Scholars Bulletin
(A Multidisciplinary Bi-weekly Journal)
An Official Publication of "Scholars Middle East Publishers",
Dubai, United Arab Emirates
Website: http://scholarsbulletin.com/

ISSN 2412-9771 (Print)
ISSN 2412-897X (Online)

Is Proximal Femur Plate A Versatile Implant in Pertrochantric Fractures?

Dr. Ganesan Ganesan Ram[1]*, Dr. S. Sumesh[2], Dr. S. Sundar[3], Dr. Muthu Manickam[4], Dr. J.K. Giriraj[5], Dr. Vijayaraghavan. Phagal Varthi[6]

[1,3,4,5]Assistant Professor, [2]Resident, [6]Professor, Department of Orthopaedics, Sri Ramachandra Medical Collage, Porur, Chennai, Tamilnadu, India

***Corresponding Author:**
Dr. Ganesan Ganesan Ram
Email: ganesangram@yahoo.com

Abstract: Various extramedullary and intramedullary implants are being used for the management of pertrochantric fractures. In this article we are going to see whether proximal femur plate is a versatile implant in the management of pertrochantric fractures. Prospective study of twenty two patients with pertrochantric fractures treated with proximal femur plate done in Sri Ramachandra medical centre, Chennai between Jan 2012 to Jan 2015. The Schatzker & Lambert criteria were used to evaluate the functional outcome. Mean follow up was one year.The mean time to union was fourteen weeks and the mean limb shortening was 0.5cm. The functional outcome was excellent in eight patients, good in ten, Fair in three and Poor in one.Union was achieved in stable and unstable trochantric fractures without significant complications and neck shaft angle was maintained following proximal femur plate fixation. Therefore this device can be a feasible alternative to proximal femur nailing and DHS fixation in certain difficult situations.
Keywords: Intertrochantric fracture, subtrochantric fracture, Proximal femur plating

INTRODUCTION

Pertrochantric fractures are one of the common fractures necessitating hospital admission. Pertrochantric fractures include the cervicotrochantric fractures, intertrochantric fractures and subtrochantric fractures. Regardless of the type of fracture, however, pertrochantric femur fractures can lead to substantial morbidity and mortality. The incidence of pertrochantric femoral fractures among females is 2 to 3 times higher than the incidence of such fractures among males[1]. Also, the risk of sustaining a proximal femoral fracture doubles every 10 years after age 50 years. Other risk factors for proximal femoral fractures include osteoporosis, a maternal history of hip fractures, excessive alcohol consumption, high caffeine intake, physical inactivity, low body weight, previous hip fracture, the use of certain psychotropic medications,visual impairment, and smoking[2,3,4]. Various extramedullary and intramedullary implants are being used for these fractures. Comminution of the lateral trochantric wall, postero-medial communition, reverse oblique fractures etc. are unstable fractures which have had poor results with the regular methods of fixation. Proximal femur locking plate is an fixed angle stable construct, with locking cancellous screws at 95, 120 and 135 degrees, which can be used in these situations in open as well as minimally invasive per cutaneous plate osteoporosis (MIPPO) technique.

The aim of present study is to assess whether proximal femur plate gives good results in various types of pertrochantric fractures.

MATERIALS AND METHODS

Prospective study of twenty two patients done in Sri Ramachandra medical centre, Chennai between Jan 2012 to Jan 2015.Inclusion criteria was all types of fresh closed trochantric and sub trochantric fracture. Exclusion criteria were open fracture, pertrochantric fracture with ipsilateral any other fracture, and non union pertrochantric fractures. We had sixteen males and six females. We used stainless steel Indian locking proximal femur plate. Intertrochantric fractures were classified according to Boyd and Griffin and Sub-trochantric fractures were classified according to Seinsheimer's[5]. Mean age of the patients was 55.2 years. Sixteen patients had intertrochantric and six patients had subtrochantric fractures. Patients were followed up at 6 weeks, 3 months, 6 months and 1 year after the surgery, with clinical and radiographic assessment of the progress of healing and complications. The Schatzker & Lambert criteria were used to evaluate the functional outcome.

