

Surgical Management Of Distal/Supracondylar Fracture Of Femur With Retrograde Intramedullary Nail

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Abstract: Background:Supracondylar and intercondylar femoral fractures are serious injuries and difficult to treat and have potential to produce significant long term disability with poor results. It is now recognized that distal femoral fractures are best treated with open/closed reduction and surgical stabilization. Many studies show retrograde intramedullary nailing is the best option.Our aim in this study is to evaluate surgical and functional outcome of retrograde intramedullary nailing in treatment of distal femoral fractures.

Methods: 20 patients,13 male, 7 female, The mean age was 39.7 years. 15 supracondylar and 5 intercondylar fractures were treated with RIN and evaluated. Closed technique was used in 15 case and open technique in 5 cases.

Results: Results were evaluated by Lysholm knee score rating system. EXCELLENT-40% GOOD-40% FAIR -15% POOR-05%. Complications of 1 case of varus deformity of less than 10°, 1 case of superficial infection and 2 case of delayed union.

Conclusion: In surgical management of distal femoral fractures retrograde intramedullary nailing is one of the better options with good functional outcomes and less complications.

Keywords: Distal femur,Supracondylar,intercondylar, retrograde intramedullary nail.

THESIS SUMMARY

Introduction

This is an era of rapid industrialization and fast pace of life which has led to concomitant rise in road traffic accident (RTA), as well as increased life expectancy, old age population, carrying dangers of osteoporosis and fractures. So these major factors contribute to such complex fractures of distal femur. The incidence of distal femoral fractures is approximately 37/1,00,000 person-years.¹

The osteosynthesis in the distal femur could be difficult because of thin cortex, comminution, osteopenia, complex injuries associated soft tissue injuries, a distal wide medullary canal and involvement of the knee joint. Most surgeons agree that distal femoral fractures need to be treated operatively to achieve optimal outcomes.²

Supracondylar and intercondylar femoral fractures are serious injuries and difficult to treat and have potential to produce significant long term disability with poor results.^[3]

In early 1960s, studies of non-operative skeletal traction⁴ of distal femoral fractures alongwith principle of Watson Jones⁵ resulted in increased incidence of many complications, like angular deformity, delayed patient mobilization, joint integrity, knee stiffness and post-traumatic osteoarthritis.^[6,7]

The options for surgical treatment are open reduction and internal fixation with Dynamic condylar screw, 95 degrees angled blade plate, locking condylar buttress plate, minimally invasive percutaneous plate osteosynthesis (MIPPO), Liss invasive stabilization technique

(LISS plate technique), Ante-grade and Retrograde intramedullary interlocking nailing. Most commonly used implant for fixation of distal femoral fractures are 95 degrees angled blade plate, dynamic condylar screw fixation allows correction only in sagittal planes. However plating requires extensive stripping of soft tissue structures, which affect soft tissue and osseous healing. The use of plates & screws in the fixation of these fractures has the inherent drawback of producing a load shielding device. The resultant osteopenia creates a substantial risk of refracture proximal to the plate. [9,10]

Intramedullary nails offer potential biomechanical advantages over plates and screws because their intramedullary location results in less stress on the implant, they have the potential for load sharing, and can be inserted with minimal stripping of soft tissue. Given the appropriate fracture patterns, ante grade IM nailing in the treatment of distal femoral fractures has been associated with angular deformities because of inability of distal interlock of the antegrade nail to achieve control of the small and often osteoporotic distal fracture fragment. [11]

So Retrograde intramedullary interlocking nailing is best in terms of decreased operative time, blood loss, anatomical reduction of articular surface, restoration of limb alignment, early mobilization and good functional outcome, have been shown to be effective ways of managing notorious distal femoral fractures.

Distal femoral fractures tend to collapse into varus. In surgical fixation of these fractures with AO blade plate or dynamic condylar screw, the shaft of femur is pulled laterally displacing the mechanical axis lateral to anatomical axis of the limb. This creates rotational movements at the fracture site causing pull of blade plate or condylar screws leading to fatigue fracture of the plates, also presence of osteoporotic bones leads to fixation failures with plates and screws traumatic surgeries.

