

## Original Research Article

# Proximal femoral nail antirotation II in fixation of intertrochanteric fractures: retrospective and prospective observational study

Arvind Kumar S. M., Arun Kumar B.\*

Department of Orthopaedics, PSG IMS and R, Coimbatore-4, Tamil Nadu, India

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**\*Correspondence:**

Dr. Arun Kumar B.,

E-mail: [arunbala2007@gmail.com](mailto:arunbala2007@gmail.com)

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### ABSTRACT

**Background:** Intertrochanteric fractures occur mostly in elderly patients, and the outcome may be extremely poor if there is prolonged bed-rest. The best treatment for trochanteric fracture remains controversial. Proximal femoral nail antirotation (PFNA) II has excellent fit as the design is adapted to the anatomical situation of small statured patients also. It has a medial lateral angle of 5 degrees. It has several distal locking options viz static/dynamic. Objective of this study was to observe the operating time, blood loss and fracture union in intertrochanteric fractures treated with PFNA II from the data collected from patient's case sheets and post-operative X-rays.

**Methods:** 25 patients who were operated with PFNA II for unstable intertrochanteric fracture were selected using random selection and following parameters were noted from the records.

**Results:** The mean age of the participants is  $70.72 \pm 8.55$  years with range from 52 years to 89 years. The mean duration was 1.98 hours  $\pm 0.66$ . The median duration was 2 with interquartile range from 1.5 to 2.5 hours. Mean blood loss was estimated to be  $390 \text{ ml} \pm 62.78$ . The median blood loss was 370 ml with interquartile range from 360 to 420 ml.

**Conclusions:** The PFNA II is an ideal implant for unstable intertrochanteric fracture since stable intramedullary fixation can be achieved with almost 100% union in the studied population.

**Keywords:** Intertrochanteric fractures, PFNA2, Proximal femoral nailing

### INTRODUCTION

Intertrochanteric fractures occur mostly in elderly patients, and the outcome may be extremely poor if there is prolonged bed-rest. The best treatment for trochanteric fracture remains controversial.<sup>1-3</sup> Many methods have been recommended.<sup>4-6</sup> Stable fixation that allows early mobilization is the treatment of choice. Cephalomedullary devices are favored as the treatment for unstable A2 and A3 fractures, especially in the absence of medial buttressing.<sup>2,3,6,7</sup> While there are numerous operative devices for treatment of trochanteric fractures, none of them are totally free of complications. There is no advantage to an intramedullary nail versus a sliding compression hip screw for low-energy pertrochanteric

fractures classified by arbeitsgemeinschaft für osteosynthesefragen/orthopaedic Trauma Association (AO/OTA) 31-A1 and A2, specifically given its increased cost and the lack of evidence to show decreased complications or improved patient outcome.<sup>4</sup>

Proximal femoral nail antirotation (PFNA II) has excellent fit as the design is adapted to the anatomical situation of small statured patients also. It has a medial lateral angle of 5 degrees. It has several distal locking options viz static/dynamic.

Insertion of the blade compacts the cancellous bone. The inserted PFNA blade achieves an excellent fit through

bone compaction and requires less bone removal compared to a screw.<sup>6,7</sup>

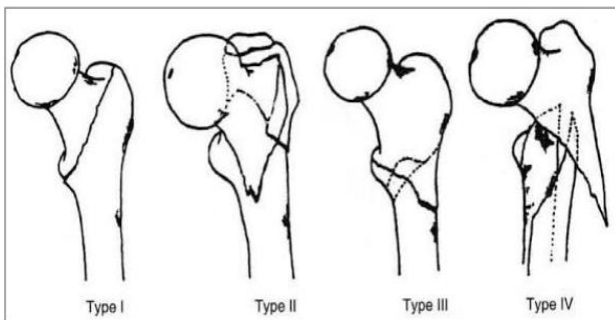
Boyd and Griffin (1949) classified fractures in the trochanteric area of femur into 4 types. Their classification is useful in planning treatment and estimating prognosis.<sup>8,13</sup>

Type 1 fractures that extend along the intertrochanteric line from the greater to the lesser trochanter. Reduction usually is simple and is maintained with little difficulty. Results generally are satisfactory.

Type 2 comminuted fractures, the main fracture being along the line, but with multiple fractures in the cortex. Reduction of these fractures is more difficult because the comminution can vary from slight to extreme.

