Research Paper

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Outcome of Patients Having Distal End Femur Fracture Treated With Locking Plate

Medical Science

KEYWORDS : Femur, Fracture, Supracondylar, Locked plating, Outcome

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ABSTRACT

background: To get better out come in distal femur fracture we need to complete anatomic restoration of the joint surface, rigid fixation without external immobilisation, atraumatic reduction of the metaphysis fracture with restoration of femoral length and alignment, adequate support of the metaphysis and early mobilisation. Various types of internal fixation have been developed for this purpose. We observeoutcomes following the use of locking plate.

objective:- . To studytheefficacy,technical requirements, functional results, radiological results, pitfalls, complications&out comes.

Materials and methods: Westudiedprospectively all patient came atDepartmentof Orthopaedics, SMIMER, SURAT withdistalfemurfracturesandweretreatedwithdistalfemur lockingcompression plate (DF- LCP)in 2yr.Allthesepatientswereincludedwithpredefined inclusion &exclusion criteriain this study. All thepatients underwentsurgical fixation and followed. Outcome was based on surgical method and addressed according to NEER'Scriteria for functional outcome.

Results: In our study Neer's scorerangedfrom59 – 94andthe meanneer's scorewas 82.4. Final analysis oftheNeer's scoreshowed 50% (15 patients)were excellent,43.33% (13 patients)weresatisfactoryi.e., in 93.33%results were found to be excellent to satisfactoryafter usig locking plate and 2 patients had unsatisfactory result.In our study average neer's score for AO type A was 81.85, and for AO type C 82.87.

Conclusion: Thenewfixationsystemoffersmany fixation possibilities and had proven its worth in complex fracture situations especially in extensivecommunition offemoralcondyleswithintra-articularinvolvementwhereotherfixation devices wereincompetent. Time tounionwasfo undtoincreasewithincreaseinage(p=0.00,statisticallysignificant)and canbeimprovedby earlyadequatefixation,primary bonegraftingandimmediate postoperative mobilization.

INTRODUCTION:- In historic evolution of orthopedic surgery the treatment of distal femur fractures has not achieved clinical results with a quality comparable to the rest of the femoral fractures. The presence of thin cortices, osteoporosis, wide medullary canals, and fracture comminution make it difficult to obtain and maintain a stable fixation[1] The goal of the treatment of these fractures is the anatomic reduction of the articular surface, restoration of the limb length, alignment and rotation, as well as allowing for an early limb mobilization to avoid articular stiffness and the loss of muscle mass.

Distal femur fractures represent 4-6% of all the femoral fractures and they occur within the 9 terminal centimeters. Most supracondylar fractures are the result of a severe axial load with a varus, valgus, or rotational force. In young patients, this amount of force is typically the result of high-energy trauma. In elderly patients, the force from a minor slip and fall on a flexed knee may be sufficient to produce these fractures. Due to high energy trauma distal femoral fractures can be significantly communited[2].

The treatment of distal femoral fractures has evolved nevertheless, these fractures remain difficult to treat and carry an unpredictable prognosis. The fracture characteristics which make these fractures difficult to treat include, Osteoporosis, Multiplanar articular injury, High degree of communition, Short distal femoral block in which it is difficult to insert fixation, associated Open wounds, Internal derangement of knee including ligament and meniscal injuries and possible Extensor mechanism injuries. Complications are significant and include Infection, Knee stiffness, Need for bone grafting, non union and Malunion[3].

Though various treatment options are available for the management of these injuries with their own advantages and disadvantages, experience with use of locking compression plate which combines fixed-angle locking screw technology with the option for conventional screw utilization is still very limited. Locked plating (LP) of distal femoral fractures has become very popular. Despite technique suggestions from anecdotal and some early reports, knowledge about risk factors for failure, non-union (NU), and revision is limited and more study is required to define its place in the management of distal femur fractures.

I like to study the efficacy, technical requirements, functional results, radiological results, pitfalls, complications & outcomes of locking plate.

