



RESULTS OF COMPOUND DIAPHYSEAL TIBIAL FRACTURES TREATED BY UNREAMED NAIL

Vikram Sharma

Senior Consultant, Fortis Escorts Hospital Faridabad

ABSTRACT

Compound fractures of tibia are one of the commonest fractures seen in clinical practice. Traditionally their treatment involved the application of external fixator and then definitive surgery once the wound has healed. This prospective study of 47 patients was undertaken to evaluate the results of unreamed interlocking nailing in such fractures. They were followed up for an average of 14 months. All the fractures united at an average of 24 weeks and there were no major complications. In our study 17 cases (36.7%) had excellent results, 19 cases (40.4%) had good results, 11 cases (23.4%) had fair results and none of the cases had poor results as per criteria laid down by Johnner and Wruhs (1982) [15]. Our study does suggest that unreamed interlocking nailing is a good method of primary internal fixation of compound (grade I to IIIB) fractures of tibia.

KEYWORDS : compound fractures, unreamed nailing

INTRODUCTION

Fractures of tibia are one of the most common fractures seen in clinical practice and many of these are compound fractures. Compound fractures traditionally used to be treated by external fixation as provisional treatment and definitive treatment once the wound is healed. Duration of such treatment was long compared to closed fractures which were usually treated by nailing. This led to more morbidity and more loss of work hours. This study was undertaken to evaluate the results of compound fractures of tibia treated by unreamed locked nailing.

MATERIAL AND METHODS

This is a prospective study of 47 patients who attended emergency department of our hospital between June 2014 and June 2017. All of these fractures were treated by wound debridement and primary stabilization by unreamed solid interlocking nailing. The surgery was done within the first six hours in all these cases. They were followed up for 10-18 months with an average follow up of 14 months.

The inclusion criteria of the study were:

- Fresh fractures.
- Adult patients ≥ 20 years of age.
- Compound type I, II, IIIA and IIIB as per Gustillo's classification

The exclusion criteria were –

- Compound fractures type III C according to Gustillo's classification
- Pathological fractures.
- Fractures in children.
- Fractures within 7cm from the knee and ankle joints.
- Patients with associated head injury, chest and abdominal trauma in which there was delay in fixation of more than six hours

Patients were operated in supine position under C arm guidance. Midline incision and medial parapatellar approach was used and retraction of patellar tendon was done in all cases. Nail was inserted using standard instrumentation. Size 9mm and Size 10 mm diameter nails were used depending upon the width of the medullary cavity with length of the nail ranging from 30-36 mm. Proximal and distal locking was done in all the cases. Static locking was done for fractures outside the middle third of tibia and dynamic locking was done for more stable fractures in the middle third. Proximal locking screws were placed using the incision jig and distal locking was done by freehand technique. No post op immobilization was used. Weight bearing was done according to the fracture pattern and size of the nail. Regular dressing of the wound was done till healing.

Patients were followed up clinically and radiologically for union at 3 weeks, 6 weeks, 12 weeks post op and then every six weeks till

consolidation of fracture and then every 12 weeks till they were asymptomatic. The data collected included the age of the patient, side of the fracture, mode of injury, geometry of the fracture, location of the fracture in tibia, grade of the compound fracture according to Gustillo classification, post operative complications, time taken for healing and final results made at the end of the study as per criteria laid down by Johnner and Wruhs (1982)

RESULTS

Out of the 47 patients, 39(82.9%) patients were in the age group of 21-40 years of age. 31(63.2%) were males and 16(32.6%) were females. Most of the fractures were caused by high energy trauma, 37(78.72%) were caused by RTA, 7(14.8%) by assault, 3(6.3%) due to fall from height. 26(55.3) patients had right sided and 21(44.6) left sided fracture. Most of the fractures were transverse 32 (68%) followed by oblique 10 (21.2%). Spiral fractures constituted 5 (10.6%) of the cases in our series. 27 (57.4%) fractures occurred in the middle third, 12(25.5%) in lower and 8(17%) occurred in the upper third of tibial shaft. All patients had fracture of both bone leg. In five cases we had fixed fibula with semitubular plate.

As per Gustillo's classification, 17 patients were with type I injury, 15 patients type II and 7 patients in type IIIA and 5 patients in type IIIB. All of the patients reported within 2 hrs of injury. All the patients were operated within 6 hours of the injury. All the patients were discharged within 3 days of the surgery and later seen in outpatients department for wound care.

6(12.7%) patients had superficial wound infection and 2(4.25%) patients had deep wound infection. However all these wound healed with regular dressings in the outpatient department. 3(6.38%) patients had necrosis of the skin without infection for which skin grafting was required. Wound of 39(82.9%) patients healed by primary healing. 8(17%) patients had their wounds healed by secondary healing and out these 3(6.38%) patients required skin grafting. Dynamisation was done in 12 cases (25.5%) at an average of 12 weeks. All fractures united at an average of 24 weeks. Fractures of 36(76.5%) patients healed in less than 24 weeks and fractures of 9(19.14%) patients healed between 24-32 weeks. The results were made at the end of the study as per criteria laid down by Johnner and Wruhs (1982). In our study 17 cases (36.7%) had excellent results, 19 cases (40.4%) had good results, 11 cases (23.4%) had fair results and none of the cases had poor results as per criteria laid down by Johnner and Wruhs (1982) [15].