Surgery was performed with the patient in supine position on a fracture table. Closed reduction was performed under C-ARM guidance in antero-posterior and lateral views and secured in traction. Skin incision was made over the trochantric region through lateral approach. Open reduction was done in cases of failure

of closed reduction. For unstable / comminuted fractures, minimally invasive technique was done under C-ARM guidance. Care is taken to avoid varus malreduction prior to plate fixation, which will lead to implant failure. After fracture reduction, the plate was placed and reduction maintained by K-wires. Cortical screw inserted for plate and bone contact. Proximally three 5mm non-cannulated locking screws were used. The inferior most locking screw, 135 degree angled, was inserted into the femoral calcar. The other locking screws, angled 95 and 120 degree, are used and finally the cortical screws are inserted. Bone grafting was not done for any cases. After the surgery, drain, if used, was removed after 48hours and all the patients were encouraged to start in-bed mobilization. Non-weight bearing ambulation was started after 2nd post-op day as tolerable. Partial weight bearing was started by 6-8 weeks after signs of callous formation were seen on follow up X ray. Weight bearing was gradually increased up to tolerance level.

RESULTS

The functional outcome was excellent in eight patients, good in ten, fair in three and poor in one patient.Six excellent results were intertrochantric fractures (Fig 1,Fig 2) and two subtrochantric fractures(Fig 3,Fig 4).All patients had fracture union. The mean time to union was 14 weeks (12-16 weeks) and the mean limb shortenings were 0.5cm (0-1cm). No patient had medialization of the shaft; varus collapse >10 degree occurred in 2 patients; and implant screw breakage occurred in 2 patients. There were no surgical site infections and all the patients had healthy surgical scars healed by primary intention.

Fig 1- Intertrochantric pre op

Fig 2-Intertrochantric 1 yr post op

Fig 3-Subtrochantric Pre op

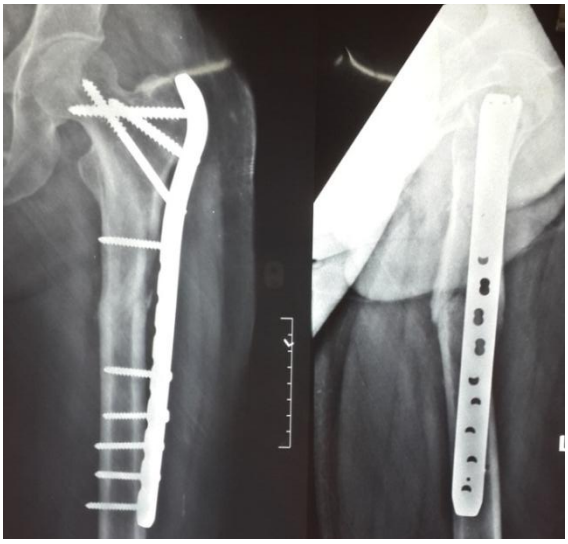

Fig 4-Subtrochantric 1 yr post op

DISCUSSION

Intertrochantric and subtrochantric fractures in young adults are usually the result of high-energy injury, such as a motor vehicle accident or fall from a height, whereas in the elderly it results from a simple fall. In a case of polytrauma and severely traumatized patients, the concept of damage control in acute management must be considered and practiced whenever it is appropriate[6].Various modalities like conservative treatment[7],traction[8],external fixator,dynamic hip screw, trochantric stabilization plate[9],proximal femur nail[10],dynamic condylar screw had been advocated in treating pertrochantric fractures. Non operative management of pertrochanteric fractures was practised prior to introduction of fixation devices. In the elderly patient this approach was fraught with high complication and mortality rates [11]. Operative treatment of these fractures in the early allowed early rehabilitation and the best chance for functional recovery.

More recently, locking plates have been designed for the proximal femur and have become available especially for the management of complex trochanteric fractures. The plate is anatomically pre contoured to the metaphyseal zone of the proximal femur. The plate is placed at the lateral side of the proximal femur and can provide a stress shield for the lateral fragment, preventing lateral migration of proximal fragments and Medialisation of femur shaft and hence can be used in cases with loss of integrity of the lateral wall [12]. They act as a fixed angle internal fixator device and achieves greater stability compared with DHS/DCS/Angle blade plate while avoiding excess bone removal and hence is ideal for osteoporotic fractures. Correct placement of locking screws is of utmost importance, especially the screw into the femoral calcar, which along the posterior and inferior locking screws enables an angular stable buttress that increases the stability of the fracture.

