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Functional and radiological outcomes of unstable tibial plateau fractures treated with isolated anterolateral locking compression plating method and dual plating method

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Abstract

Background: 1.2% of all fractures are Tibial plateau fractures with complicated intraarticular fracture pattern [1]. Open reduction and dual plating is an effective method of fixation in unstable bicondylar fractures, though there will be an extensive soft tissue dissection in dual plate fixation when compared to unilateral anterolateral Locking compression plating alone. Many journals reported that both the stabilization methods are equally effective [4-6].

Methods and Materials: March 2017-February 2019, GMKMCH, Salem-20 patients.

Results and Discussions: Unstable tibial plateau fracture treated with anatomical locking plating system provided stable fixation allowing early range of knee motion. Medial periosteal stripping can be avoided using pre-contoured Lateral periarticular locking plate [3,7]. Fracture union time was almost same in both the groups in our study. Operation time and hospitalization period are less in using unilateral locking plate alone. Locking compression plate decreases hardware impingement thereby reducing soft tissue problems.

Conclusion: Being rigid fixation, both Unilateral and Dual fixation methods provided good mechanical stability and allows early mobilization. If the medial fragment cannot be stabilized by lateral locking compression plate alone then buttressing the medial fragment by medial plate is required.

Keywords: functional, radiological, plateau fractures, plating method

Introduction

1.2% of all fractures are tibial plateau fractures with complicated intraarticular fracture pattern [1]. Surgical treatment for highly unstable bicondylar fractures of the tibia plateau remains a challenge. These fractures are often associated with soft tissue injury and wound complications. Reducing the fracture per se is also a great challenge for the surgeon. These fractures can be surgically treated with dual buttress plates, a unilateral periarticular locking plate, hybrid dual plates and hybrid external fixation [2, 6]. In highly unstable bicondylar fractures, fixation with dual plating has been the effective method after reduction of both the fracture fragments and articular surfaces.

There will be extensive soft tissue dissection in dual plate fixation, but soft tissue damage is less in case of unilateral LCP alone. Many journals reported that both the stabilization methods are equally effective [3-5]. This study was to analyze our experience with highly unstable tibial plateau fractures, Schatzker type 5 or type 6, managed using a unilateral locking plate and dual plating.

Materials and Methods

20 patients who came to our hospital with Schatzker type V and VI tibial plateau fracture pattern were analyzed. These fractures were fixed with both Dual plating and Unilateral locking plate alone using MIPPO technique during March 2017 to February 2019. Out of 20 patients, 13 patients had type V fractures and 7 had type VI fracture pattern. This analysis has been done in the patients of age group between 20 years and 60 years. Among those patients, 4 were between 20-30 years, 5 were between 30-40 years, 6 were between 40-50 years and 5 were between 50-60 years. 80% met with Road Traffic Accidents and 20% with falls in our study. Only the closed fractures have been included in this analysis. Excluded from the study are open fractures, fractures with neurovascular compromise, fractures in children. Anteroposterior and Lateral radiographs of the knee were taken in all the patients. CT scan of the injured knee was taken in all patients. Patients had been taken up for surgery after the swelling subsided and compartment syndrome is ruled out. Restoration of the articular surfaces and maintaining of the mechanical axis and to provide pain free functional range of motion was the aim of our analysis. Surgical fixation was performed under regional anesthesia. In supine position, after applying tourniquet knee is kept in 15-30* of flexion. Using C-Arm, fracture reduction done. Then the fracture is fixed with either

dual plating or unilateral LCP. Non weight bearing walking was allowed with walker support for 6 weeks and full weight bearing after solid bony union of the fracture. Postoperative x-rays were taken at 6 weeks, 3 months and 6 months. Postoperatively intraarticular step and fracture depression were assessed. Extensor lag, functional range of motion and skin conditions were assessed clinically. Patients were analyzed using Rasmussen scores in the postoperative period.

