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Original article

Distal femur fracture and union rate by using locking compression plate: Our experience from a tertiary care centre in Maharashtra

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Abstract

Introduction: Distal femur fractures remain difficult fractures to treat successfully as they are often communited, unstable, with intra-articular extension and associated with severe soft tissue injury to the quadriceps mechanism and ligament disruption of knee joint. They are often caused by high energy trauma mainly sustained in road traffic accidents.

Objective: To study the clinical profile of distal femur fracture and its union rate by using locking compression plate

Methodology: The study was conducted on patients of distal femur fracture treated by locking compression plate in tertiary care hospital during the study period September 2017 to June 2019

Results: Out of 42 patients with distal femoral fracture in our study, majority of them i.e. 12(28.6%) were from 41-50 years. Mullers type A2 was commonest i.e. 11(26.2%) followed by A3 in 10(23.8%) and A1 in 8(19%). Only in 10 cases associate implants were used. HERBERT implant was used in 5 i.e. 11.9% patients followed by TENS in 4(9.5%). Radiological assessment revealed that in majority of the cases i.e. in 25(59.5%), union took place between 16-18 weeks.

Conclusion: Non-union rate was 7.1% and union rate was 92.9% in our study. Radiological assessment revealed that in majority of the cases i.e. in 25(59.5%), union took place between 16-18 weeks followed by 11(26.2%) cases in 19-20 weeks, 5(11.9%) cases in 21-22 weeks and in 1(2.4%) it was above 22 weeks.

Key words: Distal femur fractures, locking compression plate, outcome, clinical profile

Introduction

The incidence of distal femur fractures is approximately 37 per 1, 00,000 person-years. Distal femoral fractures are much less common than hip fractures and account for about 4-7% of all femoral fractures. If fractures of the hip are excluded, 31% of femoral fractures involve the distal portion.[1]

Distal femur fractures remain difficult fractures to treat successfully as they are often communited, unstable, with intra-articular extension and associated with severe soft tissue injury to the quadriceps mechanism and ligament disruption of knee joint. Both articular and

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extraarticular distal femur fractures require anatomical reduction in order to restore the functional and mechanical axis of the extremity. Also, a stable internal fixation is required in order to start early range of movements to avoid stiffness of knee joint. Distal femoral fractures mainly arise from two different injury mechanisms. They are often caused by high energy trauma mainly sustained in road traffic accidents. Open injuries with considerable comminution of condyles and metaphysis are frequently seen, as is low energy trauma, relating to elderly patients with severe osteoporosis frequently seen as periprosthetic fracture. In high-energy trauma, the problem of restoring the function in a destroyed knee joint persists. Complex knee ligament injuries frequently occur additionally to extensive cartilage injuries. In elderly patients, extreme osteoporosis represents a particular problem for anchoring the implant.[2]

There is bimodal distribution of fractures. Most high energy distal femur fracture caused by motor vehicle accidents, sports and pedestrian accidents occurs in male between 15 & 50 years; while in women above 50 years, with osteoporosis, fractures occur due to low velocity trauma such as fall from standing height at home.[3]

Objective: To study the clinical profile of distal femur fracture and its union rate by using locking compression plate

Source of data: The study was conducted on patients of distal femur fracture treated by locking compression plate in tertiary care hospital during the study period September 2017 to June 2019

1. Type of study : -Descriptive observational study

2. Place of study : - Tertiary care and rural hospital

3. Duration of study : - September 2017 to August 2019

4. Sample size Calculated : - 42 cases

METHOD OF COLLECTION OF DATA:

1. We will prospectively follow up 42 cases of Distal Femur fractures treated with LCP during 18-month period in our hospital.

2. Patients with distal femur fracture are admitted and examined according to protocol both clinically and radiologically.

3. patient will be clinically and radiologically evaluated pre operatively and post operatively

4. Fracture care will be provided by trained orthopaedic surgeon at our hospital.

5. The patient will be assessed up regularly by clinical examination Neers' scoring and X rays taken immediately after operation, at 6 weeks, 12 weeks and 24 weeks after surgery.

Inclusion criteria:

- All patients with distal femur fractures treated with LCP
- All patients age >18years
- Open distal femur fractures up to type A, B and C

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Exclusion criteria:

- Patients of age less than 18 yrs
- Open fractures type III B and C
- Pathological Fractures
- Associated tibial plateau fractures
- Nonunion and Delayed union

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Results

Table 1: Distribution according to age

		Frequency	Percent
Age group in years	20-30	7	16.7
	31-40	10	23.8
	41-50	12	28.6
	51-60	7	16.7
	> 60	6	14.3
	Total	42	100.0

Out of 42 patients with distal femoral fracture in our study, majority of them i.e. 12(28.6%) were from 41-50 years followed by 10 i.e. 23.8% were from 31-40 years, 7 each i.e. 16.7% from 20-30- and 51-60-years age group

