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Expert Tibial Nailing Vs Distal Tibial Plating in Patients with Distal Tibial Extra-articular Fractures

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Abstract

Background: To compare tibial nailing with distal tibial plating in patients with tibial fractures. **Subjects and Methods:** 70 patients of extraarticular distal 1/3rd tibia fractures were divided into 2 groups of 35 patients each. Group I were treated with expert tibial nailing and group II with distal tibial plating. Patients were followed up for 6 months after operation and evaluated as per Johner and Wruss Criteria. Other parameters such as operative time (minutes), union time (weeks), full weight bearing (weeks) and intraoperative blood loss (ml) was also recorded. **Results:** Group I comprised of 23 males and 12 females and group II 20 males and 15 females. The mean operative time was 84.2 minutes in group I and 102.6 minutes in group II, union time was 19.3 weeks in group I and 25.2 weeks in group II, post-operative full weight bearing time was 9.5 weeks in group I and 13.3 weeks in group II and intraoperative blood loss in group I was 53.4 ml and in group II was 88.4 ml. The difference was significant (P< 0.05). Johner – Wruss scoring system revealed outcome excellent in 22 in group I and 19 in group II, good in 5 and 7, fair in 8 and 5 and poor in 0 and 4 in group I and II respectively. The difference was significant (P< 0.05). **Conclusion:** Tibial interlocking nailing found to be better as compared to plating for the management of Distal Tibial Extra-articular Fractures.

Keywords: interlocking nailing, tibial fractures, fracture.

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Introduction

The tibia constitutes one of two bones of the leg. It is weight-bearing bone, superior and tougher in comparison to fibula. The proximal component of the tibia comprises of a medial and lateral condyle.[1] These join to form knee joint's inferior portion. Intercondylar portion lies in between the two condyles. It is this particular area where the anterior cruciate ligament, posterior cruciate ligament, and menisci have their attachments. The tibial shaft is tersely widened at its higher end to support the condyles.[2] According to the AO/ASIF system "distal" tibia fractures are primary located within a square based on the width of the distal tibia. Distal tibia fractures include the more proximal metaphysis and distal diaphysis. Simple extension of the fracture into the joint which has minimal displacement is often treated in a similar manner to extra-articular fractures.[3]

The treatment of distal metaphyseal tibial fractures with IM nailing is an effective alternative for the treatment of distal metaphyseal tibial fractures. This involves removing approximately 1 cm just distal to the lowermost locking screw. It has been known for years now that one distal locking screw is insufficient and two are needed.[4] MIPO has over the years proven to be just as effective as IMN in treating mid diaphyseal fractures of the tibia.[5] Surgical wounds heal better with MIPO than IMN with better soft tissue coverage, reducing recovery time and postoperative pain, thus allowing for expedited rehabilitation.[6] Anterior knee pain, a major drawback of IMN, can also be avoided as a whole with the MIPO technique.[7] Considering this, in this study we compared tibial nailing with distal tibial plating in patients with tibial fractures.

Subjects and Methods

A sum total of 70 patients of extraarticular distal 1/3rd tibia fractures of both genders who voluntarily agreed to participate in the study were selected. Ethical clearance was obtained beforehand from institutional ethical committee.

Demographic characteristics of patient was recorded in case sheet. A thorough clinical examination was caried out. All underwent CT scan of the involved site. Patients were randomly divided into 2 groups of 35 each. Group I patients were treated with expert tibial nailing and group II with distal tibial plating. Patients were followed up for 6 months after operation and evaluated as per Johner and Wruss Criteria. Othr parameters such as operative time (minutes), union time (weeks), full weight bearing (weeks) and intraoperative blood loss (ml) was also recorded. The results were compiled and subjected for statistical analysis using

Mann Whitney U test. P value less than 0.05 was set significant.

Results

Table I Patients distribution

Groups	Group I	Group II
Method	Tibial nailing	Tibial plating
M:F	23:12	20:15

Group I comprised of 23 males and 12 females and group II 20 males and 15 females (Table I).

