

Efficacy of Reamed Interlocking Nail in the Management of Closed Tibial Shaft Fractures

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ABSTRACT

Objective: The purpose of this study is to evaluate the efficiency of reamed interlocking nails in the treatment of closed tibial shaft fractures.

Study Design: The Observational and Descriptive study

Place and Duration: Allied Hospital Faisalabad / Bahawal Victoria Hospital Bahawalpur. Jun 2018-Dec 2018.

Material and Methods: A total of 130 patients, both sexes, were included in this analysis. Enrollees were between the ages of 18 and 60. After obtaining written agreement, the demographic information of registered patients was gathered and stored in a database. A reamed interlocking nail was used to repair tibial shaft fractures in patients brought to the emergency room. Postoperatively, the length of time it took to achieve union and the frequency of problems were also evaluated. During the course of 14 months, all of the patients' follow-ups were completed. SPSS 24.0 was used to analyze the data.

Results: Included patients had mean age 30.4±5.41 years and had mean BMI 23.13±8.51 kg/m². Majority were males in this study. Most common cause of fracture was road traffic accident. In our study mean time of union among simple fractures were 11.53±14.61 weeks and mean union time of segmental fractures were 19.3±9.20 weeks. Among 130 cases, frequency of non-union fractures were 10 (7.7%), union fractures were 90 (69.2%) and delayed union were 30 (23.1%).

Conclusion: A reamed interlocking nail was the most successful and safest treatment for closed tibial shaft fractures, according to this study. A total of 92.3% of the participants in this study were able to successfully consummate their unions.

Keywords: Union, Tibial shaft fractures, Interlocking nail

INTRODUCTION

A typical method for treating both closed and open tibial fractures is intramedullary (IM) nailing [1]. Larger-diameter, better-fitting nails are easier to implant when the intramedullary reaming process is used [2]. Inserting locking screws into the nail's two ends increases its biomechanical strength and resistance to axial and torsional loads [3]. Reaming, intramedullary canal enlargement, the efficiency of nail dynamization, and the proper number of locking screws on either side of the nails are all difficulties that need to be addressed before reaming can be considered a successful procedure. When it comes to aseptic nonunion nailing, there isn't enough data to back up the use of bone grafting or osteoinductive factors.

Intramedullary reamed and nonreamed nailing are still under discussion. People who support the practise feel that reaming can improve the stability of fractures and can be employed in the healing process using reamed bone fragments. [4] According to Williams et al., reamed intramedullary nailing has a success rate of 98%. It is safe and effective to use reamed intramedullary nailing to treat nonunions in previously closed fractures [5.] For some, reaming causes blood vessel damage, increases pressure in the medullary cavity, and has been linked to an increase in the occurrence of thrombosis. [6] For treating a hypertrophic non-union of the long bone shaft, Pfister says nonreamed nailing is more common in German-speaking countries due to the procedure's ease. Interlocking nailing is suggested for closed tibial fractures with severe soft tissue injury because it has low infection rates and low nonunion rates. [7]

An open fracture or significant soft tissue injury to the tibia cannot be prevented, although therapy-related factors can. [8] Osteosynthesis instability is caused by poor clutch methods, such as fracture gaps, axial deviations, use of small-diameter nails, and locking bolts. A lack of bone healing and unstable fracture stabilisation are the most common causes of hypertrophic nonunions, which then lead to hypertrophy.[9] The exchange nailing technique can be used to close hypertrophic shaft nonunions and provide mechanical stability and biological bone stimulation at the same time. Several therapeutic approaches have been documented for the treatment of nonunion shaft tibial, however most of them have been used on a small number of

individuals It is generally accepted that the best therapy for broken or missing nails is to get new ones. 76–96% of non-infected tibial diaphyseal unions were successful[10]. An injury's duration, healing procedure, kind of fractures (or lack thereof), and manner of mending are all predictive indicators. In an average of 80% of instances, a single nail exchange procedure can be a lifesaver.[11,12] But alternative methods, including extending intramedullary implants or implant implantation, have recorded cure rates of above 90%.

As an internal splint and load shaving tool, fastening nails offer bone graft where it is needed. In order to prevent stress from surpassing the critical quantity and disrupting the fracture's placement, it provides strength. Clamping clocks allow the neighbouring joints to be shifted so that rehabilitation and stress shaving are avoided.

MATERIAL AND METHODS

This descriptive/observational study was conducted at Allied Hospital Faisalabad / Bahawal Victoria Hospital Bahawalpur and consists of 130 patients. After obtaining informed permission, we were able to determine the exact age, gender, and BMI of each patient in the study. Only those patients who were able to provide written consent were able to participate in this study.

