

Complications of closed reamed intramedullary nailing in Diaphyseal closed fractures tibia.

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A prospective study performed in Al-Kadhimiya Teaching hospital from April 2007 to Dec. 2009.

ABSTRACT:

Fractures tibia are common and many modalities for the treatment are available the most recent one is intramedullary nails with closed and reamed method, however other modalities like casting are still used.

Objectives: To evaluate the complications of closed interlocking intramedullary nailing in closed diaphyseal fractures of tibia regarding the infection rate, time for union, malalignment and knee joint pain and stiffness.

Design: Prospective study.

Setting and Timing: Department of orthopedic surgery in Al-Kadhmiya Teaching Hospital from Dec. 2007- Dec.2009.

Patient and Methods : All the patients admitted to the emergency department of the hospital and operated within 72 hours . The study is based on 35 patients including males and females having closed tibial diaphyseal fractures of skeletally mature persons (closed proximal and distal physes)

Results: Out of the thirty five (35) patient, follow up was missed in two patients, the other (33) patients were followed for a period of one year. The mean time for union was 14.4 weeks. Union rate was 91 %, delayed union in two patients (6 %). Non union in one patient (3%). Infection was noticed in three patient (9%). Loss of the reduction in two patient (6%) in a proximal third fracture. Knee joint pain in four patients (12.1%) all of them of mild grade and easily ignored.

Conclusion: From the study we concluded that closed intramedullary nailing of closed tibia diaphyseal fractures is advantageous because of early mobility, low risk of infection, good union rate, low risk of malalignment and low risk of significant knee joint pain.

Key words: Fracture tibia, closed fracture, diaphyseal, reamed intramedullary nail

الخلاصة

إن كسور عظم القصبة تمثل احد أهم الكسور وأكثرها شيوعا وهناك عدة طرق لعلاجها ويعتبر التثبيت الداخلي بواسطة العامود المقفل داخل نخاع العظم أهم واحد هذه الطرق.

هذه دراسة بحثية أجريت في مستشفى الكاظميه التعليمي من كانون أول 2007 إلى كانون أول 2009 في ردهة الكسور و جراحة العظام على 35 مريضاً مصاباً بكسر مغلق في عظم القصبة تم إدخالهم إلى صالة العمليات خلال 72 ساعة وأجريت لهم عملية التثبيت الداخلي المغلق بواسطة العاود المقفل داخل نخاع العظم وتم متابعة المرضى لمدة سنة كاملة أو لحين اكتسابهم الشفاء وتم تسجيل أية مضاعفات حدثت لهم خلال هذه الفترة وتم متابعتهم شهرياً بواسطة الأشعة السينية .

أظهرت الدراسة إن نسبة الالتحام العظمي خلال إل 24 أسبوعاً الأولى هي 92 % وان تأخر الالتحام حدث في 6 % وعدم التلاحم في 2 % وان متوسط مدة الالتحام كانت 14.4 أسبوعاً. وحدث التهاب جرثومي سطحي في مكان إدخال البراغي البعيدة في 9 % وحدث تحرك في الكسر في 6 % جميعها في الثلث القريب من عظم القصبة وتم تسجيل 12.1 % يعانون من الآلام حول الركبة .

أظهرت هذه الدراسة إن طريقة التثبيت هذه تعتبر جيدة من ناحية المضاعفات القليلة نسبياً مع نسبة التلاحم جيدة وحركة حرة للطرف السفلي مقارنة مع الطرق الأخرى.

INTRODUCTION

The tibia is strong and large bone. Its large part is subcutaneous. So it is liable for fractures and the majority is of high energy. Many modalities of treatment are invented, including casting ,external fixators and internal fixations including plate and screws and intramedullary nailing.⁽¹⁾

In choosing the mode of treatment, the fracture pattern and degree of soft tissue injury play an important role. Tibia fracture have been treated successfully in past conservatively by casting ⁽¹⁾.many displaced fractures are unstable and they need more rigid fixation .For years there were so much discussions between closed reduction and external fixation and open reduction and internal fixation .Tibia being subcutaneous increase the risk of infection and non union ⁽²⁾

Introduction of closed intramedullary nailing has changed the management policies of fracture tibia and femur .The treatment for fracture tibia by intramedullary nailing has gained popularity mainly by introduction of closed nailing facilities⁽³⁾.After intramedullary reaming, a large size nail can be used without jamming and a small type nail used in non reamed type ⁽⁴⁾.

