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Unreamed Interlocking Nailing In Grade- I Fractures of Tibia: A Retrospective Study

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I. INTRODUCTION

The tibia is the strongest and largest bone in the body next to the femur. Most of it is subcutaneous , which makes it more vulnerable to injury.One of the most common shaft fracture of long bones it tibial shaft fractures

Tibia is included in 40% of all long bone fracture. About 25% of tibial fracture are comminuted open fracture .The primary causes of these fractures are road traffic injuries .Orthopedic surgeons are facing challenges when patients come with mild and severe bone fractures with close and open fractures with severe mild and severe soft tissue damage. Open fracture should be treated as surgical emergencies. In surgical treatment , external and internal fixation methods can be applied.

II. METHODS

Between oct 2019 and June 2021, a total of 30 cases(86.67% males and 13.33% females) tibial shaft fractures were operated on with unreamed interlocking nails . Every patient came in follow-up. All patients followed for a mean period of 2 years (18-24 months) only tibial shaft fractures were included. All type of tibial fractures were taken in study. The causes of all fractures was road traffic accidents. The patient mean age was 45years and there were 66.6% closed fracture and 33.33% was grade-1 tibial fracture. 33.33% fracture was at upper 1/3 tibial fracture,33.33% were lower 1/3 fracture, and 33.33% fracture were at mid – shaft level. In all cases iv fluids ,iv ceftrixone 1gm and analgesics was given for 4 days. We also injected mikacine 500gms in grade-1 compound. Only wound washed with normal saline and betadin dressing. All cases after 5 days were under spinal anesthesia and an interlocking nail size 9mm was inserted without reaming. Every nail was interlocked proximally and distally.

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Fig1: A 30 year old female patient with distal-third tibial was treated with locking nailing.

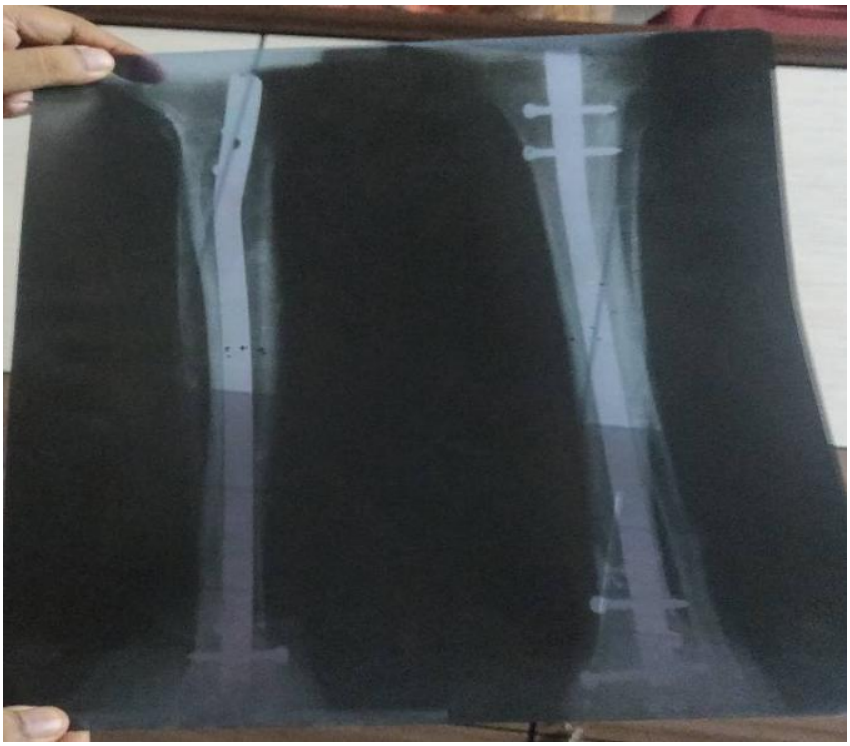

Fig 2: A 45 year male with distal one third fracture was interlocked with nail 8 weeks after injury showing full callus formation.

