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Original Research Paper

To Study the Functional Outcome of Proximal Tibia extra-articular Fractures Treated with Lcp

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ABSTRACT:

Introduction: As traditionally used IM nails have proven to be challenging in fixation of proximal tibia extra-articular fractures, The Locking compression plates are a newer modality which are minimal invasive and provide anatomical fixation. **Objectives**: To study the functional outcome of the extra-articular fracture of proximal tibia after 4, 12 and 24 weeks. **Material and Methods**: The material for the present study was obtained from the patients admitted in simmer hospital hospital with diagnosis of proximal Tibia Extra-articular fractures in adult age group (more than 18yrs) from January 2021 to January 2023. Final outcome was evaluated by Lysholym knee score. **Results**: All cases showed union. Most of the fracture union (80%) occurred between 12-16 weeks, followed by 15% of the fracture union in more than 16 weeks. 65% patients had range of motion greater than 120, 25% patients had range of motion between 90-120 and 10% patients had range of motion lesser than 90. According to Lysholym Knee Score 50% of the patients in the study group showed excellent results while 20% patients reported Good to Excellent result.

Key Words: locking compression plates, lysholym knee score, proximal tibia fractures, fracture non-union.

INTRODUCTION:

As traditionally used IM nails have proven to be challenging in fixation of proximal tibia extra-articular fractures, The Locking compression plates are a newer modality which are minimal invasive and provide anatomical fixation. Proximal Tibia extra-articular fractures are often the result of high energy trauma and treatment of these fractures remain a significant challenge. Occurrence is 5-7% of all tibial fractures in adults. As traditionally used IM nails have proven to be challenging in fixation for these types of fractures, The Locking compression plates are a newer modality which are minimal invasive and provide anatomical fixation.

ANATOMY:

The tibia also known as the shinbone or shank bone, is the larger and stronger of the two bones in the leg below the knee in vertebrates. It is commonly recognized as the strongest weightbearing bone of the body. The stability of the knee joint largely depends on the proximal part of tibia.

MECHANISM OF INJURY:

Direct injury to the upper part of the tibia, i.e., subchondral or metaphyseal region may lead to a fracture without involving the articular surface. These types of fractures may be due to road traffic accidents, assaults, etc.

CLINICAL EVALUATION:

Pts typically present with a severe pain and Ecchymosis in the leg region mainly the proximal 1/3rd ,with or without soft tissue injury. Careful neurovascular examination is required. The current study was undertaken to assess the Functional outcome of Proximal Tibia Extra-Articular Fractures Treated with locking compression plating. Twenty patients with proximal Tibia fractures were treated with locking plate and followed up for 6 months for functional and radiological outcome.

AIM:

To evaluate the functional outcome of proximal tibia extra-articular fractures operated with locking compression plate.

OBJECTIVES:

1)To Study the duration of union in proximal tibia extra-articular fractures treated with LCP.
2)To analyse the possible benefits and complications of the proximal tibia LCP.

