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Comparation Of Functional Outcome Of Supracondylar Fractures Of Femur Treated With Distal Femur Locking Compression Plate Osteosynthesis With Supracondylar Nail.

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ABSTRACT:

AIM: To evaluate and compare the functional outcome of supracondylar fractures of the femur treated with distal femur locking compression plate osteosynthesis with supracondylar nail.

OBJECTIVES: Internal fixation of supracondylar femur fractures by distal locking compression plate or by supracondylar nail. Restoration of the limb length, alignment, rotation and anatomical reduction of articular the surface. Early mobilization to regain normal quadriceps strength and functional range of knee motion for better functional outcome.

MATERIALS AND METHODS: A prospective study is conducted with a sample size of 20 from august 2021 to January 2023 in our institute. Patients attending our department with supracondylar femur fractures were treated with a distal locking compression plate or by retrograde supracondylar nail who full fill the inclusion and exclusion criteria were included in our study.

RESULTS: Among the total of 20 patients enrolled in this study, there were no deponents or losses to follow-ups. The outcomes of the patients were evaluated clinically and radiologically periodically. The Clinical evaluation was done using the NEERs scoring system for locking compression plate osteosynthesis 70%excellent,10%good, and 10%fair,10% poor results were obtained and for supracondylar nailing 80%excellent, 10%good, and 10%fair results were obtained. In our study the average flexion with supracondylar nailing is 118.03+/-17.30 and with locking compression plating is 109.03+/-18.78.

Conclusion: For Muller type A2, and A3 fractures supracondylar nail is the choice of implant for all C-type fractures locking compression plate osteosynthesis gives excellent results but supracondylar nailing can be used as an alternative for C1 and C2 type of supracondylar fractures. Proper reconstruction of fracture fragments and early mobilization give better functional outcomes.

I. INTRODUCTION

The fractures that occur at distal 9-15cm of the femur shaft are known as supracondylar fractures of the femur. The incidence of these fractures is 4-6% of all femoral fractures[1]. The incidence shows bimodal age distribution as supracondylar fractures of the femur are higher in women older than 65 years due to low-energy trauma and in males of 15 to 24 years old due to high-energy trauma such as motor vehicle accidents. Supracondylar fractures can be managed conservatively but non-operative treatment was often encountered with difficulties like persistent rotatory and angular deformity, knee joint incongruity, loss of knee motion, delayed mobilization, and secondary osteoarthritis[2]. So surgical management of supracondylar fracture of the femur has been popularised during the last few decades. The main goals of surgical treatment are the restoration of limb alignment, length and, rotation and stable anatomic reduction of the articular surface, which allows for early mobilizations and minimal soft tissue damage to prevent post-operative contractures and adhesions. The difficulty in fixation of supracondylar fracture femur is due to thin cortices, wide medullary cavity, relative osteopenia, fracture comminution, intra-articular extension and, injury to the extensor mechanism. Fractures of the femoral neck, shaft, acetabulum, patella, tibia condyle, tibial shaft and, ligament injury of knee are the injuries associated with supracondylar fracture of femur have been reported in 20% of cases[3].Because of these reasons, it is difficult to regain full knee motion and function better understanding of the injury pattern, the availability of better implants, the concept of, early surgical fixation and early post-operative

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knee mobilization all have improved the functional outcome of the patient[4]. The operative methods for supracondylar fracture femur are fixed angle blade plate, locking compression plate, condylar buttress plates, intramedullary supracondylar nailing, system, external fixation or modular distal femoral replacement prosthesis[5].

II. AIMS AND OBJECTIVES

AIMS

To evaluate and compare the functional outcome of supracondylar fractures of the femur treated with distal femur locking compression plate with supracondylar nail.

OBJECTIVES

1)Internal fixation of supracondylar femur fractures by distal locking compression plate or by supracondylar nail

2)Restoration of the limb length, alignment, rotation, and anatomical reduction of the articular surface.