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Fig 3: A 65 year old patient, interlocking nailing was done showing exuberant callus after 2 years.

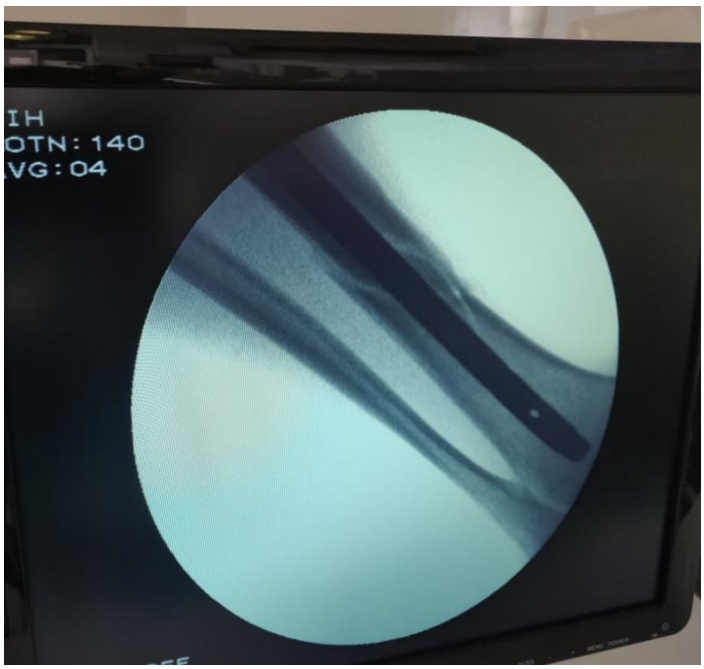

Fig4: Interlocking nailing was done in distal one third fracture. This is early postop picture in c-arm.

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Fig5: A 40 year old patient with distal one-third fracture Interlocking nailing was done which in follow up united with callus formation.

Fig 6:A 45 year old patient with fracture middle one third. Interlocking nailing was done showing good alignment of fracture. In follow-up it was united.

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Fig 7: A 50 year old patient with fracture in lower one-third. Interlocking nailing was done and in follow-up fracture was united with good callus formation and patient was able to walk after 8 weeks.

III. RESULTS

After interlocking ,nailing was rapidly healed with in 1 week in all grade-1 fractures .All patients were kept on non weight bearing walking with axilliary crutch for 6 weeks and the mean partial weight bearing time was 7.3 weeks.

- 60% patients improved with callus formation. 24% patients needed dynamisation after 10-12 weeks since the fracture site was painful.
- 82% patients showed union with exuberant callus only
- 13.33% diabetic patients showed delayed union and small discharging wound over distal interlocking screw which healed after removal of nail.
- No patients was having non union after 14 weeks.

In this study and as shown in the table below, fracture healing was assessed at the end of 6 weeks ,3months and 6 months respectively on radiographs taken in anteroposterior & lateral views.

- At the end of 6 weeks, minor callus was observed in all patients.

Frature healing (at 6weeks)	Frequency		Percentage	
Bridging callus	30		100	
Obliteration of fracture line	0		0	
No visible fracture line	0		0	

Table1: *Fracture healing at 6 weeks*

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• At the end of 3 months, callus was present for 53.3% and obliteration was present in fracture line for 46.7 % patients and no visible frature line was found.

Fracture healing (at 6 months)	Frequency	Percentage
Bridging callus	16	53.3
Obliteration of fracture line	14	46.7
No visible fracture line	0	0

Table2: Fracture healing at 3months

• At the end of 6 months,28(93.3%) cases had obliteration of fracture line and , 2(6.7%) cases had no visible fracture lines.

