

Assessment Of Functional Outcome Of OTA Type-C Distal Femur Fracture Treated With Locking Compression Plates

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ABSTRACT

Background: Distal femoral fractures accounts for 7% of all femoral fractures. These fractures usually occur either in males between 15–24 years or elderly females over 60 years of age. The present study was conducted to assess functional outcome of OTA type-C distal femur fracture fixed with locking compression plates.

Materials & Methods: 85 patients of distal femoral fractures of both genders were treated with locking compression plates. Parameter such as mode of injury, side, fracture subtype and outcome were recorded.

Results: Out of 85 patients, males were 52 and females were 33. We found that mode of injury was RTA in 56, fall in 19 and others in 10. Fracture subtype was C1 in 35, C2 in 30 and C3 in 20. Laterality was left in 37 and right in 48. The difference was significant ($P < 0.05$). Complications were deep infection in 4, reduction loss in 2, shortening in 3 and knee stiffness in 1. The difference was significant ($P < 0.05$).

Conclusion: Locking compression plates are effective method in management of distal femur fractures. It gives excellent stability and helps to maintain the length and alignment of the limb.

Keywords: Distal femoral fractures, Locking compression plates, fracture subtype

Introduction

Distal femoral fractures accounts for 7% of all femoral fractures and while excluding hip fractures number increases to 30%. Fractures of distal femur are complex type of injuries that are difficult to manage and produce long-term disability if not treated appropriately.¹ These fractures often occur either in elderly or multiply injured patients and have tendency of being unstable and intra-articular comminution. These fractures usually occur either in males between 15–24 years or elderly females over 60 years of age. To achieve full range of knee motion and functions may be difficult because of proximity of fracture to knee joint.

Probability of long-term disability further increases when these fractures are associated with marked comminution, extensive articular damage, and severe soft tissue injury.²

Anatomical reduction of articular fracture fragments, restoration of limb length, and early mobilization exercises are key factors for optimal outcomes of involved limb after surgical treatment.³ There have been many devices which have come up for the treatment of distal femur Fractures like Angle Blade Plate, Dynamic Condylar screw, Condylar buttress plate, Flexible Nails, Intramedullary Nail, External fixators and Even total Knee Replacement. With the advancement in

technology still, osteosynthesis has a greater advantage.⁴ Current distal femoral locking compression plate has multiple advantages over older ones, as they are anatomically contoured and forms a better construct with the bone, the dual advantage with a combination of conventional compression and locked plating technique.⁵ Locking compression plates are designed to apply in a minimally invasive fashion to preserve local biology and avoid problems with fracture healing and infection.⁶ The present study was conducted to assess functional outcome of OTA type-C distal femur fracture fixed with locking compression plates.

Materials & Methods

The present study comprised of 85 patients of distal femoral fractures of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. A thorough clinical examination was carried out. All patients with distal femur fracture were treated with locking compression plates. The position of the plate was confirmed under fluoroscopic guidance in both Anteroposterior and lateral views. Parameter such as mode of injury, side, fracture subtype and outcome were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

| Total- 85 | | |
|-----------|-------|---------|
| Gender | Males | Females |
| Number | 52 | 33 |

Table I shows that out of 85 patients, males were 52 and females were 33.

Table II Assessment of parameters

| Parameters | Variables | Number | P value |
|------------------|-----------|--------|---------|
| Mode of injury | RTA | 56 | 0.01 |
| | Fall | 19 | |
| | Others | 10 | |
| Fracture subtype | C1 | 35 | 0.42 |
| | C2 | 30 | |
| | C3 | 20 | |
| Laterality | Left | 37 | 0.05 |
| | Right | 48 | |

Table II, graph I shows that mode of injury was RTA in 56, fall in 19 and others in 10. Fracture subtype was C1 in 35, C2 in 30 and C3 in 20.

Laterality was left in 37 and right in 48. The difference was significant (P< 0.05).