Cases recruited in the study were between the ages of 18 and 60. A reamed interlocking nail was used on patients with tibial shaft fractures who had been brought to the emergency room for treatment. The length of time it takes for a tibia shaft fracture to heal is an important metric for evaluating therapy. It takes 10 to 13 weeks to heal a low energy fracture, but it takes 13 to 20 weeks to heal a high energy fracture. Generally speaking, a shorter time to union signifies more effectiveness. Non-union, malunion, and infection, which includes both deep and superficial infections, are common consequences and are considered a critical safety indicator. Non-union is a permanent failure of fracture healing, while malunion implies an incorrect healing in which bone is twisted or bent.

Documentation of post-surgery healing time and problems was performed. After 14 months, each follow-up had been completed. Descriptive variables were analyzed using standard deviation while categorical data were evaluated using frequency

and percentage. With the help of SPSS 24.0, the data was examined.

RESULTS

Among 130 cases, there were 80 (61.5%) males and 50 (38.5%) females in this study.(fig 1)

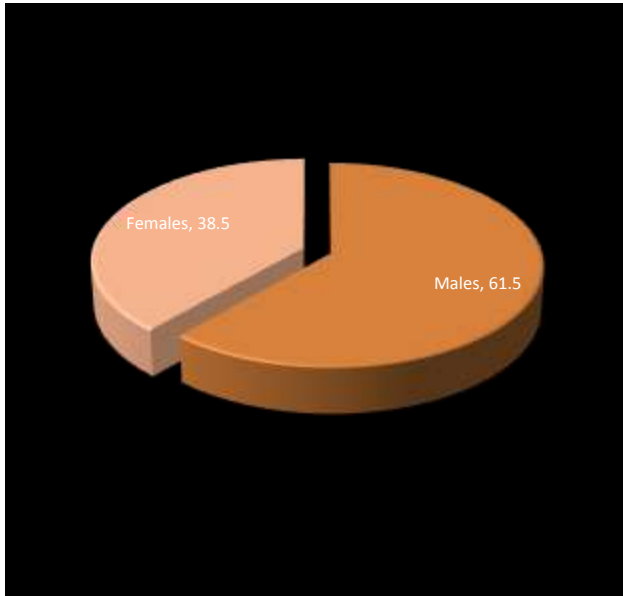


Figure-1: Sex distribution among all cases

Included patients had mean age 30.4±5.41 years and had mean BMI 23.13±8.51 kg/m². Most common cause of fracture was road traffic accident in 95 (73.1%) followed by falling 22 (16.9%) and 13 (10%) cases were because of other incidents. (table 1)

Table 1: Age and causes of fracture

Variables	Frequency	%age
Mean age (years)	30.4±5.41	
Mean BMI (kg/m ²)	23.13±8.51	
Causes of Fracture		
RTA	95	73.1
Falling	22	16.9
Other incidents	13	10

In our study mean time of union among simple fractures were 11.53±14.61 weeks and mean union time of segmental fractures were 19.3±9.20 weeks.(table 2)

Table 2: Post-operatively union time of fractures and patients satisfaction

Variables	Mean	Std
Mean union time (weeks)		
Simple fractures	11.53	14.61
Segmented fractures	19.3	9.20

Patients with tibial fractures in the middle one-third, proximal one-third, and distal one-third accounted for 80 (61.5%), 30 (23.1%), and 20 (15.4%), respectively. (table 3)

Table 3: Fractures of the shaft in relation to the location

Variables	Frequency	%age
Middle one third	80	61.5
Proximal one third	30	23.1
Distal one third	20	15.4
Total	130	100

Among 130 cases, frequency of non-union fractures were 10 (7.7%), union fractures were 90 (69.2%) and delayed union were 30 (23.1%).(fig 2)

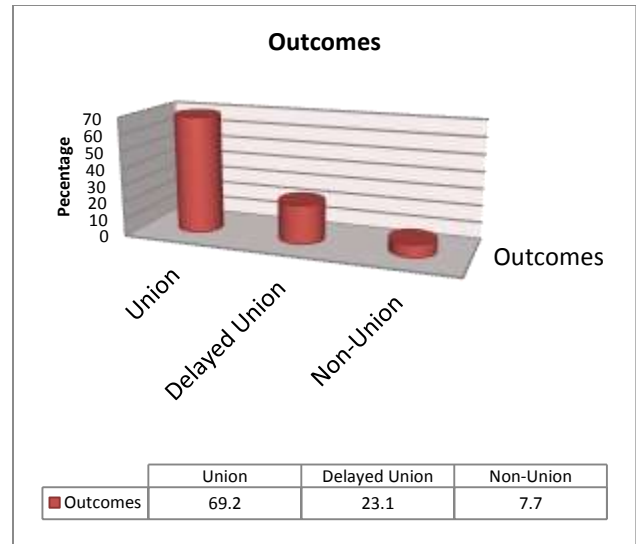


Figure-2: Results of interlocking nail therapy in enrolled patients

After successful treatment, satisfaction rate among enrolled cases were also high found in 115 (88.5%) cases.(table 4)

