



International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2017; 3(2): 823-827
© 2017 IJOS
www.orthopaper.com
Received: 16-02-2017
Accepted: 17-03-2017

Dr. Ravish V N
Professor & Unit Chief,
Department of Orthopaedics,
KIMS, Bangalore, Karnataka,
India

Dr. Vinod AC
Associate Professor,
Department of Orthopaedics,
KIMS, Bangalore, Karnataka,
India

Dr. Gaurav Sen
Senior Resident, Department of
Orthopaedics, KIMS, Bangalore,
Karnataka, India

Surgical management of fractures of distal end of femur with locking compression plate

Dr. Ravish VN, Dr. Vinod AC and Dr. Gaurav Sen

DOI: <http://dx.doi.org/10.22271/ortho.2017.v3.i2i.90>

Abstract

Background and Objectives: The fractures of the distal end of femur are one of the commonest fractures found and can be treated by different methods. Incidence of distal end of femur fractures- 37 per 1,00,000 person. This study was taken up to assess the functional outcome for internal fixation of fractures of the distal end of femur by locking compression plate and to evaluate the effectiveness and complications of distal end of femur fractures treated with locking compression plate.

Material and Methods: It is a prospective study which was carried out from November 2013 to May 2015 in Kempegowda Institute of Medical Sciences, Bangalore. In this study period 25 cases of fracture of distal end of femur, meeting the inclusion and exclusion criteria were treated by open reduction and internal fixation using Locking Compression Plate.

Keywords: Surgical management, fractures, femur, locking compression plate

Introduction

Distal femur fractures occur at approximately one tenth the rate of proximal femur fractures and make up 6% of all femur fractures. There is a bimodal distribution of fractures based on age and gender. Most high-energy distal femur fractures occur in males between 15 and 50 years, while most low-energy fractures occur in osteoporotic women >50 years. The most common high-energy mechanism of injury is a traffic accident (53%) and the most common low-energy mechanism is a fall at home (33%)^[1, 2]. In the past two decades there has emerged another injury group coming out of periprosthetic fractures^[2].

Fractures of the distal femur are common, while tibial fractures are rare. Crucial for treatment is to distinguish fractures of the metaphysis above the femoral component. This remains firmly fixed, from those involving the knee joint replacement and component loosening. Distal femur fractures are almost always managed surgically, using methods of osteosynthesis with an angle condylar or dynamic compression plate (DCP), or a short retrograde-inserted supracondylar intramedullary nail. The recent use of implants such as locking compression plates (LCP) with angle-stable screws has offered good prospects^[3].

Locking compression plate offers all advantages of angle-stable implants. It is more effective for osteoporotic bone than a Dynamic compression plate implant or a condylar plate, because it provides better fixation stability for the distal fragment^[3].

Materials & Methods

- No of cases – 25
- Place of study-Kempegowda institute of medical sciences, Bangalore.
- Prospective study.
- Patients were followed up for a period of minimum 1 year.
- Functional outcome was then assessed by functional evaluation scoring system (From Neer Cs, Ii Grantham Sa, And Shelton MI)

Correspondence
Dr. Ravish V N
Professor & Unit Chief,
Department of Orthopaedics,
KIMS, Bangalore, India

Inclusion Criteria

- Patients above 18 years of age.
- All closed fractures of the distal end of femur within 2 weeks.
- Compound fractures type 1, 2, and 3a according to the Gustilo and Anderson’s Criteria.

Exclusion Criteria

- Pathological fractures in the distal end of femur.
- Fractures more than 2 weeks of duration.
- Compound type 3b and 3c according to the Gustilo and Anderson’s Criteria.

