Original Research Paper

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Orthopaedics

SURGICAL MANAGEMENT OF TIBIAL CONDYLE FRACTURES USING LOCKING COMPRESSION PLATE

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KEYWORDS :

INTRODUCTION

The knee joint is one of three major weight bearing joints in the lower extremity. The tibial condyle fractures are one of the commonest intraarticular fractures generally these injuries falls into two broad categories, high energy fractures and low energy fractures. The majority of tibial condyle fractures are secondary to high speed velocity accidents and fall from height where fractures results from direct axial compression, usually with a valgus (more common) or varus moment and indirect shear forces. Older patients with osteopenic bone are more likely to sustain depression type fracture because their subchondral bone is less likely to resist axial directed loads. The aim of surgical treatment of tibial condyle fracture is to restore congruent articular surfaces of the tibial condyles maintaining the mechanical axis and restoring ligamentous stability eventually can achieve functional painless and good range of motion in the knee joint.

The various clinical studies established that bone beneath a rigid conventional plate are thin and atropic which are prone for secondary displacement due to insufficient buttressing and secondary fractures after removal of plate, fracture site take longer period to osteosynthesis due to interruption of vascular supply to bone due to soft tissue and periosteal stripping.

So there was the births of a new concept of biological fixation using the plates, otherwise called minimally invasive plate osteosynthesis (MIPO). But this was difficult as conventional plates needed to be accurately contoured to achieve good fixation, osteoporosis also posed the same problem of poor fixation with conventional plates.

This led to the development of the AO locking compression plate (LCP).

This new system has been regarded as technically mature. It offers numerous fixation possibilities and has proven to worth in complex fracture situations and in osteoporosis.

AIMS AND OBJECTIVES

1. To study the functional outcome of the fracture of tibial condyle.
2. To study the duration of union in tibial condyle fracture treated with LCP.

MATERIALS AND METHODS

Study was conducted on 21 patients with tibial condyle fractures admitted from OPD clinic and casuality of GOVERNMENT GENERAL HOSPITAL, KURNOOL. This study was done over period of 23 months from August 2017 to June 2019.

INCLUSION CRITERIA

- Adult (aged over 18 yrs) both male and female with tibial condylar fractures.

EXCLUSION CRITERIA :

- Patient aged below 18 yrs
- Type II and III compound fractures
- Pathological fractures.

RESULTS

We studied 21 patients with 21 tibial condyle fractures who were treated with locking compression plate (buttress type) in GGH, Kurnool between August 2017 to June 2019. The first follow up was usually between 6-8 weeks and later on patients were followed up at regular interval of 6-8 weeks till complete fracture union.

Type Of Fracture And Percentage Of Cases : Schatzker's Classification

Type of fracture	Number of patients	Percent
I. Pure cleavage	3	14.29
II. Cleavage with depression	-	-
III. Central depression	-	-
IV. Medial Condyle fracture	6	28.57
V. Bicondylar fracture	5	23.80
VI. Metaphysio diaphyseal dissociation	7	33.34
Total	**21**	**100**

In our series the majority of the fractures were found to be of type IV, V and VI fracture types which are usually associated with high velocity road traffic accident.

Method Of Reduction And Fixation

Method of reduction	Number of patients	Percentage
ORIF	16	76.19
MIPO	5	23.81
Total	21	100.0

We used MIPO technique in 5 patients both duration of procedure and soft tissue injuries are less compare to ORIF technique.

PRINCIPLE OF FIXATION

Principle	Number of patients	Percentage
Compression	4	19.04
Bridging	7	33.33
Combined	10	47.63
Total	**21**	**100.0**

We used compression type for 4 patients were both rigid fixation and buttress effect were needed. We used bridging type for 7 patients with fracture extending into meta physial region and lack of purchase to the screw due to communition in meta physial region.

Combined type was used in 10 patients were articular reconstruction is essential and need protection from collapsing in postoperative period.

