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MANAGEMENT OF DIAPHYSEAL TIBIA FRACTURES WITH INTERLOCKING NAIL WITHOUT USING IMAGE INTENSIFIER

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ABSTRACT: This is a prospective study done on Shaheed Ziaur Rahman Medical College Bogra, Bangladesh in Ortho- Surgery department from April 2014 to April 2015.The purpose of this study is to analyze the result of interlocking nailing without the use of an image intensifier. Total 35 patients were operated in this method with minimally open reduction and internal fixation with interlocking intramedullary nail. Ages of the patients were 25 to65 years. Mean union time was 16 weeks, ranging from 12 to20 weeks. We found highest number of patients having fracture in middle third of tibia and most of the injuries caused by RTA. In our study, we had compartment syndrome in 1 patient, lateral popliteal nerve palsy in 1 patient. All patients recovered with conservative treatment. It is, therefore concluded that interlocking intramedullary nailing can be performed under an experienced surgeon without the use of an image intensifier.

KEYWORDS: Management, Diaphyseal Tibia Fractures, Interlocking Nail, Image Intensifier.

1 INTRODUCTION

The tibia is more commonly fractured and sustains an open fracture than any other long bones due to its subcutaneous position with an annual incidence fracture of 2 per 1000 individuals [1]. Fracture of the tibia is one of the commonest musculoskeletal injuries and such fractures are frequently caused by high-energy trauma. The most common reasons are increasing road traffic accidents and falling from height from building constructions. The blood supply of tibia is relatively poor, therefore, complications and major disability are frequent out comes. [2, 3] Different types of intramedullary nails have been employed by surgeons over 500 years in the management of diaphyseal tibia fractures. The treatment in our hands has been filtered through many different methods from timetotime. Closed Tibial diaphyseal fractures have been internally fixed with Plates or with Intramedullary fixation devices like Centromedullary nails (K-nails, V-nails), Interlocking intramedullary nails (Reamed or Un reamed) or Multiple flexible intramedullary pins e.g. Enders nails [4,5,6]. Now, due to possibility of early ambulation and weight bearing of interlocking intramedullary nailing, it has been the modality of treatment for the diaphyseal fracture of tibia [7-10]. Intramedullary interlocking (IMIL) tibial nailing has biological and biomechanical advantage over plate osteosynthesis[11], and is usually performed using an image intensifier. But being expensive, it is not available in the most of the hospitals of resource-poor countries of the world like Bangladesh. And so, the purpose of this study is to analyze the results of interlocking nailing without the use of an image intensifier. There were 26 male and 9 female the age of patients ranged from 25 yrs. to 65 yrs. who were selected according to inclusion and exclusion criteria. Diaphyseal tibia fractures with interlocking nail normally done using image intensifier, and so it is necessary to expose radiation and radiographer is needed which made interlocking nail as an expensive surgery which is an important factor in countries with limited financial resources like Bangladesh .The purpose of this study is to analyze the results of interlocking nail without the use of an image intensifier. In this study of 35 diaphyseal tibia fractures treated with minimally open reduction and internal fixation with interlocked intramedullary nail fixation .The average follow up period was 9-12 months.

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2 PATIENT AND METHODS

This prospective This prospective study was conducted in orthopedic unit in Shaheed Ziaur Rahman Medical College Hospital Bogra from Apr. 2014 – Apr. 2015, it involves thirty five patient with closed tibia shaft fractures with unacceptable displacement (cannot be managed conservatively), aged from 25 yrs. to 65 yrs. were selected according to inclusion and exclusion criteria. Age of the injury was two days to 2 weeks. Intramedullary fixation was done by using self-locking, expandable nail in 35 patients of closed diaphyseal fractures of tibia .The various modes of injury were road traffic accidents (n = 21), fall from height (n = 9), simple fall (n = 5).Among tibial diaphyseal fractures 26 were male and 9 were female. Preoperative ceftriaxon (2gm) was given on induction and interlocking intramedullary nails (8-11) mm of diameter and (30 to 38 cm. long) were used. Antibiotics were continued for 02 weeks. Spinal anesthesia was given and patient was placed supine on the operation table.

Inclusion criteria:

- Closed Tibial diaphyseal fractures in the middle three fifths.

