

A study of surgical management of tibial condylar fractures

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Abstract

Background: Tremendous advance in mechanization and fastness of travel have been accompanied by steep increase in number and severity of fractures and those of tibial condyles are no exception. Knee being one of the major weight bearing joints of the body, fractures around it will be of paramount importance. This study is to analyze the functional outcome of CRIF or ORIF with or without bone grafting in tibial condylar fractures in adults. **Material and Methods:** 30 cases of tibial condylar fractures treated by various modalities were studied from Feb '14 to Dec'17 at our institution and followed for a minimum of 6 months. **Results:** The selected patients were evaluated clinically and radiologically, after the relevant lab investigations were taken for surgery. The knee range of motion was excellent to very good, gait and weight bearing after complete union was satisfactory, knee stiffness in three patients, wound infection in one patient and non-union in none of the cases was noted. **Conclusion:** Functional outcome is better in operatively treated tibial condylar fractures in adults, because it gives excellent anatomical reduction and rigid fixation to restore articular congruity and early motion thereby preventing knee stiffness.

Key Words: Closed reduction and internal fixation, Open reduction and internal fixation, Schatzker classification.

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INTRODUCTION

Tibial condylar fractures are one of the commonest intra-articular fractures. They result from indirect coronal or direct axial compressive forces. This makes about 1% of all fractures and 8% of the fractures in elderly. Most injuries affect lateral tibial condyle (55 to 70%) and isolated medial condyle fractures occur in 10 to 23% whereas the frequency of bicondylar lesions is found in 10 to 30% of the reported series¹. These fractures encompass many and varied fracture configurations that

involve medial, lateral or both condyles with varying degrees of articular depressions and displacements. It is essential to determine the force of injury since high energy trauma is associated with considerable soft tissue and neurovascular damage. We have advanced from the conservative approach to internal fixation in fractures as an acceptable mode of treatment. Nevertheless, tibial condylar fractures remain challenging because of their number, variety and complexity. Despite a plethora of articles, written in the past 50 years that have addressed the problems of classification and results of various treatments the optimal method of management remains controversial².

MATERIAL AND METHODS

This is a study of surgical management of tibial condylar fracture conducted in the Department of Orthopaedics at GVP Hospital, Visakhapatnam between Feb '14 to Dec'17. During this period 30 patients were treated for tibial condyl fractures in which all patients were treated by internal fixation, out of which, 8 with percutaneous cancellous screw fixation method, 7 with ORIF with

locking plate, 9 with ORIF with locking plate and bone grafting, 4 with ORIF with locking plate and buttress plate and bone grafting and 2 with ORIF with locking plate and buttress plate

Inclusion Criteria

1. Adults 20 - 60 years of age.
2. Compound fracture grade I and II

Exclusion Criteria

1. Age below 20yrs and above 60yrs
2. Grossly comminuted fractures.
3. Pathological fractures.
4. Ipsilateral fractures in the same limb.
5. Compound fracture grade III.

All patients were selected on the basis of history, clinical examination and radiography. Schatzker's classification was used to classify these fractures. The patients were followed up for an average period of 6 months (range 6-18 months). All cases were treated by open or closed reduction and internal fixation. Fixation was done by Cannulated cancellous screws, Locking compression plate, T or L buttress-plate. Follow up and assessment was performed using modified Rasmussen's clinical and radiological criteria. The patients were first seen in the casualty. The history was taken followed by general and local examination of the patient. Concerned specialists undertook appropriate management of the associated injuries. Intensive care was given to those patients who presented with shock and immediate resuscitative measures were taken. Once the patient's general condition was fit, relevant X-rays were taken. Higher investigations such as CT scan were done for tibial plateau fractures whenever necessary. The treatment method was based on the type of fracture, the amount of displacement and the amount of depression of the tibial plateau. Surgical method of treatment was done for all types of fracture irrespective of amount of displacement or depression and the degree of instability. The patients were taken for surgery at the earliest possible time depending on their medical condition, skin condition and the amount of swelling. All surgeries were done under C-arm image intensifier control. Fractures were fixed either with percutaneous technique or by open reduction and internal fixation. The fixation devices consisted of locking compression plate, T- Buttress plate, L- Buttress plates, 4.5 mm cortical screws and 6.5 mm cannulated cancellous screws. Bone grafts were used in depressed and comminuted fractures. The source of bone graft was ipsilateral iliac crest. Postoperatively patients were immobilized with an above knee posterior slab or a compression bandage for 3 weeks. Antibiotic coverage was given till suture removal. The sutures were removed on the 12th postoperative day. Patients were advised static quadriceps exercises for the initial 3 weeks followed by

passive range of motion with protected knee brace and non-weight bearing crutch walking up to 6 weeks. After 6 weeks, knee mobilization and partial weight bearing crutch walking were advised. An immediate postoperative X-ray was taken and repeated at 6 weeks, 3 months and 6 months post operatively.