3)Early mobilization to regain normal quadriceps strength and functional range of knee motion for better functional outcomes.

III. MATERIALS AND METHODS:

A prospective study is conducted with a sample size of 20 from august 2021 to January 2023 in our institute. Patients attending our department with supracondylar fractures of the femur were treated with distal locking compression plate or retrograde supracondylar nailing who full fill the inclusion and exclusion criteria were included in our study.

Inclusion criteria

1)Age group of 18-75years

2)All types of supracondylar fracture included in the AO classification

3)Gustilo Anderson classification I, II, and IIIA.

4)patients with comorbidities like diabetes, hypertension, and hypothyroidism.

Exclusion criteria

1)Open fractures type IIIB, IIIC and neurologically compromised patients

2)Pathological fractures

3)Previous surgery in and around the knee joint.

4)patient with concomitant ipsilateral fractures and distal neurovascular deficit.

5) patients aged below 18 years and above 75 years.

6)patients medically unfit for surgery.

A total of 20 patients with patella fractures admitted to the department of orthopaedics in our institute were included in the study after applying inclusionandexclusioncriteria. The required information was recorded and the proforma was prepared. Standard Anteroposterior and Lateral x-rays of the distal femur including pelvis with both hips, femur shaft full length, and knee joint x-rays are taken to note the fracture configuration and associated injuries. Computerized Tomographyistaken toassesstheexactalignmentofthefragments, intra-articular extension of the fracture, and occult fractures such as Hoffa fracture. All patients were taken for elective surgery as soon as possible after necessary blood, urine, and radiographic preoperative workup. Spinal or general anesthesia was given based on the patient's condition. patient positioned supine on radiolucent table with an injured limb knee in 30 degrees of flexion and an uninjured limb in extension.25 patients out of 50 are treated by distal locking compression plate and the remaining 25 patients are treated by supracondylar nailing. Proper antibiotic coverage is given according to the nature of injury. Post-operative rehabilitation depends upon the pattern of fracture, stability of the fixation. For stable fixation, the patient can be started on knee mobilization on a continuous passive motion from 24 – 48 hours after surgery. Hinged knee braces are applied. Isometric exercises and limited active assisted knee range of motion are encouraged. Initially, partial weight bearing is allowed based on callus formation next 4-6 weeks. After clinical and radiological union only, full weight bearing is allowed. In cases of less stable fixation initial above knee casting and followed by a functional brace, full weight bearing must be delayed until radiological evidence of fracture healing.

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Figure:1 Pre-op x-rays

Figure:2 post-operative x-ray

Figure:3 post-operative x-ray

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Figure -4 pre- operative x-ray

Figure -5 pre- operative x-ray

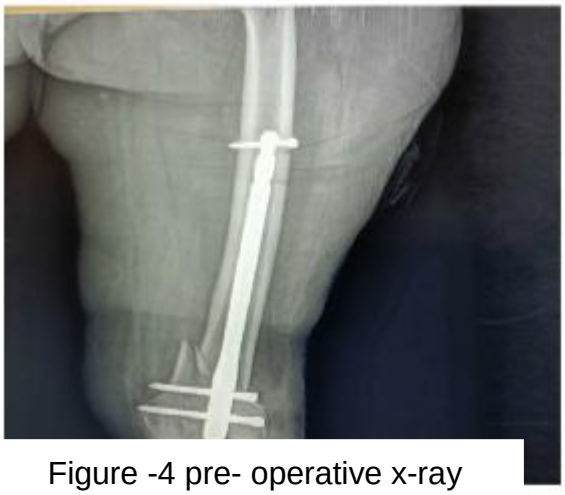

Figure -4 pre- operative x-ray

Figure -5 pre- operative x-ray

Figure -6 post -operative x-rays

IV. RESULTS AND OBSERVATIONS:

A total number of 20 of supracondylar fractures of femur were admitted and 10 out of 20 were treated by distal locking compression plate and remaining 10 out of 20 by supracondylar nail in our institute between august 2021 and January2023 results were obtained and the function outcome was compared between the two groups. Among the total of 20 patients enrolled in this study, there were no deponents or loss to follow-ups. The outcomes of the patients were evaluated clinically and radiologically on periodic basis. The Clinical evaluation was done using NEER scoring system.

