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Dr. Ajith Kumar KS
Assistant Professor, Department
of Orthopedics, Hassan Institute
of Medical Sciences, Hassan,
Karnataka, India

Dr. Syed Mohsin
Assistant Professor, Department
of Orthopedics, Hassan Institute
of Medical Sciences, Hassan,
Karnataka, India

Dr. Sreeranga N
Professor and Head, Department
of Orthopedics, Hassan Institute
of Medical Sciences, Hassan,
Karnataka, India

Corresponding Author:
Dr. Syed Mohsin
Assistant Professor, Department
of Orthopedics, Hassan Institute
of Medical Sciences, Hassan,
Karnataka, India

Comparative study of outcome of retrograde intramedullary nailing and locking compression plating of distal femoral fractures in adults

Dr. Ajith Kumar KS, Dr. Syed Mohsin and Dr. Sreeranga N

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Abstract

Fractures in the elderly are often challenging due to osteoporotic bone and co-morbidities and long term disability can occur. Surgery is the standard mode of treatment and hence a quick surgical treatment for early weight bearing and mobilization is required in order to prevent long term complications due to prolonged bed rest. All patients were documented prospectively, complete demographic details and clinical history was obtained. Clinical and radiographic evaluation was done in all the patients. Informed consent was taken and all patients were treated with DFLCP and retrograde nailing randomly. Duration of hospitalization was documented and follow up was done for 2 years. In this study, fracture union time was 12-24 weeks with among the patients of the DFLCP group with 75 percent have union and was 12-24 weeks among the patients of the retrograde nailing group with union occurring in 80 percent of patients respectively. Significant results were obtained while comparing the mean fracture union time among the patients of the two study groups. In our study, follow up was done up to 2 years with 60% of patients followed up to 15 months in both the groups.

Keywords: Retrograde intramedullary nailing and locking compression plating, distal femoral fractures, adults

Introduction

Distal femur fractures account for approximately 7% of fractures in the adults. They have bimodal age distribution; young patients as a result of high-energy injuries like road traffic accidents and elderly patients after simple falls ^[1]. Fractures in the elderly are often challenging due to osteoporotic bone and co-morbidities and long term disability can occur. Surgery is the standard mode of treatment and hence a quick surgical treatment for early weight bearing and mobilization is required in order to prevent long term complications due to prolonged bed rest ^[2]. Our study aims to compare the outcomes of DFLCP and retrograde nailing in the management of distal femur fractures. We also aim to compare the functional outcome in the groups using NEER *et al.* criteria.

Methodology

This study was performed at Hassan Institute of Medical Sciences, Hassan, Karnataka (India) from Jan 2017 to Dec 2019 for a period of 3 years. A total of 40 patients were included with predetermined inclusion and exclusion criteria in this study and were broadly divided into two groups, one treated with DFLCP and one treated with retrograde nailing. All patients were documented prospectively, complete demographic details and clinical history was obtained. Clinical and radiographic evaluation was done in all the patients. Informed consent was taken and all patients were treated with DFLCP and retrograde nailing randomly. Duration of hospitalization was documented and follow up was done for 2 years.

Inclusion criteria were closed distal femur fractures A1, A2, A3, B3, C1, C2, C3 types of Orthopaedic Trauma Association (AO/OTA) classification, patients of age 18 yrs and above both males and females and patients with comorbid diseases like controlled diabetes mellitus, hypertension, asthma, epilepsy and other medical conditions with closed distal femoral fractures.

Exclusion criteria were Compound fractures of distal femur, Closed distal femur fractures B1, B2 types of Orthopaedic Trauma Association (AO/OTA) classification, Pathological fractures, Pregnancy, Peri-prosthetic fractures, Patients of age group < 18 years and Patients unfit for surgery.

We defined fracture union as no abnormal mobility in frontal and coronal planes with no pain, without increase in temperature at the fracture site or discomfort on bearing weight and radiologically union was demonstrated by trabeculae crossing at the fracture site with continuity of the

cortex atleast in two views. Functional and radiological outcomes were assessed with NEER'S criteria. The final outcome was compared with the results available from the latest literature.

All the results were analysed by SPSS software. Chi- square test, student test and Mann-Whitney u test were used for assessment of level of significance.

