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Functional Outcome Of Supracondylar Femur Fracture Managed Retrograde Intramedullary Nailing At A Tertiary Care Centre.

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Abstract

Distal femur fractures in the supracondylar region accounts for approximately seven per cent ofall femurfractures and are very challenging to manage. This prospective study was carried out in 12 patients of supracondylar femur fracture from June 2018 ti June 2021 who were treated with retrograde intramedullary nailing. The fracture without intraarticular extension were included in the study.The mean followup time was 12 months. All the fracture healed within 4-6 months. No complications like implant failure and infection were observed in our study. Malunion and knee stiffness were common complications. There were 4 cases with excellent results, 6 with good results, 1 with fair and 1 with poor result. Retrograde supracondylar nail provides rigid internal fixation and heals rapidly compared to locking plate osteosynthesis.

Keywords: Supracondylar femur fracture, functional outcome, retrograde nailing.

Introduction:

Distal femur fractures in the supracondylar region seen in seven per cent of all fractures of femur which generally occurs due to high velocity trauma and is most commonly associated with other fractures as well.[1] Neer et al [1967] [2] treated may supracondylar fracture with conservative approach like casting, splinting, traction and other types of internal fixation. He concluded that internal fixation results in majority of complications like infection, knee stiffness and non-union. In the next 30 years, condylar blade plate and lateral fixation devices [3,4] were invented and used andsatisfactory results were obtained.Some researchers suggested that locking plate fixation leadsto varus collapse of femur. [5]

Retrograde intramedullary nail aligns the femoral shaft with the condyle and thereby prevents varus/valgus collapse and helps in achieving compression at fracture site. The study was done to analyse the outcome of intramedullary nailing in supracondylar fractures of femur.

Materials and Methods:

This prospective interventional study was done at Datta Meghe Medical College in association with Jawaharlal Nehru Medical College in a sample size of 12 patients within a study period of 2 years from June 2019 to June 2021. Inclusion criteria was all the patients with age 18 to

80 years with extra-articular supracondylar femur fracture were included in the study. Exclusion criteria was intra articular fractures of femur and associated fractures like proximal tibia and ipsilateral proximal femur which adversely affect the function outcome of adjacent joints. The patients having neuromuscular disorders were also excluded from the study.

A detailed clinical history including date of injury, mode of trauma and thorugh clinical examination of the adjacent joint was done and recorded. Fracture was immediately give a posterior slab/splint with limb elevation and ice fomentation. True Antero-posterior and lateral radiographs were advised for pre-operative planning. All the required heamtological tests were conducted and a physician clearance for anaesthesia and pre aesthetic check-up was conducted. The surgery was conducted through standard surgical approach under image intensifier guidance.

Post operatively intravenous antibiotics were given for 3 days and the converted into oral antibiotic for a week. Early Range of motion exercises were started depending upon the pain tolerance after surgery. Patients were advised non weight bearing walking with walker for 6 weeks. At 6 weeks follow the AP and lateral radiographs were taken to observe the signs of union and callus formation.

After the signs of union are visible, partial weight bearing was started which was gradually converted to full weight bearing. Functional assessment of the fracture was done using Sander's scale [6] as described in figure 1.

Function	Result*	Points
Range of motion (°)		
Flexion		
>125	Excellent	6
100–124	Good	4
90–99	Fair	2
<90	Poor	0
Extension		
0	Excellent	3
≤5	Good	2
6–10	Fair	1
>10	Poor	0
Deformation		
Angulation (°)		
0	Excellent	3
<10	Good	2
10–15	Fair	1
>15	Poor	0
Shortening (cm)		
0	Excellent	3
<1.5	Good	2
1.5–2.5	Fair	1
>2.5	Poor	0
Pain		
None	Excellent	10
Occasional or with changes in weather, or both	Good	7
With fatigue	Fair	5
Constant	Poor	0
Walking Ability		
Walking		
Unrestricted	Excellent	6
>30 minutes to <60 minutes	Good	4
<30 minutes	Fair	2
Walks at home, is confined to wheelchair, or is bedridden	Poor	0
Stair climbing		
No limitation	Excellent	3
Holds rail	Good	2
One stair at a time	Fair	1
Elevator only	Poor	0
Return to work (A or B)		
A. Employed before injury		
Returned to preinjury job	Excellent	6
Returned to preinjury job with difficulty	Good	4
Altered full time job	Fair	2
Parttime job or unemployed	Poor	0
B. Retired before injury		
Returned to preinjury lifestyle	Excellent	6
Needs occasional help	Good	4
Needs assistance at home with activities of daily living	Fair	2
Moved in with family or nursing home	Poor	0

Figure 1 showing : Sander's scale for functional assessment

The patient having score of 36-40 points were labelled as excellent, 26-35 points were Good, 16-25 points were fair and 0-15 points were considered as poor. The follow up was done at 6 weeks, 12

weeks, 6 months and 1 year and in each follow-up thorough functional assessment and radiological assessment was recorded.

