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A STUDY OF MANAGEMENT OF TIBIAL SHAFT FRACTURES BY INTRAMEDULLARY INTERLOCKING NAILING

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ABSTRACT

Fractures of diaphysis of tibia is quite common in orthopedic practice and are common entities that occur in road traffic accidents. However, management of these fractures are quite problematic and are challenging for orthopedic Surgeons. In current times intramedullary interlocking nailing is quite promising surgery to deal with tibial shaft fractures. The current study was taken up analyze cases of tibial shaft fractures with its epidemiological fractures with special emphasis on out come with intramedullary interlocking nailing. The study conducted over 25 cases indicated that the right sided middle 1/3rd tibial shaft fractures are common in young males. Medullary interlocking nailing surgery for tibial shaft fractures is very promising procedure with not only effectively promotes early healing of the fracture but also reduces hospital stay, infections nonunion and malunions.

Key words: Intramedullary Interlocking Nailing, Overall functional result, Tibial Shaft fracture, Thorsen Criteria

Introduction

Tibial diaphyseal fractures continue to pose vexing problems for orthopedic surgeons because of their varied presentations, common occurrence, notorious morbidity and difficulty to choose method of management as it is highly controversial [1]. It is estimated that the incidence of tibial fractures is nine times more common that femoral fractures. The spectrum of injuries to the tibia is so great that no single method of treatment is applicable to all fractures. Therefore, it is incumbent on the orthopedic surgeon to be skilled in a variety of treatment methods including closed functional bracing, external, skeletal fixation, open reduction and internal fixation using indirect reduction techniques, and intramedullary nailing. In the past several years there has been an unmistakable trend towards the use of small diameter nails without reaming in the management of unstable tibial shaft fractures. Sarimiento and co-workers [2] documented their experiences with functional bracing in the successful management of closed tibial fractures. However, not all the tibial fractures are amenable for brace treatment. It is more value in the treatment of closed low energy injuries. Further Functional bracing is also associated with complications like difficult reduction, loss of reduction, repeated manipulation and cast wedging, shortening, angular deformities etc. In this context the current study is taken with objective to study of management of Tibial shaft fractures by Intra Medullary Interlocking Nailing.

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Materials and Methods

The current prospective study was carried out at Department of Orthopedics Government Medical College and General Hospital from 1st July 2014 to 31 July 2015 and included twenty-five cases of Tibial diaphyseal fractures, including two tibial non-unions that were treated with locked intramedullary nailing. Prior to study consent from all the patients and clearance from Institutional Ethics Committee were obtained.

A detailed clinical history was taken, routine investigations and required specific investigations were done. All the preoperative risk factors such as diabetes, hypertension was controlled well prior to surgery. Standard Anesthetic and Surgical protocols were followed for per performing surgeries. Meticulous

postoperative care is initiated in all cases. Patients were discharged on 10th postoperative day after removal of Sutures. Patients were followed up at 6,12 and 16th weeks and later at 6months, 9months and one year and evaluation was carried out both clinically and radiologically. Full weight bearing was advised after 4-6 weeks and 10-12 weeks for stable and comminuted/ segmental fractures respectively. The static locking is converted to dynamic mode approximately 6-20 weeks after surgery by removal of screws farthest from fracture site. Implant removal was advised after 18-24 months after surgery.

Thoresen Criteria [3](Table-6)and Jonner& Wrush criteria[12] were used to assess the results. All the findings of the study are tabulated in a pretested proforma and analyzed using appropriate statistical methods.

Observations and discussion

Tibial Fractures and Age Incidence(Table-1):It is evident from the Table-1 that 80% of cases tibial fractures are seen in the age group of 20-years and least number of subjects are found in extremes of age. Median age of 35 years for occurrence of fracture corelates to the fact that younger population is at increased risk of sustaining tibial fractures thereby causing loss of lively hood as the injured being the bread earner of the family. Similar findings are noticed ina study conducted by Wiss and Stetson [4]

Table-1: Age incidence of cases

Age in Years	Number of cases(n)	Percentage (%)
11-20	2	8
21-30	8	32
31-40	5	20
41-50	7	28
51-60	3	12
61-70	0	0
Total	**25**	**100**

Sex Incidence of Cases(Table-2): In the current study 20 people male amounting to 80% and 5 were female amounting to 20 %. Similar sex incidence was noticed in studies conducted by other authors [5,6]. From this finding it is to be understood that in out society males are comparatively more mobile and hence more prone to road traffic accidents when compare to females.