Methods:- Collection of data was done from all patients coming with fractures of distal femur to Department of Orthopaedics , SMIMER , SURAT for a period of 2 years and follows: written consent was taken and patients were selected according to inclusion criteria like Age 20 and above Type of fracture: - open or close (supracondylar and supracondylar with Intercondylar extension), History by Verbal communication with patients and their attendants, Clinical examination, both local and systemic examination, Diagnosis done Clinically and Radiologically, after base line investigation and Radiological Examination Surgery (Conventional lateral approach to the distal femur was used. The incision was made directly laterally in the thigh and through the midpoint of the lateral condyle distally while staying anterior to the proximal insertion of the lateral collateral ligament. Proximally, the incision is extended as necessary for diaphyseal involvement of the supracondylar fracture. The distal incision can be extended so that it gently curves from the knee joint axis anteriorly to the lateral border of the tibial tubercle when the fracture involves the articular condyles) by Open reduction and internal fixation with Distal Femoral Locking compression plate was done. Prophylactic Antibiotics and Analgesics/ Anti-inflammatory drugs given, Post-Operative evaluation by clinical and radiological examination done. Post operatively wound healing, complications, time for union, weight bearing, and ambulation will be assessed, at time of discharge, at 3 months, at 6 months. The functional and radiographic results were recorded according to **NEER'S criteria.**

Owing to ethical consideration, strict confidentiality of the data will be maintained and permission was taken from institutional

ethical committee (IEC) SMIMER, Surat before conducting study with consent of patient.

Results:-

We evaluated (30 patients) the results of radiological union and functional outcome in these fractures. Thought DF -LCP is useful implant in osteoporotic fracture, it is not included in our study due to diagnostic problem like BMD for documentation. Age group included ranged from 21-75 years, with a mean age of 45.43 years, 21 (70%) males and 9 (30%) females, with Predominant lower limb involved was right side accounting for 17 cases (56.7%). Mode of injury included 21 (70%) road traffic accidents and 9 (30%) falls. This mode of injury confirms to the high incidence of road traffic accidents and hence high velocity injury as the major cause of this fracture. There were 53.33% AO type C and 46.66% AO type A fractures. This pattern confirms to the high velocity injuries being commonly associated with AO type C. Majority of the surgeries (46.66%) were performed in the 4 to 7 days. Delayed surgeries were due to associated injuries and co morbidities, and hence consequently delay in fitness for surgery. Local complications were present in 17 (56.66%) patients. They included restriction of knee movements, extension lag, chronic swelling of injured lower limb, thigh pain, osteoporosis, anterior knee pain and superficial infection. Average time to union was 4.5 months (18 weeks) with a range of 3 – 8 months (12 – 32 weeks), Mean range of flexion obtained postoperatively was 116.5^0 with a range of 80^o – 160^o, Four mal-alignment/ Malunion, one implant failure and one infection were the residual complications in our study. Follow up of our cases included from a minimum of 6 months to a maximum of 15 months. By using DF -LCP Mean Neer's score was 82.13. Excellent results were seen in 15 cases; satisfactory in 13, unsatisfactory in 2 and 0 case of failure was seen.

neer's score	Number Of Patients	Percentage%
EXCELLENT (>85)	15	50%
SATISFACTORY (85 - 70)	13	43.33%
UNSATISFACTORY (69-55)	2	6.67%
FAILURE (<55)	0	0%

Range Of Motion Of Knee (Flexion In Degrees)	Number Of Patients	Percentage%
>135	2	6.7%
100 - 135	25	83.33%
80 - 100	2	66.67%
60 - 80	1	3.33%

Discussion:-

Range of motion:-

In our study, the mean flexion was 116.5^0 (range 80^0 -160^0). It was attributed to the stable and sturdy construct and the early range of motion achieved with DF-LCP. The average knee flexion in Type C fractures was 110.63^0 compared to 123.21^0 in Type A fractures, which shows that intra-articular fractures lead to intra-articular stiffness and decreased range of motion.6 patients had extension lag which persisted even after physiotherapy.