Exclusion criteria:

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

SURGICAL PROCEDURE- Patient positioned on an operation table in such a way that knee be flexed through 90 degree, then a straight incision over lower border of the patella. After splitting the ligamentum patellae identify tuberosity of the tibia. .Entry is made by application of AWL then introduced a guide wire through the entry point along the anatomical axis of the tibia. Open the fractured site through a small incision. Guide wire should be checked for ensure its presence in the medullary cavity and cross at the fracture site. Reduction was done. Then reaming done by different size of reamer. Finally after measurement of proper nail size, nail is introduced under guidance of guide wire. After final reduction nail is locked by two proximal and two distal screws. Then wound is closed in layers.

POSTOPERATIVE CARE-Limb was immobilized by long leg back slab and elevated on a pillow keeping the knee in slight flexion. The patient started isometric quadriceps exercise after 24 hours of operation. Stitches were removed on 14th postoperative day. Antibiotics are given routinely for two weeks in all cases. Then the patients were discharged with the advice to walk on crutch bearing, not weight on the affected site for six weeks and then report to the OPD of SZMCH. At six weeks check X-ray done, if there are radiological evidence of union, patient is allowed to touch the toe and gradually bear some weight but never more than half. At 12 weeks further review done by check X-ray. Most of the cases full weight bearing allowed on the operated limb.

3 RESULTS

35 patients of fractures tibia were studied until the final follow up. The study included patients 25 years and above in age. Table 1 shows the age distribution of both the groups of the patients. 26 patients were male & 9 were female.

Table 1: Age distribution

S. No.	Age Group	Number of patients	Percentage
1	25-34	14	40
2	35-44	7	20
3	45-54	3	8.57
4	55-64	9	25.71
5	65 and above	2	5.72

Fractures of tibia were found to be much more common in male as against female and more than half of the cases were below 45 years of age.

The mode of injury differs. But in our study of 35 cases, road traffic accidents were found to amount for most of the injuries (60%) as compared to other modes (shown in Table 2). It indicates increasing of road traffic accidents at present age becoming the major cause of diaphyseal tibia fractures.

Table 2: Mode of Injury

S. No.	Mode of Injury	Number of Patients	Percentage
1	Road traffic accidents	21	60
2	Fall from height	9	25.71
3	Simple fall	5	14.29

In our study of 35 cases we found fracture in proximal third, middle third and distal third region of tibia. We found highest number of patient having fracture in middle third of tibia.

Table 3: Site of Fracture

S. No.	Site of Fracture	Number of Patients	Percentage
1	Proximal third	8	22.86
2	Middle third	16	45.71
3	Distal third	11	31.43

In our study among 35 cases, 17 (48.57°/o) fractures were oblique, 10 (28.57%) fracture were spiral, and 8 (22.86%) fractures were transverse in nature.

Table 4: Nature of Injury

S. No	Type	Number of Patients	Percentage
1	Transverse	08	22.86
2	Oblique	17	48.57
3	Spiral	10	28.57

The timing of surgery ranged from two days to two weeks and averaged 7 days. The operating time ranged from 40 minutes to 1.25 hours. The mean of operating time was one hour. The patients follow up was continued till the fracture union. The average time required for union was 16 weeks.

FUNCTIONAL OUT COME- Functional outcome was excellent was in17 patients, good in 11 patients, fair in 5 patients and poor in 2 patients.

Table 5: Functional outcome; (n=35)

Result	Number	%
Excellent	17	48.57
Good	11	31.43
Fair	5	14.28
Poor	2	5.72
Total	35	100

4 DISCUSSION

Tibial shaft fractures are common since they account for 9.0% of all fractures. [12]. The aim of the study was to management of diaphyseal tibia fractures with interlocking nail without using image intensifier. Interlocking nails are commonly performed using an image intensifier but various studies to avoid the image intensifier has been also tried[13-18] . In our study during surgery, the fracture site was opened with the anterolateral approach with the 3 to 5 cm skin incision centering over the fracture site. The fracture site was washed or curetted to visualize the anterior aspect of the fracture ends. In our study, we had compartment syndrome in 1 patient, lateral popliteal nerve palsy in 1 patient, fat embolism in 1 patient. All patients recovered with conservative treatment. Few patients experienced anterior knee pain, pain at fracture site & locking bolt in treatment phase, most of them recovered after sound union, physiotherapy & analgesics. None of the patients developed chronic osteomyelitis. The limitation of this study is the small sample size and limited case study material available for analysis. However, it is evident from above fact that closed interlocking intramedullary nailing without using expensive image intensifier is a safe and quite effective for treatment of tibial diaphyseal fracture.

