTA. In PFN group, higher number of fall patients were there, while in DHS group, higher number of RTA patients were there. The comparison of mean blood loss in both the groups showed a statistically significant difference ($P < 0.0001$), with a higher mean blood loss in DHS group in comparison to PFN group.

In DHS group, there were 4(8%) patients who had blood loss between 50-100 ml, in 6(12%) the blood loss was between 101-200 ml, in 16(32%) patients it was between 201-300 ml, in 16(32%) patients it was between 301-40 ml and in 8(16%) patients it was more than 400 ml.

In PFN group, there were 44(88%) patients who had blood loss between 50-100 ml, in 6(12%) the blood loss was between 101-200 ml and none of the patients had a blood loss of more than 200 ml.

In DHS group, 46(92%) patients had no complications, 1(2%) had DVT and 1(2%) had cut out of screw, 2(4%) had infection.

In PFN group, 1(2%) had infection, 49(98%) shows no complication. Average screw impaction (Fracture collapse) was 6mm. Jacobs et al reported that the average fracture settling in stable patterns was 5.3 mm and in unstable patterns was 15.7 mm. Sliding of more than 15mm leads to a higher prevalence of fixation failure. Rha et al reported that excessive sliding was the major factor causing fixation failure in unstable fracture patterns. Average limb length discrepancy was 6 mm. Gross et al. found no noticeable functional or cosmetic problems in a study of seventy-four adults who had less than 2 centimetres of discrepancy[103] and thirty-five marathon runners who had as much as 2.5 centimetres of discrepancy[104].

Normal healing time of a fracture is about 12 wks. Intertrochanteric non-union should be suspected in patients with persistent hip pain that have x-rays revealing a persistent radiolucency at the fracture site 4 to 7 months after fracture fixation. Progressive loss of alignment strongly suggests non-union, although union may occur after an initial change in alignment, particularly if fragment contact is improved.[105] Average healing time in the study was 12 weeks. In DHS group, in 2(4%) patient the union time was 2-3 months, in 26(52%) it was 3-4 months and in 22(44%) it was more than 4 months. The mean time for union in DHS group was 4.16 ± 0.47 months.

In PFN group, in 26(52%) patients the union time was 1-2 months, in 22(44%) patient the union time was 2-3 months and in 2(4%) it was 3-4 months. The mean time for union in PFN group was 2.20 ± 0.50 months.

The difference in mean union time was significant ($P < 0.0001$) with a higher union time in DHS group in comparison to PFN group.

Conclusion

In intertrochanteric fractures

1. PFN helps in achieving biological reduction and imparts stability. PFN prevents excessive collapse and limb shortening. Thus it helps in achieving overall good functional outcome.
2. PFN is a load bearing device and gives stability of fracture area proximally and shaft distally, therefore biomechanically PFN is better choice of implant for fixation of peritrochanteric femoral fractures.
3. PFN is better choice of implant than DHS in terms of blood loss during surgery and early rehabilitation.
4. Therefore we advocate the use of PFN in comparison to DHS in intertrochanteric fractures femure except when trochanteric entry point for the PFN is fractured.

Complications

In DHS group, 46(92%) patients had no complications, 1(2%) had DVT and 1(2%) had cut out of screw, 2(4%) had infection, in PFN group, 1(2%) had infection, 49(98%) shows no complication.

Conflict of Interest: None.

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