Neer Scoring System

FUNCTIONAL (70 POINTS)		ANATOMICAL (30 POINTS)	
a) Pain (20 points)		a) Gross anatomy (15 points)	
• no pain	20	• Thickening only	15
• intermittent	16	• 5 degree <u>angulation</u> 0.5 cm shortening	12
• with fatigue	12	• 10 degree <u>angulation</u> or rotation, 2 cm shortening	9
• limits function	8	• 15 degree <u>angulation</u> or rotation, 3cm shortening	6
• constant or at exertion	4-0	• Healed with considerable deformity	3
b) Walking capacity (20 points)		• Non union or chronic infection	
• same as before accident	20	b) Roentgenogram (15 points)	
• mild restriction	16	• Near normal	15
• restricted stair side ways	12	• 5 degree <u>angulation</u> or 0.5 cm displacement	12
• use crutches or other walking aids	4-0	• 10 degree <u>angulation</u> or 1 cm displacement	9
		• 15 degree <u>angulation</u> or 2 cm displacement	6
		• Union but with greater deformity, spreading with <u>condyles</u> and <u>osteoarthritis</u>	3
		• Non union or chronic infection	0
c) JOINT MOVEMENT (20 POINTS)			
• Normal or 135 degrees	20		
<u>Upto</u> 100 degrees	16		
<u>Upto</u> 80 degrees	12		
<u>Upto</u> 60 degrees	8		
<u>Upto</u> 40 degrees	4		
<u>Upto</u> 20 degrees	0		
d) WORK CAPACITY (10 POINTS)			
• Same as before accident	10		
• Regular but with handicap	8		
• Alter work	6		
• Light work	4		
• No work	2-0		

- Excellent – more than 85 points
- good – 70 to 85 points
- Fair – 55 to 69 points
- Poor – less than 55 points
- By Neer’s scoring system, the anatomical outcome was

calculated- Topogram images from pelvis to the ankle joint and drawing the mechanical and anatomical axis.

Intra-Operative Images



Results

Out of 25 patients in my study, 17 were male patient (68%) and 8 were female patients (32%). The average age of the patients were between 25-45 years. In 20 (80%) cases the type of injury was due to RTA and 5 (20%) cases were due to self-fall. 21 (84%) cases were simple type and 4 (16%) cases were compound type.

Bone grafting was done in 2 patients. The average time taken for radiological union was between 20-24 weeks. Time of

partial weight bearing was 12 weeks and full weight bearing was 22 weeks. The average range of movements was between 0-120 degrees.

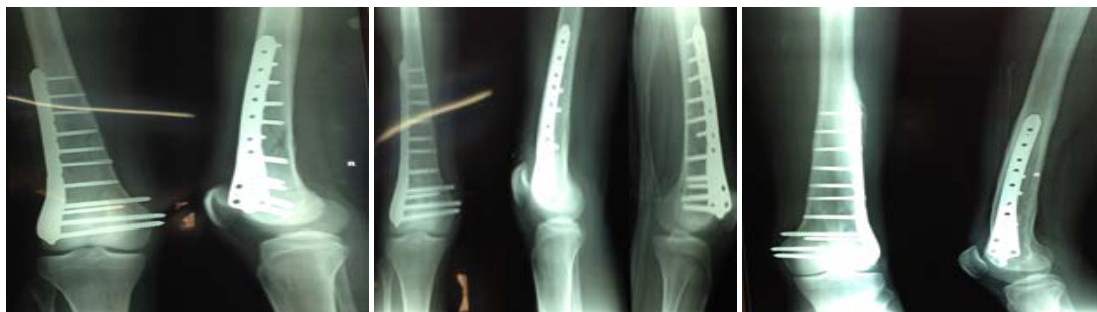
According to Neer’s scoring system, 7 (28%) cases were excellent, 14 (56%) were good, 3 (12%) were fair, 1 (4%) were poor.

Radiographic Images



PRE-OP

IMMEDIATE POST-OP

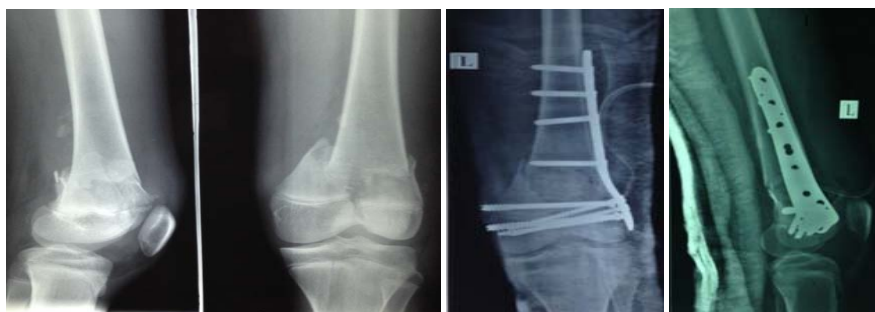


At 6th Week

At 12th Week

At 24th Week

Case no 1.



PRE-OP

IMMEDIATE POST-OP



AT 6TH WEEK

AT 12TH WEEK

AT 24TH WEEK

Case No 2.