Comparing to other studies which have used various fixations: RESUT OF Valles-Figueroa JFJ,* Rodríguez-Reséndiz F, ** Gómez-Mont JG*** (Acta Ortopédica Mexicana 2010; 24(5): Sep.-Oct: 323-329)[4] (COMPARATIV STUDY OF CONDYLAR COMPRESSION SCREW AND LESS INVASIVE STABILIZATION SYSTEM) AND OUR STUDY IS COMPAIRED.

	present group	comparison group	comparison group
study	locking plate	condylar compression screws	less invasive stabilization system
flexion in degree	116.5	102	112

NEER'S Score and Result:-

In our study evaluation according to Neer's score showed a mean Neer's score of 82.13 with a range of 59 to 94. The outcome of the surgery was evaluated on the following parameters: Knee range of motion, Time to union, Pain in the knee, Walking status, Limb shortening.

Out of our 30 patients in the study, fifteen patients (50%) had excellent results, 13 (43.33%) satisfactory, 2 (6.67%) had unsatisfactory and ZERO (0%) failure case. Excellent and satisfactory results accounted for 93.33% of cases and remaining 6.67% included unsatisfactory and failure cases. Younger aged patients had better results than older age. The time to union increased with increase in age (p=0.00, significant). There were 16 type C fractures of which 15 (93.75%) showed excellent to satisfactory results and 1 (6.25%) had unsatisfactory results. Out of 14 type A fractures 13 (92.86%) showed excellent to satisfactory results except one (7.69%) which was a failure. Type C fractures took longer time to unite than Type A fractures. The mean range of movement i.e., knee flexion was 116.5^0 with a range of 80^0 – 160^0. The average knee flexion in Type C fractures was 110.63^0 compared to 123.21^0 in Type A fractures, which shows that intra-articular fractures lead to intra-articular stiffness and decreased range of motion. 10 patients had absolutely no pain postoperatively in their knees. Out of remaining 20 patients 17 had intermittent/ occasional pain and 3 had pain with fatigue. Along with post operative intermittent pain 4 patients had associated osteoarthritis, which was present prior to surgery. All patients with pain were managed conservatively with analgesics. All patients used walking frame during immediate post-operative non weight bearing mobilization and continued the same during partial weight bearing till complete union of fracture/ painless full weight bearing. Limb shortening was present in 6 of our patients. 4 patients belonged to AO Type C fractures and 2 was AO type A. In our study 3 patients had 1 cms shortening postoperatively and rest 3 patients had 0.5 cms shortening. Shortening was corrected by appropriate heel raise in all patients. **Kim KJ, Lee SK, Choy WS, Kwon WC, Lee DH,**[5] reported mean Neer's score of 74.2 with a range of 58 to 97 of which 3 were excellent, 5 satisfactory and 7 unsatisfactory. RESUT OF Valles-Figueroa JFJ,* Rodríguez-Reséndiz F, ** Gómez-Mont JG*** (Acta Ortopédica Mexicana 2010; 24(5): Sep.-Oct: 323-329)[4] (COMPARATIV STUDY OF CONDYLAR COMPRESSION SCREW AND LESS INVASIVE STABILIZATION SYSTEM) AND OUR STUDY IS COMPAIRED.

	present group	comparison group	
Results	LOCKING Plate	Condylar Compression Screws	Less Invasive Stabilization System
EXCELLENT	50%	61.30%	71.42%
SATISFACTORY	43.33%	19.35%	9.52%
UNSATISFACTORY	6.67%	9.67%	14.28%
FALIURE	0%	9.67%	4.76%

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Conclusion:-

- From our study we concluded that DF-LCP, the "internal fixator" was a safe and reliable implant although careful preoperative planning and case selection were important factors which determine the final outcome.
- The new fixation system offers many fixation possibilities and had proven its worth in complex fracture situations especially in extensive communition of femoral condyles with intra-articular involvement where other fixation devices were incompetent.
- The DF-LCP had shown excellent to satisfactory results in majority of intra articular fractures (AO type C). It may substitute a conventional plate and screw system (compression method) in treatment of complex distal femoral fractures especially in osteoporotic bone.
- DF-LCP may prevent varus collapse in selected cases by using maximum number of screws into the distal fragment of the fracture, which had to be assessed by the surgeon during operation.
- Time to union was found to increase with increase in age (p = 0.00, statistically significant) and can be improved by early adequate fixation, primary bone grafting and immediate postoperative mobilization.

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