One of the biggest advantages is its option to use minimally invasive plate osteosynthesis and its improved fixation of osteoporotic bone achieved through screw angulation and locking plate interface.Biological fixation of comminuted sub trochanteric fractures with proximal femur locking plate provides stable fixation with high union rate and fewer complications. According to Guo-Chun Zha et al. in their study found no cases of cut-out of femoral head screw possible due to the mechanical advantage of three-dimensional and angular stable fixations[13]. In this study, we found that proximal femur locking plate can be used for stable and unstable per trochanteric fractures and had fewer complications even in osteoporotic individuals possibly due the angular stable fixation. There were no cases of peri-operative complications. We found that all patients had fracture union (6-8 weeks).

CONCLUSION

Union was achieved in stable and unstable trochantric fractures without significant complications and neck shaft angle was maintained following proximal femur plate fixation. The fracture reduction and placement of the 3 proximal locking screws into the neck and head of femur, especially the screw placed into femoral calcar, determines the outcome of the fracture. The plate can also be used using MIPPO technique and hence comminuted fractures can be treated preserving fracture hematoma. One of the major drawbacks of using proximal femur locking plate is that weight bearing is to be controlled and done only after radiological evidence of callus formation. In our study, proximal femoral locking plate fixation for per-trochantric fixation produced good results. Hence proximal femur plate is a versatile implant when dealing with per trochantric fractures.

REFERENCES

1. Zuckerman, J. D. (1996). Hip fracture. *New England journal of medicine*, *334*(23), 1519-1525.
2. Cummings, S. R., Nevitt, M. C., Browner, W. S., Stone, K., Fox, K. M., Ensrud, K. E., ... & Vogt, T. M. (1995). Risk factors for hip fracture in white women. *New England journal of medicine*, *332*(12), 767-774.
3. Hernandez-Avila, M., Colditz, G. A., Stampfer, M. J., Rosner, B., Speizer, F. E., & Willett, W. C. (1991). Caffeine, moderate alcohol intake, and risk of fractures of the hip and forearm in middle-aged women. *The American journal of clinical nutrition*, *54*(1), 157-163.
4. Paganini-Hill, A., Chao, A., Ross, R. K., & Henderson, B. E. (1991). Exercise and other factors in the prevention of hip fracture: the Leisure World study. *Epidemiology*, 2,16-25.
5. Giannoudis, P. V. (2003). Aspects of current management. *J Bone Joint Surg Br*, *85*(4), 478-483.
6. Hildebrand, F., Giannoudis, P., Kretteck, C., & Pape, H. C. (2004). Damage control: extremities. *Injury*, *35*(7), 678-689.
7. Hu, S. J., Zhang, S. M., & Yu, G. R. (2012). The treatment of femoral subtrochanteric fractures with the proximal lateral femur locking plates. *Acta ortopedica brasileira*, *20*(6), 329-333.
8. Magaziner, J., Simonsick, E. M., Kashner, T. M., Hebel, J. R., & Kenzora, J. E. (1989). Survival experience of aged hip fracture patients. *American Journal of Public Health*, *79*(3), 274-278.
9. Saarenpää, I., Heikkinen, T., & Jalovaara, P. (2007). Treatment of subtrochanteric fractures. A comparison of the Gamma nail and the dynamic hip screw: short-term outcome in 58 patients. *International orthopaedics*, *31*(1), 65-70.
10. Mereddy, P., Kamath, S., Ramakrishnan, M., Malik, H., & Donnachie, N. (2009). The AO/ASIF proximal femoral nail antirotation (PFNA): a new design for the treatment of unstable proximal femoral fractures. *Injury*, *40*(4), 428-432.

11. Valverde, J. A., Alonso, M. G., Porro, J. G., Rueda, D., Larrauri, P. M., & Soler, J. J. (1998). Use of the Gamma Nail in the Treatment of Fractures of the Proximal Femur. *Clinical Orthopaedics and related research*, *350*, 56-61.
12. Kumar, N., Kataria, H., Yadav, C., Gadagoli, B. S., & Raj, R. (2014). Evaluation of proximal femoral locking plate in unstable extracapsular proximal femoral fractures: Surgical technique & mid term follow up results. *Journal of Clinical Orthopaedics and Trauma*, *5*(3), 137-145.
13. Zha, G. C., Chen, Z. L., Qi, X. B., & Sun, J. Y. (2011). Treatment of pertrochanteric fractures with a proximal femur locking compression plate. *Injury*, *42*(11), 1294-1299.