PRE OP

IMMEDIATE POST-OP



AT 6TH WEEK

AT 12TH WEEK

AT 24TH WEEK

Case No 3.



Complications

Master Chart

Sl no	Name of patient	Age	Sex	Date of admission	Date of surgery	Date of discharge	Side	Type of injury	Simple/Compound	Diagnosis	Duration of injury	Mippo/Open/Swasthu chler	Type of implant	Bone graft/Platelet infiltration	Range of movements		Follow up			Weight bearing		Time of union	complications						outcome					
															Active	passive	6weeks	12weeks	24weeks	Partial	Complete		Superficial infections	Wound gaping	Knee stiffness	Non union	implant breakage	Bent implant		Screw backout				
1	Bazavaraju	45	Male	3/7/2013	6/7/2013	20/7/13	Left	RTA	Simple	A3	30days	Open	7 holed	-	100	110	110	120	120	12	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
2	Bettagowda	43	Male	10/10/2013	15/10/13	24/10/13	Right	RTA	Compound	C2	50days	Open	9 holed	-	100	110	110	120	120	12	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
3	Chandrashekar	28	Male	22/12/14	27/12/14	31/12/2015	Left	RTA	Simple	C2	50days	Open	9 holed	-	100	110	110	120	120	14	24	5 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
4	Chennamma	69	Female	12/8/2014	15/8/14	23/8/14	Right	Self Fall	Simple	B2	30days	Open	5 holed	-	90	100	100	110	110	14	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
5	Chikkamma	60	Female	28/10/14	31/10/14	14/11/14	Right	Self Fall	Simple	A1	30days	Open	9 holed	-	90	100	100	110	110	12	22	5 months	-	-	-	-	-	-	-	-	-	-	-	Good
6	Fathima	84	Female	11/12/2013	13/12/13	27/12/13	Right	RTA	Simple	A1	20days	Mippo	9 holed	-	100	110	110	120	120	14	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
7	Girish	40	Male	19/11/14	21/11/14	5/12/2014	Right	RTA	Simple	A3	20days	Mippo	7 holed	-	100	110	110	120	120	12	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
8	Goutham	20	Male	18/12/14	22/12/14	4/1/2015	Right	RTA	Simple	C1	40days	Open	9 holed	-	100	110	110	120	120	12	20	5 months	-	-	-	-	-	-	-	-	-	-	-	Good
9	Jayaramanna	60	Male	15/3/15	26/3/15	10/4/2015	Right	RTA	Compound	C3	11days	Swasthuckler	-	-	90	100	100	110	110	14	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Fair
10	Mariyamma	61	Female	9/7/2014	13/7/14	25/7/14	Right	Self Fall	Simple	A3	40days	Open	9 holed	-	100	110	110	110	120	12	22	5 months	-	-	-	-	-	-	-	-	-	-	-	Good
11	Mithun	23	Male	29/8/14	31/8/14	13/9/14	Right	Self Fall	Compound	C3	30days	Open	7 holed	-	100	110	110	120	120	14	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
12	Muddegowda	36	Male	27/12/13	30/12/13	13/1/14	Right	RTA	Simple	C2	30days	Open	5 holed	-	80	90	90	100	100	12	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
13	Pandu	20	Male	1/8/2013	4/8/2013	15/8/13	Left	RTA	Simple	C2	30days	Mippo	7 holed	-	100	110	110	120	120	12	20	5 months	-	-	-	-	-	-	-	-	-	-	-	Good
14	Puttabayamma	65	Female	21/1/14	23/1/14	5/2/2014	Right	Self Fall	Simple	B2	20days	Open	7 holed	-	70	80	80	90	90	12	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Fair
15	Ramanna reddy	48	Male	26/2/13	7/3/2013	9/4/2013	Left	RTA	Simple	A3	90days	Open	9 holed	+	80	90	90	100	100	12	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
16	Ravi	27	Male	20/9/13	25/9/13	10/10/2013	Right	RTA	Simple	C2	50days	Open	9 holed	-	100	110	110	110	120	12	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
17	Sharanamma	70	Female	19/12/14	22/12/14	6/1/2015	Right	RTA	Simple	C2	30days	Mippo	9 holed	-	70	80	80	90	90	12	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
18	Shivshankar	43	Male	26/8/13	4/9/2013	19/9/13	Left	RTA	Simple	A3	80days	Open	9 holed	-	60	70	70	70	80	12	20	6 months	-	-	-	-	-	-	-	-	-	-	-	Poor
19	Shyamsunder	60	Male	6/11/2014	10/11/2014	24/11/14	Left	RTA	Simple	A3	40days	Mippo	11 holed	-	100	110	110	110	120	14	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Good
20	Somasekhara reddy	35	Male	10/2/2015	12/2/2015	14/4/15	Left	RTA	Compound	C3	20days	Open	9 holed	-	70	80	80	90	90	12	22	6 months	-	-	-	-	-	-	-	-	-	-	-	Fair
21	Susheelamma	65	Female	5/8/2014	9/8/2014	22/8/14	Right	Self Fall	Compound	C2	40days	Open	9 holed	+	100	110	110	120	120	12	24	6 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
22	Umar	22	Male	29/7/14	30/7/14	12/8/2014	Left	RTA	Simple	C2	10day	Open	7 holed	-	100	110	110	110	120	12	20	5 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
23	Venkataramanna	70	Male	8/7/2014	17/7/14	2/2/2014	Left	RTA	Simple	A3	90days	Open	7 holed	-	100	110	110	110	120	12	22	5 months	-	-	-	-	-	-	-	-	-	-	-	Good
24	Vijayalakshmi	51	Female	15/11/14	19/11/14	1/12/2014	Left	RTA	Simple	A3	40days	Open	9 holed	-	100	110	110	120	120	12	20	5 months	-	-	-	-	-	-	-	-	-	-	-	Excellent
25	Vishakshamma	66	Female	9/8/2013	12/8/2013	25/8/13	Left	RTA	Simple	B1	30days	Open	5 holed	-	100	110	110	120	120	12	20	4 months	-	-	-	-	-	-	-	-	-	-	-	Good