The statistical data analysis and comparison was done using SPSS software and Microsoft excel and P value < 0.01 was considered significant.

Observation and results:

The study was conducted at our tertiary care centre with a study population of 12 cases of extra-articular supracondylar femur fractures treated with retrograde intramedullary nail. The mean age of our study was 45 years with youngest patient of 22 years and oldest of 70 years respectively. The mode of injury was Road traffic accident in 66.6% cases and 33.3% had history of fall. The road traffic accident was common in male patients. Fracture were classified according to AO classification and it was found that 9 cases were of A1 type and 2 cases were of A3 type. Only 1 case of open fracture was observed which was graded according to Gustilo Anderson classification [7] for compound fractures and it was labelled as Grade I.

All the fractures healed in a mean duration of 12 weeks. One fracture went in delayed union and was united in 6 months.No cases of superficial or deep infection were seen. On measuring the Knee Range of motion, the average flexion was found to be 112 ± 21 degrees. On measuring the deformity after union it was concluded that 10 fractures healed with normal alignment. 1 case of comminuted fracture had shortening and 1 case malunited with mild varus angulation. Shortening was of 2 cm for which shoe raise modification was given.

Functional evaluation was done using's Sander's scaling and it was observed that 4 patients had excellent outcome, 6 patients had good outcome, 1 patient had poor outcome and 1 patient had fair outcome. The follow up was done at 6 weeks, 12 weeks, 6 months and 1 year and it was found that there was significant improvement from first follow up till the final follow up (p value < 0.01). On comparison of type of fracture and function outcome, it was observed that 1 A3 type fractures resulted in poor outcome and 1 A3 type fracture resulted in fair outcome and comparison was found to be significant. Hence, it was concluded that outcome was dependent on type of fracture and comminuted fractures had delayed outcome.

Discussion:

Supracondylar femur fractures are difficult to treat and reduce. Open reduction with plating requires a long rehabilitation protocol and may result in varus collapse over a period of time. In this study, we used retrograde intramedullary nail in extra articular supracondylar fractures in total 12 patients within a study period of 2 years.

The bimodal distribution of age and mechanism of trauma that is road traffic accident was similar to other studies in the literature [3, 8, 9, and 10]. In our study, majority study population comprised of males and maximum fractures were closed fractures. This was also comparable with study done by Kumar A S et al [11] and Jain S et al [1]. The average time of union in this study was 12 weeks which was comparable with other studies in which supracondylar fracture was managed with retrograde nailing. [11,12] Moreover, studies in which supracondylar femur manged with open reduction and plateosteosynthesisthe mean time of union ranges were between 12 to 20 weeks.[1, Thus, theclosed reduction and nailing leads to rapid union as compared to open reduction and plate osteosynthesis for supracondylar fractures of femur which are extraarticular.

For the evaluation of function outcome, we used Sander's scaling system [6] and it was observed that 33.33 % patients had excellent outcome and 50 % patients had good outcome. 8.3 % patients had fair and poor outcomes. The results were comparable with the study by Gellman et al [12] who reported 16.6% excellent outcomes and 62% good outcome whereas 4% patients had poor results. In study done by Jain S et al [1], similar results were obtained after open reduction and locking plate osteosynthesis. According to AO classification, there were 10 cases of A1 type fracture and 2 cases of A3 type fractures. On comparison of fracture pattern with outcome, it was observed that, 50 % cases of A3 type fractures resulted in fair outcome and another 50% cases resulted in poor outcome. It was concluded that the outcome is dependent on fracture pattern that is simple fractures had good outcome and comminuted fractures had fair/poor outcome.This was comparable with many studies in literature [1,8,9,10,11,12]

Improvement in knee range of movements in our study was comparable with other case studies in the literature.[1,8,9,10,11,12] Knee stiffness was seen in 4 patients and it was one of the majorly observed complication due to lack of physiotherapy by the patient. Knee stiffness gradually improved with physiotherapy. These findings were comparable with many studies in literature [1,8,9,10,11,12]. Mal-union with varus angulation was seen in one patient. 2cm shortening was seen in a patient who had comminuted fracture for which patient was given shoe raise. Though the study was not free of complications, the functional outcome of retrograde nailing was good.

Conclusion:

Retrograde intramedullary nail is an excellent alternative for fixation of supracondylar fracture which are extra-articluar as it results in good outcome with less complications. Blood loss and intra operative time is lesser as compared to open reduction and locking plate osteosynthesis. Complication such as varus malalignment which is common with locking plate osteosynthesis is less commonly observed with retrograde nailing.

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