Interlocking intramedullary nailing greatly improve rotational stability ⁽⁵⁾⁽⁶⁾. The fracture below the level of tibial tubercle and above the plafond can be treated with intramedullary nail stabilization⁽⁷⁾.The small size of nails is associated with increased rate of nail or screw breakage ^(8,9).Reaming may lead to vascular damage and thermal necrosis of the bone ⁽¹⁰⁾.Reamed nailing have comparable results to non reaming especially in open fractures⁽¹¹⁾. This procedure reduces hospital stay ,early mobilization and better outcome anatomically as well as functionally, as claimed by the advocates of this type of management.

This study was conducted to estimate the effectiveness and the complications of this type of management in closed tibia diaphyseal fractures,

PATIENTS AND METHODS.

This prospective study was conducted in orthopedic unit in the teaching hospital of Al-Kadhimya from Dec. 2007 – Dec. 2009 , it involves thirty five patient with closed tibia shaft fractures with unacceptable displacement (can not be managed conservatively), were operated on within seventy two hours, meanwhile were stabilized by back slab temporarily (till the time of operation).

All fractures were reduced closely and fixed with reamed intramedullary nail with proximal and distal locking screws with no application of tourniquet and no traction table was used. No other modalities of fixation were added post operatively. Ankle and knee movement were encouraged as soon as the pain subsides, non weight bearing policy is adopted till the evidence of callus formation. Distal screws removal when the patient can fully weight bear with no pain and obliteration of fracture site as evident radiologically. All the patients were followed by a regular monthly visits with x rays examinations for a maximum of one year follow up. The patient were followed for infection rate, time for radiological proved fracture union. Loss of reduction and knee joint pain .

There were 25 patients(75.7%) males and 8 patients (24.3%) females. The mean age was 34.4 years ranging from 22-56 years. The cause of fractures were RTA in 25 patients (75.7%), industrial in two patients (6%), fall from height in 4 patients (12%) and sport injury in two patients (6%). There were three (9%) cases of proximal third , 24 (72.7 %) of middle third and 6 (18.1%) of distal third tibia fracture. There were 8 (24.2%) with transverse fracture, 6 (18.1%) with short oblique, two (6%) with spiral and 17 (51.5%) with comminuted fracture pattern. Fibula was broken in 3 (9%). Blood transfusion was necessary in two (6%) cases in the emergency department before the operation and no blood was required during or after the operation (the average external blood loss during the operation was about 25 c.c). The nailing was performed within 72 hours closely and under X ray control and no tourniquet was used. Non weight bearing policy till evidence of callus formation followed by partial weight bearing till obliteration of the fracture site is evident radiologically then full weight bearing is allowed for at least 6 weeks followed by dynamization by removal of the distal locking screws.

Inclusion criteria:

Closed Tibial diaphyseal fractures in the middle three fifths.

Exclusion criteria:

- Skeletally immature bone.(open proximal or distal physes)
- Multiple injured patients
- Previously injured limb
- Patient with peripheral vascular disease
- Patient with medical illnesses.

Results:

In this study the intramedullary nails were performed in 35 patients with closed diaphyseal tibial fractures. Among them 33 patients (94.2%) were followed to complete recovery or to a maximum of one year and two patient (5.8%) were lost during the follow up period .

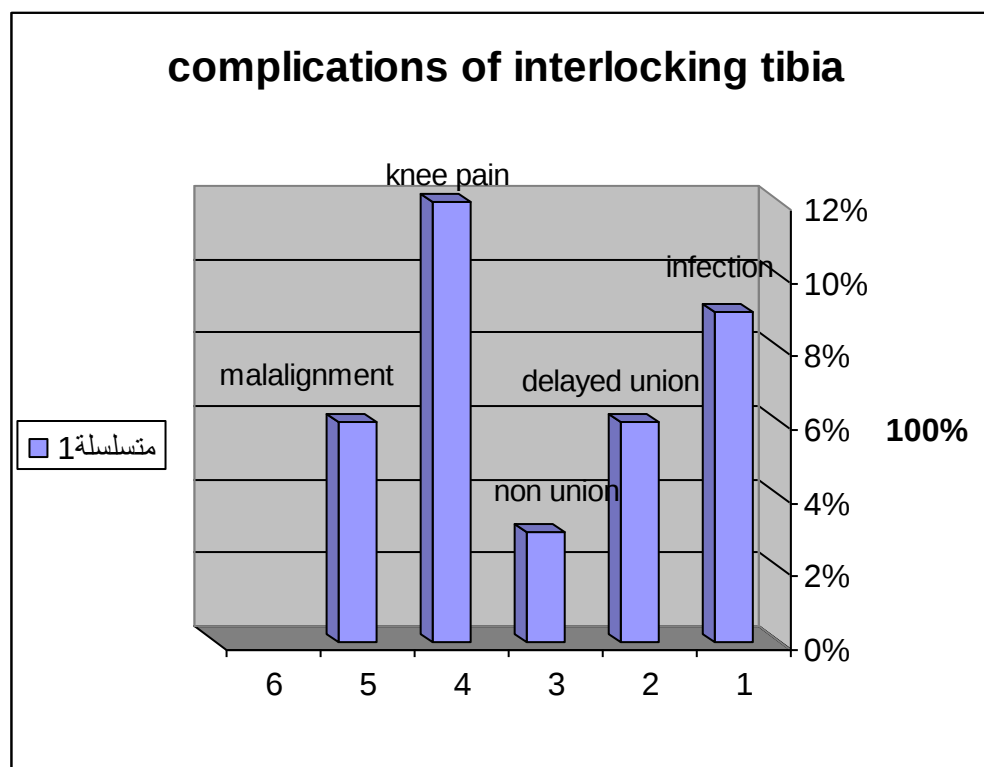
The results showed that bony union occurred in 30 (90.9%) of the cases within 24 weeks, delayed union (more than 24 weeks) was seen in two patients(6 %) and non union in 1 (3%) in a distal fracture. Mean union time was 14.2 weeks ranging from 11-24 weeks. Infection occurred in three patient (9%) was a superficial wound infection at the distal locking screw resolved well with oral antibiotics. Malalignment (loss of the reduction) observed in two (6%) patients both were in proximal third fracture and in form of anterolateral angulations of more than 10 degrees compared with the immediate post operative x ray images. Prolonged knee pain occurred in four(12.1%) and no cases of knee stiffness was reported.