STATISTICAL METHOD USED:

Data were entered in MS-Excel and analysed in SPSS V25. Descriptive statistics were represented with frequency and percentages for qualitative data, Mean with SD for quantitative data.

1.Age distribution:

variables	Sample size	Minimum	Maximum	Mean	SD
Age	20	20	75	38.89	10.71

Table-1 showing age distribution.

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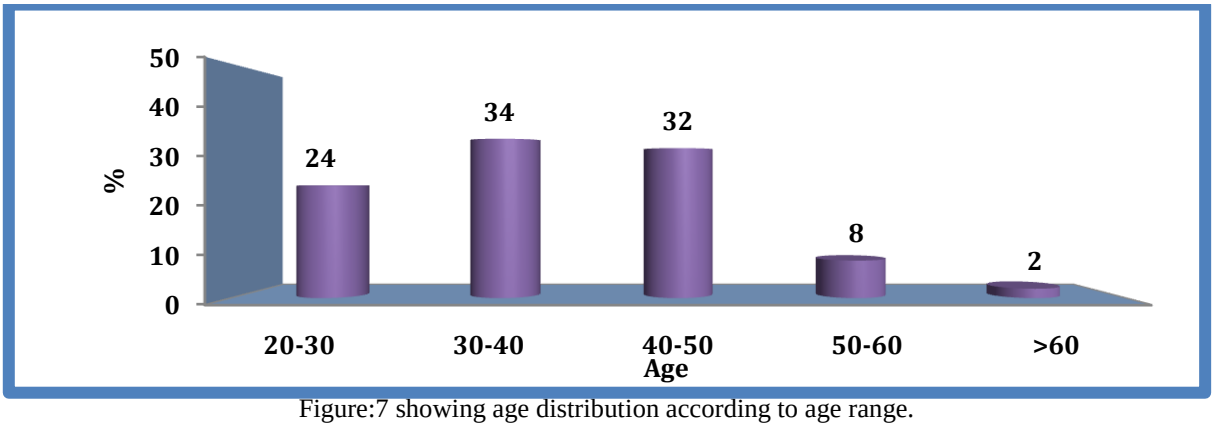

Figure:7 showing age distribution according to age range.

2.Sex distribution:

