

Epidemiology of Open Tibial Shaft Fractures in Vindhya Region of Madhya Pradesh

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Abstract:

Introduction: Open fractures are more common in tibial shaft and delayed union, non-union and infection are relatively common complications of tibial shaft fractures, Tibia is the most commonly fractured long bone from its shaft. Open Fractures are particularly common in tibia because of its subcutaneous location. Even small degrees of rotational mal-alignment of the fracture tibia become noticeable because of hinge joints on its either side. In this study we evaluated the pattern of tibial shaft fracture in vindhya region of Madhya Pradesh

Material & Method: The study consisted of 36 selected cases of open fractures of tibial shaft and pattern of tibial shaft fracture is based on mode of trauma, type of injury, level of fracture and radiological type of fracture.

Results: Results being based on mode of trauma, type of injury, level of fracture and radiological type of fracture. Road traffic accidents (RTA) are most common mode of trauma with 61.11%. 33.33% of Grade III B open type of injury constitutes highest among Grade III An open, Grade II open, Grade I open fractures. Lower one third and spiral type of fracture is most common with 44.44% and 41.66% incidence respectively.

Discussion: The study was done in vindhya region of Madhya pradesh to study pattern of open tibial shaft fracture. Lower one third of tibial shaft fracture is common in this region. Male with age group 30-39 being commonly involved in fracture. So an idea of open tibial shaft fracture and its pattern in particular area is presented in this study.

Keywords: RTA, Open tibia fracture, Spiral fracture, Vindhya region.

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Introduction

Open fractures are more common in tibial shaft and delayed union, non-union and infection are relatively common complications of tibial shaft fractures, because of more frequency of compound fractures and high energy fractures due to road traffic accident.

Tibia is the most commonly fractured long bone from its shaft [2]. Joints both proximal and distal to the tibia are hinge joints so even small degrees of rotational mal-alignment of the fracture become noticeable.

Hence accurate reduction of fragments is more important in this bone.

Our aim in the present study is to study the pattern of tibial shaft fracture in the Vindhya region of Madhya Pradesh.

Material & Methods:

The present study comprises of 36 selected cases of open fracture of tibial shaft from September 2005 to September 2007 admitted in the Department of Orthopaedics Surgery, Shyam Shah Medical College and Associated Sanjay Gandhi Memorial Hospital, Rewa (M.P.) which is the center of Vindhya region of M.P. and patients of this region usually comes to this hospital for treatment.

Inclusion Criteria:

Displaced compound fractures of tibial shaft of patient above 15 years of age and of both sexes are included in the study. All patterns of fracture (transverse oblique, spiral, comminuted segmental) at various levels (upper 1/3rd, middle 1/3rd and lower 1/3rd) along with patients with all modes of trauma are included.

Exclusion Criteria: Patient below 15 years of age is excluded in the study.

Observations: The observations are based on complete follow up study of these patients.

Table 1: Age Distribution of Patients

Age Group (in years)	Total	
	No.	%
15-19	3	8.33
20-29	11	30.55
30-39	14	38.88
40-49	4	11.11
≥ 50	4	11.11
Total	36	100

Mean age of patient was 34 years. Mean age of male patients was 33 yrs and that of female patients was 38 years. Youngest patient was 15 year old and oldest was 68 year old. The incidence of fracture was most common in the 20-40 year age group which is the most productive age group population and population involved in more outdoor activities.

Table 2: Sex distribution patients

S. No.	Side	Total	
		No.	%
1	Male	31	86.11
2	Female	5	13.88
Total		36	100

Most patients were male due to increased exposure to outdoor environment and driving vehicles.

Fracture was more common on right side. Out of 36 patients 25(69.44%) got fracture on right side while 11(30.55%) got on left side.

Table 3: Mode of Trauma

S. No	Mode of Trauma	Total	
		No.	%
1	RTA	22	61.11
2	Fall from Height > 4 Ft.	9	25.00
3	Fall from < 4 Ft.	3	8.33
4	Assault by hard and blunt object	2	5.55
Total		36	100

Most common cause of injury was road traffic accidents (RTA)

Table 4: Type of Injury (Gustilo Anderson Classification)

Type	Total	
	No.	%
Closed	0	0
Grade I Open	6	16.66
Grade II Open	8	22.22
Grade III A open	10	27.77
Grade III B open	12	33.33
Total	36	100

Grade III_B was most common type of open fractures and they were treated by external fixator application.

Table 5: Level of Fractures

S. No.	Level	Total	
		No.	%
1	Upper third	7	19.44
2	Middle third	7	19.44
3	Junction of M/3 and L/3	6	16.66
4	Lower third	16	44.44
Total		36	100

Fractures were most common in the lower third of tibia.