SURGICAL APPROACH

Side	Number of patients	Percentage
Anteromedial	11	52.38
Anterolateral	10	47.62
Total	**21**	**100.0**

We preferred anteromedial approach for 11 patients for fractures with medial condylar displacements and MIPO technique of reduction and fixation is essential. This approach need less soft tissue stripping from bone and can contour plate appropriately. Anterolateral approach was done for 10 patients with lateral condylar displacement fractures and soft tissue injuries on medial side of tibial condyle.

CLINICAL RESULTS

Clinical result	No. of cases	Percentage
Excellent	11	52.38
Good	7	33.33

Fair	02	9.53
Poor	01	4.76
Total	21	100

Out of 21 cases treated, 11 cases gave excellent result, 7 cases came out with good result, fair in 2 cases, and 01 case of poor results

DISCUSSION

We presented the clinical study of surgical treatment of 21 tibial condyle fractures. The analysis of the results were made in terms of age of patients, sex distribution. Occupation of patient, laterality of fracture, mode of violence, analysis of the types, method of reduction and fixation, principle of LCP fixation, surgical approach and complications.

SEPPO E. Honkonen conducted 130 tibial plateau fractures taking into consideration of -
1. Condylar widening of > 5mm.
2. Lateral condyle step off > 3mm
3. All medial condylar fracture

In our series the indications for the surgery were the same standard indications as for the tibial plateau fractures. 3mm depression was considered as an indications for surgery in our series.

In our series we used MIPO technique for reduction and fixation in 5 patients 23%. In which both duration of procedure and soft tissue injuries are less compare to ORIF technique, wound healing also better and faster compare to ORIF technique but it demands more surgical techniques.

In our series we used combined principle of fixation in 10 patients 47.6% and achieved good articular reconstruction and protection from collapsing during post operative period. We used bridging type of principle of fixation in 7 patients 33.33% in metapyseal comminution fractures and osteoporotic patient where bone graft was needed we have not done bone graft in these patient as LCP implant system provide good fixation and prevent collapse of fracture during postoperative period.

We used compression type principle of fixation in 4 patients 19.04% were both rigid fixation and buttress effect were needed, but postoperatively due to toggling of condylar screws (non locking screws) there was an collapse of condyle in two patients.

In our series we had no cases of any purely implant related complications and average time for union of fracture was 18 weeks.

We are able to achieve 52.38% excellent result and 33.33% good result (over all 85.7%, acceptable results) with our standard surgical care. In addition we have 9.5% fair and 4.7% poor results in term of functional outcome. These results are comparable and on par with other documented standard studies.

Rambold 1992	93% acceptable
Seppo E 1993	85% satisfactory
Joseph Schatzkar 1986	85% satisfactory
Our study 2017	85% satisfactory

CONCLUSION

- The anchorage of the locking head screw was found to be excellent even in osteoporotic bone. Drilling the holes for the locking head screw should always be through a screw-in drill sleeve.
- While bridging a fracture, care must be taken to select a strong plate and leave atleast 2-3 plate hole, without inserting screws over the fracture. This prevent the stress concentration and achieves an elastic fixation which is very essential for secondary fracture union.
- Even in osteoporotic bone, bone graft is not essential for defect in metaphyseal region as LCP internal fixator system act as single implant and prevent collapse of fracture intraoperatively and postoperatively subsequently bone deficient will heal by callus formation.
- When LCP used as combined principle of fixation we can reconstruct tibial plateau with compression and prevent it from collapse by bridging principle.
- In our study LCP as a compression plate was not as good as combined and bridge plating type of fixation.
- Fractures treated with MIPO healed rapidly by secondary fracture union and hence achieving strong bone union across the fracture at a much earlier time compared to open reduction and internal fixation due to less soft tissue injury leads to minimal blood supply interruption to tibial condyle.

Thus we conclude that the locking compression plate system with its various type of fixation act as an good biological fixation including difficult fracture situations.

But this also involve the risk that may occur unless properly planned preoperatively and follow guided principles intra operatively.

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