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Corresponding Author
Manoj Bhagirathi Mallikarjunaswamy,
Department of Orthopedics, CIMS, Chamarajanagar, Karnataka, India

Author Designation
[1]Senior Resident
[2,4,5]Post Graduate
[3]Assistant Professor

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A Study on Clinical Presentation of Cases of Complex Proximal and Distal Tibial Fractures at a Tertiary Care Hospital

[1]C.S. Rohith, [2]Siddharam Biradar, [3]Manoj Bhagirathi Mallikarjunaswamy, [4]Viresh and [5]Megha Naikal

[1,2,4,5]Department of Orthopaedics, Chamarajanagar Institute of Medical Sciences, Yadapura, Karnataka, India
[3]Department of Orthopedics, CIMS, Chamarajanagar, Karnataka, India

Abstract
The majority of lower extremity fractures, or 17% of all long bone fractures, are tibial fractures. Additionally, 5-10% of all tibial shaft fractures involve the proximal third of the tibia. Patients with clinically and radiologically confirmed proximal and distal metaphyseal fractures of tibia and were eligible for the study according to the above mentioned eligibility criteria were included in the study after informed consent from the patient. After carrying out necessary laboratory investigations and obtaining physical fitness for surgery, the subjects were surgical managed with expert tibial nailing through supra patellar approach. In the study, majority of the subjects belonged to the age group of 31-45 years (53.3%). The next common age group was 46-60 years (26.7%). The mean age of the subjects was 42.83±11.47 years. In the study, majority of the cases were distal tibial fractures (60.0%), while remaining 40.0% cases were proximal tibial fractures.

INTRODUCTION

Tibia supports the body's weight while also acting as a conduit for the foot's neurovascular supply. The tibia is vulnerable to injury because of its position and the fact that its anteromedial border is covered by skin[1].

The tibia's length ranges from 30-47cm and its diameter is 8-15mm. Diaphysis is especially vulnerable to twisting injuries because it gets thinner distally. Contrary to its outward appearance, the medullary canal has a cross section that is substantially more rounded. Its hourglass form and variable Isthmus protrusion mean that only the middle few centimeters of the diaphysis may achieve a tight endosteal fit and intra medullary fixation[2,3].

The majority of lower extremity fractures, or 17% of all long bone fractures, are tibial fractures. Additionally, 5-10% of all tibial shaft fractures involve the proximal third of the tibia[4].

It demonstrates a bimodal distribution, with low energy spiral patterns more frequently occurring in individuals over 50 and high energy transverse and comminuted patterns more frequently occurring in patients under 30.

However, high energy tibial fractures are roughly twice as common in males as in girls in younger patients. Tibial diaphyseal fractures with high energy are frequently linked to motor vehicle accidents.

MATERIALS AND METHODS

Study Population: Patients with complex proximal and distal fractures of tibia, admitted under the department of Orthopedics of study center during the proposed study period.

Study Design: Prospective clinical study.

Sample Size:

- The total sample size was rounded to 30.

Sampling Method:

- Convenience Sampling.

Inclusion Criteria:

- All skeletally mature patients (Age >18yrs).
- Proximal and distal metaphyseal fractures of tibia.
- Metaphyseal fractures of tibia extending into diaphysis.
- Type 1 and 2 tibia fractures.

Exclusion Criteria:

- Patient age less than 18 years.
- Pathological fractures.
- Type 3 fractures of tibia.
- Non-union and delayed union.
- Patients not fit for surgery.

Patients with clinically and radiologically confirmed proximal and distal metaphyseal fractures of tibia and were eligible for the study according to the above mentioned eligibility criteria were included in the study after informed consent from the patient.

After carrying out necessary laboratory investigations and obtaining physical fitness for surgery, the subjects were surgical managed with expert tibial nailing through suprapatellar approach.

Patient were followed up post operatively and at 1, 3, 6 and 12 months regularly until the union was achieved both clinically and radiologically.

RESULTS AND DISCUSSIONS

In the study, majority of the subjects belonged to the age group of 31-45 years (53.3%). The next common age group was 46-60 years (26.7%). The mean age of the subjects was 42.83±11.47 years.

In the study, majority of the subjects were males (70.0%) and the remaining were females (30.0%).

In the study, the most common mode of injury was road traffic accidents (66.7%), followed by injury sustained in the workplace (20.0%). Remaining 13.3% suffered fracture due to fall from height.

