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**Dr. Raghavendra MS**  
Senior Resident, Department of  
Orthopaedics, Karwar Institute  
of Medical Sciences, Karwar,  
Karnataka, India

**Dr. Bharath Shekharappa  
Gadagoli**  
Assistant Professor, Department  
of Orthopaedics, Karwar  
Institute of Medical Sciences,  
Karwar, Karnataka, India

## Indirect reduction vs anatomical reduction in complex inter trochantric fractures managed with proximal femur locking compression plate

**Dr. Raghavendra MS and Dr. Bharath Shekharappa Gadagoli**

### Abstract

**Background:** proximal femur fracture is one of the common fracture in elderly. The purpose of this study was to compare the results Indirect reduction vs anatomical reduction in complex inter trochantric fractures managed with proximal femur locking plate.

**Materials and methods:** The proposed study is a hospital based prospective study. It was done between 2013 and 2016. 40 patients of inter trochantric fracture were included in the study. 20 cases randomly were treated by indirect reduction and rest 20 by anatomic reduction. The union rate, hip function and complication were compared between the 2 groups.

**Results:** In the Study, 19 (95%) of the fractures united in 16 wk in indirect reduction group where as 80% of direct reduction group had union in 16 wk. There were no cases of intraoperative fracture comminution, or infection in indirect reduction group but anatomical reduction group had 3 cases of infection and 2 intraoperative fracture comminution. 7 patients in indirect reduction group had mal union and 2 had screw breakage but anatomical reduction group had no such complications. Functional results were graded according to the Harris hip score. Overall functional results were excellent in 70% in indirect reduction group compared to 93% in anatomical reduction group of patients.  
n=number of cases

**Keywords:** Intertrochanteric fractures, proximal femur locking compression plating, plate osteosynthesis

### Introduction

The proximal femur fractures are devastating injuries that most commonly affect the elderly population. Intertrochanteric fractures are common in the elderly female due to osteoporosis and 90% of fractures result from a simple fall<sup>1</sup>. These fractures can be managed by conservative methods, but malunion and complications of prolonged immobilization is the end result. Thus, surgery by internal fixation is the ideal choice. Proximal femur- locking compression plate (PF-LCP) represents a feasible alternative for the treatment of unstable inter-trochanteric fractures. PF-LCP provides the surgeon with the flexibility to achieve plate to bone apposition as well as axial compression or angular stability. In this study we compared the 2 techniques of reduction for fixation that is indirect reduction with traction against open anatomical reduction.

### Materials and methods

The proposed study is a hospital based prospective study. It was done between 2013 and 2016. On admission of the patient a careful history was elicited from the patients. The patients were then assessed clinically to evaluate their general condition and the local injury. The general condition of the patient and the vital signs were recorded. Methodical examination was done to rule out fractures at other sides. Local neurologic and vascular deficit was assessed.

### Inclusion Criteria

1. Patients with unstable extracapsular proximal femur fractures AO-OTA type 31A2 and 31A3 extending from basicervical region to 5cm below the lesser trochanter.
2. Fractures less than 3weeks old.
3. Skeletally mature patients.
4. Patients willing for treatment and giving consent for operative management.

### Correspondence

**Dr. Raghavendra MS**  
Senior Resident, Department of  
Orthopaedics, Karwar Institute  
of Medical Sciences, Karwar,  
Karnataka, India

**Exclusion Criteria**

1. Open fractures.
2. Patients with multiple trauma.
3. Fractures more than 3 weeks old.
4. Patients with neurovascular injuries.
5. Patients with fractures already treated with other modes of ORIF and failed.
6. Patients unfit for surgery with other comorbidities.

Operative technique: After induction of anaesthesia, patient was placed in the supine position, then parts were painted and draped as for the standard hip fracture fixation. The tip of the greater trochanter was located by palpation or occasionally by using image intensifier in obese patients. A 6-8cm longitudinal incision was taken from the tip of trochanter in distal direction

along the shaft of femur. Fascia lata was opened in line with the incision and gluteus medius and vastus lateralis muscles were split in line with the fibers and tip of the trochanter and proximal femur exposed.

