



A STUDY COMPARING OUTCOME OF LOCKING PLATE WITH INTRAMEDULLARY NAIL IN DISTAL TIBIA FRACTURE

Orthopaedics

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KEYWORDS

INTRODUCTION:

In the modern world with the increase in the number of fast moving vehicles there is a great increase in the number and severity of musculoskeletal trauma. The goal of fracture treatment is to obtain union which allows restoration of function¹.

Fractures of the distal tibia account for less than 10% of all fractures of lower extremities and occur more frequently in younger men and women². The management of distal tibial fractures remained challenging due to subcutaneous position in the leg, and the risk of open fractures. High energy trauma and poor blood supply at lower one third shaft of tibia pose difficulties in bringing out optimal results³.

The management of tibial fractures remains controversial despite advances in both non-operative and operative care. We conducted this study to compare the rate of union of distal tibia fractures treated with plating versus intramedullary nailing.

MATERIAL AND METHODS

This prospective study was conducted on adult patients with distal tibial fractures, admitted in the Department of Orthopaedics, at NIMS Medical College, Jaipur. The present series included 30 patients who were included in the study after obtaining formal consent as per inclusion criterion. Out of 30 patients, 15 were treated with interlocking nail and other 15 were treated by plating for distal tibia extra-articular fractures.

Patients with closed distal tibia fracture and open fracture of distal tibia up to Gustilo Anderson Grade II were included in the study. Pediatric fracture, pathological fracture, intraarticular fracture, associated proximal tibia fracture and open fracture except Gustilo Anderson type I and II were excluded from the study.

Pre-operative broad spectrum antibiotics were given on the day of surgery and antibiotics were continued for three to five days post-operatively. The surgery was performed with the patient in supine position under general, spinal or epidural anaesthesia depending upon choice of anesthesiologist and patient comorbidities.

All patients were followed up for at least 9 months. Regular check-ups were made at 24 hours, 5th postoperative day, 14th post operative day, 6 weeks, 12 weeks, 6 month and then finally at 9 months.

RESULTS:

The mean age was 36.6 years and 43.47 years for Interlocking nail and

plating group respectively. Both groups were comparable with no statistical difference. The most common age group was 21- 50 years which represents more active group of patients.

Males were predominantly affected in our study accounting for 83.3% as compared to females which represented only 16.7% of patients.

Commonest mode of injury was high velocity road traffic accidents that accounted for 73.33%. Most common fracture pattern seen was type 43-A1 (30%) and type 42-A3 (16.66%) and 43-A2 (16.66%). The right side was more involved 63.33% as compared to left side which represented 36.67%. In our study 53.33% patients had closed fractures, 36.66% had Gustilo Anderson type I fracture and 10% had Gustilo Anderson type II fractures. The p value was not significant between groups and both groups were comparable. Mean Operative time was 77.33 minutes (Range 70-100 min) in Interlocking group while it was 94.67 minutes (Range 80-115 min) in plating group.

Mean duration of hospital stay in the interlocking group was 6.6 days (Range 4 to 11 days) which was statistically less significant than the plating group 9.27 days (Range 6 to 16 days).

Partial weight and full weight bearing was started at 7.2 weeks (Range 3 to 12 weeks) and 13.2 weeks (Range 8 to 20 weeks) in Interlocking group which was significantly early than 9.33 weeks (Range 6 to 14 weeks) and 16.64 weeks (Range 14 to 20 weeks) in plating group respectively.

Union was defined clinically as the ability to walk without any support and pain and radiologically as solid callus bridging across the fracture fragments. The mean time to union was 20.33 weeks in the interlocking nail group and 23.21 weeks in the plating group. Majority of fractures united within 16-24 weeks. One patient of the plating group showed no signs of union either clinically and radiologically at 9 months of duration. The patient had diabetes mellitus and had deep infection after surgery. All patients in the nailing group healed uneventfully. Four patients in the interlocking nail and one case from the plating group healed with significant valgus or varus of more than 5 degrees. One patient from the interlocking nail group healed with anteversion more than 5 degrees. Five patients in the plating group developed wound infection while only one patient in the interlocking group had wound infection.