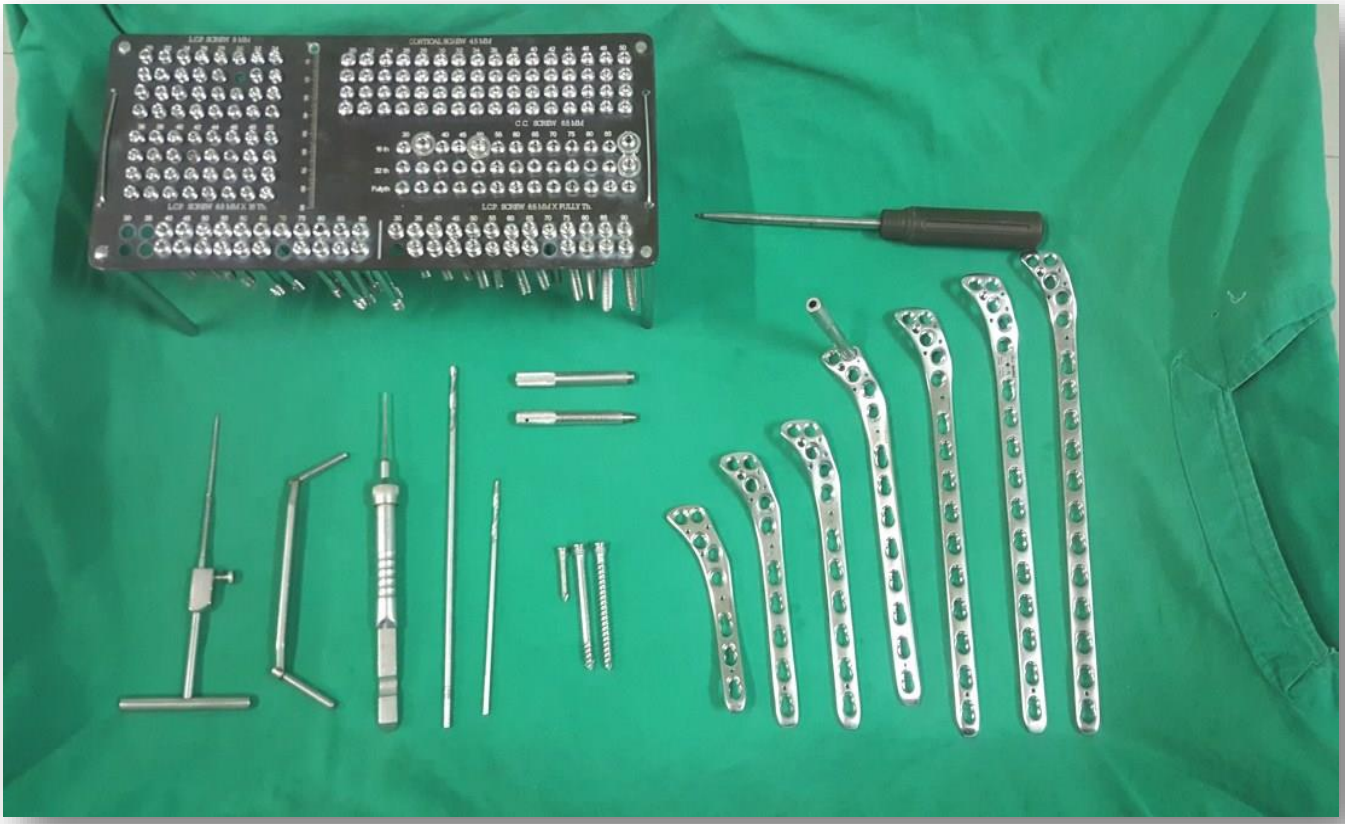
3)To establish the role of locking plates in early mobilization.
4)To study the functional outcome of the extra-articular fracture of proximal tibia after 4, 12 and 24 weeks.

METHODOLOGY:

The material for the present study was obtained from the patients admitted in the hospital with diagnosis of proximal Tibia Extra-articular fractures in adult age group (more than 18yrs) from January 2021 to January 2023.
All 20 cases were treated by Minimal invasive technique with locking plate under C-Arm guidance.

METHOD OF DATA COLLECTION:

Patients were evaluated at the time of discharge, and at 6 weeks, 12 weeks and 24 weeks post operative follow-up, based on range of motion of Knee, clinical and radiological union, and complications if any. Final outcome was evaluated by LYSHOLM KNEE SCORE.



INCLUSION CRITERIA:

1. Simple closed fractures of proximal tibia extra-articular
2. Adult patients (age more than 18 years).
3. Metaphyseal fractures with diaphyseal extension.

EXCLUSION CRITERIA:

1. Intra-articular proximal tibia Fractures
2. Pathological fracture of proximal tibia
3. Distal neurovascular deficit and Severe soft tissue injury

TREATMENT PROTOCOL:

After thorough clinical evaluation, X-ray of the affected Tibia was taken in AP & lateral view. immobilization was done by Long Knee Brace.The patient was taken up for surgery after anesthetic fitness.
The average injury-surgery interval was 7 days.

ANAESTHESIA:

Spinal anesthesia:
image showing anesthetist giving spinal anesthesia.

PATIENT POSITION AND DRAPPING:

Patient placed in supine position on radiolucent operating table.