**Reduction of fracture**

Group 1: patient was placed in the supine position on the fracture table with adduction of the affected limb by 10-15 degrees and closed reduction of the fracture was done with traction and rotation.

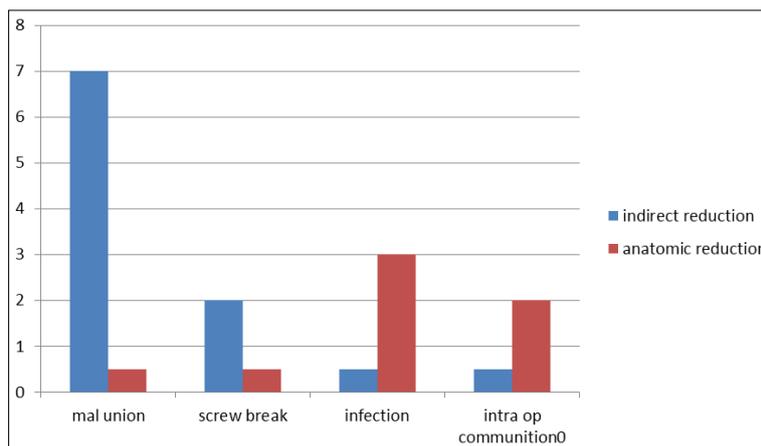
Group 2: fracture table not used, the fracture was reduced anatomically with reduction forceps.

Both group fractures were fixed with proximal femur locking plate. Wound closed in layers

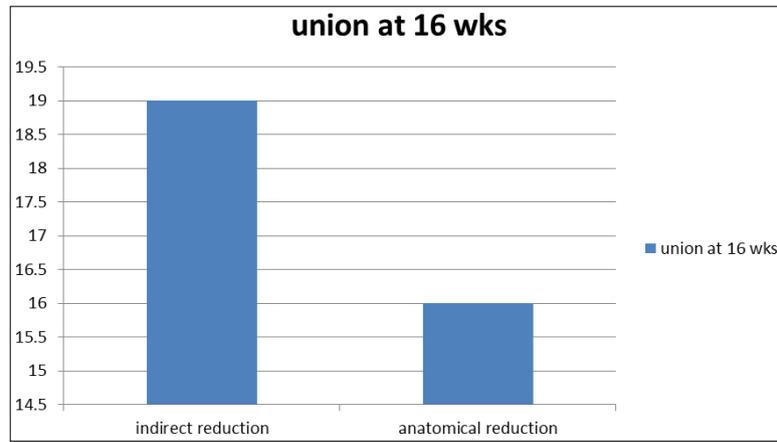


**Observation:** 40 closed unstable fractures of proximal femur were treated with proximal femoral locking compression plate. These were followed for 2 years. Average age in our study was 49.6 years. There was an almost equal distribution of cases in all age groups and most of them were males (75%). Most of these fractures were right sided (62.5%). Most of the cases were result of road traffic accident (43.75%) in the young and self-fall (40.62%) in the elderly. Most of the fracture types were AO type 31 A2 (56.25%). Comminuted intertrochanteric fracture constituted 35 cases. Average OT time for indirect reduction group was 60 mins. it was 100 mins in anatomic reduction group.

Mean duration of hospital stay was 4.5 days. 19 (95%) of the fractures united in 16 wk in indirect reduction group where as 80% of direct reduction group had union in 16 wk. There were no cases of intraoperative fracture comminution, or infection in indirect reduction group but anatomical reduction group had 3 cases of infection and 2 intraoperative fracture comminution. 7 patients in indirect reduction group had mal union and 2 had screw breakage but anatomical reduction group had no such complications. Functional results were graded according to the Harris hip score. Overall functional results were excellent in 70% in indirect reduction group compared to 93% in anatomical reduction group of patients.



Complications comparison



**Discussin**

**Conclusions**

1. proximal femoral LCP is a good option for proximal femoral fractures in the elderly patients especially for severe communitated fracture and osteoporosis
2. indirect reduction wit traction decreases the operative time and blood loss but chances of mal union and screw breakage

is more

3. direct anatomical reduction has longer operative time and infection but less mal unions and good hip function in long follow up
4. it is better to achieve anatomical reduction when using proximal femur locking plate for intertrochantric fractures



Screw break



mal union

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