Table 2: Distribution according to gender

		Frequency	**Percent**
Gender	Male	32	76.2
	Female	10	23.8
	Total	42	100.0

In our study, there were 32 males (76.2%) and 10 (23.8%) females. Male preponderance was seen with male to female ratio as 3.2:1

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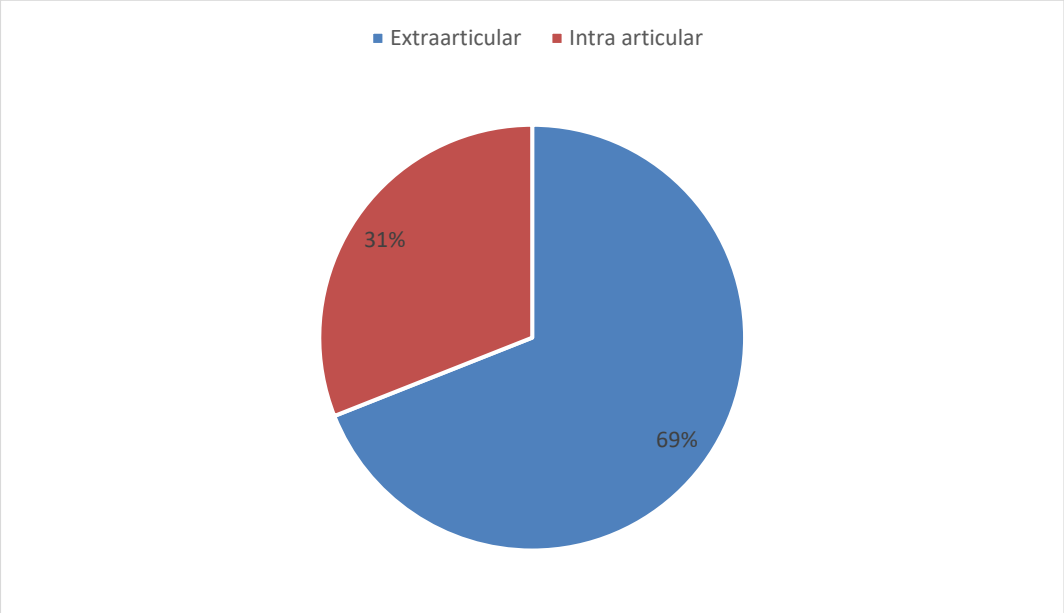
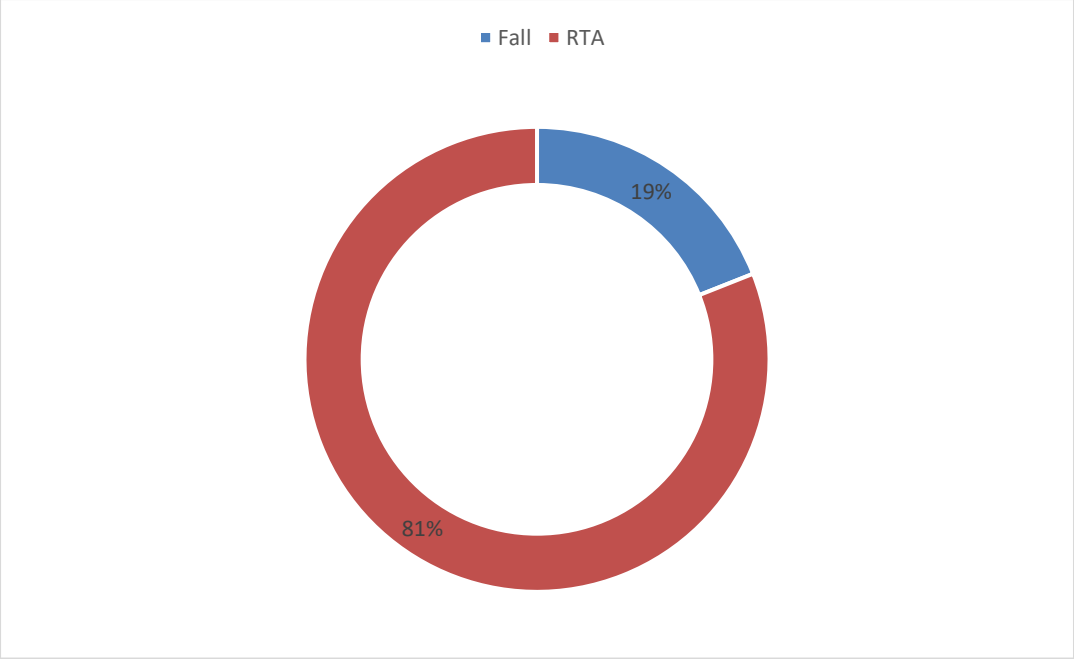
Figure 1: Distribution according to type of fracture



In our study, more commonly involved was extraarticular in 29 (69%) and in 13 i.e. 31% it was intraarticular type

Figure 2: Pie diagram showing distribution according to mode of injury



Commonest mode of injury in our study was Road traffic accidents in 34 patients i.e. 81% and in 8(19%), it was fall.