Fracture healing (at 6weeks)	Frequency	Percentage
Bridging callus	0	0
Obliteration of fracture line	28	86.7
No visible fracture line	2	6.7

Table3: Fracture healing at 6 weeks

Result	Number	Percentage
Excellent	16	53.3
Good	9	30
Fair	5	16.66
Total	30	100

Table 4: Functional outcome (n=30)

IV. DISCUSSION

In our study,30 patients of tibia fracture were included out of which 26 were male and 4 were females with mean age 45 years.

Tibia fractures are among the most difficult fractures to treat effectively. The soft tissue condition, degree of comminution, and joint damage sustained at the time of injury affect long-term clinical outcome. The goal of surgical treatment is to achieve an anatomical realignment of the articular surface while providing sufficient stability to allow early movement. This should be accomplished using techniques that minimize devascularization to bone and soft tissue in the hope of reducing complications resulting from treatment. Intramedullary nailing is a well established surgical technique for the treatment of closed and open tibial fractures

Unreamed interlocking nailing is a lucrative option in management of closed and grade 1 gustilo tibial fractures. Since the vascularity is not damaged, fractures tend to unite early. There is minimal blood loss intra- operatively and is associated with low risk of infection. Early mobilization can be advocated. It minimizes hospital stay and early recovery. Johner R et al. [3] reported that plating as compared to nailing results in infection five times more in incidence and non-union twice as common. Unreamed nailing has advantages compared to reamed nailing that it doesn't damage the endosteal blood supply. Klien MP et al. [7] ,evaluated the cortical blood supply of canine tibiae after nailing with and without reaming. They found that reaming disrupts an average of 70 percent of the cortical blood supply ,while insertion of a nail without reaming disrupts the blood supply

in only the inner third of the cortex. There was bimodal distribution with respect to age group. 35% of cases were in the age group 20 to 30 years while 25% belonged to 4 to 50 years age group. Singer RW et al8 showed average to be 36 years in their study of 43 patients. Bonatus T et al. [9] studied 72 such cases where he determined the average age to be 30.3 years. There were 16 male and 4 female patients, indicating male patients to be more than female patients. Singer RW et al. [8] study included 30 males and 11females, while Bonatus T et al. [9] study had 52 men and 19 women. High velocity trauma is the main cause of open tibial fractures. Motor cycle accidents (two wheelers) constituted 60% of the cases, 25 were motor vehicle accidents (four wheelers), while 15% were pedestrian accidents Majority of the cases sustained fractures from road traffic accidents. Singer RW et al 8 reported 54.16% fractures to be out of motor vehicle accidents. Whittle AP et al. [10] in their study found out that the most common mode of injury was pedestrian –automobile accident- 23 cases (46%). In our study, we obtained excellent results for management of closed and grade 1 gustilo tibial fractures using unreamed techniques. What we observed was that at the end of 6 months, 28(93.3%) cases had obliteration of fracture line and , 2(6.7%) cases were non union but they united after doing dynamisation and PTB cast application for 3 weeks. We observed 2 diabetic patients with fractures, who showed delayed union but fracture united after extraction of nail which happened after 4 years.

Various modalities of treatment have been suggested for treating tibia fracture. Closed nailing and closed interlocking were introduced after the advent of image intensifier. Majority of these fractures satisfactorily treated by close inter locking nail but in Indian health infrastructure particularly at rural centers where the facility of image intensifier was not available, it is not the method of choice. Our aim is targeting to that area of health system, so that the treatment of fracture tibia could be made available.

Management of fracture tibia by closed intramedullary interlocking nailing is the ideal method which gives rigid fixation, rotational stability with minimal complications and early union with restoration of function.

V. CONCLUSION

We conclude that interlocking nailing of metaphyseal fractures of tibia, provides an effective achievement of fracture alignment. In all fractures interlocking proximally and distally was done that provides mechanical stability and prevents loss of reduction. When applied after insertion of the nail, with interlocking, it provides very rigid, anatomical reduction and fixation.

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