

A Prospective & Comparative Study on the Clinical & Radiological Outcomes in Imilnaling Versus Dual Plating of Femur Following Fractures Shaft of Femur

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ABSTRACT

The aim of this study is to prospectively analyse the clinical, functional & radiological outcome of IMIL nailing versus dual plating of femur following fracture shaft of femur. The study was spread over a period of 30 months, but recruitment of new patients was stopped by December 2019, so that minimum follow up period was approximately 12 months. Majority of the FSF patients belonged to the 18-45 years age group (88%). The age of the oldest patient was 65 years & the youngest patient was 18 years old. Both IMIL nailing & dual plating was done to fix the FSF in this prospective study. On assessing the patients clinically using Thoreson et al scoring system, no significant difference was found between the two groups at 12 months.

Key words: IMIL nailing, Dual plating, Shaft of femur

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decreased morbidity, mortality & better functional outcome [4].

INTRODUCTION

The femur is the longest, strongest & the principal weight-bearing bone of the lower extremity. Femur shaft fractures (FSFs) are a major cause of morbidity & mortality in patients who sustain high velocity trauma [1]. A lower-force incident, such as a fall from standing, may cause an FSF in an older person with low bone stock [1]. Morbidity in FSF occurs due to limb shortening, mal-alignment, non-union, delayed union, knee contractures, & associated complications. Mortality is not common but can occur in case of compound injury, infection, fat embolism, ARDS, or multiple organ failure commonly in poly-trauma patients [2]. Early surgical management & internal fixation of the fracture plays an important role in decreasing the morbidity & mortality [3]. Treatment of FSFs is aimed at restoring the alignment, rotation, & limb length along with rehabilitation. The factors that influence the treatment are fracture site, degree of communication, patient's age, presence of co-morbidities, socio-economic status & associated injuries if any. Conservative treatment of FSF in adults is not common. With the availability of various surgical stabilization techniques, there are numerous studies that support surgical stabilization as it results in

MATERIALS AND METHODS

The study was conducted on 50 patients with FSFs. They were divided into approximately two equal groups of which one group was treated with IMIL nailing & the other group was treated with dual plating. The study included patients that presented in the casualty & the OPD of SREE BALAJI MEDICAL COLLEGE & HOSPITAL, Chrompet, Chennai, from JULY 2018 to DECEMBER 2020. The study was spread over a period of 30 months, but recruitment of new patients was stopped by December 2019, so that minimum follow up period was approximately 12 months. This study comprised of a recruitment period of 18 months & a study period spread over a total of 30 months to assess the clinical radiological & functional outcome.

Inclusion criteria

Sex: Male & Female both included.

Age: All patients in age group of 18 years to 65 years

Fresh FSFs.

Poly-trauma patients where early mobilisation is needed.

Exclusion criteria

Type III compound /open FSF cases.

Infected FSFs.

Pathological fractures.

FSFs with intra-articular extension.

Delayed union, malunion or non-union cases.

The patients that presented to the ortho OPD & casualty with FSFs were admitted & a careful detailed history was obtained to reveal MOI, presence of any co-morbidities & the functional status of patient before the injury.

The patients were then examined clinically to assess the general condition. The vital signs were recorded. A detailed head to toe examination was done to rule out associated injuries, if any. Affected limb was assessed for swelling, abnormal mobility, LLD & open wounds if any. General surgery opinion was obtained in high energy poly-trauma patients. Standard anteroposterior & lateral view X-rays were taken of the entire femur, including one joint above & below (i.e., hip joint & knee joint). Fracture pattern was noted & was classified based on AO

classification. Anteroposterior & lateral view X-rays of the uninjured side was also taken to determine normal alignment & also to assess length of nail pre-operatively. The patient was given adequate analgesics & limb was then immobilized in a Thomas splint with skin traction. All surgical routine investigations were done (Hb, bleeding time, clotting time, LFT, RFT, Serum electrolytes, Random blood sugar, Blood grouping & cross matching, urine routine, ECG & chest X-ray) & anaesthesia fitness was obtained. Pre-operatively if the hemoglobin value was less than 10 g/dl, blood transfusion was done pre-operatively.

RESULTS

Age distribution

Majority of the FSF patients belonged to the 18-45 years age group (88%). The age of the oldest patient was 65 years & the youngest patient was 18 years old (Table 1).

Table 1: Age distribution.

| Age group | No. of patients | % of cases |
|-----------|-----------------|------------|
| 18 - 45 | 44 | 88 |
| 45 - 65 | 6 | 12 |
| Total | 50 | 100 |

Sex distribution

Out of the 50 patients with FSFs 39 patients (78%) were

male & 11 (22%) were female (Table 2).