Graph I Assessment of parameters

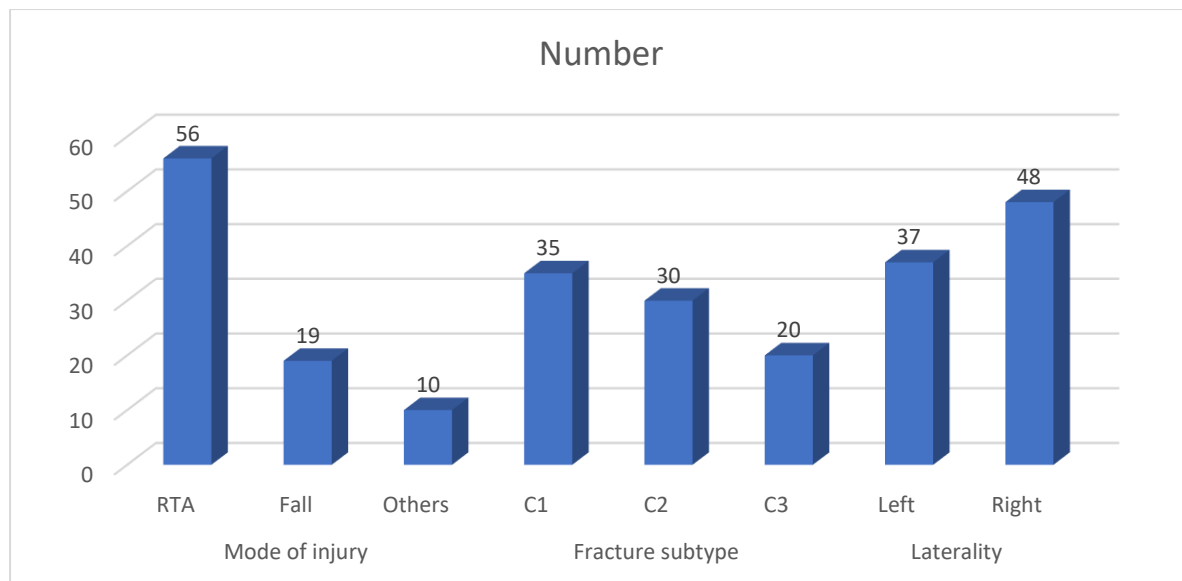


Table III Assessment of complications

| Complications | Number | P value |
|----------------|--------|---------|
| Deep Infection | 4 | 0.03 |
| Reduction loss | 2 | |
| Shortening | 3 | |
| Knee stiffness | 1 | |

Table III shows that complications were deep infection in 4, reduction loss in 2, shortening in 3 and knee stiffness in 1. The difference was significant ($P < 0.05$).

Discussion

Various surgical approaches have been suggested to achieve an adequate exposure of the distal femoral articular surface, including medial/lateral parapatellar approaches, swashbuckler approach, tibial tubercle osteotomy, and combined medial and lateral approaches.⁷ External ring fixators have been used with mixed results by several previous authors to address the comminution in these complex injuries.^{8,9} Some have used dual medial and lateral plates in these. Most previous authors have employed primary bone grafting to enhance union in these complex fractures. The use of swashbuckler approach for C3 fractures has not been reported yet in the literature.^{10,11} The present study was conducted to assess functional outcome of OTA type-C

distal femur fracture fixed with locking compression plates.

We found that out of 85 patients, males were 52 and females were 33. Agrawal et al¹² determined the clinico-radiological outcome after fixation with a single locked plate using modified swashbuckler approach. 12 patients with C3 type distal femur fractures treated with a lateral locked plate, using a modified swashbuckler approach, were included in the study. The extraarticular component was managed either by compression plating or bridge plating depending on the fracture pattern. Primary bone grafting was not done in any case. The clinical outcome at 1 year was determined using the Knee Society Score (KSS). All fractures united at a mean of 14.3 ± 4.7 weeks. There were no significant complications such as non-union, deep infection, and implant failure. One of the patients underwent secondary bone grafting at 3 months. The mean range of motion of the knee was $120^\circ \pm 14.8^\circ$. Seven patients had

excellent, three patients had good and two patients had a fair outcome according to the KSS at 1 year. At a mean follow up of 17.6 months, three patients showed radiological evidence of secondary osteoarthritis of the knee joint. However, only one of these patients was symptomatic.

We found that mode of injury was RTA in 56, fall in 19 and others in 10. Fracture subtype was C1 in 35, C2 in 30 and C3 in 20. Laterality was left in 37 and right in 48. Kumar et al¹³ in their study a total of 35 cases was recruited. All the distal femoral fractures were treated with a distal femoral locking compression plate. The patients were followed up at 1, 3, 6, and 12 months respectively. There were 27 males and 8 females with a mean age of 48.5 years (range 25–94). The greater part of the cases was of type C2 (AO classification) and was due to high energy trauma. The functional outcome was assessed using the NEER's criteria. In this study, the average time of the union of fracture was 16 weeks. In 26 cases (75%) we obtained satisfactory to excellent results. Post-operative complications associated with the fracture were knee stiffness six (17.1%), varus deformity in three (8.5%), shortening in five (14.2%), and two (5.7%) superficial wound infections

We found that complications were deep infection in 4, reduction loss in 2, shortening in 3 and knee stiffness in 1. Kapil et al¹⁴ in their study 40 patients with distal femoral fractures were fixed by DFLCP. Demographic profiles, time to unite the fractures, functional outcomes as well as complications related to this surgery were noted. Time to unite the fracture was 19.32 ± 5.48 weeks (range 14–32 weeks). There was one case of non-union, one case of malunion (varus union $<10^\circ$), four case of delayed union, two cases of superficial infection, one case of deep infections, one case of implant failure, and two cases of extensor lag of more than 15° . Based on Neer's scores, there were 30% excellent, 45% satisfactory, 20% unsatisfactory, and 5% failure rates. Distal femoral locking plate is the treatment of choice in the management of comminuted distal

femoral fractures both in Type A and Type C varieties. It not only maintains the biological environment of bone but also prevents metaphyseal collapse and provides the stable construct for fracture union with good functional outcomes.

The limitation the study is small sample size.

Conclusion

Authors found that locking compression plates are effective method in management of distal femur fractures. It gives excellent stability and helps to maintain the length and alignment of the limb.

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