

Surgical outcome of proximal femoral fractures using proximal femoral - locking compression plate

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Abstract: *Introduction:* Proximal femoral fractures are complex fractures following devastating injuries in young and elderly population. Despite marked improvement in implant design, surgical technique and patient care these fractures are associated with high incidence of implant failure, refracture and varus collapse. Intramedullary nails are technically demanding and associated with high re-operation rates. The study was done to evaluate the outcome of proximal femoral fractures treated with proximal femur locking compression plate (PF-LCP). *Methods:* This study is conducted at Al Ameen Medical College and Hospital, Bijapur during the period Jan 2012 to March 2014. Pertrochanteric fractures especially unstable intertrochanteric & subtrochanteric fractures were included. Technical difficulties with the implant and operating time were quantified. Union of fracture site and implant related complications were followed up clinically and radiological. The Harris Hip Score was used to evaluate the functional outcome. *Results:* Thirty-two patients were available for final evaluation with average age of 55.4 years. The average operation time was 1 hour and 35 minutes with mean blood loss of 180ml. Union was achieved in all the cases with an average time of 17 weeks. Complications included one case of delayed union and three cases of varus collapse. *Conclusion:* PF-LCP achieves anatomical reduction and stable fixation with higher union rate and fewer complications.

Keywords: Proximal femoral fracture, PF-LCP, Pertrochanteric, fracture, Subtrochanteric fracture.

Introduction

Proximal femoral fractures are challenging injuries which are commonly seen in elderly population due to low energy trauma along with osteoporosis and in younger patients with high energy trauma. Dilemma exists regarding the choice of implant for these fractures. The most widely accepted treatment is intramedullary nailing but there are some challenges like placement of the nail, anatomical reduction in reverse oblique fractures and when fracture line extends into the greater trochanter [1]. Nailing is also sought with complications including femoral shaft fractures, varus deformity and malrotation [2].

The proximal femoral locking compression plate (PF-LCP) is a limited contact fixed angular, stable construct [3] with high pullout strength. The screw head locks into the PF-LCP and provides stability, it does not fail at the bone screw interface, and also provides strong anchor in osteoporotic fractures [4]. Extramedullary implants are helpful minimizing problems such as abductor weakness and superior gluteal nerve

injury [5]. Biomechanically PF-LCP provides more axial stiffness, less torsional stiffness [6]. Complex fracture patterns can also be tackled by multiple locking screw holes of PF-LCP. The limited contact also helps in Biological healing by minimizing the pressure on the periosteum. This study reviewed the surgical outcome of PF-LCP for proximal femoral fractures in terms of union, postoperative complications.

Material and Methods

This study included total of 34 patients admitted to Al Ameen Medical College and Hospital from Jan 2012 to March 2014 with proximal femoral fractures. 21 males and 13 females had a mean age of 55.4 years (41-80). The largest group was from 51-60 years. Right sided fractures were seen in 19 patients and Left sided in 15 patients.

Proximal femoral fractures included subtrochanteric and intertrochanteric fractures (Table-1). Intertrochanteric were classified according to Kyle's classification (Table-2).

21 patients suffered subtrochanteric fractures and 13 patients had intertrochanteric fractures. Subtrochanteric fractures were classified according to Seinsheimer's (Table-3).

Fracture	Intertrochanteric	Subtrochanteric
Male	8	13
Female	5	8

Kyle's Classification	Intertrochantericfracture
Type I	None
Type II	2
Type III	4
Type IV	7

Seinsheimer's classification	Subtrochanteric fracture
I	None
IIa	None
IIb	None
IIc	1
IIIa	6
IIIb	9
IV	3
V	2

Surgical Technique: Surgery was performed under spinal anaesthesia, supine position on fracture table (Fig-1) using straight lateral incision over the greater trochanter extending distally. Image intensifier was used to visualize the AP and Lateral views for fracture reduction and implant fixation. Temporary K- wires and Interfragmentary screws were used when deemed necessary.

Fig-1: Preparation for Surgery

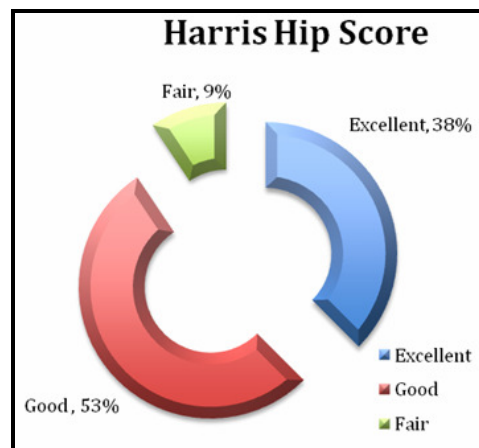


After the surgery patients were followed up at 6 weeks, 3months, 6 months and 1 year intervals, evaluated clinically by Harris Hip score and radiological for union at fracture site, and implant related complications.

Results

2 patients were lost in follow-up and 32 patients were available for the study. Out of 32 cases 3 healed with varus deformity of less than 15 degrees and 2 cases of shortening upto 15mm. we encountered one case of delayed union which went on to heal at the end of 30 weeks. All 32 cases had radiological union. There were no intraoperative complications as well as mortality. According to Harris Hip Score the functional outcome were as follows. Excellent (90 point) in 12 cases, Good (80-89 point) in 17 cases, Fair (70-79 point) 3 cases (Fig 2). The excellent and good outcome together was 91%.

