

Case Report**Proximal Femoral Locking Plate (PFLP) A Salvage Option in Nonunion of Proximal Femoral Fractures****Aggarwal HO**, Assistant Professor*, **Singh M**, Professor & Head*, **Sareen S.**, Assistant Professor*

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Abstract Nonunion of intertrochanteric fractures is uncommon because there is excellent blood supply and good cancellous bone in the intertrochanteric region of the femur. When primary fixation of proximal femoral fractures with implants fails, revision osteosynthesis may be challenging. Tracts of previous implants and remaining insufficient bone stock in the proximal femur pose unique problems for the treatment. Intramedullary implants like proximal femoral nail (PFN) or surface implants like Dynamic Condylar Screw (DCS) are few of the described implants for revision surgery. There is no evidence in the literature to choose one implant over the other. We used the proximal femoral locking compression plate (PFLP) in one case undergoing revision surgery. We aimed to evaluate the efficacy of this implant in salvage situations. Patient with primary proximal femoral fracture (reverse oblique type) was treated with DHS and plate and subsequently went into non union because of implant failure. Fracture united satisfactorily after fixation with PFLP and bone grafting, without any complications.

Key Words:- Keywords: Proximal femoral locking compression plate, proximal femoral fracture Osteosynthesis.

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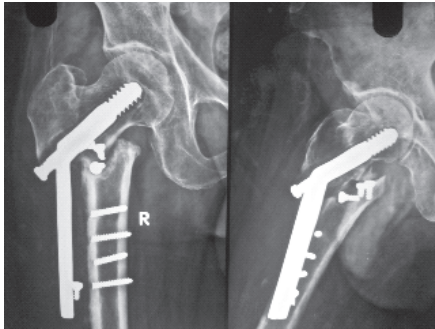
Introduction

Nonunion of the femoral neck is the main complication following fractures of the femoral neck. In spite of improved operative techniques, nonunion is still reported in 10-20% of cases.¹ However, Nonunion of intertrochanteric fractures is uncommon because there is excellent blood supply and good cancellous bone in the intertrochanteric region of the femur.² Most intertrochanteric fractures treated by conservative methods or internal fixation heal.^{3,4} Occasionally, nonunion or early failure of fracture fixation occurs, the reasons being delayed treatment, unfavorable fracture patterns, poor bone quality, or suboptimal internal fixation.⁵⁻⁹ Literature is sparse regarding primary intertrochanteric nonunions and its treatment. Revision internal fixation and bone grafting has been reported in fixation failures in very few series and results have generally been encour-

aging.⁹⁻¹² Surface implants (extra-medullary) like a dynamic hip screw (DHS), dynamic condylar screw (DCS), proximal femoral locking compression plate (LCP), or intra-medullary implants such as proximal femoral nail (PFN) are commonly used for the fixation of proximal femoral fractures. When primary fixation of proximal femoral fractures with these implants fails as a result of wrong selection of implant or other factors then revision surgery is a challenge. Tracts of previous implants and remaining insufficient bone stock in the proximal femur pose unique problems for the treatment. Intramedullary implants like proximal femoral nail (PFN) or surface implants like Dynamic Condylar Screw (DCS) are few of the described implants for revision surgery. There is no evidence in the literature to choose one implant over the other.

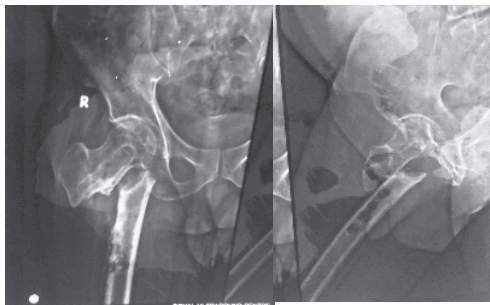
Material And Methods

50 years old patient of non union of proximal femur fracture was initially treated with DHS & plate at a private hospital. As the fracture was reverse oblique type, implant gave away once the patient started mobilization of limb. (Figure 1)



Failed DHS done for wrong indication

Patient reported to us after the removal of primary implant and proximal femur was quite osteopenic with so many tracts of previous implants in bone. (Figure 2)



X-Rays after 6months

There was insufficient bone stock available for the internal fixation. We have used Proximal femoral locking plate (PFLP) for undergoing revision surgery. We aimed to evaluate the results of this implant in such a salvage conditions.

He was having 5 cm shortening and was walking with limp. The neck-shaft angle was 90°.