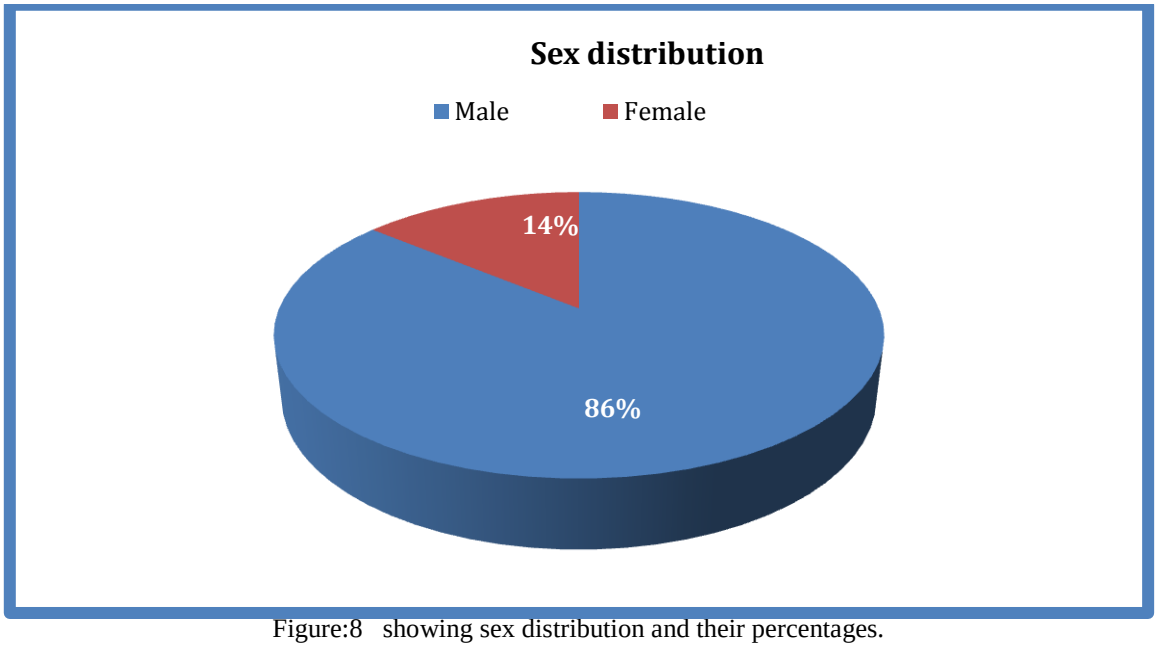

Figure:8 showing sex distribution and their percentages.

3. Side of injury:

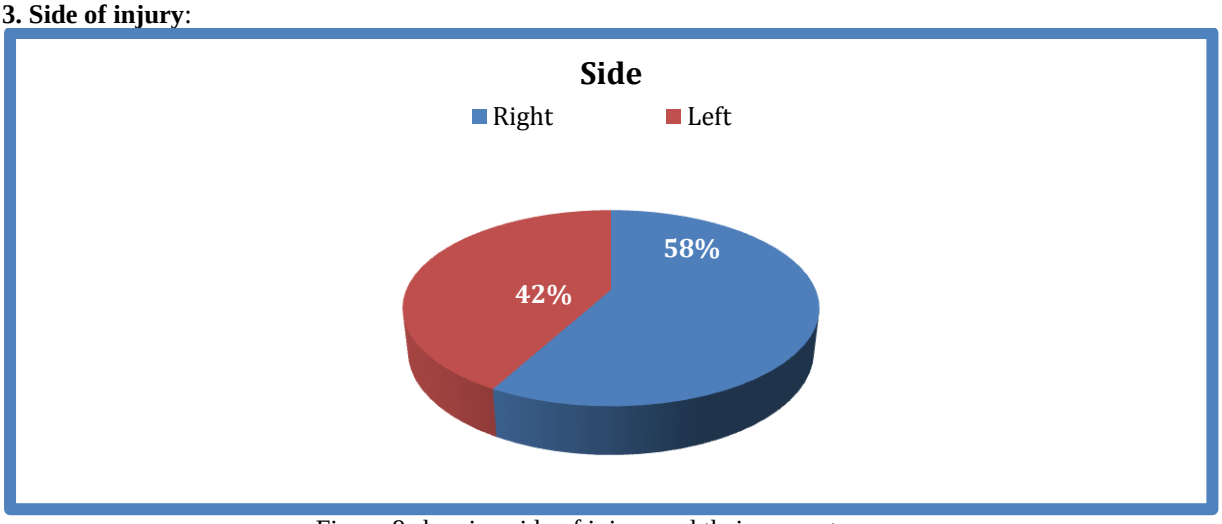

Figure:9 showing side of injury and their percentages.