SURGICAL APPROACH:

Antero-Lateral Approach:

After acceptable reduction an antero-lateral approach is used with inverted hockey stick incision . The plate is then slid subcutaneously across the fracture site to reach distal fragment Locking Screws are then used to fix the proximal and distal fragments. fracture site to reach distal fragment.

Locking Screws are then used to fix the proximal and distal fragments.

CLOSURE:
Wound closure is done in layersand aseptic dressing done.
INTRA-OP C-ARM IMAGING

FOLLOW UP ASSESSMENT:

- Follow-up of pt. was done at 6 weeks, 3 months and 6 months post-op
- For all subjects, radiographs were performed at subsequent follow-up
- Patients were evaluated based on:
- Range of motion of the Shoulder
- Complications
- Clinical union and Radiological union.

EVALUATION:

Final outcome was evaluated by Lysholm Knee Score.

RESULTS:

Score	Outcome
98 - 100	excellent
93 – 97	good to excellent
82 – 92	fair to good
66 – 81	fair
<= 65	poor

The mean age of patients in the study group was 33.75 years and Majority of the patients (70%) were male , Road Traffic Accident in 75% patients was the main cause of fracture.55% of the fractures were found to be OTA 41-A2 followed by OTA 41-A3 (45%). The mean operative time was 89.51 hours, while the mean hospital stay was 6.6 days . Most of the fracture union (80%) occurred between 12-16 weeks, followed by 15% of the fracture union in more than 16 weeks. 65% patients had range of motion greater than 120, 25% patients had range of motion between 90-120 and 10% patients had range of motion lesser than 90. According to Lysholym knee score 50% of the patients in the study group showed excellent results while 20% patients reported Good to Excellent result. 5% patient each reported knee stiffness and knee instability and 90% patients had no complications.

DISCUSSION:

Proximal tibia being involved in body weight transmission through knee joint and leg, plays a vital role in knee function and stability. Fractures of proximal tibia have historically been difficult to treat because of its subcutaneous location of the anteromedial surface of the tibia. Severe bone and soft tissue injuries are not infrequent and there is high incidence of open fracture compared with other long bones. Extra-articular proximal tibial fractures are often the result of high-energy trauma with displacement and comminution. They lead to complex tissue injuries involving bone and surrounding soft tissues. Complications of treatment and associated injuries with this fracture have led to several approaches and mode of fixation with little consensus on optimal management. Conventional Arbeitsgemeinschaftfur Osteosynthe sefragen (AO) plating needs fracture exposure and extensive soft-tissue dissection, thus carrying the risks of bleeding, infection and soft-tissue healing problem. Although the soft-tissue healing problem and deep infection can be largely avoided with a hybrid fixator, it carries the risks of non-union, malunion rotational deformity, or stiffness of adjacent joints27,28; patient dissatisfaction is also a major limit of this procedure. With the introduction of the locking plate (LCP) in the fracture fixation, the fixation of proximal tibia fracture has undergone a revolutionary change. The present study was conducted to evaluate the functional outcome of proximal tibia extra-articular fractures treated with locking compression plating. The mean age of patients in the study group was 33.75 years. It was observed that majority of the patients (70%) were male and Road Traffic Accident in 75% patients was the main cause of fracture. 60% of the fractures were on the right side. This is in concordant to the study of Naik MA et al. The study of Naik MA et al31was a

