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ORIGINAL RESEARCH

A randomised retrospective comparative study of intertrochanteric fracture treated with pfn v/s pfna2: an original research

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ABSTRACT

Introduction: The therapy of intertrochanteric fractures in older patients presents a significant problem for today's orthopaedic surgeons. Extramedullary implants, such as dynamic hip screws, have given way to intramedullary implants, such as PFNA2 nail types. This represents an evolution in the implants. Early mobilisation of the patient is the primary objective of treating such fractures, which almost never result in complications such as non-union. This is done to avoid the consequences that can arise from being bedridden for an extended period of time.

Materials and procedures: From 2015 and 2020, the current study comprised a total of 100 different patients. The PFNA and PFNA2 nails treatment was administered to a total of 50 individuals. Current study took note of patients' ages and sexes, as well as the nature of their injuries, any concomitant ailments, and any comorbidity. There was a classification of fracture patterns.

Results: When compared to the PFNA implant, our findings showed that the PFNA2 procedure resulted in reduced intraoperative blood loss and improved outcomes with regard to the rates of nonunion.

Conclusion: The PFNA2 implant is superior to other options in terms of the intraoperative issues it causes, the amount of blood it requires, and the union rates it achieves.

Key words: Intertrochanteric, Fracture, PFN, PFNA2, femoral surgery.

INTRODUCTION

Proximal femoral fractures have been on the rise all over the world due to factors such as an increase in life expectancy, which has led to an increase in osteoporosis among the senior

population, as well as an increase in the number
of road traffic accidents among younger people [1, 3]. It is anticipated that the overall number of trochanteric fractures will reach 1.6 million by the year 2025 and 2.5 million by the year 2050. This percentage is anticipated to climb to 32% in 2025 and 38% in 2050 [4]. In 1990, 26% of all intertrochanteric fractures were documented in Asia. In 2025 and 2050, this figure is expected to rise even more. Concerns about insufficient management of trochanteric fractures mostly centre on the potential for immediate instability and chronic mal-union, both of which can lead to post-injury deformity. Fractures in the intertrochanteric region carry a modest probability of causing a disturbance in the blood supply to the head of the femur. The sub-trochanteric region is subject to relatively high biomechanical stress during normal weight bearing and ambulation. This, in addition to the pull of the muscles attached to the proximal fragment, makes sub-trochanteric fractures predominantly challenging to treat, with an increased rate of complications including non-union and implant failure. While treating such injuries, the goal is to limit the amount of displacement that occurs and to stabilise the area using implants in order to permit early mobilisation and weight bearing while the fracture is healing [5].In the debate between extramedullary implants and intramedullary implants, a large number of publications have been published [5, 7]. The biomechanical qualities of an intramedullary implant are superior, and it is also more resistant to failure. [8]. Both the PFNA and the PFNA2 are intramedullary implants that have an angulation of 6 degrees at the proximal end. When the helical blade is forced inside the femoral head, it causes the cancellous bone to become more compressed. This compaction enhances the strength of the femoral head and boosts the bone's stability in the cervico-cephalic direction. It is technically preferable to use a PFNA2 with a single helical blade for patients from Asian populations who have short femurs. When it comes to biomechanics, the helical blade of PFNA2 offers superior levels of cut-out resistance to screws [9].Current study investigated the various characteristics of PFNA and PFNA2 fixation in the treatment of intertrochanteric fractures of the femur in a retrospective study.

MATERIAL AND METHODS

This is an observational randomised retrospective comparativestudy with 100 participants in each group. According to the hospital data, a total of 100 patients received PFNA and PFNA2 implant between the years 2015 and 2020. The discoveries made during the operation were documented. Postoperative findings were reviewed and compared in terms of clinical, radiological, and functional assessment at intervals of two weeks, six weeks, three months, and six months after surgery. These assessments were performed respectively.

STATISTICAL TECHNIQUES

For the purpose of data collection, a programme known as SPSS was utilised (version 20.0 for Windows; SPSS, Chicago, IL). Descriptive statistics were utilised in order to investigate both the patient and their characteristics, in addition to the important outcome variables.