Follow up: The first follow up was carried at 6th week post operatively and an X-ray was taken to assess fracture union and loss of reduction if any. The second follow up was done at 3 month during which X-ray of operated knee taken and a clinical evaluation of fracture union is done. Based on the clinical and radiological signs of union patients were allowed partial weight bearing and gradually progressed to full weight bearing. The patients were then followed up for a minimum of 6 months, during which time the anatomic and functional evaluation was done using the modified Rasmussen clinical and radiological criteria.

RESULTS

Evaluation of the outcome was done at the end of follow up period. In this study 66.6% were male patients and 33.4% patients were female patients showing male predominance. 66.6% were in the 4th and 5th decade. High incidence of fractures was seen in businessman and employee (53.4%) followed by housewives and labourers. Mode of injury is highly associated with road traffic accident which accounts for about 56.6% followed by fall from height and fall on level surface which account the rest. There was left sided predominance of 63.4% as compared to right side of 36.6%. Majority of the fractures (76.6 %) were found to be of type I, type II, type III fracture types i.e. pure cleavage fracture, cleavage with depression fracture and Central depression fractures. All fractures united within expected time except one with infection, not a single case of non-union was noted in the series. One patient with wound infection developed stiffness of the knee joint. Grading of the results was done using modified Rasmussen Criteria for clinical and radiological assessment. Out of 30 patients treated with surgical procedure, 10 cases had excellent results, 15 patients came out with good results, fair in 3 cases and 2 cases had poor result, due to infections and knee stiffness. Retrospectively it was found that high velocity injuries (Type V-VI) have poor outcome than low velocity injuries (type – I-IV)³.

DISCUSSION

Tibial condylar fractures, one of the commonest intra articular fractures are major traumatic events occurring as a result of RTA, fall from height, violence etc. The management of tibial condylar fracture has always been a subject of debate because of their variety and complexity.

High energy intraarticular fractures of the tibial condyles lead to management problems and remains challenging for orthopedic surgeons even to date. Tibial condylar fractures are more commonly seen in the active productive age group (31-50 years) due to high-energy trauma. Closed treatment of these injuries had little success necessitating open reduction and stable internal fixation, if necessary bone grafting is done in order to get good results. The advantages are decreased operative time, less blood loss, smaller incision, short hospital stay and early rehabilitation⁴. In the early half of the 20th century I. Palmer reported two studies having satisfactory percentage of good to excellent short and long term results with surgical method of treatment^{5,6}. In our study majority of the patients were males (66.6%). This can be attributed to high level of activity. The significance of tibial condylar fracture related sex distribution was not available in literature even though male preponderance is expected. In our study, the indications for the surgery were the same standard indications as for the tibial condylar fractures. 3mm depression was considered as an indication for surgery in the series⁷. No criteria were formulated as to particular method of fixation for particular type of fracture. So each case was individualized and treated accordingly. All cases of the type I and a case of type IV were treated with CRIF and percutaneous cancellous screw fixation. Types II, III, V and VI fractures with >3mm depression was treated by ORIF with locking compression plate, Buttress plate and bone grafting wherever necessary. This study, according to modified Rasmussen clinical and radiological criteria, 33.4% gave excellent result, 50.0% good results (over all 83.4% acceptable results) with our standard surgical care using various standard fixation methods. In addition we have 10.0% fair and 6.6% poor results in terms of functional outcome. These results are comparable and on par with other documented studies. In another published study of 159 cases of Tibial plateau fracture of all types, treated by conservative (46%) and surgery (54%), evaluated by Hohl and Luck method, reported better, good and excellent results by surgery (84%) than conservative (62%) methods⁸. B.B Porter *et al* advocated good anatomical reduction for best results in surgical management of tibial condyle fractures⁹. Fractures treated by ORIF with buttress plate and Bone grafting achieved 88% acceptable results¹⁰. Posttraumatic osteoarthritis was directly proportional to the amount of displacement¹¹.

Management of tibial condylar fractures is by ORIF and bone grafting whenever necessary gives good functional results. It appears that there is no role of conservative management in tibial condylar fractures except in type I and in patients who are at risk for surgery.

CONCLUSION

To determine the ideal method of management of tibial condylar fractures, a good clinical judgement is essential. If rational treatment is to be instituted the surgeon must have sound knowledge of the personality of the injury and a clear understanding of the knee examination, imaging studies and must be familiar with a variety of techniques available at present for treating tibial condyles fractures.

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