DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20221625

Original Research Article

Study of importance of medial cortex in distal femur comminuted fracture

Mayur K. Kalariya[1]*, Ankit R. Patel[1], Dhruvik K. Lathiya[2]

[1]Department of Orthopedics, GCS Medical College, Ahmedabad, Gujarat, India
[2]Department of Orthopedics, GMERS Medical College, Junagadh, Gujarat, India

Received: 08 May 2022
Accepted: 03 June 2022

***Correspondence:**
Dr. Mayur K. Kalariya,
E-mail: mk.mayur.kalariya.29@gmail.com

ABSTRACT

Background: Distal femur fractures require high energy trauma by means of road traffic accidents. There are various modalities of fixation, involving plating, external fixator and intramedullary nailing. cause of nonunion like smoking, osteoporosis, early weight bearing, improper construction of fixation, improper reduction.
Methods: The study was conducted on 20 patients having distal femur fractures operated previously by using a different modality of implant goes in failure like bending of implant, broken of implant, peri implant fracture after second episode of trauma. Patient was preoperatively assessing for rule out occult low grade infection by blood investigation like ESR and CRP. Previous X-ray review to find cause of nonunion.
Results: All patients showed a complete union at the fracture site with an average duration of 4-6 months. There was no complaint of infection, joint stiffness or difficulty in weight bearing after treatment with revision fixation and bone grafting. Patients were able to walk without affecting their daily activity of living.
Conclusions: Comminuted medial cortex left unfixed or maligned will go into varus collapse and leads to failure of fixation.

Keywords: Distal femur, Comminuted fracture, Varus collapse, Failure of fixation

INTRODUCTION

Distal femur fractures include fractures of the supracondylar and intercondylar region and are relatively common injuries.[1-4] The goals of treatment follow AO principles of anatomic reduction of the articular surface, restoration of limb alignment, length and rotation. Despite improvements in implant design, management of distal femur fractures remains a challenge; fractures are often comminuted, intra-articular and involve osteoporotic bone, making fixation challenging to achieve.

Failure of fixation and failure to union is very common.[5-10] Various causes are quiescent infection, smoking, osteoporosis, early weight bearing and improper fixation.

In distal femur comminuted fracture stable fixation is very important. As weight bearing axis is passing near to medial cortex alignment of these cortex is very important in fracture fixation.

METHODS

Study type

Study type was of prospective and retrospective study.

Study place

The study carried out at GCS medical college and hospital.

Period of study

The study conducted from June 2018 to April 2021, with ethical approval and statistical calculation as mentioned in the result.

The present study of importance of medial cortex in distal femur comminuted fracture conducted at GCS medical college and hospital on 20 patients having distal femur fractures operated previously by using a different modality of implant goes in failure like bending of implant, broken of implant, periprosthetic fracture after second episode of trauma. Patient was preoperatively assessing for rule out occult low grade infection by blood investigation like ESR and CRP.

Previous X-ray review to find cause of nonunion, that patient was excluded from study which had known predisposing cause of nonunion.

Inclusion criteria was any comminuted distal femur fracture treated previous by any mode of fixation.

Pre-operative planning

All preoperative investigation and distal femur with knee ap lateral and oblique view to evaluate fracture status and broken implant status preoperative fitness and varus angulation calculation and knee flexion deformity in previously operated cases (Figure 1).

Figure 1: Pre operative radiograph.

Surgical technique

In a previously operated case implant was removed first than fracture site freshened by removing fibrosis, angular deformity and shortening corrected and fracture was fixed with medial column plate followed by lateral column plate and bone graft (Figure 2).[13]

Bone graft was accordion medial wall defect and comminution of fracture like tricortical graft, fibular stud graft or cortico-cancellous graft.

