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A FUNCTIONAL EVALUATION STUDY OF DISTAL FEMORAL FRACTURES FIXED WITH DISTAL FEMORAL LOCKING PLATE

Orthopaedics

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ABSTRACT

Distal femur fractures present considerable challenges in management in a country like ours. Geriatric patients especially women sustain fractures due to osteoporosis because of post-menopause complications. Supracondylar fractures of femur have a bimodal distribution. They account for 6% of all femur fractures and 31% if hip fractures. This study puts in an effort to study the distal femoral fractures fixed with distal femoral locking plate.

KEYWORDS

Orthopedics, Functional evaluation, Distal femoral fractures.

INTRODUCTION:

Nearly, 50% of distal femur intra-articular fractures are open fractures. Before 1970, most supracondylar fractures were treated nonoperatively. The trend of open reduction and internal fixation has become evident in recent years with good results being obtained with AO blade plate, dynamic condylar screw, intramedullary supracondylar nail and locking compression plate. Elderly patients and osteoporosis pose difficulty in treating intra-articular fractures of the lower end of femur. Loss of stable fixation is of great concern in these cases. Hence, locking compression plate use has an advantage in these patients[1].

Locked plates and conventional plates rely on completely different mechanical principles to provide fracture fixation and they provide different biological environments for healing. Locked plates may increasingly be indicated for indirect fracture reduction, diaphyseal/metaphyseal fractures in osteoporotic bone, bridging severely comminuted fractures. The locking construct had a significantly higher load to failure ratio and less permanent deformation with cyclic loading. All of these studies reveal that locking plates with unicortical or bicortical diaphyseal fixation have adequate axial stiffness, but more flexibility when compared to conventional fixed-angle implants. The studies that evaluated torsional stiffness have shown that the distal fixation in locked implants is typically maintained while conventional fixed-angle implants have a higher rate of distal cutout from the femoral condyles. Early postoperative mobilisation brings out good range of motion and better function of the limb.

Aims and Objectives:

To study the union rates with locking compression plates.

Materials and Methods:

His study was done in the Department of Orthopedics, Srinivas Institute of Medical Sciences, Mangalore.

Thirty cases that was admitted to the Department were studied in detail and an attempt has been made to report promptly.

Exclusion Criteria:

1. Patients who are on immune-supressant drugs.

Inclusion Criteria:

1. All the patients were 20-60 years. This was done to understand the patterns especially in the working group.

Criteria for Evaluation of the Results – was taken from From Neer CS, II Granthan SA, and Shelton ML1.

Results:

Table 1: Age Distribution

Number	Mean age	Std Deviation
30	35.28 years	11.48 years

Table 2: Sex Distribution

Number	Male	Female
30	09	21

Table 3: Supracondylar fracture

Supracondylar fracture category (n=30)	Frequency
Muller A1	06
Muller A2	06
Muller A3	Nil
Muller B1	Nil
Muller B2	Nil
Muller B3	Nil
Muller C1	09
Muller C2	06
Muller C3	03

Table 4: Work Capacity after surgery (After 6 weeks)

Work Capacity	Frequency
Same as before	21
80 percent recovery	08
50 percent recovery	01
Inability	Nil

Table 5: Functional Results

Grades	Frequency
Excellent	21
Fair	08
Good	01
Poor	Nil

DISCUSSION:

Schutz M, Muller M et al, reported internal fixation using the LISS was performed at an average interval of 5 days (range: 0-29 days) after the injury. 48 fractures were operated on within the first 24 hours. Revision operations were required for 2 cases of implant breakage. 4 cases of implant loosening and they needed 7 debridements to deal with infections. The study showed clearly that when working with LISS primary cancellous bone grafting was not necessary. The total follow up rate was 93% and 5% nonunion was observed.2 Yeap E.J. and Deepak A. S3 conducted a retrospective review on eleven patients who were treated for type A and C distal femoral fractures (based on AO classification). All fractures were fixed with titanium distal femoral locking compression plate. The patient's ages ranged from 15 to 85 with a mean of 44. Clinical assessment was conducted at least 6 months postoperatively using the Schatzker score system. Results showed that four patients had excellent results, four good, two fair and one failure3 With the present study, surgical grade stainless steel implants were used and results found to be 65% excellent and 15% each of good and fair and only 5% poor. The results were analysed at 3, 6, 12 and 18 month intervals in the present study using Neer's scoring system.

Zlowodzki et al combined these series (n=327) and evaluated the outcomes as part of a systematic literature review. Average nonunion, fixation failure, deep infection and secondary surgery rates were 5.5%, 4.9%, 2.1% and 16.2%, respectively. Some of the technical errors that have been reported for fixation failure have involved waiting too long to bone graft defects allowing early weightbearing and placing the plate too anterior on the femoral shaft. This study far exceeds the present study by sheer sample size, current study (n=20).4 Mark Miller et al prospectively compared the outcomes of LISS and retrograde intramedullary nailing. At 12 months, no statistically significant differences were noted for nonunion, fixation failure, infection and secondary surgical procedures. However, this was a relatively small series and no power analysis was reported.5 Vallier et al concluded that locking plates should only be used when conventional fixed-angle devices cannot be placed. They also noted the significant added cost of locking plates. To decrease the risk of implant failure with locking plates, they recommended accurate fracture reduction and fixation along with judicious bone grafting, protected weightbearing and modifications of the implant design.6 Marti et al compared the LISS plate with unicortical locking screws to the dynamic condylar screw and condylar buttress plate in axial loading and cyclic axial loading to failure in a cadaveric 1 cm fracture gap model. The LISS had more reversible and less irreversible deformation when compared to the other two constructs, which they attributed to the titanium composition and the unicortical screws.7 Zlowodzki et al compared the LISS plate with unicortical locking screws to the 95 degrees blade plate in axial, torsional and cyclic no statistically significant differences were noted for nonunion, fixation failure, infection and secondary surgical procedures. However, this was a relatively small series and no power analysis was reported.5 Vallier et al concluded that locking plates should only be used when conventional fixed-angle devices cannot be placed. They also noted the significant added cost of locking plates. To decrease the risk of implant failure with locking plates, they recommended accurate fracture reduction and fixation along with judicious bone grafting, protected weightbearing and modifications of the implant design.6 Marti et al compared the LISS plate with unicortical locking screws to the dynamic condylar screw and condylar buttress plate in axial loading and cyclic axial loading to failure in a cadaveric 1 cm fracture gap model. The LISS had more reversible and less irreversible deformation when compared to the other two constructs, which they attributed to the titanium composition and the unicortical screws.7 Zlowodzki et al compared the LISS plate with unicortical locking screws to the 95 degrees blade plate in axial, torsional and cyclic axial loading in a cadaveric 1 cm fracture gap model. Under axial loading, significantly higher loads to failure, energy absorbed at failure and displacement at load to failure were noted for the LISS plate. The blade plate was significantly stiffer in torsion. But, the LISS plate had significantly less permanent deformation under cyclic axial loading. They concluded that the LISS provided improved distal fixation in osteoporotic bone.

Conclusion:

Compression plates with locking provide good angular stability by their triangular reconstruction principle. It is of great use in elderly patients with severe osteoporotic bone.

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