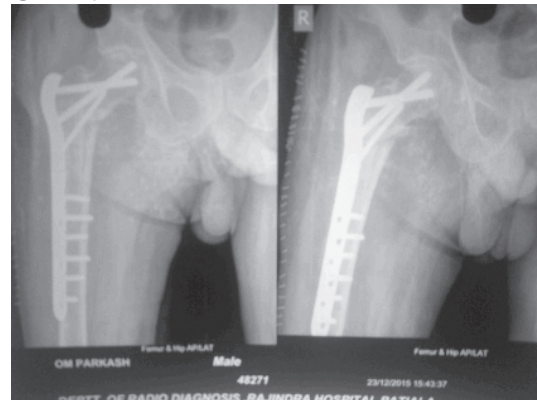
The present surgery was performed 1.5 year after the initial surgery.

Operative Procedure

Surgery was performed with the patient in the supine position on a fracture table under an image intensifier. A lateral approach to the proximal femur was used. Fracture ends were freshened from all sides and curetted to remove all intervening soft tissues. Fibular graft was inserted in intramedullary cavity to provide internal stability and proximal femoral locking plate was applied to stabilize the fracture. The

reduction was checked under c-arm in both AP and lateral view and the neck shaft angle was checked. Cancellous bone graft taken from iliac crest was placed on either side of fracture.

(Figure 3)



Post operative X ray

Postoperatively, quadriceps strengthening and knee bending exercises were initiated from day 1. Axillary crutch walking without toe touch was started at 3 weeks. Partial weight bearing was started when clinical and radiological union was achieved. Patient was followed up at the outpatient department at monthly intervals till union occurred. Clinical and radiographic healing processes were recorded.

Results

Patient was followed up both clinically and radiologically over a period of 12 months.

Operative time was 152 min. Blood loss was approximately 1200 ml. There were no intraoperative or immediate postoperative complications. Satisfactory union was achieved in 9 months. Postoperative neck-shaft angle measured after union was 127°.

The preoperative mean active flexion was 40°, which improved to 110°. Both the internal and external rotations at hip joint were full and painfree. The limb length improved by 5 cm.

There was no infection or pain at the hip at final follow-up of the patient. Patient was satisfied with the outcome. He was capable of walking with full weight bearing after 9 months of surgery.

Discussion

Nonunion of intertrochanteric fractures is uncommon as these fractures tend to occur through well vascularized cancellous bone.^{2, 8,13-16}

When nonunion does occur, it is usually in

patients with unfavorable fracture patterns, poor bone quality, or suboptimal position of internal fixation devices.¹⁵ The incidence of nonunion in patients with intertrochanteric fractures is reported to be 1–2%.¹⁶ A diagnosis of primary intertrochanteric nonunion is made when at least 15 weeks after the fracture there is radiological evidence of a fracture line, with either no callus (atrophic) or with callus that does not bridge the fracture site (hypertrophic) and mobility of the fragments on examination under an image intensifier.⁹

There is a paucity of published studies on the treatment of primary intertrochanteric nonunions.^{9,11,12} The available literature suggests that a variety of different implants may be used successfully to treat intertrochanteric nonunion and stable fixation of the proximal fragment. In treatment of nonunion from fixation failures of intertrochanteric fractures, DHS with cementation, medial displacement osteotomy, valgization, and blade plate fixation have all been reported.^{9,11,12} These studies confirm that union can be achieved both in primary nonunions and nonunions after implant failure with revision internal fixation for physiologically younger patients with good remaining bone stock. In cases where primary fixation with conventional implants fails, revision osteosynthesis may prove to be challenging for the operating surgeon due to several reasons. First, the entry point and reamed canal of the previous intramedullary implant may pose problems for the insertion of a new intramedullary implant with better angulation and alignment. Second, there may be insufficient bone stock in the proximal femur due to the previous surgeries. In such cases, revision surgery with surface implants such as DHS/DCS may also be difficult due to inadequate purchase of the screw in the femoral head. Third, in cases of nonunion, fixation in compression mode is

desirable. Nevertheless, in cases that have undergone multiple operations, it is difficult to achieve compression with conventional intramedullary implants. Implants such as PFN, DHS, or DCS can be used for revision surgery in such challenging cases.

However, we preferred to use proximal femoral locking plate to achieve stable fixation in compression mode (Figure 4). The treatment of intertrochanteric nonunion is guided by the age of the patient. In older patients with low-demand activities and poor bone quality or a damaged hip articular surface, arthroplasty allows earlier patient mobilization and greater certainty of outcome. Our patient was physiologically young patient with long life expectancy with well-preserved femoral head. That's why, we preferred to do osteosynthesis by using proximal femoral locking plate to achieve stable fixation in compression mode.

Our experience affirms that in cases with poor bone stock, union in nonunion of intertrochanteric fractures can be achieved with internal fixation by using proximal femoral locking plate and grafting procedures.

Conflict of Interest None

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