DISCUSSION

Fractures of tibia have been successfully treated by interlocking nailing which involved reaming of medullary canal. However it does involve damage to the endosteal blood supply and was thought to increase the rate of infection in compound fractures where damage to the periosteum already had already decreased cortical blood supply. Reaming also produces large amounts of devitalized bone

which further increases the chances of infection. Moreover, reaming has also been known to increase the chances of fat embolism. Unreamed nailing, therefore has a definite role in the management of compound fractures as it causes less damage to endosteal blood supply. Moreover good union rates have been achieved within accepted time in our study.

Mean age of the patients in our study was 28 yrs (18-38) years. This was consistent with similar age groups in other studies (1,2) and probably is due to the more active lifestyle in this age group. 87% of patients were males and 13% were females and was consistent with most of the reported series [5,6,7]. This preponderance may be due to more outdoor activities of males. Road traffic accidents were the most common cause which was similar to the findings of other studies (8,7).

All the patients achieved union at an average period of 24 weeks (18-34 weeks). Reimer et al [13] (union rate 7.6 months), Singer and Kellam [12] (union rate 6.1 months), Schandelmaier et al [11] (25.8±14 weeks), Hasse et al (6 months) and Osterman PA et al (23.5 weeks) [11] reported similar results.

In our study 17 cases (36.7%) in our study had excellent results, 19 cases (40.4%) had good results, 11 cases (23.4%) had fair results and none of the cases had poor results as per criteria laid down by Johnner and Wruhs (1982) [15].

CONCLUSION

Based on the facts that it is a single surgery and that union was achieved in all the patients without any major complications, and 76.5% patients had excellent or good results, our study does suggest that unreamed interlocking nailing is a good method of primary internal fixation of compound fractures of tibia (grade I to IIIB). However further studies with more number of patients across many centres are required to further establish its role in such fractures.

REFERENCES

1. Henley M B: Non-reamed versus external fixators. Presented at Annual Meetings of orthopaedic Trauma Society Los Angeles CA, 1994.
2. Whittle A P, Russel T A, Taylor J C et al: Treatment of the tibial shaft with the use of interlocking nailing without reaming, *J. Bone and Joint Surg* 1992; 74A: 1162-71.
3. Lottus J O: Medullary nailing of the tibia with the triflange nail, *Clin Orthop* 1974; 332: 37-51.
4. Whittle A P, Russel T A, Taylor J C et al: Treatment of the tibial shaft with the use of interlocking nailing without reaming, *J. Bone and Joint Surg* 1992; 74A: 1162-71.
5. Wiss D A: Flexible medullary nailing of acute tibial shaft fracture, *Clin Orthop* 1986; 212: 122-132.
6. Puno R M, Taynor J T, Negano et al: Critical analysis of results of treatment of 201 tibial shaft fractures, *Clin Orthop*. 1986; 212: 113-21.
7. Bone L B, Sucato D, Stegmann P M et al: Displaced isolated fractures of the tibial shaft treated with either a cast or intramedullary nailing, *J Bone Joint Surg* 1997; 79A: 1336-41.
8. Sarmiento A: A functional below the knee cast for the tibial fractures, *J Bone and Joint Surgery* 1967; 49A: 855-75.
9. Sedlin E D, Zitner D T: The lottes Nail in closed treated of tibia fractures, *Clin Orthop* 1985; 192: 185-92.
10. Ekland A, Thorson B O, Alho A, Stronsoe K, Follers G and Hankebo: Interlocking intramedullary nailing, the treatment of the tibial fractures (a report of 45 cases), *Clin Orthop* 1988; 231: 205-15.
11. Schandelmaier P, Krettek C, Ruloff J et al: Outcome of tibial shaft fracture with severe soft tissue injury treated by unreamed nailing versus external fixation, *J Trauma* 1995; 39: 707-711.
12. Singer R W, Kellam J F: Open tibial diaphyseal fractures. Results of unreamed locked intramedullary nailing, *Clin Orthop* 1995; 315: 114-118.
13. Reimer B L, Dichristina D G, Cooper A et al: Non-reamed nailing of tibial diaphyseal fractures in blunt polytrauma patients, *J Orthop Trauma* 1995; 9: 66-75.
14. Ostermann P A, Knopp W, Josten C, Muhr G: A comparative analysis of unreamed intramedullary nailing and external fixator in complicated tibial fractures, *Chirurg* Nov. 1993; 64(ii): 913-7.
15. Johnner R, Wruhs O: Classification of tibial shaft fractures and correlation with results after rigid fixation, *Clin Orthop* 1983; 178: 7-25.