Fig-2: Outcome of Harris Hip Score



Discussion

In our study we evaluated 32 patients in terms of functional outcome for proximal femoral fractures using PF-LCP and obtained similar results in terms of, time to union and Harris hip score. Complications included varus collapse of less than 15° with good functional outcome. Among the four different fixation techniques PF-LCP has been reported to be the strongest construct for vertically oriented femoral neck fractures [7]. Zha GC *et al.* reported that the PF-LCP fixation achieved union rate of 100% at the end of one year [8]. Pertrochanteric fractures with missing posteromedial corners resulted in high axial

loads with eventual varus collapse and screw breakage [9]. In our study we had 3 cases of varus collapse following early weight bearing, but fractures later on went into uneventful union.

Controversy still exists regarding the fixation method of pertrochanteric femoral fractures. Wanq Y *et al.* concluded that PF-LCP is the credible method in elderly population, especially for severe comminuted fracture and osteoporotic bone [10]. On the contrary, Wirtz *et al.* reported high failure rate of 37%. He reported secondary varus collapse, cut outs and proximal screw fracture, suggested that the small screw size and less number of proximal screws were insufficient to provide stable fixation of the proximal fragment [11].

In our study we used all the three screws in the proximal fragment, which may explain the higher

union rate (100%). We avoided weight bearing till 8 weeks as we accounted varus collapse following early weight bearing. In our study the mean time to union was 17 weeks. The average operation time was 1 hour and 15 minutes with mean blood loss of 180 ml. However, there are some limitations to this study. We have a relatively small sample size and we were unable to carry out comparative analysis with other extramedullary or intramedullary devices.

Conclusion

We imply that PF-LCP is an ideal implant for comminuted intertrochanteric fractures with poor bone quality and multi fragmentary subtrochanteric femoral fractures (Fig-3 to 5).

Fig-3: a) Subtrochanteric fracture. b) Treated with PF-LCP. c) Fracture is united at the end of 18 weeks

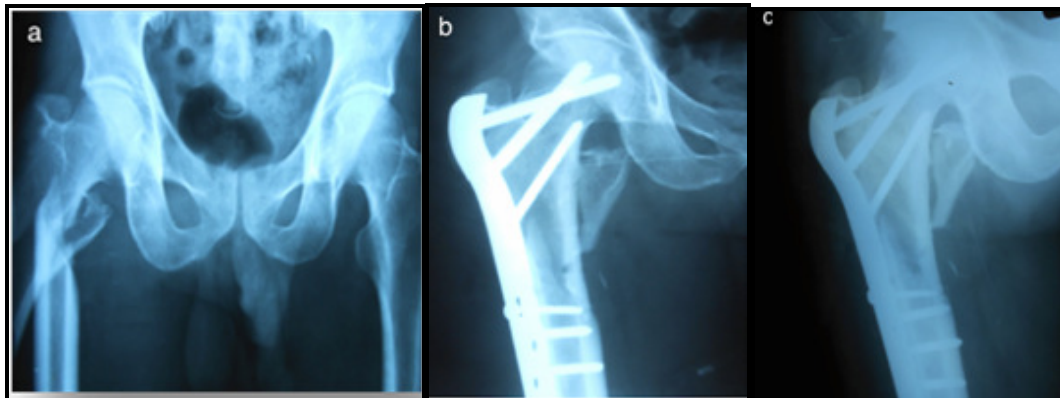


Fig-4: a) Pre op X ray of left proximal femur fracture. b) 6 weeks post op X ray. c) 16 weeks post op showing fracture consolidation

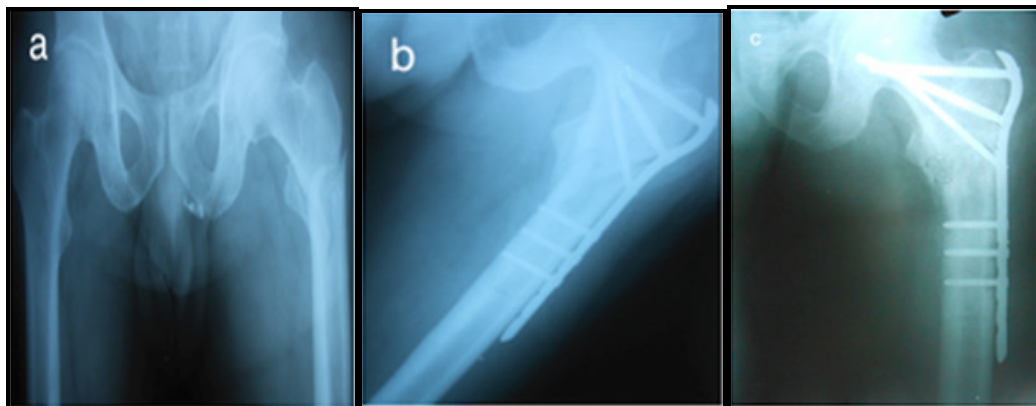
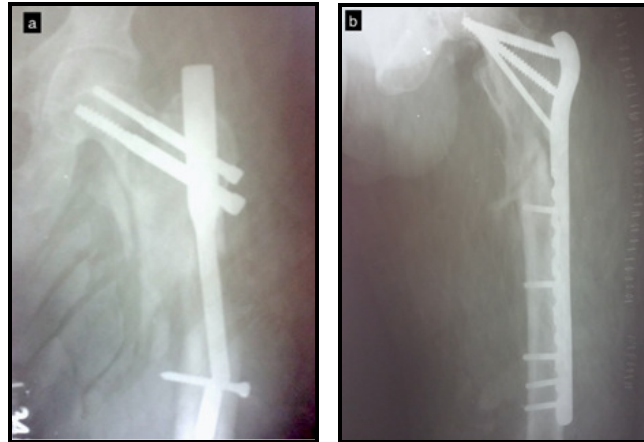


Fig-5: a) Failed proximal femoral IM nail. b) Revision surgery with PF-LCP

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