Table 3: Distribution according to Mullers type fracture

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		Frequency	Percent
Mullers type	A1	8	19.0
	A2	11	26.2
	A3	10	23.8
	C1	1	2.4
	C2	6	14.3
	C3	6	14.3
	Total	42	100.0

In our study, mullers type A2 was commonest i.e. 11(26.2%) followed by A3 in 10(23.8%) and A1 in 8(19%)

Table 4: Distribution according to implants used

		Frequency	Percent
Associated implant used	4MMCC	1	2.4
	HERBERT	5	11.9
	TENS	4	9.5
	No implants	32	76.2
	Total	42	100.0

In our study, only in 10 cases associate implants were used. HERBERT implant was used in 5 i.e. 11.9% patients followed by TENS in 4(9.5%)

Table 5: Distribution according to union as outcome

		Frequency	Percent
Union	Non-union	3	7.1
	Union	39	92.9
	Total	42	100.0

Non-union rate was 7.1% and union rate was 92.9% in our study.

Table 6: Radiological union duration in patients

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		Frequency	Percent
Radiological union (weeks)	< 16	0	0.0
	16-18	25	59.5
	19-20	11	26.2
	21-22	5	11.9
	>22	1	2.4
	Total	42	100.0

Radiological assessment revealed that in majority of the cases i.e. in 25(59.5%), union took place between 16-18 weeks followed by 11(26.2%) cases in 19-20 weeks, 5(11.9%) cases in 21-22 weeks and in 1(2.4%) it was above 22 weeks.

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Discussion

Age and gender distribution:

In our study, out of 42 patients with distal femoral fracture in our study, majority of them i.e. 12(28.6%) were from 41-50 years followed by 10 i.e. 23.8% were from 31-40 years, 7 each i.e. 16.7% from 20-30- and 51-60-years age group. In our study, there were 32 males (76.2%) and 10 (23.8%) females.

Mean age in our study was found to be 45.79±14.73 years

In our study, male preponderance was seen with male to female ratio as 3.2:1. In our study, out of 32 males, majority i.e. 10(31.3%) were from 31-40 years age followed by 9(28.1%) from 41-50 and 6(18.7%) from 20-30 years age group. Out of 10 females, majority i.e. 4(40%) were from 51-60 years age followed by 3(30%) from 41-50 and 2(20%) from above 60 years age group.

SK Venkatesh Gupta et al[4] in 2015 conducted study which is a hospital based prospective study centered in orthopedic department, Mamata General Hospital, Khammam. All cases were fresh, 78 patients were males and 22 patients were females. The median age was 47 years ranging from 20-70 years.

Pradeep Patil et al[5] in 2016 from Maharashtra conducted study with 30 patients with closed fracture lower end of femur. The duration of follow up ranged from 6 months to 24 months. 70% were males & 30%were females and they belonged to 17-75-year age group.

Rajani Ranjanet al[6] conducted a prospective study was done during June 2012 to July 2016. Total 28 patient were enrolled in our study. There were 21 male and 7 females. The age range was from 21 to 68 years.

Mode of injury

Commonest mode of injury in our study was Road traffic accidents in 34 patients i.e. 81% and in 8(19%), it was fall. Almost 79% fractures in our study were reported amongst males in the 25-45 years age group predominantly. Most of our patients were seen on the day of injury

Winquist et al[7] also had 77% of cases because of motor vehicular accidents. This observation by various authors implies that fracture shaft femur is usually a result of high energy trauma. So, it is commonly associated with other injuries.

White et al[8] observed 76% of his cases were associated with RTA injuries.

Functional outcome using NEERs grade

In our study, functional assessment by using NEERs grade revealed that in 27 i.e. 64.3% the results were excellent. In 12(28.6%) cases it was good. Fair results were seen in 2(4.8%) and in 1 i.e. 2.4% it was poor.

In our study, functional outcome of 29 patients with extraarticular fracture having excellent functional outcome in terms of regaining loss of knee flexion as compared to 13 patients with intraarticular fractures having good and fair results according to Neers criteria.

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Ramu AC et al[9] in his study reported that 71.4% of type A fractures had excellent to satisfactory results as compared to 50% of the type C fractures. functional results were evaluated using Neer's *et al* rating system. Overall 9 cases (30%) had excellent rating, 14 cases (45%) had satisfactory rating and 7 cases (25%) had unsatisfactory.

Vallier et al[10] evaluated functional outcome at the end of one year using Neer's scoring system. Results were excellent in 12 patients (57%), good in 4 (19%), fair in 3(14%) and poor in 2(10%).

Anuj Kumar Lal et al[11] reported in his study that there was excellent result seen in 50% of cases, while 46.67 had good results.

Conclusion:

1. Non-union rate was 7.1% and union rate was 92.9% in our study.
2. Radiological assessment revealed that in majority of the cases i.e. in 25(59.5%), union took place between 16-18 weeks followed by 11(26.2%) cases in 19-20 weeks, 5(11.9%) cases in 21-22 weeks and in 1(2.4%) it was above 22 weeks.

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