In the study, majority of the subjects were operated 3 and 7 days after injury (53.4%).

The next common duration between injury and surgery was less than 2 days (23.3%).

In the study, majority of the cases were distal tibial fractures (60.0%), while remaining 40.0% cases were proximal tibial fractures.

In the study, about 36.7% of the subjects suffered associated injuries. Remaining 63.3% cases presented without any associated injuries. The associated injuries were head, facial and forearm injuries, fracture of fibula over the affected limb and fracture of clavicle and femur.

Among the 11 individuals who suffered associated injuries, head injury and ipsilateral fibula fracture were observed to be the most frequent injuries, followed by facial injury.

In the present study, majority of the subjects belonged to the age group of 31-45 years (53.3%). The next common age group was 461-60 years (26.7%). The mean age of the subjects was 42.83±11.47 years. Further, on comparison with the previous studies, it was observed that the proximal and distal tibial fractures often seen in adult age group. This can be made clear with the mean age being compared with the previous literature as follows:

Majority of the subjects in the present study were males (70.0%) and the remaining were females (30.0%). This sort of male predominance was observed

Table 1: Age distribution of the study subjects

		Frequency (N)	Percentage
Age group	<30 years	4	13.3
	31-45 years	16	53.3
	46-60 years	8	26.7
	>60 years	2	6.7

Table 2: Distribution of the study subjects based on gender

	Mean	SD	Median	Minimum	Maximum
Age (in years)	42.83	11.47	41.50	23.00	67.00

Table 3: Distribution of the study subjects based on mode of injury

		Frequency (N)	Percentage
Gender	Male	21	70.0
	Female	9	30.0

Table 4: Distribution of the study subjects based on interval between injury and surgery

		Frequency (N)	Percentage
Mode of Injury	Road Traffic Accidents	20	66.7
	Workplace Injury	6	20.0
	Fall From Height	4	13.3

Table 5: Distribution of the study subjects based on the proximity of tibial fracture

		Frequency (N)	Percentage
Duration till Surgery	<2 days	7	23.3
	3-5 days	8	26.7
	6-7 days	8	26.7
	8-14 days	5	16.7
	>14 days	2	6.7

Table 6: Distribution of the study subjects based on associated injuries

		Frequency (N)	Percentage
Associated Injuries	Yes	11	36.7
	No	19	63.3

Table 7: Specific associated injuries among the study subjects

		Frequency (N)	(%)
Associated injuries (N=11)	Head injury	3	27.3
	Facial injury	2	18.2
	Clavicle fracture	1	9.1
	Both bone forearm fracture	1	9.1
	Femur fracture	1	9.1
	Ipsilateral fibula fracture	3	27.3

Studies	Mean age
Present Study	42.83 years
Sun Q *et al*[5].	47.47 years
Chan DS *et al*[6].	42.00 years
Sanders RW *et al*[7].	41.17 years
Courtney PM *et al*[8].	37.60 years

Studies	Male : Female
Present Study	70.0 : 30.0
Sun Q *et al*[5].	80.8 : 19.2
Sanders RW *et al*[7].	63.8 : 36.2
Courtney PM *et al*[8].	71.0 : 29.0

in most of the previous studies which has been showed in the following table. This is mainly because of the fact that males are often exposed to harmful environment, which could result in fractures.

In the present study, the most common mode of injury was road traffic accidents (66.7%), followed by injury sustained in the workplace (20.0%). This has been universal as road traffic accident was the commonest cause in most of the previous studies such as Fu B *et al*. (65.2%), Xu H *et al*. (58.3%), Bleeker NJ *et al.* (49.6%) and Courtney PM *et al.* (43.0%).

Majority of the cases in the present study were distal tibial fractures (60.0%) and about 36.7% suffered associated injuries which include head, facial and forearm injuries, fracture of fibula over the affected limb and fracture of clavicle and femur. Remaining 63.3% cases presented without any associated injuries. In another study by Fu B *et al.,* the commonest associated injury was observed to be ipsilateral fracture of fibula, followed by pelvic fracture.

CONCLUSIONS

- Majority of the subjects belonged to the age group of 31-45 years (53.3%) and the mean age was 42.83±11.47 years.
- Majority were males (70.0%) and the most common mode of injury was road traffic accidents (66.7%).

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