



CLINICAL AND RADIOLOGICAL OUTCOME OF PERCUTANEOUS SCREW FIXATION OF SCHATZKER TYPE I AND TYPE II TIBIAL PLATEAU FRACTURES- PROSPECTIVE STUDY

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ABSTRACT Tibial plateau fractures, also known as BUMPER FRACTURES are one of the common fractures around the knee joint. This study aims to study the outcome of the commonest variants of these fractures with minimally invasive, percutaneous screw fixation technique. In our study, 20 cases of Schatzker Type I and Type II tibial condyle fractures were treated by the above mentioned method. Both clinical and radiological results were analyzed. All fractures united at the end of 12 weeks. This method has allowed early mobilization as well as excellent functional outcome of the knee joint. This method causes minimum soft tissue damage and uses inexpensive and minimum hardware.

KEYWORDS :

INTRODUCTION

Tibial plateau fractures are one of the commonest intra articular fractures. It comprises 1% of all fractures and 8% of fractures in elderly. Motor vehicle accidents account for the majority of these fractures in younger individuals, but elderly patients with osteopenic bone may experience these after a simple fall. These fractures encompass many and varied fracture configuration that involve medial, lateral or both plateaus with many degrees of articular depression and displacement. Apart from tibial plateau bony injury, meniscal tear and ligament injuries should be assessed.

The stationary lower limb may be struck by a moving object. This common pedestrian injury is also called "BUMPER FRACTURE", since the bumper of most vehicles being placed roughly at knee height. The knee joint may be subjected to angulation, rotation or shearing strains and when the subject is upright his body weight assists in the injury and he falls over. Treatment methods proposed for fractures of the tibial condyles ranges from extensile exposure with arthrotomy and reconstruction of the joint surface with plate and screw fixation; arthroscopy or limited arthrotomy and percutaneous screw fixation or external fixation with pin or wire fixator; to closed manipulation and casting. Conservative treatment at any age may be complicated by knee stiffness, malunion, and non-union.

The simplest implants are lag screws used to compress simple fracture line in isolation or in conjunction with other fixation devices.

This study aims to document and describe the outcome percutaneous cancellous screw fixation of Type I and Type II Schatzker tibial plateau fractures.

MATERIALS AND METHODS

The present study is a prospective study. 20 patients in the age group of 20- 70 yrs who sustained isolated Schatzker type I and type II tibial plateau fractures treated by percutaneous cancellous screw fixation at Government Medical College, Thrissur From March 2014 to February 2015, were studied and followed up for a period of 6 months.

Ages, sex, occupation, nature of trauma, type of fracture and co morbidities were noted for each case after proper history taking, clinical examination and radiological work up.

The percutaneous screw fixation of the tibial condyle fracture was done under C-ARM guidance. 6.5mm partially threaded cannulated cancellous screws with washers were used for fixation.

For Schatzker Type I tibial condyle fracture, the fracture was reduced and compressed using two or three partially threaded cancellous screws.

For Schatzker Type II tibial condyle fracture, the articular depression was elevated using the blunt tip of a 3.2mm drill bit. The drill bit was introduced through an anteromedial cortical window on the proximal tibia and adequate articular elevation was confirmed in the C-arm. The subchondral region below the elevated articular surface was subsequently filled with cancellous bone graft and reinforced by two or three partially threaded cancellous screws.

The operated limb was immobilized in a long leg splint for 10 days. Wound care and supportive treatment were given. Early range of motion exercises were begun as tolerated by the patient. After 6 weeks, the patient was allowed partial weight bearing followed by full weight bearing.

The patient was evaluated at 10 days, 6 weeks, 3months and 6 months. Thorough clinical examination and radiological assessment was done on every visit

When the patients were followed up at 6th month, the clinical and radiological assessments were done using the *Rasmussen Clinical Grading system and modified Rasmussen Radiological Grading system*¹.

RESULTS

The study had 14 males (70%) and 6 females (30%). The mean age was 43.5 years. Road traffic accidents were the most common cause of injury followed by falls. The patients who sustained Schatzker type I and Schatzker Type II tibial plateau fractures were equal in number; 10 each.. 40% of type I cases were associated with medial collateral ligament injury while 90 %of the type II cases had MCL injuries. All cases of Schatzker type I and 80% of the type II fractures had good to excellent clinical outcomes. Good to excellent radiological results were obtained for all cases of type I and 90% of type II fractures.

FUNCTIONAL OUTCOME OF THE TECHNIQUE		
Schatzker Classification	TYPE I	TYPE II
Excellent	80% (8 cases)	20% (2 cases)
Good	20% (2 cases)	70% (7 cases)
Fair		10% (1 cases)

Only 1 among the 20 cases (5%) developed wound site infection, which could be controlled by wound care and antibiotics

DISCUSSION

Proximal tibial articular fractures can be caused by motor vehicle accidents or bumper strike injuries. However, sports injuries, falls, and other less violent trauma frequently produce them, especially in elderly patients with osteopenia. Ligamentous injuries occur more frequently in minimally displaced, local compression, and split compression fractures, and it is wise to obtain stress radiographs of the knee to evaluate these structures.

Kiran Shete, Parag Sancheti, Rutuj Kamdar⁷, Sancheti Institute of Orthopaedics and Rehabilitation, Pune in 2006 studied the role of Esmarch bandage and percutaneous cannulated cancellous screws in tibial condyle fracture. They found it to be a good modality of treatment of tibial condyle fractures of Schatzker types I, III and IV.

In 2012, Dr.V.S.Ravindranath⁸ has designed a device for direct elevation and reduction of the fragments thus potentially expanding the indications of percutaneous screws to fragments with >5mm depression. A total of ten cases were treated by this method of percutaneous elevation of the depressed fractures of lateral condyles of the tibia using this device. Device was inserted through a bony window on the anteromedial surface of tibia. The inner piston of the device in slowly hammered inside thus elevating the depressed fragment. Elevation of fragment could be achieved in all the cases. The fractures were fixed with cancellous screws applied percutaneously. There were no cases with loss of fixation or subsidence of the fragment. All cases achieved radiological union and have good knee function at follow up.

Tushar Agarwal, Anil Salgia, Samar Kumar Biswas, Sahil Sanghi, Subash Rajendra Puri⁹ in 2012 found that percutaneous screw fixation for Schatzker type I, II, and IV fractures is an excellent treatment alternative to open reduction internal fixation (ORIF) or conservative management. Percutaneous cancellous screw fixation for closed tibial plateau fractures is minimally invasive, hence less morbid than ORIF. It reduces hospital stay and cost. It enables early mobilization with minimal instrumentation, and achieves satisfactory outcomes without any anatomical deformity or functional impairment as often seen with conservative management.

In our technique we used an easily available 3.2 mm drill bit for elevation and reduction of type II fractures and we obtained good to excellent outcomes. This technique is cost effective and allows early knee mobilization.

CONCLUSION

Type I and Type II tibial condyle fractures can be effectively treated by percutaneous cancellous screw fixation technique with minimal complications. Type I fractures give the best results. Minimally invasive technique reduces post operative pain and hastens fracture healing and rehabilitation. The technique uses readily available and less expensive hardware for fixation and allows early return to normal life. This technique is an easily reproducible technique that provides good to excellent functional results at a lower cost.

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