prospective cohort study in which all patients with extra-articular proximal tibial fracture were treated with percutaneous locked plating (PLP). 91.5% patients were male and 8.5% patients were female. The mean age of the patients was 42 years. Among modes of injury road traffic accidents are the most common(93.3%) with more (73.3%) fractures on right side. 55% of the fractures in this study were found to be OTA 41-A2 followed by OTA 41-A3 (45%). This correlates to the findings in the studies of Naik MA et al31, Reddy JPK et al35and Meena RC et al. Naik MA et al31had observed in their study that the mode of injury in 41 (87%) patients was because of high-velocity road-traffic accident whereas 6 (13%) were due to fall from a height. The study of Reddy JPK et al35had 30 patients classified according to AO classification system. 3.3% of the patients were type A1, 13.3% type A2, 30% type A3, 16.7% type C1, 30% type C2 and 6.7% type C3. In the study of Meena RC et al29,40% of the fractures were found to be OTA 41-A2 and 60% fractures were OTA 41-A3 (45%). In the present study, the mean operative time was 89.51 hours, while the mean hospital stay was 6.6 days. Most of the fracture union (80%) occurred between 12-16 weeks, followed by 15% of the fracture union in more than 16 weeks. There were 13 (65%) patients with range of motion greater than 120, 5 (25%) patients with range of motion between 90-120 and 2 (10%) patients with range of motion lesser than 90. This correlates to the study of Meena RC et al. Meena RC et al29 observed that the mean operative time was 87.91 hours and mean hospital stay was 5.3 days. In extra-articular proximal tibial fractures treated with proximal tibial plating, time to full weight-bearing has ranged from 6 to 13 weeks depending on the fracture location, fracture pattern, and surgeon's preference. In the study of Meena RC et al, the time required before full weight-bearing, which was done only after complete radiological union, was 22.84 weeks in Group B.

50% of the patients in the study group showed excellent results while 20% patients reported Good to Excellent result, 15% patients reported Fair to Good result and 10% patients reported Fair result. This is similar to the results of Kim JW et al, Rambold36, Jensen D25, Chaix et al37, Lee et al and Feng et al.

Kim JW et al32did retrospective study on 30 patients with proximal tibia fracture treated with MIPO. Primary union was achieved in 24 patients and early bone grafting was performed in 6 patients. 23 patients achieved an excellent result and 7 achieved a good result. Rambold36 in 1960 reported that internal fixation of tibial plateau fractures and early mobilization contributes to good anatomical and functional results. Jensen D26 in 1990 got good results by surgical treatment of proximal tibia fractures. Chaix et al reported 86% good to excellent results by surgical means of treatment. Lee et al37 reported good to excellent results by surgical means of less invasive stabilization system treatment. Feng et al reported good results when fixed with LCP in comparison with dynamic compression plate (DCP) with an additional benefit of minimally invasive surgery. There was 1 (5%) patient each with knee stiffness and knee instability. 18 (90%) patients had no complications. This is agreeable to the findings of Sommer et al33 and Gonzailez HY et al. Sommer et al published the results of the first general study of various locking compression plates in 2003. In their prospective study, they treated 144 patients with 169 fractures involving tibia (57), humerus (45), radius (19), and femur (18) and assessed the patients for 1 year. In 130 fractures the healing took place in the expected period without any complications. A total of 27 complications occurred (19 patients) including implant loosening / pull out (5 patients), Plate failure (4 patients) non-union (1 patient), secondary fractures immediately adjacent to implant after a subsequent injury (5 patients) and infection (2 patients). Analysis by the experts concluded that the mechanical complications arose entirely from technical errors of application. No purely implant related complications occurred. They concluded that the LCP was a technically mature and has proven its worth in complex fracture situations and in revision operations after the failure of other implants. Gonzailez HY et al studied 122 injuries in 113 patients treated with the LCP and LISS. They found that despite the large number of open and comminated fractures no serious complications such as deep infections, non-union, vascular lesions or deep venous thrombosis were noted. Also they concluded that the proven value of these systems (LCP and LISS) in complex fracture situations and revisions surgeries. They found the procedure to be safe and reliable.

CONCLUSION:

Extra-articular proximal tibial fractures are often the result of high energy trauma with displacement and comminution. They lead to complex tissue injuries involving bone and surrounding soft tissues. Conservative management of these fractures has often resulted in malunion, non-union, rotational deformity, or stiffness of adjacent joints, so there has been a shift towards operative management of these fractures. Locking Compression plating in extra-articular proximal tibia fracture showed promising results. They provide rigid stability to the fracture site and prevent secondary fracture collapse. Locking Compression plating preserves the vascularity and hence decreases the risk of infection and wound breakdown. However, it is important for the surgeon to understand and respect the applied fixation principles, the specific anatomical considerations and the implant characteristics when using a locking plate. Locking Compression plating by MIPPO technique in extra-articular proximal tibia fracture showed promising results. LCP with MIPPO preserves the vascularity and

hence decreases the risk of infection and wound breakdown and non-union.

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