The results were evaluated as (excellent) in 21 (63.6%) when no pain or stiffness , no infection , no loss of reduction and healed within 24 weeks. Evaluated as (Good) in 3 (9%) when no pain or stiffness and had only infection and united within 24 weeks, and (Fair) when developed knee joint pain or delayed union 6 (18.1%) and evaluated as (poor) in three (9%) when developed unacceptable malalignment or non union.

Mechanism of injury	Number of patients	percentage
RTA	25	75.7 %
SPORT INJURIES	2	6 %
FFH	4	12%
INUSTERIAL INJURIES	2	6%

FRACTURE PATTERN	NUMBER OF PATIENTS	PERCENTAGE
COMMINUTED	17	51.5 %
TRANSVERSE	8	24.2 %
SHORT OBLIGUE	6	18.1%
SPIRAL	2	6%

	NUMBER OF PATIENTS	PERCENTAGE
EXCELLENT	21	63.6%
GOOD	3	9%
FAIR	6	18.1%
POOR	3	9%



DISCUSSION:

This study was carried out on the closed reamed interlocking nailing in closed tibia diaphyseal fractures, the results were compared with the available data.

In this study the mean time of bone union for closed fractures was 14.2 weeks ranging from 11-24 weeks less than reported in the study of Court Brown and coworkers⁽¹²⁾ who reported 16.9 weeks, Bostman and Hannien reported 15.3 weeks⁽¹³⁾ and less than reported by Pervais who reported 16.4 weeks mean union time and 3.6% delayed union rate⁽¹⁴⁾. There were 4% non union rate in our study compared to 0% in the study of Brown et al⁽¹⁵⁾. Exchange nailing is useful method to promote union⁽¹⁶⁾ of tibial fractures when slow consolidation occurs after treatment with non reamed nailing.

Delayed union was reported 20 % in the study of Karladni with average union time of 16.4 weeks with 3.8% non union rate⁽¹⁷⁾ and 0 % delayed union with average union time of 12 weeks with 0% non union rate in that of Toivanen⁽¹⁸⁾, while average union time was 19 weeks with 1.8% non union rate in the study of Bone⁽¹⁹⁾.

Infection rate was 9% in our study, non was a cause of non union, more than reported by Court Brown and Coworkers⁽²⁰⁾ who reported 3.5% (16 out of 450).

Whittle et al reported 8% infection rate⁽²¹⁾. Santoro et al⁽²²⁾ and Melcher⁽²³⁾ reported an infection rate of 4%. In the study of Lang et al⁽²⁴⁾ reported thirty two proximal tibia fractures treated with locked intramedullary nailing, thirty out of the thirty two fractures healed while 84% had angulations of 10 or more degrees in the frontal plane, in our study the two cases of malalignment were in the proximal third tibia.

In our study no case of knee joint stiffness was reported only four cases (12%) of prolonged knee joint pain. Compared with 40% reported in Karladini⁽¹⁶⁾ and 76 % in that of Toivanen (18) and 35 % reported by Toivanen⁽²⁵⁾.

Our study showed that dynamization is necessary for bone union.

CONCLUSION

From this study we can conclude that such technique of closed intramedullary nailing has many advantages and relatively less complications. Early mobilization, early weight bearing, lowest infection rate and acceptable union rate.

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