

Management of Closed Tibial Shaft Fractures with Reamed Interlocking Nail

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ABSTRACT

Objective: The aim of this study is to determine the effectiveness of reamed interlocking nail in the management of closed tibial shaft fractures.

Study Design: Descriptive/ Observational study

Place and Duration: Study was conducted in Orthopaedic Unit Ayub Medical Teaching Institute Abbottabad and DHQ Teaching Hospital Gomal Medical College Dera Ismail Khan for nine months duration from January 2019 to September 2019.

Methods: Total 80 patients of both genders were presented in this study. Age ranges of enrolled cases were 20-70 years. Demographically details of enrolled cases were recorded after taking written consent. Patients who had tibial shaft fractures were admitted in emergency ward and underwent for reamed interlocking nail. Postoperatively union time and rate of complications were assessed. Complete follow up of the patients were take place in duration of 14-months. Data was analyzed by SPSS 20.0 version.

Results: Mean age of the patients was 28.65±8.77 years with mean BMI 24.16±6.23 kg/m². Out of 80 patients, 47 (58.6%) were males and 33 (41.4%) were females. Traffic accident was the most common cause of fracture found in 60 (75%) cases, followed by fall from the height 15 (18.75%) and the rest were others 5 (6.25%). Mean united time of simple fractures were 13.14±4.14 weeks while among segmental fractures union time observed 18.13±6.17 weeks. Frequency of union fractures was 62 (77.5%), delayed unions were 13 (16.25%) and non-unions were 5 (6.25%). Satisfaction rate was 72 (90%) among all cases.

Conclusion: We concluded in this study that reamed interlocking nail was an effective and safest method for the management of closed tibial shaft fractures. Overall union rate in this study was 93.75% and showed less morbidity among cases.

Keywords: Interlocking nail, Tibial shaft fractures, Union

INTRODUCTION

Because of its superficial placement Tibia is the most often fractured long bone. Tibial brokenness is widespread in patients with lower extremity injuries and is a major cause of morbidity.¹ Most of these fractures continue following high-energy trauma, such as motorcycle accidents, pedestrian accidents, height losses, motor vehicle accidents and infrequently gunshot injuries. Delayed union, malunion, nonunion, and inflammation are common complications of fracture at tibial shaft^[1]. Proponents can be detected for treatment by plaster cast, open reduction and inner fixation with plates and screws, external fitting agents and locked or unlocked, intramedullary nails^[2,3].

Closed and open-tibial shaft fractures of type I and II GUSTILO are considered using intramedullary nails ^[1]. Use of intramedullary nailing is highly susceptible to infection, especially in open-tibial shaft fractures of grade 2 and degrees 3. For closed and open fractures of grade 1 many surgeons reserve intramedullary nailing. Delayed attachment of tibial shaft open fractures in patients with multitrauma gives much superior results in radiology and clinical conditions when compared to emergent fixation^[4,5]

While the development of a tibial shaft nonunion such as open fracture and serious soft tissue injury cannot be controlled with injury-dependant risk factors^[6], factors connected to therapy can be addressed. Several problems arising from poor clutch methods such as fracture gap, axis

deviations, the use of small diameter nails and locking bolts lead to osteosynthesis instability^[7]. These fractures are usually connected to defective bone healing, and as a result of poor and unstable fracture stabilization, they appear as hypertrophic nonunion. The hypertrophic form of the shaft nonunion offers the option of closed non-union therapy, however, by employing the exchange nailing principle in order to promote mechanical stability and biological bone stimulation. Several therapeutic strategies, most of them with a small number of patients, have been documented for the treatment of nonunion shaft tibial. Exchange nailing is usually accepted as the therapy of choice. Success rates of 76–96 percent have been recorded for tibia's non-infected diaphyseal union^[8-11]. Several predictive indicators have been identified, including time between the initial injury and swap of nets, fixing method, fractures and type of fractures^[12]. In almost 80 percent of non-union groups, fracture healing might take place following a single nail exchange procedure ^[9,13]. But with alternate procedures such as expandable intramedullary implants or placing, cure rates more than 90 percent have also been documented.

Nails that fasten together serve as an internal splint and serve as load shaving equipment to provide the spot with bone graft. It provides strength that prevents stress from exceeding the crucial quantity that can interrupt the location of the fracture. Clamping clocks allow the adjacent

joints to be moved to prevent rehabilitation and to minimize stress shaving.

MATERIAL AND METHODS

This descriptive/observational study was conducted in Orthopaedic Unit Ayub Medical Teaching Institute Abbottabad and DHQ Teaching Hospital Gomal Medical College Dera Ismail Khan for nine months duration from January 2019 to September 2019 and consists of 80 patients. Patients detailed demographics including age, sex and body mass index were calculated after taking informed consent. Patients who had open fractures, pathological fractures and those did not give written consent were excluded from this study.

Age ranges of enrolled cases were 20-70 years. Patients who had tibial shaft fractures were admitted in emergency ward and underwent for reamed interlocking nail. Postoperatively union time and rate of complications were assessed. Complete follow up of the patients were take place in duration of 14-months. Categorical variables were assessed by frequency and percentage but descriptive variables were calculated by standard deviation Data was analyzed by SPSS 20.0 version.