Tenny and Wiss³⁴ (1993) clinical assessment criteria was used to assess

outcome between the two groups. Excellent results were more common in the interlocking nail groups (53.33%) compared to plating group (46.66%). Poor results were more common in plating group 13.33% in comparison to 6.66% the interlocking nail group.

DISCUSSION

Fractures of the distal tibia account for less than 10% of all fractures of lower extremities and occur more frequently in men than women aged between 35-40 years². Our study findings are similar and the mean age in the interlocking nail group was 36.6 years and in the plating group was 43.47 years.

The management of these fractures remains challenging. The goal of treatment in these fractures is to attain rapid union with acceptable axial and rotational alignment, while initial bone length is preserved¹. In the past most authors concluded that all distal third leg bone fractures are to be treated conservatively and are not amenable to open reduction and internal fixation because most distal tibial fractures involve the weight bearing surface of the ankle joint and are mostly comminuted. Further proximity of these fractures to the ankle makes the surgical procedure more complicated resulting in unacceptable deformity and ankle stiffness. Recent advances in surgical techniques and instrumentation has lead to aggressive surgical intervention in these cases with good functional outcome.

Males were predominantly affected in our study accounting for 83.3% as compared to females 16.7%. Adel E et al¹ (2012) series had an incidence similar to our study, with males accounting for 88.4%. Holagundi L et al² (2014) found males 80% females 20% in their study. In our study the right side was more involved in 63.33% of patients, as compared to left side in 36.66% of patients. Holagundi L et al² (2014) found right side involvement 76.6% and left side 23.3% in their series.

In our study, the commonest mode of injury was road traffic accidents (RTA) which accounted for 73.33%. The incidence of injury due to RTA was almost similar to series of Pawar E D et al¹ (2014) (60%), Holagundi L et al² (2014) (73%). Vaza J V et al⁶ (2014) reported RTA as most common mode in both the groups. The reason of high incidence of RTA can be attributed to increased numbers of vehicles, overcrowding, poor road conditions and lack of regard for traffic rules. In our study the most common fracture pattern seen was type 43-A1 (30%) and type 42-A3 (16.66%) and 43-A2 (16.66%). The pattern of fracture was similar to reported by Pawar E D et al¹ (2014) with OTA/AO type 43-A1 most common pattern (46.66%).

In the present study the average duration of surgery was 77.33 minutes in the interlocking group and 94.67 minutes in the plating group. This was comparable to studies done by Li Y et al⁷ (2012) and Guo et al⁸ (2010) that was 60 minutes and 81.2 minutes in the interlocking group and 70 minutes and 97.9 minutes in plating group respectively.

In the present study the average time to partial weight bearing was 7.33 weeks in Interlocking group and 9.33 weeks in plating group. This is comparable to studies done by Pawar E D et al¹ (2014) and Vaza J V et al⁶ (2014)

In the present study the average full weight bearing was 13.2 weeks in Interlocking group and 16.64 weeks in plating group. This is comparable to studies done by Li Y et al⁷ (2012), by Pawar E D et al¹ (2014) and Vaza J V et al⁶ (2014)

Complications encountered in Interlocking nail group were superficial infections in 1 patients, delayed union in 2 patient and anterior knee pain in 3 patients. Whereas in plating groups there were 3 delayed union, 1 non-union, superficial infections in 3 patients, deep infections and wound dehiscence in 2 patients. Superficial infections were treated with an extra course of intravenous and oral antibiotics as per culture and sensitivity. In the study of Vallier H A et al⁹ (2008) founded total of 10 patients (8.8%) with complications of delayed union or non-union, out of that 8 cases (12%) were from Interlocking nail group and 1 case (2.7%) was from plating group. While in other Vallier H A et al¹⁰ (2011) reported 8 patients with delayed or non-union, out of which 5 were from Interlocking nail group and 3 were from plating group.

In our study, the results were evaluated according to the Tenny and Wiss criteria. There was 80% good to excellent results in both the groups treated with plating and Interlocking intramedullary nailing. Similar results were found in the studies conducted by Obulapathy D et al³ (2015); Yip WH et al¹¹ (2006) and Hegazy G et al¹².

CONCLUSIONS:

Intramedullary nail and distal tibia plating both showed good results in extraarticular distal tibia fractures. Intramedullary nail had fewer skin complications and enjoyed earlier weight bearing and fracture union.

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