

Original Research Article

Evaluation of mobilization in operated case of fracture tibia

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ABSTRACT

Background: In spite of all the advances optimal method of treatment, fractures of the tibia still pose a challenge to the orthopaedic surgeons and thus the management of the fractured tibia requires the widest experience, the greatest wisdom, and the nicest of the clinical judgement in order to choose the most appropriate treatment for particular pattern of injury. Therefore, in this study we evaluated the role of mobilization efficacy and results of nailing and plating compression in management of tibial fractures and its VAS scoring.

Methods: This is a prospective study of fractures tibia in 150 cases aged from 18-60 years, out of which 109 (72.6%) were males. The left side was involved in 85(56.6%) patients and RTA was the major cause of the tibial fractures 98 (65.3%). Among the patients full weight bearing time was early (<3 weeks) with 90 (60%) and 60 (40%) patients within delay (>3 weeks) of surgery.

Results: VAS score was significant better in early (<3 weeks) mobilization and in nailing treatment of tibial fractures in first month (7.8±0.74 and 7.6±0.81) and (2.1±0.8 and 1.8±0.65) at the final follow-up. Vas score correlation was significant with process and mobilization.

Conclusions: We here conclude from our study that interlocking nailing appears to be promising method of treatment of unstable tibia fractures in adults without any external splintage after adequate stabilization and early weight bearing leading to excellent functional results in most of cases.

Keywords: Tibial fractures, VAS scoring, Mobilization

INTRODUCTION

Tibia fractures are among the most common conditions treated by orthopaedic surgeons in their daily practice. Tibia fracture is one of the most common fractures of the lower limbs with highest number of treatment alternatives.^{1,2} Tibial fractures are caused most commonly due to high energy trauma like road traffic accidents(RTA), fall from height, assault and also due to pathological causes like bone infections.

There have been various recommendations regarding postoperative weight bearing and is considered an important clinical issue.³

There is a high rate of postoperative complications in distal tibial fractures including compartment syndrome, vascular injury especially in displaced fractures. The surgical management options for treatment of distal shaft tibia fractures vary depending on the type of fractures, age group, bone density, soft tissue status and associated complications.⁴ These include open reduction and plate osteosynthesis, minimally invasive plate osteosynthesis, external fixators, ring fixators and interlock nailing.⁵⁻⁸ Stable internal fixation and early mobilization is one of the current concepts in fracture treatment.⁸

However, it is difficult to obtain a stable internal fixation in an osteopenic bone. The screw is weakly held to the

bone and pull-out is probable which may cause implant failure.⁹ Locking compression plate has added advantage of the ability to manipulate and reduce the small and often osteoporotic fracture fragments directly.

The optimal method of surgical treatment of fractures of the distal third tibia remains debatable. The goals of treatment are the same as that of all tibial shaft fractures, i.e. anatomical alignment and stable fixation, minimal soft tissue injury, early joint motion, early weight bearing and rapid healing.¹⁰⁻¹³ The intramedullary interlock nailing under image intensifier fulfils these objectives. In the present study, we are evaluating the role of mobilization efficacy and results of nailing and plating compression in management of distal shaft tibial fractures on the basis of VAS score.

METHODS

This study was prospective, observational, hospital based and randomized study. It was conducted at our institute from July 2017 to June 2018. We included 150 adult patients of either sex with unilateral, complete distal third tibia shaft fractures who were operated with either intramedullary nailing or plating. The inclusion criteria for our study was skeletally mature patients (age >18 years), either sex (male/ female) who suffered from closed or open (Gustilo Anderson Classification Type I and II) distal shaft tibia fractures and who were willing for being considered as a part of study. Young patients (age <18 years), pathological fractures, intra articular fractures, patients with fractures or abnormalities in contralateral lower limb were excluded.

All the patients who completed the inclusion criteria were considered for the study after prior informed consent. Detailed history was taken and complete examination was done. All patients underwent routine blood investigations and planned for surgery after pre anaesthetic checkup. Fractures were defined on the basis of AO classification and were operated upon either by nailing or plating depending on the type of injury. All patients who had open (Gustilo Anderson Type 1 or 2) injury were taken for primary debridement of wound and closure. These patients were operated after their wound showed signs of healing.