Type 3 fractures that are basically subtrochanteric with at least one fracture passing across the proximal end of the shaft just distal to or at the lesser trochanter.

Type 4 fractures of the trochanteric region and the proximal shaft, with fracture in at least two planes, one of which usually is the sagittal plane and may be difficult to see on routine anteroposterior radiographs. If open reduction and internal fixation are used, two plane fixations are required because of the spiral, oblique, or butterfly fracture of the shaft.



**Figure 1: Boyd and Griffin classification of intertrochanteric fracture.<sup>13</sup>**

### **Aim**

The aim of the study is to observe the operating time, blood loss and fracture union in intertrochanteric fractures treated with PFNA II. Observe the operating time, blood loss and fracture union in intertrochanteric fractures treated with PFNA II from the data collected from patient's case sheets and post-operative X-rays.

### **METHODS**

It is a retrospective observational study which included 25 Patients diagnosed to have intertrochanteric fractures and treated with PFNA II at our hospital (PSG) during June 2017 to July 2018 were selected for this study.

### **Inclusion criteria**

Inclusion criteria were all Intertrochanteric fractures treated with PFNA II. Patients willing for treatment and given written informed consent.

### **Exclusion criteria**

Exclusion criteria were pathological fractures, infection, treated after 3 weeks of trauma, patients medically unfit for surgery, compound fractures associated with vascular injuries, ipsilateral femoral shaft fractures and pelvic fractures, patients not willing for treatment, and open reduction done.

25 patients who were operated with PFNA II for unstable intertrochanteric fracture were selected using random selection and following parameters were noted from the records. The criteria taken into consideration were duration of surgery, intra operative blood loss, post-operative X-ray for assessment of union after 6 weeks and the data was statistically analysed.



**Figure 2: Immediate post-operative X-ray of patient 10.**



**Figure 3: 6 Weeks follow up X-ray of patient 5.**

### **RESULTS**

The mean age of the participants is 70.72 (SD±8.55) years with range from 52 years to 89 years.

**Table 1: Duration of Surgery.**

S. no	Duration (hours)
1	2.5
2	2
3	1.5
4	1.5
5	3
6	1.5
7	3
8	2
9	1.5
10	1.5
11	3
12	2
13	2
14	1
15	1.5
16	1
17	2
18	2.5
19	1.5
20	3
21	2.5
22	1.5
23	2.5
24	2
25	1.5

**Table 2: Blood loss.**

S. no	Blood loss (ml)
1	480
2	370
3	400
4	360
5	520
6	320
7	550
8	360
9	450
10	310
11	360
12	370
13	390
14	420
15	400
16	380
17	360
18	310
19	360
20	450
21	330
22	390
23	440
24	320
25	350

The mean duration was 1.98 hours (SD±0.66). The median duration was 2 with interquartile range from 1.5 to 2.5 hours. Mean blood loss was estimated to be 390 ml (SD±62.78). The median blood loss was 370 ml with interquartile range from 360 to 420 ml.

**DISCUSSION**

PFNA II is a newer device used in fixation of intertrochanteric fracture. Previously, most surgeons used the dynamic hip screw as the choice of implant for intertrochanteric fracture. In this study the advantages of the device have been studied by means of operating time, blood loss and fracture union. Among the cases studied the mean blood loss was found to be very low when compared with that of dynamic hip screw (DHS) as quoted in the few studies. The operating time has been found to be reduced (statistically significant p<0.001) when this is compared with that of DHS.<sup>10-14</sup>

The blood loss in our study was lesser in this study when compared to most other studies that used DHS.<sup>12-16</sup> The difference in blood loss was statistically significant (p<0.001) with 95% C.I. Since this method of nail insertion uses small incisions and less soft tissue dissection, the mean blood loss is very less.

The simple operating steps reduces the duration of the surgery when compared to that of the DHS. The mean duration of surgery was less than 2 hours. This difference is statistically significant (p<0.001).<sup>18-24</sup> There was almost 100% union noted in this study than the previous studies, hence there is no worry for the operating surgeon about the fracture union.<sup>13,27-31</sup>

**CONCLUSION**

The PFNA II is an ideal implant for unstable intertrochanteric fracture since stable intramedullary fixation can be achieved with almost 100% union in the studied population. The PFNA II was easy and quicker procedure with minimally invasive technique and minimal blood loss when compared with previous studies that used the dynamic hip screws.

**Limitations**

Small sample size and short duration of follow up.

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