

COMPARISON OF OUTCOME IN REAMED VERSUS UNREAMED NAILING IN THE TREATMENT OF TIBIAL DIAPHYSIAL FRACTURE

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ABSTRACT

Background: Tibial diaphysial fractures are among the notorious fractures as far as management is concerned. **Objective:** To compare the outcome (union) between reamed and unreamed nailing in transverse tibial diaphysial fractures. **Patients and Methods:** Study Design: Experimental study. Setting: Department of Orthopaedic Surgery, Bahawal Victoria Hospital Bahawalpur. Study Duration: 8 months from 1st January 2009 to 31st August 2009. Study subjects: 210 patients were divided into two groups A and B. Group A patients were managed by reamed interlocking nail tibia and group B patients by unreamed interlocking nail tibia. Follow up was done up to 3 months and outcome in terms of union was compared between two groups. 15 patients in each group were lost to followup so data analysis was done on 180 patients. **Results:** Union was achieved in 80% of patients in group A while 70% in group B. **Conclusion:** Our study suggests that reamed interlocking nail tibia is better treatment option than unreamed interlocking nail tibia.

Key Words: Tibial diaphysial fracture, Interlocking nail tibia, Reamed, Unreamed

INTRODUCTION

Fractures of tibia are important for two reasons. The first is that they are common and secondly they are controversial and any thing that is both common and controversial, must be important.¹ A long period of convalescence is inherent even to an uncomplicated healing course of notorious fracture.² Both conservative and surgical techniques have been introduced in an effort to speed time to union while minimizing the occurrence of complications such as residual deformity, consolidation problems, refracture, infection, compartment syndrome, peripheral injuries, anterior knee pain, joint stiffness and vascular complications.^{3,4} Closed reduction and cast immobilization have been regarded as the standard treatment of tibial shaft fractures.^{5,6} However, during recent years many reports have shown that immobilization in plaster cannot guarantee sufficient stability for all tibial fractures.^{7,8} Along with more developed intramedullary locking nail have gained numerous advocates in the treatment of both closed and open tibial shaft fractures.^{9,10,11} This study was undertaken to compare the outcome in terms of union with interlocking nail with and without reaming.

PATIENTS AND METHODS

This experimental study was carried out at Department of Orthopaedic Surgery, Bahawal Victoria Hospital, Bahawalpur for eight months from 1st January to 31st August 2009.

One hundred and eighty patients of tibial diaphysial fractures were included in the study and divided in two groups A and B (A for reamed nailing and B for unreamed nailing) having 90 patients in each group.

Eligible patients fulfilling the inclusion criteria were recruited, were explained about study procedure and purpose in brief and their informed consent was taken. The group allocation was made as follows:

Eligible patients were offered two folded chits bearing letter A reamed, B unreamed and they were requested to pick one of those and patients were grouped accordingly. The process was done till the completion of sample size. Group A was treated by reaming of tibia medullary cavity, while group B was treated by unreaming of tibia medullary cavity then intramedullary nail inserted of proper size with either dynamic or static locking. Both groups after surgery were assessed at 3 months for outcome, in terms of union. Fifteen patients from each group were lost to followed up and so analysis was done on 180 patients. Data was entered and analyzed in SPSS version 10.

RESULTS

The data of 180 patients of tibial diaphysial fracture was analyzed. Among these 156(86.7%) were male while 24 (13.3%) were female, so male to female ratio was 6.5:1

The age range was from 20 to 45 years, majority of patients fell in age group of 30-45 years. Duration of

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fracture was 0-14 days.

Follow up of both groups was done at 3 months. Fifteen patients were lost to followed up from both groups. Patients who completed their follow up were included in analysis. Groups were well matched for age, sex and fracture type. After 3 months, in group A patients 80% were having union while in group B 70% were having union ($p=0.121$ chi square = 2.400)

Table I: Outcome (Union) in two groups.