Table II Assessment of parameters

Parameters	Group I	Group II	P value
Operative time (minutes)	84.2	102.6	0.01
Union time (weeks)	19.3	25.2	0.02
Full weight bearing (weeks)	9.5	13.3	0.02
Intraoperative blood loss (ml)	53.4	88.4	0.03

The mean operative time was 84.2 minutes in group I and 102.6 minutes in group II, union time was 19.3 weeks in group I and 25.2 weeks in group II, post-operative full weight bearing time was 9.5 weeks in group I and 13.3 weeks in group II and intraoperative blood loss in group I was 53.4 ml and in group II was 88.4 ml. The difference was significant (P< 0.05) (Table II)

Table III Assessment of outcome

Johner – Wruss scoring System	Group I	Group II	P value
Excellent	22	19	0.94
Good	5	7	0.41
Fair	8	5	0.05
Poor	0	4	0.01

Johner – Wruss scoring system revealed outcome excellent in 22 in group I and 19 in group II, good in 5 and 7, fair in 8 and 5 and poor in 0 and 4 in group I and II respectively. The difference was significant (P< 0.05) (Table III).

Discussion

Distal tibia shaft fractures are significant challenge for surgeons. The treatment of these fractures has evolved over past few decades with better understanding of the soft tissue biology.[8] Giving more importance to anatomical reduction and ignoring often injured soft tissues has led to poor outcomes and high complication rates.[9] Fractures of the distal tibia are distressing because these occur mainly because of high-energy mechanisms and vehicles.[10] Because of the complex nature, fractures of distal tibia and pilon are difficult to manage. In combination with crucial bone injury, the adjacent soft tissue components often become severely traumatized.[11,12] We compared tibial nailing with distal tibial plating in patients with tibial fractures.

Our results revealed that Group I comprised of 23 males and 12 females and group II 20 males and 15 females. Kumar et al[13] included plating group (20) patients and nailing group (32) patients. The mode of injury was road traffic injury in 32 cases followed by self-fall in 17 cases and sports related injury in 3 cases. Distal tibia fracture was associated with in 29 patients (87%) of nailing group whereas in 17 patients (80) of plating group. Average distance of fracture from pilon was 6 cm in nailing group and 3cm in plating group. The average duration of surgery in nailing was group was 88 minutes (range, 65-130 minutes) whereas average duration of surgery in plating group was group was 92 minutes (range, 70-130 minutes). The average time for union was 16 weeks for nailing group and for plating group it was 18 weeks.

Our results showed that the mean operative time was 84.2 minutes in group I and 102.6 minutes in group II, union time was 19.3 weeks in group I and 25.2 weeks in group II, post-operative full weight bearing time was 9.5 weeks in group I and 13.3 weeks in group II and intraoperative blood loss in group I was 53.4 ml and in group II was 88.4 ml. Zhu et al[14] compared the outcomes of closed reduction and expert tibial nailing (ETN) versus open reduction and plate and screw fixation in treating two segmental tibial fractures. 53 cases of two segmental fractures of the tibial shaft were treated respectively by closed reduction and ETN (ETN group, n=31) or open reduction fixation with plate and screws (PS group, n=22). All the patients were successfully followed up. The period was 19.2 months for ETN group and 20.5 months for PS group. All the fractures in ETN group had union without complications such as malunion, infection, or osteofascial compartment syndrome; whereas there were 3 cases of superficial infection cured by repeated dressing change and 2 cases of delayed union in PS group. The total incidence of complication in PS group was 22.7% (5/22), much higher than that in ETN group (p<0.05). Moreover, ETN group showed a better result in terms of intraoperative blood loss, operation time, postoperative weight bearing time and fracture union time. In ETN group, at one-year follow-up, Johner-Wruhs' criteria was adopted to assess the postoperative function, which was reported as excellent in 18 cases, good in 10 cases and fair in 3 cases in ETN group (100% excellent-good rate). While in PS group, the result was excellent in 10 cases, good in 7 cases, fair in 3 cases and poor in 2 cases.

Johner – Wruss scoring system revealed outcome excellent in 22 in group I and 19 in group II, good in 5 and 7, fair in 8 and 5 and poor in 0 and 4 in group I and II respectively. Kwok et al[15] found 8 studies that evaluated plate compared with nail for distal tibial fractures. No significant difference was found between the use of a plate and nail regarding bone union complications, wound complications including superficial infection, and deep infection. They found a significantly reduced risk of fracture malalignment with the use of a plate compared with a nail.

Conclusion

Tibial interlocking nailing found to be better as compared to

plating for the management of Distal Tibial Extra-articular Fractures.

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