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4.Mode of injury:

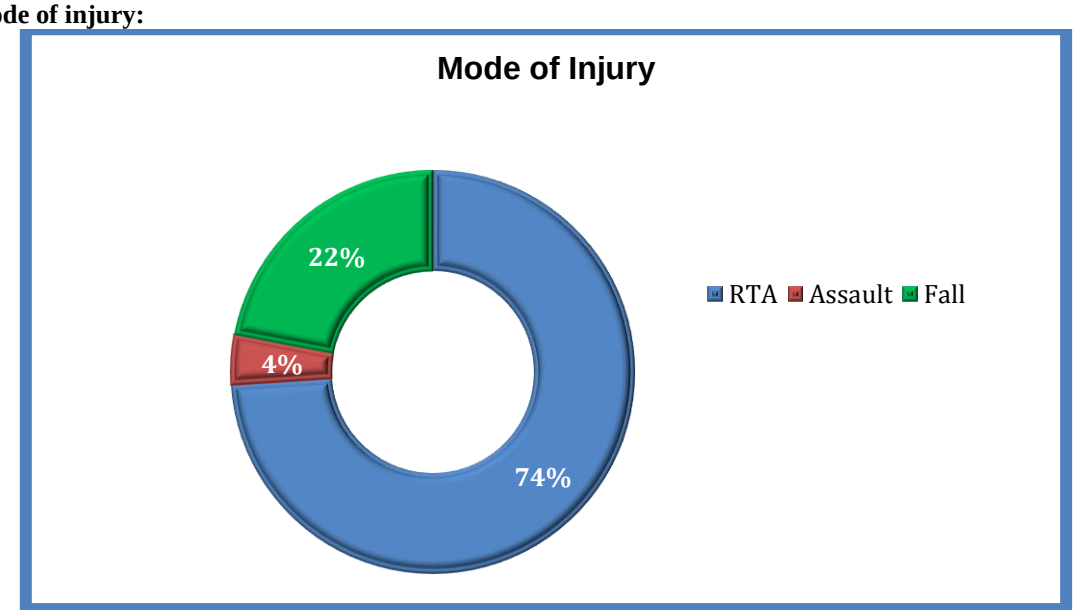

Figure:10 showing mode of injury and their percentages.

5.Type of fracture:

Type of fracture	Frequency	Percentage
Mullers type-C1	10	50%
Muller type-C2	6	30%
Mullers type-C3	4	20%
Total	20	100%

Table -2 showing type of fracture and their percentages

6.Admission and operation time:

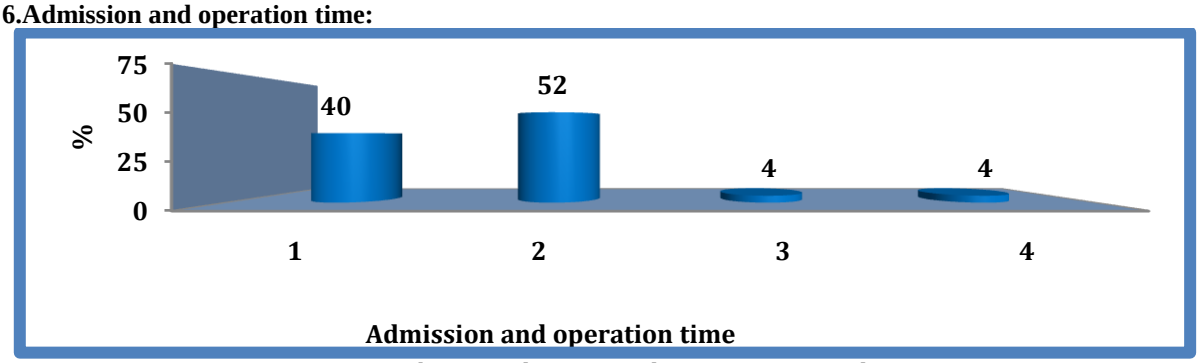

Figure:11 showing admission and operation time in days.