Union	Group A	Group B	Total
Yes	72(80%)	63(70%)	135(75%)
No	18(20%)	27(30%)	45(25%)
Total	90	90	180

Chi square= 2.400

P value=0.121

DISCUSSION

Tibia is currently the most fractured long bone in the body because of high speed trauma such as motor vehicle accidents. The presence of hinge joints at the knee and the ankle allows no adjustment for rotary deformity after fracture, thus special care is necessary during reduction to correct such deformity. Delayed union, nonunion, and infection are relatively common complications of tibial shaft fractures.^{12, 13} Operative treatment is indicated for most tibial fractures caused by high energy trauma. Operative treatment allows early motion, provides soft tissue access and avoid complications associated with immobilization. The goal of treatment are to obtain a healed, well-aligned fracture, pain-free weight-bearing, functional range of motion of the knee and ankle joints. The optimal treatment method should assist in meeting these goals while minimizing complications, especially delayed union or non-union.¹⁴

Intramedullary interlocking tibial nailing is the leading modality of treatment for diaphysial tibial fractures. It has biological and biomechanical advantage over plate osteosynthesis. Various studies regarding the safety and effectiveness of closed intramedullary interlocking nailing have been done. Locked intramedullary nailing currently is considered the treatment of choice for most types I, II, and IIIA open and closed tibial shaft fractures and is especially useful for segmental and bilateral tibial fractures.¹⁵

The fact that intramedullary reaming damages the

endosteal blood supply has been appreciated for many years. However, recent work has quantified the extent of the damage. Klein et al²¹ showed that reaming of the canine tibia diminished the cortical blood supply by 45 to 85%, whereas use of unreamed nails was associated with a 15 to 30% reduction. In a study it was noted that cortical revascularization of sheep tibiae took up to 6 weeks after unreamed nailing, compared with 12 weeks after reamed nailing. In another study,⁹ however, took a contrary view, suggesting that reaming is actually beneficial to fracture union.

Court-Brown et al¹⁰ undertook the first prospective study of reamed and unreamed nails in straightforward closed tibial fractures and showed that reamed nails were associated with a lower union time and less secondary surgery than unreamed nails. There was also a higher incidence of screw breakage and malunion in the unreamed group, it was their conclusion that the use of unreamed nails in straightforward closed tibial fractures should be abandoned. More recently, other surgeons have corroborated their results.¹⁶

A study showed that patients treated with unreamed nails had a significantly longer union time, higher incidence of non-union, higher rate of screw breakage and a significantly greater number of secondary procedures than patients treated with a reamed nail.¹¹

Blachut and associates randomized 136 closed tibial diaphysial fractures to treatment by reamed or unreamed nailing.¹⁶ Mean age was 35 years with motor vehicle being the cause of injury in 40% patients. In 73 patients treated with reamed nailing 7 patients had delayed union while 3 patients were having non-union. Coles CP and Gross M studied 895 patients treated by casts, plates and interlocking nails.¹ The incidence of malunion was lower with operative treatment as compared to conservative management. Data showed that there is difference between reamed and unreamed interlocking nail of tibia diaphysial fracture.¹

Keating et al¹⁷ carried out a prospective trial comparing reamed and unreamed nails in open tibial fractures. They randomized 94 patients with 96 fractures to treatment with either a reamed Grosse Kempf nail or an unreamed Delta nail. They analyzed their results in detail and showed no significant difference in the incidence of compartment syndrome, infection and malunion. The time to union for the different fracture types was similar and the

only significant difference was in the incidence of implant failure where they noted a 7% incidence of screw breakage in the reamed nails, compared with 27% in the unreamed group.¹⁷

In our study, group A patients have a success rate of 80% while group B have 70%. Studies has reported union in 96% to 100% of fractures treated by reamed nailing^{1,10} while other studies has reported union rate of 80 to 100% of fractures.¹⁸⁻²¹

A study showed that patients who were operated by reamed interlocking nail were having satisfactory union as compared to unreamed interlocking nail.²¹ All the results obtained were compatible with international studies as mentioned earlier. Our study indicated that patients who underwent unreamed nailing have slightly prolonged healing time as compared to reamed nailing but statistically it was not significant. Keeping all above discussion in mind it is still difficult to decide that which modality will be the first line therapy for management of tibial diaphysal fracture. In our study reamed interlocking nail is slightly a good operation (p value=0.121) as compared to unreamed interlocking nail. However, we felt it appropriate to undertake a multicentre study of large patient group's, randomized study of reamed and unreamed nailing in these fractures.

CONCLUSION

According to data in our study there were no significant differences between reamed and unreamed nailing in the management of tibial diaphysal fracture for outcome i-e union. Although there is trend towards improved union with reamed nailing but statistically it was not proved in our study. Last decade has not only refined our knowledge of this technique but has questioned whether we can improve our management. It is still to be observed whether new nail design will increase the incidence of union that is associated with current generation of interlocking nail.

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