Results

All the 20 patients were followed for a period of at least 6 months to a maximum period of two years. Out of these 20 patients, 08 patients had unilateral LCP and 12 had dual plating. Rasmussen scoring is based on both functional and radiological criteria. In our analysis, Rasmussen's functional scores were excellent in 13 patients, Good in 6 patients and poor in one patient. Based on Radiological criteria, outcomes were excellent in 14 patients and Good in 6 patients. As per functional score, nine patients had excellent results. Extensor lag was present in one patient operated with dual plating which is a fair result and this patient had comminuted tuberosity fracture. Good results is seen in two patients because of restriction of flexion of about 20*-30*.

Six patients had excellent results and 2 patients had good results in patient group operated with anterolateral LCP alone. As per radiological score, nine patients had excellent results and 3 patients had good results because of fracture depression of 2-3 mm in 2 patients and condylar widening of 2mm in one patient. This is seen in patients operated with dual plating. Six patients had excellent results and 2 patients had fracture depression in the group operated with anterolateral LCP alone.

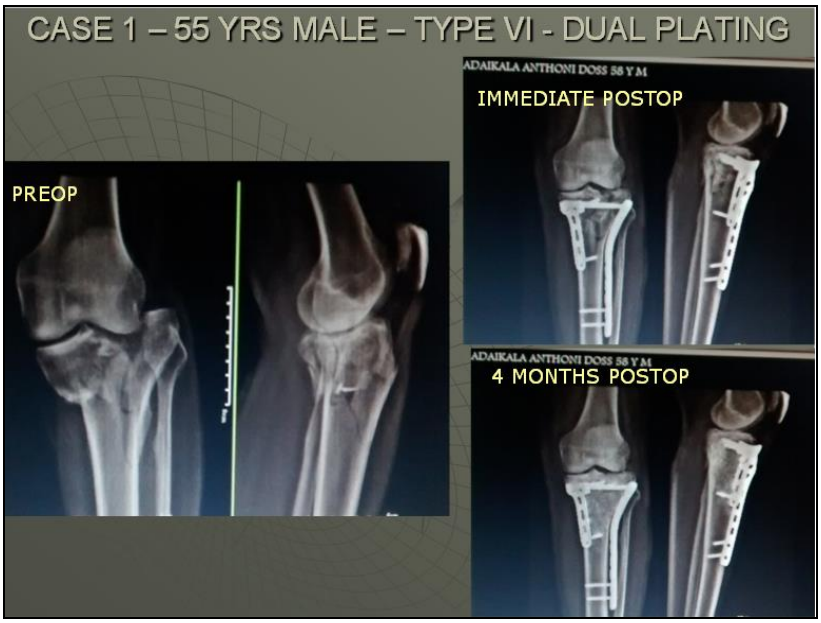

Fig 1

Fig 2

Table 1

	Dual plating	Anterolateral LCP
Bony union	16-22 weeks	14-20 weeks
Operative time	60-70 mins	35-40 mins
Hospital stay	6-8 days	4-7 days
Functional outcome	Excellent-9(75%) Good-2(17%) Fair-1(8%)	Excellent-6(75%) Good-2(25%)

Medial periosteal stripping was avoided in using anterolateral LCP alone [3, 5]. Intra-articular soft tissue injury, such as ligamentous or meniscal damage are commonly seen in unstable tibial plateau fractures [10], which may influence the postoperative functional outcome [8]. These two surgical methods provided rigid fixation and allowed early motion to avoid intra-articular adhesion [9].

Conclusion

As per our analysis, the union time was nearly equal in both the groups. Locking compression plate decreased the hardware impingement very effectively. Being rigid fixation, both Unilateral and Dual fixation methods provided good mechanical stability and allows early mobilization Also, our study showed that usage of Lateral locking compression plate fixation alone decreased the operative time and hospital stay of the patients. Buttressing the medial fragment by medial plate is required only if the medial fragment cannot be stabilized by Lateral LCP alone.

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