

Comparative Evaluation of Efficacy of PFN and PFN Antirotation in Treating Patients with Femur Fracture: An Hospital Based Study

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ABSTRACT

Background: Fractures of hip or proximal femur are frequently observed and horrendous fractures that generally afflict the elderly subjects with 90% observed in more than 60 years age. Therefore; the present study was conducted to evaluate the efficacy of PFN and PFN anti-rotation in managing patients with intertrochanteric femoral fractures.

Materials and Methods: The present prospective survey was performed in the Department of Orthopaedics, Government Medical College & Bangur Hospital, Pali, Rajasthan (India) and the study enrolled 20 subjects with intertrochanteric fractures of adults above than 21 years of age. Both the clinical and radiographic outcome of all the operated patients was assessed. Functional outcome was assessed using the Harris hip score. All the data thus obtained was arranged in a tabulated form and analysed using SPSS software.

Results: There were only 3 subjects less than 40 years of age, 5 were between 40-60 years. The mean time to sit amongst Group I patients was 2.8 days and Group II patients were 2.6

days. The mean time to stand amongst Group I and Group II subjects was 5.1 days and 5 days. The preoperative mean score in Group I and Group II was 50.1 and 51.4 respectively.

Conclusion: From the above study it can be concluded that both the treatment modalities are equally efficacious in managing fractures of femur.

Keywords: Femur, Trochanteric, Hip, Fracture.

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INTRODUCTION

Fractures of hip or proximal femur are frequently observed and horrendous fractures that generally afflict the elderly subjects with 90% observed in more than 60 years age. Intertrochanteric fractures are well-defined as fractures of proximal portion of femur observed between lesser and greater trochanter of the bone. Due to advancement in the medical treatment, the senior citizen population is increasing day by day.¹⁻³ Before the advent of appropriate fixation tools, management of intertrochanteric femoral fractures were non operative and required prolonged bed rest using traction till healing of fracture was seen and that was followed by prolonged ambulation training.⁴ Keeping in thoughts the age of subjects who suffered from intertrochanteric fractures and majority of subjects also had osteoporosis and a modification of screw of proximal femur nail that consists of a helical blade and provides better hold in the osteoporotic femur head was used.⁵⁻⁷ Therefore; the present study was conducted to evaluate the efficacy of PFN and PFN anti-rotation in managing patients with intertrochanteric femoral fractures.

MATERIALS AND METHODS

The present prospective survey was performed in the Department of Orthopaedics, Government Medical College & Bangur Hospital, Pali, Rajasthan (India) and the study enrolled 20 subjects with intertrochanteric fractures of adults above than 21 years of age. The study was divided into two groups- Group I subjects were managed by PFN and Group II subjects were managed by PFN anti-rotation. The follow up of all the patients was performed for 6 months.

The subjects were informed about the study and a written consent was obtained from all. Complete clinical and demographic details of all the subjects were obtained. All the biochemical and hematological investigations of all the subjects were carried out prior to initiation of the surgery. Skilled and experienced orthopedic surgeons performed all the surgical procedure as per the respective groups.

Both the clinical and radiographic outcome of all the operated patients was assessed. Functional outcome was assessed using the Harris hip score. All the data thus obtained was arranged in a

tabulated form and analysed using SPSS software. Chi square test was used for assessing the probability. P value of less than 0.05 was considered as significant.

RESULTS

Table 1 shows the demographic characteristics of the study population. There were only 3 subjects less than 40 years of age, 5 were between 40-60 years. There were 12 subjects more than 60 years of age. There were 9 males and 11 females amongst the group. There were 10 subjects in each group.

Table 2 illustrates the mean time patients were allowed partial weight bearing. The mean time to sit amongst Group I patients was 2.8 days and Group II patients was 2.6 days. The mean time to stand amongst Group I and Group II subjects was 5.1 days and 5 days. The mean time to walk amongst both the groups was 5.6 days and 5.4 days respectively. There was no significant difference between the groups.

Table 3 illustrates the Harrison Hip score amongst the study groups. The preoperative mean score in Group I and Group II was 50.1 and 51.4 respectively. The score and 1 month postoperative was 61.4 in Group I and 60.5 in Group II. There was no significant difference between the groups. The score at 6 month postoperative was 77.8 and 78.5 respectively in both the groups.