Table-2: Sex Incidence of cases

Sex	Number of cases(n)	Percentage (%)
Male	20	80
Female	5	20
Total	**25**	**100**

Side of incidence(Table-3): It is obvious from the table that right side Tibia is commonly fractured as seen in 60% of cases than left tibia which is seen in 40% cases. No bilateral tibia fractures are encountered in our study. Similar findings were noticed in a study conducted by Atkins et al[7]

Table-3: Side of Fractures

Side	Number of cases(n)	Percentage (%)
Right	15	60
Left	10	40
Bilateral	0	0
Total	**25**	**100**

Site of Fracture(Table-4): It can be inferred from Table-4 that in the fracture of middle 1/3rd of the tibial shaft is more common as seen in 52% cases when compared to fractures of distal 1/3rd (36%). Least involved part of shaft in our study is proximal 1/3rd and seen in only 3 cases amounting to 12% of cases. Similar observations were made in a study conducted by Blachut etal [8] in cases of open fractures of tibial shaft.

Table-4: Site of Tibial Fracture

Site of Fracture	Number of cases(n)	Percentage (%)
Proximal third	03	12
Middle third	13	52
Distal third	09	36
Total	**25**	**100**

Type of Fracture According to A.O. Classification(Table-5): It is evident from table-5 that most of the cases belong to Class-A of A.O/OTA classification amounting to 68% flowed by Class-B(24%) and Class-C is limited to only 2 cases amounting to 08%.

Table-5: Distribution of cases according to A.O. Classification

Type of Class		Number of Cases(n)	Percentage (%)
A	1	3	12
	2	9	36
	3	5	20
B	1	4	16
	2	2	08
	3	1	04
C	1	1	04
	2	0	00
	3	0	00
Total		**25**	**100**

Further of the total 25 cases, 21(92%) were closed fractures, two cases were open fractures and two cases were non-union amounting to 4% each. Of these cases 13 cases were spiral fractures, four cases are comminuted fractures. The classification and findings are comparable with other studies [9-10]

Overall functional Result: Table-6 below indicate overall functional result as per Thoresen Criteria. With intramedullary interlocking nailing, excellent results were achieved to that extent it was 64% excellent, 28% good, fair and poor amounting to 4% in each category. Thus with the obvious advantages of early mobilization of patient, reduced morbidity and decreased time for union, low rates of complications, the indications are widened for interlocking nailing for which it has become the treatment of choice for unstable tibial diaphyseal fractures. Similar results were found in a study conducted by Riquelme et al [11,12].

Table-6: Thoresen criteria and Overall function result

Thoresen Criteria	Excellent	Good	Fair	Poor
Malalignment of Tibia in degrees/Varus/valgus	5	5	10	>10
Procurvatus/recurvatum	5	10	15	>15
Internal Rotation	5	10	15	>15
External Rotations	10	15	20	>20
Shortening(Cms)	1	2	3	>3
Knee Flexion(degrees)	>120	120	90	<90
Extension deficit(degrees)	5	10	15	>15
Pain/swelling	None	Minor	Significant	Severe
No.of cases(n)	**16**	**7**	**1**	**1**
Percentage (%)	**64**	**28**	**4**	**4**

Conclusion

From our current study we would like to put forward the following conclusions as to the benefits of medullary interlocking nailing.

1. The interlocking nail has widened the range of indications for medullary osteosynthesis of tibial shaft fractures.
2. Stability is achieved by transverse threaded screws in prefabricated holes in the nail which anchor the implant directly to the cortical bone, thereby controlling length, alignment and rotation of the limb.
3. Interlocking intramedullary nailing has proved to be useful for difficult comminuted segmental, Grade-I open fractures and unstable tibial fractures especially in patients with multiple fractures.
4. Interlocking nail also has important role in management of Aseptic nonunion.
5. Static reamed nail with locking screws above and below the fracture site secures the best stability of the fracture.
6. Since the closed intermedullary nailing does not disturb the fracture hematoma it aids for better fracture healing.
7. Reaming decreases the time to fracture union and thence necessity for second operation and also increase the stability and strength of the Bone-Nail Unit.
8. I allow for early protected weight bearing and joint mobility and so also aids for decrease in morbidity and dependence of patient, infection, malunion and nonunion.
9. The risk of refracture after implant removal is very less.

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