ORIGINAL ARTICLE

OUTCOME OF PERITROCHANTERIC FRACTURES TREATED WITH PROXIMAL FEMORAL NAIL VERSES DYNAMIC COMPRESSION SCREW

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ABSTRACT: OBJECTIVES: The objective of this study is to compare the results of proximal femoral nail intramedullary fixation device verses dynamic compression screw with extramedullary device in the treatment of peritrochanteric fractures. **METHODOLOGY:** A prospective study from June 2012 to Aug 2013, including 50 patients with intertrochanteric fractures. In group I 25 patients were treated with long proximal femoral nail intramedullary fixation and Group II 25 patients treated with dynamic hip screw with extramedullary device for peritrochanteric fractures. Clinical assessments regarding pain and function, radiological assessment were undertaken at the final follow-up. **RESULTS:** Fracture healing was observed at an average of 6 weeks in Group I and 7 weeks with Group II. Excellent and good results were obtained in Group I with 88%, fair in 12 %. No case with poor results. In Group II, 80% showed excellent and good, 16% with fair and 4% with poor results. **CONCLUSION:** From this sample study, we consider that PFN is an excellent implant for the treatment of peritrochanteric fractures. The terms of successful outcome include a good understanding of fracture biomechanics, proper patient selection, good preoperative planning, accurate instrumentation, good image intensifier.
KEYWORDS: Peritrochanteric fractures, PFN, DHS, intramedullary fixation.

INTRODUCTION:

- Peritrochanteric fractures are devastating injuries that most commonly affect the elderly and also in young, have a tremendous impact on both the health care system and society in general.(1)
- Peritrochanteric fractures mainly comprise of fractures of trochanter and subtrochanteric region.
- Despite marked improvements in implant design, surgical technique and patient care, peritrochanteric fractures continues to consume a substantial proportion of our health care resources.(2)
- Peritrochanteric fracture is a leading cause of hospital admissions in elderly people.
- Conservative methods of treatment results in malunion with shortening and limitation of hip movement as well as complications of prolonged immobilization like bed sores, deep vein thrombosis and respiratory infections.(3)
- There are various forms of internal fixation devices used for peritrochanteric Fractures; of them the most commonly used device is the Dynamic Hip Screw with Side Plate assemblies. This is a collapsible fixation device, which permits the proximal fragment to collapse or settle on the fixation device, seeking its own position of stability.(4)

- The more latest implant for management of peritrochanteric fractures is PROXIMAL FEMORAL NAIL, which is also a collapsible device with added rotational stability.[5]
- This implant is a centromedullary device and biomechanically more sound.[6]
- It also has other advantages like small incision, minimal blood loss.[7]

METHODOLOGY:

- It is a prospective randomised comparative study which was carried out from June 2012 to August 2013 in Bapuji Hospital and Chigateri General Hospital attached to J.J.M. Medical College, Davangere.
- In group I 25 patients were treated with long proximal femoral nail intramedullary fixation
- Group II 25 patients treated with dynamic hip screw with extramedullary device for peritrochanteric fractures.
- Clinical assessments regarding pain and function, radiological assessment were undertaken at the final follow-up.

CRITERIA FOR SELECTION OF PATIENTS:

INCLUSION CRITERIA:

- Sub trochanteric fractures
- Stable and unstable intertrochanteric fractures{Reverse oblique fractures and Inter trochanteric fractures with loss of posteromedial cortex}

EXCLUSION CRITERIA:

- Inter trochanteric fractures involving piriformis fossa.
- Open hip fractures.
- Pathological fractures.
- Periprosthetic fractures.
- Pediatric fractures (before physeal closure).
- Pt not willing for surgery.
- Pt unfit for surgery.

DATA COLLECTION:

1. Demographic information,
2. Trauma mechanism,
3. Type of fracture,
4. Time between injury and definitive stabilization,
5. Surgical time,
6. Complications.

PRE-OP PLANNING:

- Determination of nail diameter: Nail diameter was determined by measuring diameter of the femur at the level of isthmus on an AP x ray.

- Determination of neck shaft angle: Neck shaft angle was measured on the unaffected side on an AP x-ray using goniometer.
- Length of the nail: A standard length PFN nail (250mm) is used in all our cases.
- All patients operated under spinal anaesthesia after achieving satisfactory reduction with fracture table under image intensifier guidance.

AFTER TREATMENT:

- Sutures removed on 10th postoperative day.
- Patients were encouraged to sit in the bed after 24 hours after surgery. Patients were taught quadriceps setting exercises and knee mobilization in the immediate post-operative period.
- Patient was taught gait training before discharge from the hospital. Only in very unstable fracture patterns weight bearing was not advised.