Table 2: Sex distribution.

| Sex | No. of Patients | % of cases |
|--------|-----------------|------------|
| Male | 39 | 78 |
| Female | 11 | 22 |
| Total | 50 | 100 |

Side affected

Out of 50 the patients with FSFs, in 36 patient's right side

was affected, while the left side was affected in 14 patients.

Table 3: Side affected.

| Side affected | No. of cases | % of cases |
|---------------|--------------|------------|
| Right | 36 | 72 |
| Left | 14 | 28 |
| Total | 50 | 100 |

Surgical procedure

Out of the 50 patients, in 25 patients' fracture was fixed

using IMIL nail & dual plating was done to fix FSFs in the remaining 25 patients.

Table 4: Surgical procedure.

| Procedure | No. of cases | % of cases |
|--------------|--------------|------------|
| IMIL nailing | 25 | 50 |
| Dual plating | 25 | 50 |
| Total | 50 | 100 |

THORESEN BO score

After clinical evaluation of the patients treated with IMIL nailing & dual plating, 22 patients treated by IMIL nailing & 21 patients treated by dual plating had excellent results. Good results were observed in 2 patients in the IMIL nailing group & 3 patients in the dual plating group.

One poor result was observed each in IMIL nailing & dual plating group. There was no significant association between dual plating & IMIL nailing when compared to THORESEN BO SCORE with p value >0.05 (0.894), chi-square 0.223, df2 (Table 5).

Table 5: Theory on bone score.

| THORESEN BO SCORE | IMIL Nailing | | DUAL Plating | |
|-------------------|--------------|------------|--------------|------------|
| | No. of cases | % of cases | No. of cases | % of cases |
| Excellent | 22 | 88 | 21 | 84 |
| Good | 2 | 8 | 3 | 12 |
| Fair | 0 | 0 | 0 | 0 |
| Poor | 1 | 4 | 1 | 4 |
| Total | 25 | 100 | 25 | 100 |

After evaluating the patients treated with IMIL nailing & dual plating with LKS in the follow-up visits, 22 patients treated by IMIL nailing & 20 patients treated by dual plating had excellent results (>90 score). Good results (score between 84-90) were observed in 1 patient in the IMIL nailing group & 3 patients in the dual plating group. Fair results (score between 65-83) were observed in one patient each treated with dual plating & IMIL nailing.

DISCUSSION

In this study the average time required for IMIL nailing was around 75 minutes compared to dual plating where the average time was around 105 mins. Majority of IMIL nailing procedures were done in 71-80 minutes whereas majority of dual plating procedures were done in 101-110 minutes. The dual plating procedure took a significantly longer time to perform than the IMIL nailing procedure [5].

Post-operatively, blood transfusion was done in 1 patient (4%) treated with IMIL nailing, whereas 5 patients (20%) treated with dual plating required blood transfusion. There was a significant difference in intra-operative blood loss in dual plating of the femur when compared to IMIL nailing of the femur (p-value <0.00001) [6]. On FSF treated by dual plating showed an estimated blood loss of 432 ml & an average transfusion requirement of about 3 units during their hospital stay. FSFs cases treated with IMIL nailing observed an average blood loss of 470 ml & 560 ml respectively [7].

Radiological union was observed by 12-16 weeks in 84% cases (21 patients) treated with IMIL nailing whereas radiological union was seen by 17-20 weeks in 56% (14 patient) treated with dual plating. In this study we observed that radiological union in cases of nailing (12-16 weeks) was achieved earlier compared to dual

plating (17-20 weeks) [8]. Mean radiological union in the IMIL nailing group was 32.5 weeks & 36.3 weeks in locked dual plating group [9].

CONCLUSION

FSFs are one of the commonest injuries sustained due to high velocity trauma. Early & prompt internal fixation of the FSF is the mainstay for restoring the anatomical alignment & to achieve a good functional outcome. Both IMIL nailing & dual plating was done to fix the FSF in this prospective study. On assessing the patients clinically using Thoreson et al scoring system, no significant difference was found between the two groups at 12 months. The time taken for surgery for IMIL nailing was less when compared to dual plating & blood loss was also less in IMIL nailing group. Radiological union was achieved earlier by a median value of 4 weeks in IMIL nailing compared to dual plating. Rate of functional recovery of the patients treated with IMIL nailing was faster compared to patients treated with dual plating in the initial months but ultimately the functional outcome was the same by 1 year in both the groups. However, more comparative studies are required to adequately assess the advantages & disadvantages associated with dual plating & nailing in FSFs.

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