Table 1: Demographic characteristics of the study

Variable	Frequency		Total
	Group I	Group II	
Age(years)			
<40	2	1	3
40-60	2	3	5
>60	6	6	12
Gender			
Male	5	4	9
Female	5	6	11

Table 2: Mean time patients were allowed partial weight bearing

Time (days)	Group I	Group II	P value
Mean time to sit	2.8	2.6	>0.05
Mean time to stand	5.1	5.0	>0.05
Mean time to walk	5.6	5.4	>0.05

Table 3: HHS score amongst the groups

HHS score	Group I	Group II	P value
	Preoperative	50.1	
Postoperative 1 month	61.4	60.5	>0.05
Postoperative 6 month	77.8	78.5	>0.05

DISCUSSION

The incidence of fractures hip are drastically elevating with advancing age in all population subgroups around the globe, and the prevalence of hip fractures is going to tremendously rise to approximately 512,000 by the coming year 2040.⁸ Fractures of hip crucially consist of trochanteric and femur neck fractures, and the

incidence of mortality associated with femoral fractures fluctuates between 15% to 30% in United States.⁹ With the usage of surgical treatment strategies using stable fixation, quick mobilization is essential and there is also decrease in the frequency of complications. There are essentially two types of fixations used for trochanteric fractures, plate fixation and then there are intramedullary implants.^{10,11} The standard implants for managing hip fractures are dynamic hip screw.¹²⁻¹⁷ Whereas, when they were compared with intramedullary implants, they showed a biomechanical drawback because of their broad length.¹⁸ The advent of proximal femoral nails was by the AO/ASIF in the year 1998 and thereafter have been widely used in treatment trochanteric fractures.¹⁹⁻²² Though various studies have demonstrated the usefulness of PFN but there have been few associated technical failures also.^{19, 20} In the present study, the mean time to sit amongst Group I patients was 2.8 days and Group II patients was 2.6 days. The mean time to stand amongst Group I and Group II subjects was 5.1 days and 5 days. The mean time to walk amongst both the groups was 5.6 days and 5.4 days respectively. There was no significant difference between the groups. The preoperative mean score in Group I and Group II was 50.1 and 51.4 respectively. The score and 1 month postoperative was 61.4 in Group I and 60.5 in Group II. There was no significant difference between the groups. The score at 6 month postoperative was 77.8 and 78.5 respectively in both the groups. A study conducted by Gadegone WM et al who studied the outcome of augmented proximal femoral nails in Relation to prevention of clinical complications and failure frequency in cases of unstable trochanteric fractures. The study was prospectively performed amongst 82 subjects with trochanteric femur fractures between April 2010 to December 2015. All the fractures were Managed using PFN along with additional augmentation using a screw from trochanter to the inferior region of femur head in order to enhance the strength of the lateral wall of trochanter. Follow up was performed for a mean duration of 8.4 months. The Salvati and Wilson hip score was 32 amongst 88% of the subjects at the end of follow up. The usage of additional screw upgraded the stability in case of lateral trochanteric fractures.²³ As per a study by Carulli C et al. they found statistically significant superior support by PFN augmented with regard to duration of surgery, blood loss and recovery. There was no significant difference in the ability to walk at 3 months and 6 months follow up.²⁴

CONCLUSION

From the above study it can be concluded that both the treatment modalities are equally efficacious in managing fractures of femur. There was no significant difference observed in our study regarding the weight bearing time and Harrison hip score amongst both the groups.

REFERENCES

- Sadic S, Custovic S, Jasarevic M, Fazlic M, Krupic F. Proximal Femoral Nail Antirotation in Treatment of Intertrochanteric Hip Fractures: a Retrospective Study in 113 Patients. Medical Archives. 2015; 69(6):352-56.
- Endigeri P, Pattanashetty OB et al. Outcome of intertrochanteric fractures treated with proximal femoral nail: A prospective study. J OrthopTraumatol Rehabil 2015; 8:25-9.