RESULTS:

1. The time required for PFN (mean 90min, range 75-130 min) was found to be more than that required for DHS (mean 80min, range 60-110 min). But this time difference was not significant (P=0.07, unpaired t test).
2. Intraoperative complication and delayed complication are described in the following table.
3. Mean time for weight bearing in PFN is (10.5+/-2.5 wks) and in DHS is (11.5+/-2.4wks).But this time differences not significant (p=0.16, unpaired t test).

FOLLOW UP: All patients were followed at 6 weeks, 12 weeks, 6 months and some patients upto one year and further if necessary.

At each follow up radiograph of operated hip with upper half femur was taken and assessed for fracture union and implant failure and screw cut out.

DISCUSSION: The treatment of peritrochanteric fractures of the proximal femur is still associated with some failures.

The reasons are disregard for biomechanics, overestimation of the potentials of new surgical techniques or new implants or poor adherence to established procedures.[8]

PFN provides rotation stability by the de rotation screw.[9]

From the mechanical point of view, a combined intramedullary device inserted by means of minimally invasive procedure seems to be better in elderly patients.

Closed reduction preserves the fracture haematoma, an essential element in the consolidation process.

Intramedullary fixation allows the surgeon to minimize soft tissue dissection there by reducing surgical trauma, blood loss, infection, and wound complications.[10]

In our study the mean time for full weight bearing is not significant in both groups.

Our study showed 2 cases of implant failure, 6 cases of shortening>1 cm and limp in Group II, which was not seen in Group I.(P=< 0.001) which is highly significant. PFN group has functionally better outcome [22 (88%) pts had excellent and good results, no case of poor

results] compared to DHS group [20 (80%) pts excellent and good, 4 fair and 1 case of poor result].

CONCLUSION: From this sample study, we consider that PFN is an excellent implant for the treatment of peritrochanteric fractures.

The terms of successful outcome include a good understanding of fracture biomechanics, proper patient selection, good preoperative planning, accurate instrumentation, good image intensifier.

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Fig. 1: PFN case 1 Preop X-ray

