Original Article

Complications of close interlock nailing in the management of close tibial fracture

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Objective: To determine the frequency of complications of locally made interlock nailing in tibia after nine months of surgery.

Methodology: This case series study was done from March 2004 to February 2014 in the Department of Orthopedic and Trauma Postgraduate Medical Institute, Hayatabad Medical Complex, Peshawar, Pakistan. A total of 58 adults (after the closure of epiphysis) patients were randomly selected provided that they had close diaphysial fracture of tibia which is located 7 cm below the knee joint and 4 cm above the ankle joint and fracture less than one week old.

Results: Out of 58 patients, anterior knee pain was observed in 14(24.1%), delayed union in 10(17.2%), external of 10^0 rotation in 4(6.9%), internal rotation of 5^0 in 1(1.7%), non union in 4(6.9%) and intramedullay infection in 3(5.2%). Shortening of 1 centimeter (cm) was seen in 2(3.4), 2 cm in 1(1.7%) and 1.5 cm in 3(5.2%) cases. Distal screw were broken in 2(3.4%), proximal screw broken in 1(1.7%), Nail broken in 2(3.4), infection at proximal screw in 2(3.4%) and at distal screw was 2(3.4%). Restriction of knee flexion occurred in 1(1.7%), restricted ankle movements in 1(1.7%), varus angulation of 10^0 in 1(1.7%), valgus angulation of 10^0 in 1(1.7%), ankle pain in 1(1.7%) and deep vein thrombosis in 1(1.7%).

Conclusion: Interlocking nail is considered to be the gold standard for management of tibial fracture but it is not free of complications, especially knee pain and angular rotation. (Rawal Med J 201;40:402-405).

Key Words: Complications, interlock nailing, intramedullary nail, fracture tibia.

INTRODUCTION

The tibia by its location is exposed to frequent injuries as one third of its surface is subcutaneous. In treating the close tibial diaphysial fractures there are different operative and non operative methods.[1] Intramedullary interlocking nailing is considered to be the gold standard for management of tibial shaft fractures.[1] Despite the vast experience of surgeon due to growing use of intramedullary nailing, tibial nailing is not without complications, if properly not inserted.[2] The most common complications include changing the limb axis, rotation of the factions against each other, and degenerative changes in the knee depend on the introduction of nail art.[1,3] Ankle or knee pain was reported frequently after nailing but was not limiting to activity in most.[4] No patients reported hindrance in work due to pain after nailing in tibial fracture.[5]

There are several anatomic structures around the knee joint that are prone to damage during nail insertion. These are patellar tendon,[6,7] menisci,[8] articular cartilage,[9] and infrapatellar branch of the saphenous nerve and infrapatellar fat pad.[6] In addition, the presence of prominent nail or screw[10] and the associated muscular weakness are the causative factors of pain.[11,12] Oblique screw in the proximal aspect in some nails are biomechanically more stable in tibial fractures but with this type of nailing, the proximal screw may injure the proximal tibiofibular joint and that may the cause of knee pain.[13] The purpose of this study was to find out the frequency of various type of complications of locally made interlock nailing in tibia after nine months of surgery.

METHODOLOGY

This case series study was done from March 2004 to February 2014 in the Department of Orthopedic and Trauma Postgraduate Medical Institute, Hayatabad Medical Complex, Peshawar, Pakistan. A total of 58

adults patients were randomly selected provided that they had closed diaphysial fracture of tibia, which is located 7 cm below the knee joint and 4 cm above the ankle joint and fracture less than one week old. Open and pathological fractures excluded from the study. Informed consent was taken from all patients to be included in the study.

In the last ten years 350 patients were screened who had come for a regular follow up after nine months of their surgery for any type of complaints and 58 patients were selected with different type of complaints. A questionnaire was developed which included name of the patient, age, gender, type of injury, cause of injury and different type of complication. X Rays after three, six and nine months of surgery were reviewed and any type of complication were noted. The progress of healing at fracture site was examined clinically and radiologically. All the data were analyzed with SPSS version 17.

RESULTS

The study included 58 patients and age range was between 20 and 65 years with mean 35.5±12.805 years and 44(75.9%) were male and 14(24.1%) were female. Twenty seven (46.6%) patients had right sided fracture and 31(53.4%) left sided fracture (Table 1). Most of the fractures were type A (Table 2).