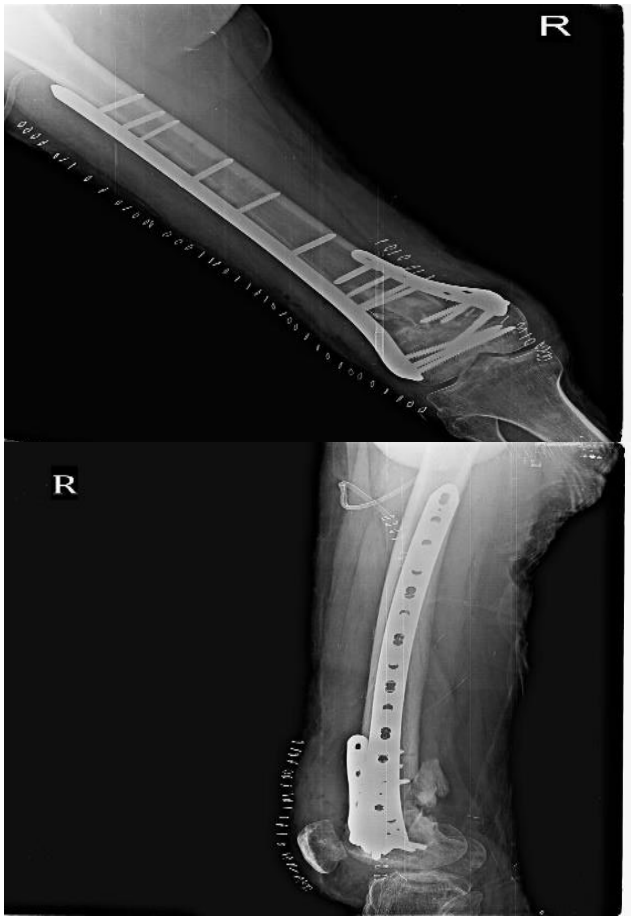

Figure 2: Post operative radiograph.

Post-operative management

Immediate post operative ankle and toe mobilization done and in bed knee bending was started the next day of surgery high sitting and bed side knee bending was avoided. Partial weight bearing was allowed after radiological sign of union.

RESULTS

Patients ranged from 30 to 65 year of age with mean age 51.9 year of age. Containing age group of 30-45 years (20) present of sample, 45-55 years (35) present of sample and 55-65 years (45) present of sample size (Table 1).

Table 1: Age distribution.

Age group (years)	Number of patients	Percentage (%)
30-44	4	20
45-54	7	35
55-65	9	45
Total	20	100

In our study 14 males and 6 females were observed (Table 2). Union achieved at 3 month 75%, 4 month 15%, 5 month 10% no any patient remains without union (Table

3). Those patients who did not achieve union at the end of three month was supplemented with bisphosphonate therapy. Complication-1 patient had superficial infection treated with antibiotic and regular dressing without any surgical intervention.

Table 2: Gender distribution.

Gender	Number of patients	Percentage (%)
Male	14	70
Female	6	30
Total	20	100

Table 3: Union time.

Time of union (months)	Number of patients	Percentage (%)
3	15	75
4	3	15
5	2	10
No any patient left without union		

DISCUSSION

Distal femur fractures included fractures of the supracondylar and intercondylar region and were relatively common injuries. Failure of fixation and failure to union was very common, among all causes. Failure of fixation and failure to union was very common due to improper alignment or fixation of the medial cortex in distal femur comminuted fracture.[1]

Incidence with age and sex

In our study total patients included 20 among these distributed in ages from 30 to 65 year and male was 14 (70%) and female was 6 (30%). This was explained by more incidents of distal femur in male than females.

Union

Nonunion did occur with locking plates, rates as high as 20% having been reported.[2-12] Steinberg et al demonstrated higher rates of union with dual plating in AO type C3 distal femur fractures.

Chapman et al studied definitive treatment in 18 patients with bone autograft or allograft and either double plating with DCS or CBP or lateral plating with a CBP or ABP. All patients achieved union.[14]

In our study also the union rate was 100% achieved.

Limitation

Our study was in some cases primary fixation was done by another surgeon so can't be sure that failure was due only by medial comminution.

