ORIGINAL ARTICLE

Outcome of Supracondylar Fractures of The Femur with Locking Condylar Buttress Plate

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ABSTRACT

Background: The incidence of distal femur fractures is about 4-7% of all femur fractures. The young are mostly affected due to their involvement in road traffic accidents. Earlier attempts of internal fixation were met with great complications mostly due to unavailability of good fixation devices which would allow early range of motion. With the introduction of the locking plates interest has again developed in fixation of these fractures by these new implants as they allow early range of motion.

Objective: The objective of the study was to determine the outcome of Supracondylar Fractures of The Femur with Locking Condylar Buttress Plate

Materials and Methods: In this prospective study all the patients operated at department of Orthopedics, Bahawal Victoria Hospital for distal femur fracture fixed by locking condylar buttress plate were followed up for six months or till time of radiological union. Time to union, non-union rate and complications were assessed.

Results: Time to union was 117 days (range 90-150 days). There were no cases of non-union in this small series of patients. Only one case of surgical site infection was diagnosed which required immediate attention.

Conclusion: Our results are encouraging with better outcome in terms of union and less complications. This enables us to continue this study further to project on a larger patient data so that future recommendations can be framed.

Keywords: supracondylar fracture femur, distal femur locking buttress plate

INTRODUCTION

There are multiple classifications of distal femur fractures mentioned in literature but the AO/OTA classification is most commonly used and is useful in determining treatment and prognosis. It is based on the location and pattern of the fracture and considers all fractures within the trans-epicondylar width of the knee.

Before 1970, most supracondylar fractures were treated with non-operative methods such as traction and cast bracing due to lack of adequate internal fixation devices. However, difficulties were often encountered, including persistent angular deformity, knee joint incongruity, loss of knee motion and delayed mobilization. During the last few decades, operative techniques, technology and devices have markedly improved and now most surgeons agree that distal femur fractures should be treated operatively to achieve optimal patient outcomes. The goal of treatment is restoration of limb function which can be achieved by anatomic articular surface reduction, gentle tissue handling, and restoration of limb alignment, length, rotation, stable fixation and early mobilization.

Available implants for fixation of these fractures are dynamic condylar screw (DCS), fixed angle blade plate, condylar buttress plate, locking condylar buttress plate, antegrade interlocking intramedullary nail, retrograde interlocking intramedullary nail and small wire ring external fixator. Each has its own advantages and disadvantages and is dependent to a large extent on the fracture pattern, host factors and the surgeon's resources and experience. The fixation targets to be achieved are anatomic reduction and rigid internal fixation of the intra-articular fracture fragments and stable biological fixation of the articular component to the diaphyseal component of the femur.

Dynamic condylar screw (DCS) can be used to fix the fractures in this region but is not suitable if there is

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severe comminution and another disadvantage is that insertion of the condylar lag screw requires removal of a large amount of bone, which makes the revision surgery more difficult, should it be necessary. Fixed angle condylar blade plate is another option but the technique is demanding and the device is also unsuitable for osteoporotic bone due to inadequate fixation and reduction may be lost due to hammering during implant insertion in case of comminuted fracture. Condylar buttress plate was used in the 1970s and 1980s but high complication rates were reported which adversely affected clinical results including non-union or delayed union, infection, malunion (especially varus collapse), the need for bone grafting in case of significant comminution and also poor stability of the construct in osteoporotic bone and knee stiffness owing to delayed mobility. Antegrade intramedullary nail can also be considered in distal femoral fractures but it is unsuitable if the distal fracture fragment is small and varus or valgus malunion can also occur due to wide and osteoporotic metaphyseal region. Retrograde intramedullary nailing is another option for fractures in this region and can be performed in case of AO/OTA type A fractures but the potential disadvantages include knee sepsis, stiffness, patellofemoral pain and synovial metallosis resulting from nail or screw fretting or breakage. Furthermore with complex intra-articular C3 injuries the device is unsuitable due to comminution. Small wire ring external fixator can also be used in selected cases but disadvantages include cumbersome device, unacceptable to most of patients and unsuitable in case of small distal fracture fragment.

Presently, the locked condylar buttress plate would have the best of functions of the extramedullary implants list with advantage of better fixation of small distal fracture fragment and also in case of osteoporotic bones.

PATIENTS AND METHODS

This was a prospective study. Twenty three patients were treated with ORIF for displaced AO/OTA type A and C fractures of the distal femur between August 2013 and December 2013. Three patients were lost to follow-up and were excluded from study. The remaining 20 patients were followed-up for a period of six months and formed the basis of this study. This study included fourteen men and six women with an average age of 42.1years (range from 22 to 70 years). Twelve patients sustained fracture of right femur while eight sustained fracture of left femur. Three patients sustained injury as a result of fall and seventeen were victims of road traffic accident.

RESULTS

Time to union was 117 days (range 90-150 days). There were no cases of non-union in this small series of patients. Only one case of surgical site infection was diagnosed which required immediate attention but removal of implant was not required and only delayed healing was seen but bone grafting was not required.

Fig. 1: Lateral view of supracondylar intercondylar fracture distal femur

Fig. 2: Post-op X-ray after fixation with locking plate

DISCUSSION

Early results of fixation of the distal femur were not encouraging due to problems with fixation, mechanical stability and high infection rate[1-7]. This changed as the newer methods of fixation were discovered which would prove superior to conservative methods providing better fixation, better stability and option for limited exposure. Higgins et al in their study compared strength of fixed angle blade plate to that of locking condylar buttress plate and mentioned the later to be significantly stronger construct[8]. The recent introduction of the fixed-angle screw-plate or locking condylar buttress plate technology may present surgeons with a more accommodating and reliable alternative to the blade plate, non-fixed angle condylar

buttress plate and screws or DCS.

The biomechanical study performed on cadaver femur for stability and strength of the different implants used for fixation of the distal femur showed that the locked buttress plate provided greater stability and better fixation in axial loading[9].

The improved fixation of the locking plate is due to the locking head screw which exhibit high stability with a moderate axis deviation in the angle of insertion of up to 5°. However, there is a significant decrease in stability with increasing axis deviation (>5°). An aiming device is recommended to provide optimal fixation with angular stability[10]. Similarly, Garneau and colleagues also showed experimentally that the locking condylar plate showed statistically significant rigidity both in axial and torsional loading[11].

Bolhofner and colleagues reported their series of 57 AO Type A and C supracondylar fractures treated by indirect reduction and internal fixation. They did not use double plating or bone graft in any patient. All patients were followed at four weeks interval till time of union and for at least a year. Hardware failure did not occur in this series. Outcomes were assessed using a modified Schatzker scoring method. Using the scale, there were 84% good to excellent results, 11% fair results, and 5% poor outcomes. Fair and poor results tended to occur in more severe fractures and were primarily due to limited knee motion. Complications included two broken screws, one deep infection, and one malunion. No fractures failed to unite[12].

In a retrospective study of prospectively enrolled 119 patients conducted at two level 1 trauma centres, the outcome of supracondylar fractures of femur fixed using the LISS method showed that 93% of fractures healed without bone grafting, 5 losses of proximal fixation, 2 nonunions and 3 acute infections. No case of varus collapse or screw loosening in the distal femur was observed. The knees in the study had a final range of motion between 1^0 and 109^0. They concluded that the maintenance of distal femoral fixation was 100% despite treatment of an elderly subgroup (age >65 years). The locking condylar buttress plate used in LISS posed no problems[13].

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