Table 1. Side of injury.

	Number	Percent
Right	27	46.6
Left	31	53.4
Total	58	100.0

Table 2. Types of fracture.

	Number	Percent
A	25	43.1
B	21	36.2
C	12	20.7
Total	58	100.0

Table 3. Mechanism of injury.

	Number	Percent
Fall	24	41.4
RTA	34	58.6
Total	58	100.0

Table 4. Complications.

Complications	Number	Percent
Ankle Pain	1	1.7
Anterior Knee Pain	14	24.1
Delayed union	10	17.2
Distal Screw broken	2	3.4
External rotation of 10 degree	4	6.9
Foot Drop	1	1.7
Infected ILN	3	5.2
Infection of distal Screw	2	3.4
Infection of proximal Screw	2	3.4
Internal Rotation of 5 degree	1	1.7
Nail Broken	2	3.4
Non union	4	6.9
Proximal Screw Broken	1	1.7
Restricted Ankle movements	1	1.7
Restricted Knee Flexion	1	1.7
Shortening of 1 cm	2	3.4
Shortening of 1.5 cm	3	5.2
Shortening of 2 cm	1	1.7
Deep Vein Thrombosis	1	1.7
Valgus Angulation of 10 degree	1	1.7
Varus Angulation of 10 degree	1	1.7
Total	58	100.0

Thirty four (58.6%) factures were due to road traffic accidents (Table 3). Anterior Knee pain, delayed union and non union were most common complication (Table 4).

DISCUSSION

Tibia is the most commonly fractured long bone in the body. Since it is the large bone of the body and one of the principal load bearing bones in lower extremity, fractures can cause prolonged morbidity, extensive disability unless treatment is appropriate.[14] In Inam et al study[15], 21 in 30 patients had knee pain. Two (6.7%) patients had restricted ankle movements while 4(13.33%) patients had restricted knee flexion. One nail (3.3%) got infected & was removed. Sheikh et al[16] studied 22 closed tibial shaft fractures in whom 2 cases of delayed union were noted. Infection was noted in one case. In another one case shortening of 12 mm and valgus deformity was noted due to loosening of distal screw. Ilyas et al[17] in 15 patients with tibial fracture showed 0% infection rate, nail breakage and bending of distal locking screw in one case each.

They noted full range of movements of the knee joint. Bukhari[18] findings coincide with our study in which he included 21 patients and note no deep infections, rotational (>10º) or angular (>10º) deformity, or shortening (>2 cm).

Pob³ocki et al[19] found varus deformity was the most common complication that was observed in 5(11%) cases (out of 45 patients). Other Less commonly observed complications were external rotation of the limb in 1 case and anteflexion in 1 case. Attal et al[20] noted the frequency of delayed union of 12.2%. In his study, malalignment of >5° in any plane one year after surgery was 5.5%. Proximal third fractures were at a higher risk of postoperative malalignment, which was 17.6 %.

Bonnevialle et al[21] studied intramedullary nailing with reaming (Grosse-Kempf nail) in 32 patients in which only one case (3.12%) developed deep infection while in our study infection was 5.2%. Steinberg et al[22] showed 20.4% complications related to the nailing; 5.55% deep infections, 3.7% superficial infections, 2 bone shortenings of 1 centimeter secondary to nail protrusion in the knee, 1 compartment syndrome, 1 fracture propagation, 1 distal malalignment, and 1 delayed union.[22]

In another study, Bonnevialle et al[23] pointed out that there was normal movement in knee and ankle while 19 out of 38(50%) patients complained of anterior knee pain while in our study, knee pain was observed in 24.1% cases. Thirty six patients were studied by Väistö et al[24] in which 24 (67%) had anterior knee pain while in our study, knee pain was observed in 24.1% patients. Complications in the form of secondary osteoarthritis of the knee has been reported.[24] Court-Brown et al studied 25 patients in which average union time was15.4 weeks with no infection, malunioin, non union or delayed union.[25]

CONCLUSION

Interlock nailing of tibia with reaming remains the preferred method and gold standard for treatment of tibial diaphyseal fracture. However, it can cause unexplained pain at nail insertion site and may cause angular/and axial malalignment apart from infection, compartment syndrome and union problem.

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