Table 6: Radiological Type of Fracture

S. No.	Type	Total	
		No.	%
1	Transverse	3	8.33
2	Spiral	15	41.66
3	Oblique	9	25.00
4	Comminuted	6	16.66
5	Segmental	3	8.33
Total		36	100

Spiral fracture pattern was most common.

Discussion

Tibia is the most commonly fractured long bone from its shaft worldwide. Compound fractures are more difficult to treat than closed fractures. Compound fractures are surgical emergencies that perhaps should be thought of as incomplete amputations. We are now in the fourth era of treatment of compound fracture according to Tscherne [3] functional preservation characterized for aggressive wound debridement, definitive fracture stabilization with internal or external fixation & delayed wound closure.

With the use of modern antibiotics & antiseptics more & more compound fractures are being fixed internally but external fixator has a definite role in the treatment of compound fractures. Fractures with small wounds can also be treated conservatively.

In this study majority of patients were between age group of 20-40 years. Overall mean age was 34 years. Mean age of male patient were 33 yrs & of female slightly higher 38 yrs. This age group is the most productive & most earning, most mobile age group & involved in more outdoor activities of family & society. Hence impact of this fracture is high & causes significant morbidity to the patient, family & society. Hence appropriate treatment & early rehabilitation of these patients is very important. Court Brown [4] (1998) also reported average age of 37 years for fracture tibia & fibula.

Out of 36 cases there were only 5 (13.88%) females & 31 (86.11%) males. Male population is more involved in outdoor activities, driving vehicles & more mobility. RTA was the predominant cause of trauma in our study followed by fall from height (> 4 feet). These fractures are high energy fractures. Out of 36 fractures there were 22 cases (61.11%) were due to RTA.

Due to rapid growth of population, rapid industrialization and increased number of vehicles, RTA is increasing day by day. Tibia being an exposed & subcutaneous bone commonly fractured in motorcyclist accident &

compound fractures are more commonly met with this mode of trauma. As they are high energy fractures & associated with high grade compounding, treatment of these fractures is especially difficult.

Similar incidences were reported by Ekeland, Thoresan, Alho et al (1988) in which 23 fractures (51%) were due to RTA. In the study by Russel Taylor [6] (1992) 68% of cases had RTA as mode of trauma.

In the study of Sarmiento et al [7] (1984) the commonest cause of fractures was also RTA

In this study grade IIIB (Gustilo Anderson) were most common type of compound fractures followed by Grade IIIA, II & I. Out of 36 cases there were 12 (33.33 %) cases of grade IIIB compound fracture, 10 (27.77 %) were of grade IIIA, 8 (22.22 %) were of grade II and 6 (16.66 %) were of grade I compound fracture. Due to subcutaneous location of tibia this bone is easily exposed by a high energy trauma classifying this fracture into grade IIIB classification. Treatment of grade IIIB compound fracture of tibia is especially difficult requiring simultaneous treatment of bony & soft tissue injury by orthopaedic & plastic surgeons respectively. Majority of grade III compound fracture were treated by external fixator. Court Brown [5] (1995) also reported incidence of 65% of grade III compound fracture amongst the compound fractures. Out of 26 patients, 25 (69.44 %) were of dominant right sided injuries. In India on a left sided traffic right sided leg is more exposed to trauma.

In our study lower 1/3rd was the most common level of fracture followed by mid-1/3rd, upper 1/3rd & junction of mid 1/3rd & Lower 1/3rd. Out of 36 cases there were 16 (44.44%) of fracture at Lower 1/3rd & 7 (19.44%) each at mid-1/3rd & upper 1/3rd & 6 (16.66%) of junction of mid 1/3rd & Lower 1/3rd. Fractures of lower 1/3rd of tibia are especially prone for non-union due to diminished blood supply to this part of bone. In the series of Russel and Taylor [6] (1992) 57.4% cases were in the middle and lower 1/3rd junction. Sarmiento et

al [7] (1984) had 49.6% of their cases with fractures in the middle third. Fractures of the lower third constituted 38.9% of the fracture.

In our study, spiral pattern was most common type of pattern of fracture followed by oblique & comminuted types. Out of 36 cases there were 15 (41.66%) of spiral & 9 (25.00%) cases of oblique & 6 (16.66%) cases of comminuted fractures. Spiral fractures pattern is an unstable type of fracture requiring stable reduction and fixation.

In the study by Ekeland, Thoresan, Alho et al (1988) most fractures were transverse or short oblique but 20% were comminuted and 11% were segmental. Sarmiento et al [7] (1984) reported 30.7% comminuted fractures, 26.6% oblique fractures, 21.5% spiral fractures, 17.9% transverse fractures and 3.3% segmental fracture. Road traffic accidents are increasing day by day with the increased number of these fractures. Study to evaluate their pattern helps administration to take measures to prevent these unfortunate incidents.

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