Fig. 2: pfn case1 immediate post op x-ray

Fig. 3: pfn case 16 week post op x ray

Fig. 4: pfn case 16 months post op x-ray

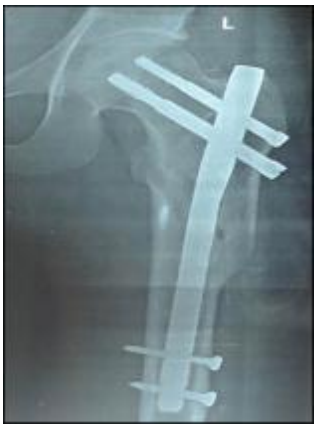

Fig. 5: pfn case1 1 yr post op x-ray

Fig. 6: pfn case 1 clinical photo hip flexion post op

Fig. 7: pfn case 1 clinical photo straight leg raising test post op

Fig. 8: pfn case 1 clinical photo sitting cross legged post op

Fig. 9: pfn case 2 pre op x ray

Fig. 10: pfn case2 immediate post op x ray

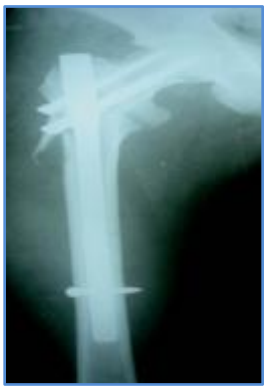

Fig. 11: pfn case 2 6weeks postop x ray

Fig. 12: pfn case3 6 months post op x ray

Fig. 13: pfn case 3 1yr post op x-ray

Fig. 14: pfn case2 clinical photo straight leg raising post op

Fig. 15: pfn case 2 clinical photo squatting post op

Fig. 16: dhs case 1 pre op x-ray

Fig. 17: dhs case1 immediate postop x-ray

Fig. 18: dhs case 1 post op follow up

Fig. 19: dhs case 1 clinical photo squatting post op

Fig. 20: dhs case1 clinical photo sitting cross legged post op

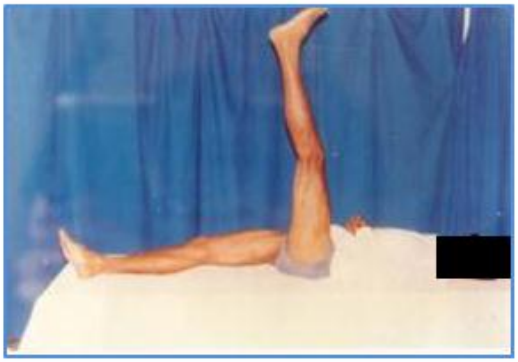

Fig. 21: dhs case1 clinical photo straight leg raising post op

Fig. 22: dhs case 2 pre op x-ray

Fig. 23: dhs case2 immediate post op x-ray

Fig. 24: dhs case 2 post op follow up

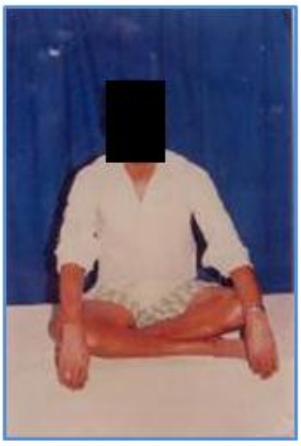

Fig. 25: dhs case 2 clinical photo

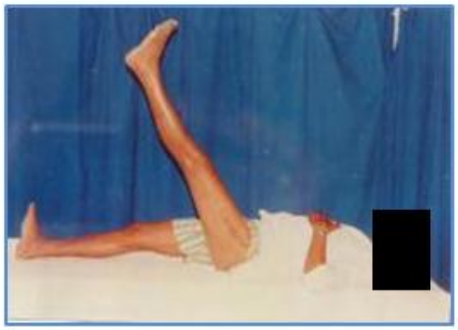

Fig. 26: dhs case2 clinical photo straight leg raising post op

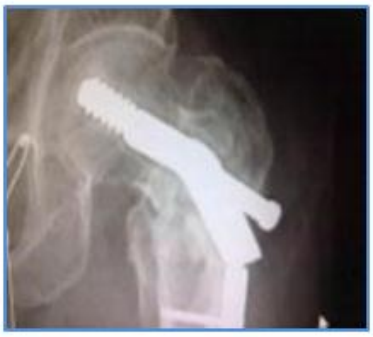

Fig. 27: slide plate breakage in type4 fracture

Fig. 28: screw cut out in dhs group

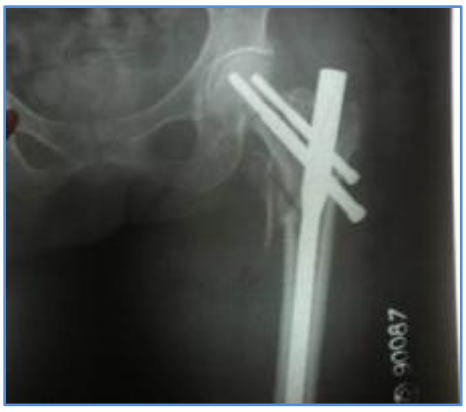

Fig. 29: screw cut out in dhs group treated with implant removal and revision surgery with pfn

1. AGE DISTRIBUTION:

	PFN		DHS		
AGE	CASES	%	CASES	%	TOTAL
21-40	7	28%	6	24	13
41-60	11	44%	10	40	21
61-80	6	24%	8	32	14
81-100	1	4%	1	4	2

2. TYPE OF FRACTURES:

	PFN		DHS		
TYPE	CASES	%	CASES	%	TOTAL
TROCHANTERIC	15	60	20	80	35
SUBTROCHANTERIC	10	40	5	20	15

3. TROCHANTERIC # CLASSIFIED BY BOYD AND GRAFFIN:

	PFN		DHS		
TYPE	CASES	%	CASES	%	TOTAL
I	2	13.3	4	20	6
II	6	40	7	35	13
III	5	33.3	6	30	11
IV	2	13.3	3	15	5

4. SUBTROCHANTERIC CLASSIFICATION BY SEINSHEIMER:

	PFN		DHS		
TYPE	CASES	%	CASES	%	TOTAL
I	0	0	0	0	0
II a	1	10	0	0	1
II b	1	10	1	20	2
II c	2	20	1	20	3
III a	3	30	2	40	5
III b	3	30	1	20	4
IV	0	0	0	0	0
V	0	0	0	0	0

5. DURATION OF SURGERY:

INTRA OPERATIVE	PFN	DHS
Mean duration of screening (in sec)	80	80
Mean duration of operation (in min)	90	80
Mean blood loss in ml	120	150-180

6. INTRAOPERATIVE COMPLICATION:

Intra operative complications	PFN	DHS
Open reduction	2	2
Failure to get anatomical reduction	3	3
Failure to put derotation screw	2	-
Varus angulation	2	3

7. DELAYED COMPLICATION AT 6 MONTHS FOLLOW UP:

COMPLICATION	PFN	DHS
Delayed union	2	1
Varus malunion	2	3
Implant failure	0	2
Non union	0	0
Shortening > 1 cm	1	6
Knee stifness	1	2
limp	0	5

8. FUNCTIONAL ASSESSMENT:

RESULT	PFN	%	DHS	%
EXCELLENT	12	48	11	44
GOOD	10	40	9	36
FAIR	3	12	4	16
POOR	0	0	1	4

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