After the surgery, all patients followed strict physiotherapy protocol depending on their pain. Patients were started with active toe movements and ankle ROM exercises immediately post operatively. On the day after surgery, patients were started with static and dynamic quadriceps exercises. Patients were advised non-weight bearing walking on the second post op day. In stable fractures, patients started partial weight bearing walking on 5th post op day. Full weight bearing walking was started at 6 weeks post operatively. In osteoporotic patients, weight bearing was delayed. Patients were evaluated for pain on the basis of VAS Score at regular

intervals starting from postoperative day 1, day 5, day 14, 6 weeks, 3 months and 6 months.

All the data collected was evaluated with the help of statistician. Mean, Standard deviation, Student t-test, Pearson correlation were calculated using SPSS software version 20. P<0.05 was considered significant for this study.

RESULTS

There were 150 patients in the study including 109 (72.6%) males and 41 (27.4%) females with mean age of 42.01±15.1 years (Table 1).

Table 1: Distribution of cases between both sexes in specified age groups.

| Age (year) | No. of cases (Males) N (%) | No. of cases (Female) N (%) | Total (%) |
|--------------|-------------------------------|--------------------------------|-----------|
| 18-30 | 41 (27.3) | 18 (12) | 59 (39.3) |
| 31-40 | 22 (14.6) | 12 (8) | 34 (22.6) |
| 41-50 | 21 (14) | 7 (4.6) | 28 (18.6) |
| 51-60 | 13 (8.6) | 3 (2) | 16 (10.6) |
| 61-70 | 12 (8) | 1 (0.6) | 13 (8.6) |
| Total | 109 (72.6) | 41 (27.4) | 150 (100) |

Table 2: Pre-operative assessment.

| | N (%) |
|---|-----------|
| Laterality of fracture | |
| Left | 85 (56.6) |
| Right | 64 (42.6) |
| Bilateral | 01 (0.8) |
| Mode of injury | |
| RTA | 98 (65.3) |
| FFH | 49 (32.6) |
| Assault | 3 (2.1) |
| Mobilization (full weight bearing) | |
| Early (<3 weeks) | 90 (60) |
| Delay (>3 weeks) | 60 (40) |

Table 3: Full weight bearing (in weeks) according to procedure.

| Mobilization (Full weight bearing) | Procedure | |
|------------------------------------|-----------|---------|
| | Plating | Nailing |
| Early (<3 weeks) | 40 | 50 |
| Delay (>3 weeks) | 3 | 57 |

In present study in 56.6% cases (85 cases) left limb was affected. In majority of cases 98 (65.3%) mode of injury was RTA. This was followed by fall from height (42.6%). In the present series full weight bearing time was early (<3 weeks) (Figure 1 A and B) with 90 (60%) and 60 (40%) patients within delay (>3 weeks) of surgery (Table 2). Early and delay mobilization following associated

injury were managed with accordingly shown in (Table 3).



Figure 1 (A and B): Clinical images of 55 year male showing (<3 weeks) early mobilization after 5th day of surgery done with tibia interlocking nail.

Table 4: Follow-up VAS scoring with full weight bearing (in weeks).

| Mobilization full weight bearing | VAS score | | |
|----------------------------------|-----------|----------|----------|
| | 1 month | 3 month | 6 months |
| Early (<3 weeks) | 7.8±0.74 | 5.3±0.70 | 2.1±0.8 |
| Delay (>3 weeks) | 8.3±0.2 | 5.8±0.73 | 3.5±0.6 |
| P value | 0.001 | 0.067 | 0.001 |
| Pearson Correlation | -.355** | -.606** | -.414** |

**Correlation is significant at the 0.01 level (2-tailed).

Table 5: Follow-up VAS scoring with procedure.

| Procedure | VAS SCORE | | |
|---------------------|-----------|----------|----------|
| | 1 month | 3 month | 6 months |
| Plating | 8.2±0.61 | 5.7±0.67 | 3.5±0.65 |
| Nailing | 7.6±0.81 | 5.1±0.66 | 1.8±0.65 |
| Pvalue | 0.001 | 0.765 | 0.001 |
| Pearson correlation | 0.350** | 0.334** | 0.272** |

**Correlation is significant at the 0.01 level (2-tailed).

VAS score was significant (0.001) better in first month (7.8±0.74) and (2.1±0.8) six month in early (<3 weeks) mobilization. Pearson Correlation was also significant (0.001) of VAS score and mobilization (Table 4). In nailing VAS score was significant (0.001) better in first month (7.6±0.81) and (1.8±0.65) six month. Pearson

Correlation was significant (0.001) of process and mobilization (Table 5).

