Original Research Paper

Volume-9 | Issue-12 | December - 2019 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Orthopaedics

A CLINICAL STUDY OF THE SURGICAL MANAGEMENT OF SUPRACONDYLAR FRACTURE FEMUR BY RETROGRADE INTRAMEDULLARY (GSH) INTERLOCKING NAIL

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KEYWORDS :

INTRODUCTION .

In the early 1960s, there was a great reluctance towards operative management of this fracture because of high incidence of infection, non-union, malunion, inadequate fixation and lack of proper instruments, implant as well as antibiotics. The traditional management of displaced fracture supracondylar of femur was along the principle of Watson Jones[1] & John Charnley[2]. This comprised of skeletal traction, manipulation of fracture and external immobilization in the form of casts and cast bracings. These methods however, met with problems like deformity, shortening, prolonged bed rest, knee stiffness, angulation, joint incongruity, malunion, quadriceps wasting, knee instability and post-traumatic osteoarthritis. The trend of open reduction and internal fixation has become evident in the recent years with good results being obtained with the AO blade plate, dynamic condylar screw and other implant systems like intramedullary supracondylar nails. Supracondylar fractures tend to collapse into varus. During application of AO blade plate or dynamic condylar screw, the shaft of femur is often pulled laterally displacing the line of weight bearing, lateral to the anatomic axis of condyle. This creates rotational movements at the fracture site that causes pulling off the blade plate or condylar screws leading to fatigue fracture of the plates. Also, the presence of osteoporotic bone leads to fixation failures with screws and plates cutting of the soft bone. The obvious advantage of an intramedullary device is that it aligns the femoral shaft with condyles reducing the tendency to place varus movement at the fracture site. And because the bending movement of an intramedullary device is substantially reduced failure of fixation in osteoporotic bone should be less. In addition, a retrograde intramedullary supracondylar nail has got distinct advantages of preservation of fracture hematoma, decreased blood loss, minimal soft tissue dissection, less operative time and reduced rate of infection. The purpose of this study is to evaluate the results of supracondylar and intercondylar fracture of femur, treated by closed / open reduction and internal fixation using retrograde intramedullary GSH interlocking nail.

MATERIALS AND METHODS

A study was conducted on 20 patients with Supracondylar fracture femur admitted from OPD Clinic and Casualty clinic of GGH, Kurnool. The study was done over a period of 23 months from August 2017 to June 2019.

INCLUSION CRITERIA:-

1. Age between 15-70years
2. H/O Trauma (RTA,fall fromheight).

EXCLUSION CRITERIA:-

1. Mid shaft femur fractures
2. Nonunion.
3. Malunion.
4. Pathological fractures

RESULTS

In this study 20 patients with supracondylar fracture of femur were admitted studies. all the cases were treated in Governmental General Hospital, Kurnool between the period of August 2017 to June 2019. The method used for fracture fixation was closed or open reduction and internal fixation with retrograde intramedullary supracondylar GSH nail. The duration of follow up ranged from 3 months to 23 months. Out of 20 patients, 1 patient developed knee sepsis, nail was removed immediately and patient was lost for follow-up. 65% good to excellent result were obtained using Neer's and Sander's evaluation scoring system.

The following are the observations noted.

Table-1: Age and Sex Distribution

Age (Years)	Male	Female	Total	
			No	Percent
21-30	7	0	7	35
31-40	7	0	7	35
41-50	3	1	4	20
51-60	1	1	2	10
Total	18	2	20	100

In this study, the youngest case was 25 years old male and the oldest was 54 years. Overall mean age was36.15 years. In males, it was 34.89 years and females it was 47.5 years. Most of the patients sustaining fractures due to vehicular accidents were between 21-40 years age group and equal number of cases were in the age groups 21-30 and 31.40 years. Males were involved fourteen times as compared to females.

Table 2 : Side of fracture

Side of fracture	Number of cases	Percentage
Right	14	70
Left	6	30
Total	20	100

In this study right side affection was seen more than twice as common as left

Table 3 : Side of fracture

Side of fracture	Number of cases	Percentage
Right	14	70
Left	6	30
Total	20	100

In this study right side affection was seen more than twice as common as left

Table 4: Mechanism of Injury

Mechanism of injury	Number of cases	Percentage
Road traffic accident	15	75
Fall from height	5	25
Total	20	100

Seventy five (75%) percent fractures were sustained due to road traffic accidents and fall from height accounted for 25% of fractures.