5 CONCLUSION

Interlocking intramedullary nailing is expensive and required image intensifier normally. But it can be achieved without the use of image intensifier once if the surgeon develops a reasonable experience of direct visualizing the hole of the nail and experience and practice with the use of distal aiming device. So, the management of diaphyseal tibia fractures with interlocking nail without using image intensifier solely depends on the experience of the surgeon.

BIOGRAPHY

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REFERENCES

[1] Alho A, Benterud JG, Hogevold HE, et al: Comparison of functional bracing and locked medullary nailing treatment of displaced tibial fractures. Clin Orthop 1992 april;(277):243-50.
[2] Rockwood A Charles, Green P David, Bucholz W Robert, Heckman D James. Rockwood and Green's fractures in adults (4th ed.). Lippincott-Raven 1996.
[3] G.S. Kulkarni. Textbook of Orthopedics and Trauma. Jaypee Brothers: Medical Publishers (P.) Ltd 1999.
[4] Watson T: Current Concepts Review :Treatment of Unstable Fractures of the Shaft of the Tibia J Bone Joint Surg.1994:76-A, 1575-1584
[5] Lottes, J.: Medullary nailing of the tibia with the triflange nail. clin. Orthop., 105: 253-266, 1974.
[6] Wiss, D. A.: Flexible medullary nailing of acute tibial shaft fractures. clin. Orthop., 212: 122-132, 1986.
[7] Alho A, Benterud JG, Hogevold, HE, Ekrland A, Stromsie K. Comparison of functional bracing and locked intramedullary nailing in the treatment of displaced tibial fractures. Clin Ortho 1992; 277: 243-50.
[8] Brug E, Pennig D: Indications for interlocking nailing. Unfallchirurg 1990; 93: 492-8.
[9] Tanna D.D., Interlocking tibial nailing without an intensifier. J Bone Joint Surg (British) 1994; 76: 670.

[10] Alho A, Ekeland A, Stromsoe K, Folleras G, Thoresen BO. Locked intramedullary nailing for displaced tibial shaft fracture. J Bone Joint Surg (British) 1990; 805-9.
[11] Gleeson NFR, Nachinolcar UG. Management of fracture shaft of tibia interlocking nailing versus plating. Indian J Orthopaed 1998; 32: 103-6.
[12] Garcia Juarez JD, Aguilera Zepeda JM, Bienvenu AT. Encalada Diaz MI, Sheldon OD. Use of the orthofix intramedullary nail in tibial shaft fractures. A review of 22 cases. Acta Orthop Mex 2007; 21: 212-6.
[13] Ikem IC, Ogunlusi JD, Ine HR. Achieving interlocking nails without using an image intensifier. Int'l Ortho 2007; 4: 487-90.
[14] Garcia Juarez JD, Aguilera Zepeda JM, Bienvenu AT. Encalada Diaz MI, Sheldon OD. Use of the orthofix intramedullary nail in tibial shaft fractures. A review of 22 cases. Acta Orthop Mex 2007; 21: 212-6.
[15] Tanna DD. Interlocking tibial nailing without an intensifier. J Bone Joint Surg (Bri) 1994; 76: 670.
[16] Babis GC, Benetos IS, Zoubos AB, Soucacos PN. The effectiveness of the external distal aiming device in intramedullary fixation of tibial shaft fractures. Arch Ortho Trauma Surg 2007; 127: 905-8.
[17] Giri SK. Achieving distal locking without an image intensifier. Nepal Med Coll J 2007; 9:275-77.
[18] Krettek C, Konemann B, Farouk O, Miclau T, Kromm A, Tscherne H. Experimental study of distal interlocking of a solid tibial nail: radiation-independent distal aiming device (DAD) versus freehand technique (FHT). J Ortho Trauma 1998; 12: 373-8.