DISCUSSION

Tibia fractures present a spectrum of soft tissue and bony injuries that can produce permanent disabilities. Their treatment is challenged by fracture comminution, instability, displacement and extensive soft tissue injuries. The goals of treatment are restoration of joint congruity, normal limb alignment, knee stability and a functional range knee motion. The major limitations of non-operative treatment include inadequate reduction of articular surface and ineffective limb alignment control. Furthermore the extended period of hospitalization and recumbence are not cost-effective in today’s health care environment. It must be emphasized that this study is only short term follow up of six months and the discussion that follows is essentially a preliminary assessment.

The age of the patients in the study ranged from 18 and 80 years 59 (39.3%) with average age of 42.01±15.1 years. Higher incidence in this age is mostly due to active life style and prone for accidents resulting in high velocity injuries. The incidence of fractures in our study was more common in males (72.6%) which can be attributed to the risk of injury due to occupational and ambulant life led by them. Among modes of injury RTA are the most common (65.3%) with more (56.6%) fractures on left side. These are comparable to the studies made by Dendrinis et al, Barei et al and Patil et al.¹⁰⁻¹²

Among the 150 patients full weight bearing time was early (<3 weeks) with 90 (60%) and 60 (40%) patients within delay (>3 weeks) of surgery. VAS score was significant better in early (<3 weeks) mobilization and in nailing treatment of tibial fractures in first month (7.8±0.74 and 7.6±0.81) and (2.1±0.8 and 1.8±0.65) at the final follow-up. Vas Score was also found correlation significant with process and mobilization. The results of functional evaluation showed 86.7% excellent results and 13.3% good results. Rambold in 1960 reported that internal fixation of tibial plateau fractures and early mobilization contributes to good anatomical and functional results.¹³ Jensen in 1990 got good results by surgical treatment of proximal tibia fractures.¹⁴ Chaix et al reported 86% good to excellent results by surgical means of treatment.¹⁵ Lee et al reported good to excellent results by surgical means of less invasive stabilization system treatment.¹⁶ Feng et al reported good results when fixed with locking compression plate in comparison with dynamic compression plate with an additional benefit of minimally invasive surgery.¹⁷ Kim et al reported good results with minimally invasive plate osteosynthesis technique in treatment of open proximal tibial fractures with adequate soft tissue coverage.¹⁸ Ahmed et al In January 2017 done study on Evaluation of outcome of management of distal tibia fracture using distal tibia locking plate concluded that compression locking plate is

a good device for stabilizing distal tibia fractures.¹⁹ The period of immobilization was again individualized depending on the security of rigid fixation and other circumstances demand. The benefits of early knee motion include - reduce knee stiffness and improved cartilage healing (regeneration). However, these benefits are to be cautiously balanced by risks, including loss of fracture reduction, failure of internal fixation and compromised ligament and soft tissue healing. Several studies stated that the prognosis is given by the degree of displacement, type of fracture, method of treatment and quality of postoperative care.

CONCLUSION

Surgical management of tibial fractures will give excellent anatomical reduction and rigid fixation to restore articular congruity, help to facilitate early mobilization and reducing post-traumatic osteoarthritis and hence to achieve optimal knee function. Nailing remains a good choice in comminuted or more severe patterns of tibial fractures. We recommend and here conclude from our study that closed interlocking nailing appears to be promising method of treatment of unstable tibial fractures in adults without any external splintage after adequate stabilization and early weight bearing leading to excellent functional results in most of cases. This implant leads to an extremely low rate of infection and alignment with early mobilization and decreased limitation of motion of knee and ankle joint. Using all current surgical principles and techniques, has excellent clinico-radiological outcome and is relatively safe.

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