Table-5:Correlation between Nail Length and Nail Diameter and Final Flexion

Nail	Flexion					
	<90 degrees		91-109 Degrees		>110 Degrees	
	No	%	No	%	No	%
Length						

150 mm	-	-	-	-	-	-
200 mm(n=5)	2	40	1	20	2	40
250 mm (n=13)	1	8	4	31	8	62
350 mm dia (n=1)		-	-	-	1	100
Diameter						
10 mm (n=6)	1	17	2	33	3	50
11 mm (n=7)	2	29	2	29	3	42
12 mm (n=6)	-	-	1	17	5	83

The final knee flexion seems to become slightly better if nails with larger diameter were used.

8 patients (62%) out of 13 with 250mm long nail had ≥110 degree knee flexion.

5 out of 6 patients (83%) with 12 mm diameter had ≥ 110 degree flexion.

Table-6: Correlation between Number of Distal Locks and Knee Flexion

Number of locks	Flexion					
	<90 degrees		91-109 Degrees		>110 Degrees	
	No	%	No	%	No	%
3 (n=1)	-	-	-	-	1	100
2 (n=15)	2	13	2	13	11	74
1 (n=3)	1	33.33	2	66.66	-	-

At least two distal locks gave uniformly good final knee flexion in this study

Table 7: Nature of Fracture

Nature of Fracture	Number of cases	Percentage
Closed	14	70
Group-I compound	0	0
Gropu-II compound	4	20
Group-III compound	2	10
Total	20	100

In the present study, there were 6 compound fractures, 4 being grade-II and 2 being grade-III according to Gustilo-Anderson's classification. Out of these 2 grade- III compound cases, one was type-IIIA and one was type-IIIB.

Table-8: Distribution of Fracture

Nature of Fracture	Number of cases	Percentage
A1	8	40
A2	10	50
A3	2	10
Total	20	100

Type- A1 fractures were patients in 40%, A2 in 50% and A3 in 10% of cases

Neer's Rating:

Long-tern final results were rated using the Neer's rating system. Which allots points for pain, function, working ability, joint movements, gross and radiological appearance.

Table-9: Neer's Rating

Rating	Number of cases	Percentage
Excellent > 85 points	10	50
Good 70-85 points	3	15
Fair 50-69 points	6	30
Poor < 50 points	1	5

In 65% cases, there was good to excellent results

Table-10: Sander's Rating

Malalignment of >5 degree	Points	Number of cases	Percentage
Excellent	36 to 40	10	50
Good	26 to 35	3	15
Fair	16 to 25	6	30
Poor	0 to 15	1	5

In 65% cases, there was good to excellent results.

DISCUSSION

The mean age was 36.15 years. Out of 20 patients, 18 were below 50 years and of them, 14 were below 40 years age.

In the present series, there were 18 male patients with age group 34.89 years, and 2 female with average age of 47.5 years.Thus, in the study conducted by Gellmann (1996) and Watanabe (2002), where female predominance was seen. The age group under consideration was older in contrast to the study by Lucas SE (1993) and the present series, where male predominance in the younger age group was observed.

Secondly, in the present study of 20 patients, 15 had suffered road traffic accident with 14 being under 50 years of age. This highlights the predominant cause of trauma in younger population as road traffic accident, and in turn the relatively younger population under study.

Watanabe Y (2002) concluded that, final knee arc was inversely correlated to age. All patients less than 60 years age had excellent range of motion.

In the present series, the relation between age and final flexion was not analyzed because of the 20 patients, 18 were younger than 50 years age. Of the 18 patients, 10 had knee flexion >110 degree, one had deep infection and lost from follow-up after nail removal. While one patient older than 50 years had knee flexion >110 degree. At the same time it was observed that, 14 out of 18 patients in younger population had sustained high energy trauma and 6 of them were open wounds, compared to older population in In the present series, fracture fixation was done by closed reduction under image intensifier in 16 patients and open reduction done in 4 patients out of 20.

The final knee flexion seems to become slightly better if nails with larger diameter were used.8 patients (62%) out of 13 with 250mm long nail had ≥110 degree knee flexion.5 out of 6 patients (83%) with 12 mm diameter had ≥ 110 degree flexion.

CONCLUSION:

1. Retrograde intramedullary supracondylar nail is a good fixation system for distal third femoral fractures, particularly extra-articular type
2. The operative-time is lessened with decrease in blood loss.
3. Closed reduction can be achieved by not disturbing fracture hematoma and soft tissue.
4. Even with open reduction, there is less soft tissue trauma and less postoperative stiffness.
5. There is no non-union, less delayed unions and rates of angular or rotational malunions.
6. Early surgery, closed reduction, at least two screws in each fragment and early post-operative knee mobilization are essential for good union and good knee range of motion.

Thus, supracondylar nail is the optimal tool for many supracondylar fractures of femur. It provides rigid fixation in a region of femur, where a widening canal, thin cortices and frequently poor bone stock make fixation difficult. Surgical exposure for nail placement requires significantly less periosteal stripping and soft tissue exposure than that of lateral fixation devices.

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