Discussion

In 20 (80%) cases the type of injury was due to RTA and 5 (20%) cases were due to self-fall. 21 (84%) cases were simple type and 4 (16%) cases were compound type. Bone grafting was done in 2 patients. The average time taken for radiological union was between 20-24 weeks. Time of partial weight bearing was 12 weeks and full weight bearing was 22 weeks. The average range of movements was between 0-120 degrees. According to Neer's scoring system, 7 (28%) cases were excellent, 14 (56%) were good, 3 (12%) were fair, 1 (4%) were poor. 2 patients had superficial infection, 3 patients had wound gaping, 12 patients had knee stiffness and bent implant was seen in 1 patient. 16 patients had range of movements from 110-120 degrees, 3 patients had 100-110 degrees, 3 patients 90-100 degrees, 2 patients 80-90 degrees, 1 patient <80 degrees. The mean range of movement postoperatively was 96.4 degrees.

Conclusion

- Locking compression plate is a good fixation system for distal end femoral fractures.
- Operative time is reduced and surgical dissection is minimum.
- Device provides good angular stability and helps in early mobilization.

Reference

1. Paige Whittle, Fractures of the lower extremity, Chapter - 5 Campbell's Operative Orthopaedics, Eleventh edition, III, 3170-3190.
2. Arneson TJ, Melton LJ. 3rd, Lewallen DG. Epidemiology of Diaphyseal Fractures in Rochester, Minnesota, 1965-1984. Clin Orthop. 1988; 188-94
3. EJ Yeap, Deepak AS. Distal Femoral Locking

Compression Plate Fixation in Distal Femoral Fractures: Early Results. Malaysian Orthopaedic Journal. 2007; 1(1):12- 17.

4. Christoph Sommer. Biomechanics and clinical application principles of locking plates. Suomen Ortopedia ja Traumatologia SOT 1 2006, 29:20.
5. Heather A Vallier, Theresa A Hennessey, John K Sontich, Brendan M Patterson. Failure of LCP Condylar Plate Fixation In The Distal Part of the The Femur A Report of Six cases. J bone joint surg. 2006; 88(4):846-853
6. Sommer C, Babst R, Muller M, Hanson B. Locking Compression Plate Loosening and Plate Breakage A Report of Four Cases. J Orthop Trauma September 2004; 18(8):571.
7. Frankenhauser C, Frenk A, Marti A. A comparative biomechanical evaluation of three systems for internal fixation of distal fracture of femur. Orthopaedic Research Society. 1999; 24(1):498.
8. Peter J, O'brien, Robert M Meek, Piotr A Blachut, Henry M. Broekhuysse, fractures of the distal femur, Chapter -48 Rockwood and Green's Fractures in Adults, Sixth edition. 2, 1915-1967.