RESULTS

For the purposes of the study, cases that were operated on with PFN Implants and PFNA2 Implants were, respectively, assigned to Group A and Group B. The average age of our patients was 63.2 years, with a standard deviation of 15.13 years. The gender distribution of Group A revealed that there were 80% males and 20% females, but the gender distribution of Group B showed that there were 75% males and 25% females. Accidents involving other vehicles were the cause of injury for 26% of patients in Group A and 42% of patients in Group B, while falls were the cause of injury for 77% of patients in Group A and 65% of patients in Group B. In Group A, 7% of patients experienced difficulties during the operation,

while 11% of patients experienced issues after
the procedure. Patients who were treated with PFN A2 screws did not experience any difficulties in the late postoperative period. In contrast, non-union occurred in 15% of patients who were treated with PFN, but union occurred in all patients who were given PFN A2. Table 1It was found that there was a statistically significant difference between the two groups in terms of the amount of blood that was lost. In 87% of patients treated with PFN, blood transfusion was required, in contrast to just 55% of patients treated with PFN A2. Table 2,357% of patients treated with PFN A2 were able to begin partial weight bearing within 1.5 months, but just 15% of patients treated with PFN were able to do so. In 7% of patients treated with PFN and in 13% of patients treated with PFN A2, there was a difference in the length of the limbs seen. Twelve percent of patients who were treated with PFN experienced malunion. The Harris Hip Score (HHS) of patients treated with PFN A2 was lower than the HHS of patients treated with PFN, which was 83.25± 10.23. Those treated with PFN had a mean HHS of 80.33± 10.26.

Table 1: Full weight bearing status of postoperative patients

Full weight bearing	**Group A%**	**Group B%**	P
Up to 3 months	31	65	0.0225
>3 to 6 months	69	37	

Table 2: Intra operative complications

Intra operative complications	**Group A**	**Group B**
Guide wire breakage	8	0
Iatrogenic fracture	4	0

Table 3: Intra operative blood loss

Blood loss	**Group A %**	**Group B%**	**P**
<100 mL	13	45	**0.0215**
≥100 mL	87	55	

DISCUSSION

The morbidity associated with pertrochanteric fractures is significant, and the prolonged bed rest that is required to treat them can cause many problems (bed sores, pulmonary infections). Osteoporosis makes the situation worse, both in terms of the quality of the fixation and the number of failed implants. In cases of intertrochanteric fracture of the femur, the treatment of choice has been an early combination of fixation and mobilization [10]. Previous implants, such as the Dynamic hip screw, functioned according to the principle of controlled collapse. Extramedullary implants exhibited a high failure rate in lateral wall fractures and a reverse oblique fracture pattern. These were the implants that were being discussed. It was discovered that intramedullary implants have some beneficial biomechanical effects [11]. There have been reports of cemented hip arthroplasties being performed on patients who have highly comminuted and ancient intertrochanteric fractures [12].The uniquely shaped tip of the intramedullary nail is responsible for the significant reduction in the stress concentration that it causes. The helical blade used in PFNA2 offers two distinct benefits. Instead of removing the cancellous bone from the femoral head, as is done with femoral screws, this procedure compacts the cancellous bone that is already present there. In addition to this, in comparison to ordinary screws, it has a larger contact surface area with the cancellous bone of the femur [13].62 patients with Intertrochanteric and Subtrochanteric femur fractures who underwent surgery with either PFNA or PFNA2 implants were included in the study that was published by Loo et al. They found that 83.9% of patients were able to return to their prior mobility level within six months of having surgery. In spite of the fact that they did not come across

any occurrences of helical blade cutoff, they
documented three instances of lateral sliding blade protrusion [9].Bajpai observed in his analysis of 77 patients that both implants (PFN- screw vs helical) were comparable in terms of the amount of time needed for surgery, the functional assessment, the amount of time spent in the hospital, and the amount of blood lost [14].The findings of this investigation are more in line with those of a study carried out by Harshwardhan et al [15], which found that cases operated on with a Helical blade PFNA2 implant required less surgical time, low blood loss, early weight bearing, and less time for the bone to unite.

LIMITATIONS

Yet, current research also has certain drawbacks. The number of people in the sample is low. The procedures were carried out by a number of different surgeons, which led to surgeon bias [15, 16].The consensus would become clearer and pave the way for more confident recommendations for the management of intertrochanteric fractures if there were additional randomised control studies with higher sample sizes over a wide population. A proper intraoperative reduction of fracture fragments, as well as the correct position and length of the femoral screw or helical blade, are still the most critical criteria in determining a favourable outcome of these surgeries [17].

CONCLUSION

Within the limitations of this study, PFNA2 is a superior implant in terms of intraoperative problems, blood requirements, and union rates, to name a few of its advantages. Further research across various age groups and regions is suggested.

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