The advantages of intramedullary device is that it aligns the femoral shaft with condyles decreasing the tendency to varus movement of fracture site. Also advantageous in osteoporotic bone stabilization, Retrograde intramedullary nail has got distinct advantage of preservation of fracture haematoma, minimal soft tissue dissection and hence decrease operative blood loss, decreased operative time and reduced incidence of infection, early mobilization and good functional outcome.

The purpose of this study is to evaluate the results of supracondylar and intercondylar fracture of distal femur treated by closed/open reduction and internal fixation using Retrograde intramedullary nail.

Methods

In this prospective study of 20 cases of distal femoral fractures who were treated in K.R.Hospital, MMCRI, Mysore between the period of August 2009 and September 2011 are included. The method used for the fracture fixation was RIN. The duration of follow up ranged from 2 to 24 months. The distal femoral fractures studied included the supracondylar and intercondylar fractures. Twenty patients with fifteen SC and five IC of the distal femoral fracture were treated with RIN and evaluated. The mean age of patients in our study was 39.7 years maximum number of patients were between 20-29 years of age. 13 patients were male and 7 were females. The fracture occurred on right side in 8 (40%) patients and in left side 12 (60%) patients. RTA was the main cause of fracture accounting to 80%. Among these fractures, 15 were of

closed type and 5 were of open type. In our study Mullers type A fractures were more in number i.e. 15 out of which, 6 were of type A1, 6 was of type A2 and 3 were of type A3. There were 5 type C fractures out of which 3 was C1 type and 2 was C2 type. Out of 20 patients closed technique was used in 15 case and open technique in 5 cases. All static locking done. The final results were evaluated by functional evaluation scale developed by Lysholm knee score rating system.

Result

Results were evaluated by functional evaluation scale developed by Lysholm knee score rating system. According to Lysholm knee scoring system, EXCELLENT-40% GOOD-40% FAIR - 15% POOR-05% Comparing our results with standard studies of

1. Emmet Lucas et al. 34 (1993)
2. Richard. E Gellman et al. 45 (1996)
3. Patel. K et al. 48 (2004)
4. Present study (2012)

In Lucas study number of cases was 33 with average ROM was 100°, with 1 bent and broken nail and infection with septic knee and average union time of five months.

In Gellman study number of cases was 24 with average ROM was 104°, results were 16 good, 2 fair and 2 poor results and average union time was 4 months.

In Patel K study number of cases was 25, open cases were 28% and closed were 72%. AO classification was used. All cases were operated by percutaneous RIN. Average union time was 3.1 months and average ROM was 117°. 84% showed excellent, 8% showed good and 8% showed fair results correspondingly.

In our study 20 cases were studied with 15 closed and 5 open cases, average age was 39.7 years, 16 cases were due to RTA and 4 due to fall.

In our study we found average union time 3.6 months comparatively less than Lucas and Gellman study and slightly more than Patel case study.

In our study average ROM was 111.25% which is more than Lucas and Gellman study and less than Patel K case study.

We had complications of 1 case of varus deformity of less than 10°, 1 case of superficial infection and 2 case of delayed union.

In our study functional results are better than Lucas and Gellman study and comparatively less better than Patel K case study. We attribute this less better result because we operated five cases by open technique compared to all percutaneous RIN in Patel K case study.

Conclusion

The study was conducted to assess fracture pattern, management treatment evaluating the results of RIN in the treatment of supracondylar and intercondylar fractures of distal femur. Analysis of our study showed that this is good method of treating type A and C fractures. In type C fractures good articular congruity was achieved by fixing the fragments with cannulated cancellous screws first and then inserting RIN. Retrograde insertion of nail stabilized the fracture below isthmus and interlocking neutralized the rotational stresses and restricted telescoping of fragments, there by preventing angulation, rotational instability and shortening. This stability allowed us to

mobilize the knee early and improve the range of motion and quadriceps power.

So we conclude that in surgical management of distal femoral fractures retrograde intramedullary nailing is one of the best options.

Keywords

Distal femoral fractures, retrograde intramedullary nail, supracondylar, intracondylar.

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