Table-4: Patients satisfactory results

Variables	Frequency	Percentage
Satisfaction		
Yes	115	88.5
No	15	11.5

DISCUSSION

When it comes to treating TF, there is a lot of debate concerning whether or not to use reamed or unreamed intramedullary nailing. When the endosteal blood flow, bone necrosis, compartment syndrome, and infection are all factors to consider, reamed intramedullary nailing has the advantage of giving optimum biomechanical stability. [13,14] Unreamed intramedullary nailing's mechanical stability might be impaired, limiting its usefulness [15]. However, the difficulties listed above are not present in unreamed intramedullary nailing.

As a frequent and effective therapeutic option, locking tibial shaft fractures together is becoming more popular and more widely used. In most cases, an image intensifier is employed to keep the garments locked away. Among 130 cases, there were 80 (61.5%) males and 50 (38.5%) females in this study. Included patients had mean age 30.4±5.41 years and had mean BMI 23.13±8.51 kg/m². Most common cause of fracture was road traffic accident in 95 (73.1%) followed by falling 22 (16.9%) and 13 (10%) cases were because of other incidents. [16] To explore 56 Tibial fractures in India, Joshi et al. interviewed 52 men and four women, with the majority of the fractures occurring as a result of car accidents. [17] In a further study conducted in Karachi, Pakistan, Ali et al. reported that the population of tibial fractured patitudes was 88.39 percent male and 14.6 percent female. [18] In our study, 75% of the patients were under the age of 40, which corresponds to the primary earning group in contemporary society. Because of this, it was critical that they returned to work as soon as possible.

In our study mean time of union among simple fractures were 11.53±14.61 weeks and mean union time of segmental fractures were 19.3±9.20 weeks. Court-Brown et al studied 25 patients who were free of infection, malunion, nonunion, or delayed union and had a 15.4-week average union time. 45 individuals were assessed in a research conducted by Larsen et al[19]. Compared to a group of reamed patients, the average time it took for a fracture to heal was 16.7 weeks in an unreamed patient group. P=0.004 indicated that the difference was significant. It was performed by Mohit Bhandari and colleagues (2008) in a

randomised, double-blind trial of 1319 patients who had a tibial shaft fracture that had been treated with either intramedullary or unreamed nailing. The results showed that reamed intramedullary nailing could be beneficial in closed fracture patients. [20] There were 26 intra-medullary clinging fractures treated in a Turkish research study. After today, there will be five months before the United Nations General Assembly in New York. Using intramedullary locking for comminuted fractures was found to have a decreased risk of complications due to its superior protection of the periosteal circulation. [21]. Our study lasted an average of 18 weeks, while Vidyadharn et colleagues [22] examined clinical radiation from an interlocking nail in the tibia and found that the average healing period for fractures was 20.1 weeks. In addition, he found that creating tibial diaphyseal fractures using precise intramedullary nails, which is a rather safe method, had outstanding clinical and radiological outcomes.

Among 130 cases, frequency of non-union fractures were 10 (7.7%), union fractures were 90 (69.2%) and delayed union were 30 (23.1%). Patients with tibial fractures in the middle one-third, proximal one-third, and distal one-third accounted for 80 (61.5%), 30 (23.1%), and 20 (15.4%), respectively. Many earlier research have shown similar outcomes. [23,24] When it comes to the treatment of both open and closed tibia fractures, several randomised controlled studies and meta-analyses have found RIN to be equally effective as C. Using intramedullary bone nailing as a stabilising technique relies on the contact between a long bone and a flexible implant rod. Increased contact between the rigid long bone and the elastic implant rod can be accomplished by reaming the medullary cavity. However, serious side effects, such as bone necrosis, are conceivable and might provide a considerable obstacle to the therapy. [25] (Foote and colleagues, 2015). Intramedullary nailing was found to be superior to alternative fixation methods by Foote et al., which is in line with our findings. For open tibia fractures, Foote et al. believed that UIN was the most likely treatment choice. However, our data suggested RIN would be a better alternative, independent of C. [26]

Tibial shaft fractures can be successfully treated by intramedullary nailing and closed locking, as seen above.

CONCLUSION

A reamed interlocking nail was the most successful and safest treatment for closed tibial shaft fractures, according to this study. A total of 92.3% of the participants in this study were able to successfully consummate their unions.

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