Results

Table 1: Time interval between injury and surgery

Time Interval (Days)	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
Upto 3 days	9	45	8	40
4-7	5	25	6	30
8-14	4	20	3	15
>15	2	10	3	15
Total	20	100	20	100

Table 2: Bone grafting

Bone grafting	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
Present	4	20	3	15
Absent	16	80	17	85
Total	20	100	20	100

Table 3: Duration of hospitalisation

Duration of hospitalization (weeks)	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
1	2	10	2	10
1-2	8	40	7	35
2-3	6	30	7	35
3-4	3	15	2	10
>4	1	05	2	10
Total	20	100	20	100

Table 4: Local complications

Local Complications	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
Present	10	50	10	50
Absent	10	50	10	50
Total	20	100	20	100

Table 5: Time of fracture union

Fracture union time (weeks)	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
<12	4	20	3	15
12-24	15	75	16	80
>24	1	05	1	05
TOTAL	20	100	20	100

Table 6: Follow UP

Follow up (months)	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
<10	7	35	6	30
10-15	12	60	12	60
>15	1	05	02	10

Table 7: Neer's SCORE AND results

Results	DFLCP		Retrograde Nailing	
	Number of patients	Percentage	Number of patients	Percentage
Excellent	9	45	8	40
Satisfactory	7	35	9	45
Unsatisfactory	3	15	2	10
Failure	1	05	1	05
Total	20	100	20	100

Significant number of 45 percent of patients underwent DFLCP with 3 days of injury and 40 percent of patients had retrograde nailing within 3 days. 25 percent patients had DFLCP in 4-7 days and 30 percent had nailing in 4-7 days.

Bone graft was used only in 4 out of 20 patients in DFLCP group and 3 out of 20 patients in nailing group.

Most of the patients were hospitalized up to 3 weeks in both groups. Local complications like restriction of movements, extension lag, chronic swelling of injured lower limb, thigh pain and osteoporosis had similar incidence in both groups.

In this study, fracture union time was 12-24 weeks with among the patients of the DLFP group with 75 percent have union and was 12-24 weeks among the patients of the retrograde nailing group with union occurring in 80 percent of patients respectively. Significant results were obtained while comparing the mean fracture union time among the patients of the two study groups.

In our study, follow up was done up to 2 years with 60% of patients followed up to 15 months in both the groups.

On comparing the clinical and radiological outcome, it was observed that excellent results were obtained in 45 percent of the patients of the DLFP group and in 40 percent of the patients of the retrograde nailing group. Satisfactory results were obtained in 35 percent of the patients of the DLFP group and in 45 percent of the patients of the retrograde nailing group. Failure occurred in 1 patient each of both the study groups.

Discussion

In this study, mean fracture union time was 19...weeks and 14...weeks in DFLCP and nailing group respectively which is similar to Shyam *et al.* who reported 18.36 and 14.38% in each group respectively. Julia *et al.* who reported that time taken for union for Plating was around 15 weeks, which was comparable to Henderson *et al.* and Markmiller *et al.* who observed it to be 12 and 14 weeks respectively [3, 4]. Weight and Collinge *et al.* achieved union at an average of 13 weeks, Kregor *et al.* at 11 weeks [5, 6]. Schandelmaier *et al.* at 13 weeks, Schutz *et al.* at 14 weeks, and Henderson *et al.* around 12 weeks. Time taken for union for Nailing in Julia *et al.* study, average healing time in weeks was 13 which was comparable to Gellmann *et al.* 12 weeks, Kumar *et al.* 14 weeks and Ingman *et al.* 12 weeks [7, 8].

The clinical and radiological outcome in our study showed excellent results in 45 percent of the patients of the DLFP group and in 40 percent of the patients of the retrograde nailing group. Satisfactory results were obtained in 35 percent of the patients of the DLFP group and in 45 percent of the patients of the retrograde nailing group. Failure occurred in 1 patient each of both the study groups.

Shyam *et al.* reported 53.33 percent of the patients of the DLFP group and in 46.67 percent of the patients of the retrograde nailing group. Satisfactory results were obtained in 20 percent of the patients of the DLFP group and in 26.67 percent of the patients of the retrograde nailing group. Failure occurred in 1 patient as in our study [1]. Ramanand M *et al.*

showed that LCP plating proved to be the better choice than DFN for treating distal femur fracture with respect to surgical duration, mobilization, fracture union, weight bearing, range of motion and complications [9]. Kumar SK *et al.* concluded that distal femoral locking plate in the treatment of choice in the management of comminuted distal femoral fractures especially type A fractures where they had found higher Neer score [10].

Our study showed no significant difference in the outcomes of two surgeries, although the fracture union time was faster in retrograde nailing. Similar results were proposed by Shyam *et al.* [11].

Conclusion

We conclude that both DFLCP and retrograde nailing are equally effective surgical treatment options for distal femur fractures in adults and have comparable outcomes. However, fracture union time is comparatively faster in retrograde nailing than in DFLCP.

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