RESULTS

Mean age of the patients was 28.65±8.77 years with mean BMI 24.16±6.23 kg/m². Out of 80 patients, 47 (58.6%) were males and 33 (41.4%) were females. Traffic accident was the most common cause of fracture found in 60 (75%) cases, followed by fall from the height 15 (18.75%) and the rest were others 5 (6.25%). (table 1)

Table 1: Demographically details of enrolled cases

Variables	Frequency	%age
Mean age	28.65±8.77	
Mean BMI	24.16±6.23	
Sex		
Male	47	58.6
Female	33	41.4
Causes of Fracture		
RTA	60	75
Fall from height	15	18.75
Other incidents	5	6.25

Mean union time of simple fractures were 13.14±4.14 weeks while among segmental fractures union time observed 18.13±6.17 weeks. Satisfaction rate was 72 (90%) among all cases. (table 2)

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

Variables	Frequency	%age
Mean union time (weeks)		
Simple fractures	13.14±4.14	
Segmented fractures	18.13±6.17	
Satisfaction Rate		
Yes	72	90
No	10	10

There were 52 (65%) patients had tibial fracture at middle one third, 16 (20%) had proximal one third and 12 (15%) had distal one third. (table 3)

Table 3: Association of shaft fractures with respected to site

Variables	Frequency	%age
Middle one third	52	65
Proximal one third	16	20
Distal one third	12	15
Total	80	100

Frequency of union fractures was 62 (77.5%), delayed unions were 13 (16.25%) and non-unions were 5 (6.25%). (table 4)

Table 4: Outcomes among enrolled cases after interlocking nail treatment

Variables	Frequency (n=80)	%age
Union	62	77.5
Delayed union	13	16.25
Non-union	5	6.25

DISCUSSION

The interlocking of tibial shaft fractures has become a common and successful method for treatment. Usually, image intensifier is used to lock the clothes. In our study total 80 patients of both genders were presented with mean age 28.65±8.77 years. Mean BMI of the patients were 24.16±6.23 kgim². Patients were aged between 20-70 years. Majority of the patients 58.6% were males.[14] Joshi et al. investigated 56 Tibial fractures in India, 52 being male, 4 being female, and most of the time causing road traffic accidents. [15] The population of 88.39 percent male and 14.6 percent female tibial fractured patitudes also were discovered in a further study by Ali et al. in Karachi, Pakistan. [16] 75% of patients in our study were less than 40 years of age, which is the main earning group in our culture. Their early return to work was therefore highly essential.

In our study road traffic accident was the most common cause of fracture found in 60 (75%) cases, followed by fall from the height 15 (18.75%) and the rest were others 5 (6.25%).[15] Mean union time of simple fractures were 13.14±4.14 weeks while among segmental fractures union time observed 18.13±6.17 weeks. Satisfaction rate was 72 (90%) among all cases. Vidyadharn et al(17) evaluated the clinical radiation from interlocking nail in tibia and discovered that the average time for healing fractures was 20.1 weeks while the average duration for our investigation was 18 weeks. He also brought out the great clinical-radiological outcomes of careful intramedullary nails to cause tibial diaphysial fractures and is rather safe. In a Turkish research 26 intramedullary clinging fractures were treated. [18] It is five months between now and the Union. Their investigation found that intramedullary locking is more suitable for cominuted fractures since the periosteal circulation is better preserved and the complication rate is hence reduced. [18] Court-Brown et al investigated 25 patients without infection, malunion, non union or delayed union with an average union duration of 15.4 weeks. In a study of Larsen et al[19] 45 patients evaluated . The average duration to heal of fracture was 16.7 weeks in a group of reamed patients and 25.7 weeks in a group of unream. The difference (P=0.004) was important. A randomized blinded trial of 1319 cases in which a tibial shaft fracture had been treated with either intramedullary or unbeatable nailing was

performed by Mohit Bhandari et al. (2008) and demonstrated the potential benefits for reamed intramedullary nailing in closed fractured patients. [20]

There were 52 (65%) patients had tibial fracture at middle one third, 16 (20%) had proximal one third and 12 (15%) had distal one third. Among these fractures, Frequency of union fractures was 62 (77.5%), delayed unions were 13 (16.25%) and non-unions were 5 (6.25%) in our study. These results were comparable to the many previous studies.[21,22] The total union rate for this study was 93.75%, with the comparable mean union time. Drosos et al. corrected 157 in-tramedullary nail fractures and showed a 97.5% overall union rate and average union time 25.8 weeks. Nork et al. operated on 36 intramedullary nail-locked tibial fractures and averaged 23.5 weeks of union time. [24] In another study, the union rate was 90.6%, and 24 weeks on average. 18 Shah et al. re-fixed 36 intramedullary SIGN nail tibial fractures with a total union rate of 97.2% and a mean period of 22 weeks to the union. [25]

The foregoing shows that intramedullary nailing closed locking is a safe and effective solution for the treatment of tibial shaft fracture.

CONCLUSION

We concluded in this study that reamed interlocking nail was an effective and safest method for the management of closed tibial shaft fractures. Overall union rate in this study was 93.75% and showed less morbidity among cases.

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