7.Implants used:

Implants	No. of cases
Locking compression plate	10
Supracondylar nail	10

Table -3 showing implants used for treatment of supracondylar fracture of femur

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8. Fracture Union:

Procedure done	Fracture union in weeks
Locking compression plate	14 weeks
Open Supracondylar nailing	14 weeks
Closed supracondylar nailing	12 weeks

Table -4 showing fracture union of different procedures of supracondylar fracture of the femur in weeks

9. Range of movements:

Implants used	Mean Flexion	Mean Extension
Locking compression plate	109.03+/-18.78	0
Supracondylar nailing	118.03+/-17.30	0

Table:5 shows the range of movements

10. Results according to NEERs scoring scale according to implant used

Implants	Grading	No. of cases	Percentage
Locking compression plate	Excellent	7	70%
	Good	1	10%
	Fair	1	10%
	Poor	1	10%
Supracondylar nailing	Excellent	8	80%
	Good	1in	10%
	Fair	1	10%
	Poor	1	10%

Table –6 shows the results according to implants used

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Final results

Grading	No. of cases	Percentage
Excellent	13	65%
Good	3	15%
Fair	2	10%
Poor	2	10%

Table -7 shows the final results.

V. DISCUSSION:

In our study 20 supracondylar fractures of the femur with intercondylar extension among which 10 were treated by distal locking compression plate and 10 were treated by supracondylar nailing, their results were determined and analyzed. The average group is 38.89+/-10.71years with male preponderance compared to other studies such as Lucas et al [6], which shows young patients with male preponderance. Watanabe et al[7]study shows high female preponderance in the older age group and high male preponderance in the younger age group. In our study the average time for the union for locking compression plate osteosynthesis cases is 14 weeks and with supracondylar nailing, cases are 12 weeks. Henderson et al[8] the union time of fracture treated with plating is 12 weeks and in Markmiller et al[9],union time is 14 weeks. Studies done on supracondylar nailing for supracondylar fracture of the femur by Gellmann et al[10] and Ingman et al[11] is 14 and 12 weeks respectively. Based on the type of fracture, age of the patient, bone quality, and associated injuries the type of implant is selected to treat the supracondylar fracture of femur. In the study done by Lucas et al[12],Gellman et al[13],Kumar et al[14], Ingman et al[15], Shroff A. S.[16]the average knee flexion with use of nailing procedure is 104, 106, 100,102,112 degrees. In study done by Kregor[17],Schutzker[18],Markmiller et al[19], Shroff A.S.[20] reported the average knee flexion with locking compression plating procedure is 103, 107, 110,107 degrees respectively. In our study the average flexion with supracondylar nailing is 118.03+/-17.30 and with locking compression plating is 109.03+/-18.78. The final outcome is analysed by using the Neer's scoring system, for locking compression plate 70%excellent,10%good and 10%fair,10% poor results were obtained and for supracondylar nailing 80%excellent, 10%good and 10%fair results were obtained.Sabarisree M, Jyothiprasanth M et al[21]based on Neer's scoring system the final outcome for all cases was Excellent in 25 (83.33%), good in 3 (13.33%) and fair in 1 (3.33%) patients. Srinath et al[21]according to NEER'S Score 13 patients (65%) showed excellent result, 3 Patients (15%) showed good outcome, 4 patient (20%) showed fair outcome and none showed poor outcome.Road traffic accidents were found to be the major cause. Most of the fractures were of closed type. About 96% of cases were operated within 3 days. Only one case treated with a locking compression plate has delayed union and restriction of flexion at 70 degrees**.**

VI. SUMMARY AND CONCLUSION:

This is a prospective study for finding out the functional results of supracondylar fractures of femur fracture treated by locking compression plate with supracondylar nailing a period of 17 months in the Department of Orthopedics in our institute. In our study, 20 cases were followed up for 17 months. As per our study. The results of our study are comparable with other studies in the literature review. 30-40 years of age accounted for the maximum number of patients. Incidence is more common in males. Right-sided injury is more common than the left side. For Muller type A2, and A3 fractures supracondylar nail is the choice of implant for C-type fractures locking compression plate osteosynthesis gives excellent results but supracondylar nailing can be used as an alternative for C1 and C2 type of supracondylar fractures. Proper reconstruction of fracture fragments and early mobilization gives better functional outcome.

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