CONCLUSION

Dual plating of distal femur fractures offers a reliable stable fixation in cases with medial supracondylar bone loss, non-union after failed fixation with single lateral plate, and comminuted distal femur fractures (AO type C3).

ACKNOWLEDGEMENTS

Author would like to thanks to patient who gave consent for study and junior Dr. Nishant and Dr. Sunil who helped in data collection.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Karam J, Campbell P, David M, Hunter M. Comparison of outcomes and analysis of risk factors for non-union in locked plating of closed periprosthetic and non-periprosthetic distal femoral fractures in a retrospective cohort study. J Orthop Surg Res. 2019;14:150.
2. Henderson CE, Kuhl LL, Fitzpatrick DC, Marsh JL. Locking plates for distal femur fractures: is there a problem with fracture healing? J Orthop Trauma. 2011;25:S8-14.
3. Henderson CE, Lujan TJ, Kuhl LL, Bottlang M, Fitzpatrick DC, Marsh JL. 2010 mid-America Orthopaedic ap Association physician in Training award: healing complications are common after locked plating for distal femur fractures. Clin Orthop Relat Res. 2011;469:1757-65.
4. Kregor PJ, Stannard JA, Zlowodzki M, Cole PA. Treatment of distal femur fractures using the less invasive stabilization system: surgical experience and early clinical results in 103 fractures. J Orthop Trauma. 2004;18:509-20.
5. Syed AA, Agarwal M, Giannoudis PV, Matthews SJ, Smith RM. Distal femoral fractures: long-term outcome following stabilization with the LISS. Injury. 2004;35:599-607.
6. Vallier HA, Immler W. Comparison of the 95-degree angled blade plate and the locking condylar plate for the treatment of distal femoral fractures. J Orthop Trauma. 2012;26:327-32.
7. Schutz M, Muller M, Regazzoni P. Use of the less invasive stabilization system (LISS) in patients with distal femoral (AO33) fractures: a prospective multicenter study. Arch Orthop Trauma Surg, 2005;125:102-8.
8. Kayali C, Agus H, Turgut A. Successful results of minimally invasive surgery for comminuted supracondylar femoral fractures with LISS: comparative study of multiply injured and isolated femoral fractures. J Orthop Sci. 2007;12:458-65.

9. Wong MK, Leung F, Chow SP. Treatment of distal femoral fractures in the elderly using a less invasive plating technique. Int Orthop. 2005;29:117-20.
10. Weight M, Collinge C. Early results of the less invasive stabilization system for mechanically unstable fractures of the distal femur (AO/OTA types A2, A3, C2, and C3). J Orthop Trauma. 2004;18:503-8.
11. Hoffman MF, Jones CB, Sietsema DL, Tornetta P 3rd, Koenig SJ. Clinical outcomes of locked plating of distal femoral fractures in a retrospective cohort. J Orthop Surg Res. 2013;8:43.
12. Henderson CE, Bottlang M, Lujan T, Fitzpatrick DC, Madey SM, Marsh JL. Stabilization of distal femur fractures with intramedullary nails and locking plates: differences in callus formation. Iowa Orthop J. 2010;30:61-8.
13. Ebraheim N, Buchanan G, Liu X, Cooper M, Peters N, Hessey J et al. Treatment of distal femur nonunion following initial fixation with a lateral locking plate. Orthop Surg. 2016;8:323-30.
14. Chapman MW, Finkemeier CG. Treatment of supracondylar nonunions of the femur with plate fixation and bone graft. J Bone Joint Surg Am. 1999;81:1217-28.
15. Sain A, Sharma V, Farooque K, Muthukumaran V. Dual Plating of the Distal Femur: Indications and Surgical Techniques. Kirubakaran Pattabiraman Cureus. 2019;11(12):e6483.

Cite this article as: Kalariya MK, Patel AR, Lathiya DK. Study of importance of medial cortex in distal femur comminuted fracture. Int J Res Orthop 2022;8:477-80.