3. Nherera L, Trueman P, Horner A, Watson T, Johnstone AJ. Comparison of a twin interlocking derotation and compression screw cephalomedullary nail (InterTAN) with a single screw derotation cephalomedullary nail (proximal femoral nail antirotation): A systematic review and meta-analysis for intertrochanteric fractures. *J Orthop Surg Res.* 2018; 13:46.
4. Zhang K, Zhang S, Yang J et al. Proximal femoral nail vs. dynamic hip screw in treatment of intertrochanteric fractures: a meta-analysis. *Med Sci Monit.* 2014; 20:1628-33.
5. Li M, Wu L, Liu Y, Wang C. Clinical evaluation of the Asian proximal femur intramedullary nail antirotation system (PFNA-II) for treatment of intertrochanteric fractures. *J. Orthop. Surg. Res.* 2014; 13:1-8.
6. Gardenbroek TJ, Segers MJ, Simmermacher RK, Hammacher ER. The proximal femur nail antirotation: an identifiable improvement in the treatment of unstable pertrochanteric fractures. *J. Trauma.* 2011; 71:169-174.
7. Shen L, Zhang Y, Shen Y, Cui Z. Antirotation proximal femoral nail versus dynamic hip screw for intertrochanteric fractures: a meta-analysis of randomized controlled studies. *Orthop. Traumatol. Surg. Res.* 2013; 99:377-83.
8. S. R. Cummings, S. M. Rubin, and D. Black, "The future of hip fractures in the United States. Numbers, costs, and potential effects of postmenopausal estrogen," *Clinical Orthopaedics and Related Research*, no. 252, pp. 163–166, 1990.
9. S. T. Canale and J. H. Beaty, *Campbell's Operative Orthopaedics*, St. Louis, Mo, USA, 11th edition edition, 2007.
10. A. L. Utrilla, J. S. Reig, F. M. Muñoz, and C. B. Tufanisco, "Trochanteric gamma nail and compression hip screw for trochanteric fractures: a randomized, prospective, comparative study in 210 elderly patients with a new design of the gamma nail," *Journal of Orthopaedic Trauma*, vol. 19, no. 4, pp. 229–233, 2005.
11. M. J. Parker and H. H. Handoll, "Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures," *Cochrane Database of Systematic Reviews*, no. 1, Article ID CD000093, 2002.
12. M. S. Butt, S. J. Krikler, S. Nafie, and M. S. Ali, "Comparison of dynamic hip screw and gamma nail: a prospective, randomized, controlled trial," *Injury*, vol. 26, no. 9, pp. 615–18, 1995.
13. S. H. Bridle, A. D. Patel, M. Bircher, and P. T. Calvert, "Fixation of intertrochanteric fractures of the femur. A randomized prospective comparison of the gamma nail and the dynamic hip screw," *Journal of Bone and Joint Surgery B*, vol. 73, no. 2, pp. 330–34, 1991.
14. P. R. Goldhagen, D. R. O'Connor, D. Schwarze, and E. Schwartz. A prospective comparative study of the compression hip screw and the gamma nail, *Journal of Orthopaedic Trauma*, vol. 8, no. 5, pp. 367–372, 1994.
15. C. W. Hoffman and T. G. Lynskey. Intertrochanteric fractures of the femur: a randomized prospective comparison of the gamma nail and the ambi hip screw, *Australian and New Zealand Journal of Surgery*, 1996; 66(3), 151–55.
16. P. J. Radford, M. Needoff, and J. K. Webb. A prospective randomised comparison of the dynamic hip screw and the gamma locking nail, *Journal of Bone and Joint Surgery B*, 1993; 75(5), 789–93.
17. M. J. Parker and H. H. Handoll, "Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults," *Cochrane Database of Systematic Reviews*, vol. 16, no. 3, Article ID CD000093, 2010.
18. J. Anand, *The Elements of Fracture Fixation*, Churchill Livingstone, New York, NY, USA, 1997.
19. H. Banan, A. Al-Sabti, T. Jimulia, and A. J. Hart, "The treatment of unstable, extracapsular hip fractures with the AO/ASIF proximal femoral nail (PFN)—our first 60 cases," *Injury*, 2002; 33(5), 401–05.
20. I. B. Schipper, S. Bresina, D. Wahl, B. Linke, A. B. Van Vugt, and E. Schneider, "Biomechanical evaluation of the proximal femoral nail," *Clinical Orthopaedics and Related Research*, 2002; 405, 277–86.
21. G. Al-yassari, R. J. Langstaff, J. W. M. Jones, and M. Al-Lami, "The AO/ASIF proximal femoral nail (PFN) for the treatment of unstable trochanter femoral fracture," *Injury*, 2002; 33(5), 395–99.
22. W. M. Gadegone and Y. S. Salphale, "Proximal femoral nail—an analysis of 100 cases of proximal femoral fractures with an average follow up of 1 year," *International Orthopaedics*, 2007; 31(3), 403–08.
23. Gadegone WM, Shivashankar B, Lokhande V, Salphale Y. Augmentation of proximal femoral nail in unstable trochanteric fractures. *SICOT J.* 2017; 3:12.
24. Carulli C, Piacentini F, Paoli T, Civinini R, Innocenti M. A comparison of two fixation methods for femoral trochanteric fractures: a new generation intramedullary system vs sliding hip screw. *Clinical Cases in Mineral and Bone Metabolism.* 2017; 14(1):40-7.

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