ORIGINAL ARTICLE

Frequency of tibial diaphyseal fractures among patients presenting with motorcycle accidents

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Abstract

Introduction: Tibia is one of the long bone of the body. Due to its superficial location tibial fractures are common. Due to increasing population and changing human habits the number of accidents and high energy trauma is rising. Management of open fracture tibia is a complex problem and is a challenge for both Orthopaedic and plastic surgeons and requires the widest experience, the greatest wisdom, and the nicest of the clinical judgment in order to choose the most appropriate treatment for particular pattern of injury. This study will give us the latest and updated knowledge about the frequency of tibial diaphysial fractures after motorcycle accident. Our results may vary with other study because of lack of knowledge of traffic rules, excessive use of motorbike, rash driving. The results of this study will be shared with local orthopedic surgeons to devise future research and policy recommendations.

Objective: To determine the frequency of tibial diaphysial fractures among patients presenting with motorcycle accidents.

Study design: Descriptive cross sectional.

Material and methods: In this study a total of 222 patients were observed. Detail patient history and clinical examination was done. Laboratory investigation and X-rays was confirmed the diagnosis of tibial diaphyseal fractures. All the above mentioned information including name, age, gender, socio-economic status, occupation, education level was recorded in a proforma. Strictly exclusion criteria had followed to control confounders and bias in the study results.

Results: In this study mean age was 30 years with SD ± 12.33. 93% patients were male while 7% patients were female. More over 34% patients had tibial diaphyseal fracture and 66% patients did not had tibial diaphyseal fracture.

Conclusion: Our study concludes that the frequency of tibial diaphysial fractures was 34% among patients presenting with motorcycle accidents.

Keywords: Tibial diaphysial fractures, motorcycle accidents, road traffic injuries.

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Introduction

Tibia is one of the long bone of the body.[1] Due to its superficial location tibial fractures are common.[2,5] Due to increasing population and changing human habits the number of accidents and high energy trauma is rising.[3,13] Management of open fracture tibia is a complex problem and is a challenge for both Orthopaedic and plastic surgeons and requires the widest experience, the greatest wisdom, and the nicest of the clinical judgement in order to choose the most appropriate treatment for particular pattern of injury.[4,5,14] Different options for management of tibial fracture are irrigation, debridement, external fixation, plating and intramedullary nailing.[6]

Treatments of distal tibial fractures are usually different from diaphysial fractures and are frequently associated with worse results and complications. There seems to be a controversy about fibular fixation in the treatment of distal tibial fractures. Several studies about the effects

of fibular fixation on distal tibial fractures have been done.[7,8,11,12]

Road traffic injures (RTIs) are responsible for a substantial proportion of deaths and injuries and are responsible for more years of life lost than most human diseases. Human behavior factors, vehicle factors, and road factors contribute to the causation of road traffic crushes.[8]

Injuries related to motorcycles contribute significantly to the number road traffic injuries seen at Western Provincial Hospital, Kakamega, taking out a significant number of lives and burdening health workers with consumption of hospital resources. Lower limb injuries involving the femur fractures, hip dislocation, tibial fractures and ankle injuries constituted 51% of all the injuries.[9] In one study, there were 100 males and 16 females who presented with history of motorcycle accidents. Tibial fractures predominated at 29.3%, with 25% of these being open and the rest closed.[10]

Motorcycle is the most commonly used vehicle for transport not only in Pakistan but in all parts of the world. Due to lack of safety regulations and issues related to compliance with traffic laws, motorcycle accidents are most common accidents in any part of the world including Pakistan, Peshawar and Kohat. This study is designed to determine the frequency of tibial diaphyseal fractures after history of motorcycle accidents. Tibia being the superficial bone is first in contact with the ground in any type of motorcycle accident and studies on the frequency of its fractures are extremely rare. This study will give us the latest and updated knowledge about the frequency of tibial diaphysial fractures after motorcycle accident. Our results may vary with other study because of lack of knowledge of traffic rules, excessive use of motorbike, rash driving. The results of this study will be shared with local orthopedic surgeons to devise future research and policy recommendations.

Material and Methods:

Study Settings: Orthopaedics Department of Khyber Teaching Hospital, Peshawar and District Headquarter Hospital, Kohat.

Duration of study: Six months 28th June, 2018 to 28th December, 2018.

Study design: Descriptive cross sectional.

Sample size: Sample size was 222, keeping 29.3%[10] proportion of tibial fracture after motorcycle accidents, 95% confidence level and 6% margin of error using WHO sample size calculations.

Sample t echnique: Consecutive (non probability sampling)

Sample selection:

Inclusive Criteria:

1 All patients presenting with history of motorcycle accident with duration <48 hours.

2 Both genders, male and female

3 Age 18-60 years.

Exclusive Criteria:

1. Pathological fractures as they also need primary pathology to be dealt with. (on the bases of clinical investigations and radiological findings)

2. Medically unstable patient who is an extremely poor anesthetic and surgical risk. In such situation less invasive and short procedures are recommended initially till stabilization of patient's condition.

The above mentioned conditions act as confounders and if included had introduce bias in the study.

Data collection procedure: Approval of the hospital ethical committee is obtained prior to conducting the study. Fully informed and written consent was taken from the patients. The study was conducted on patients presenting to emergency / Orthopaedic Department of Khyber Teaching Hospital Peshawar and District Head-

Table 1: *Age distribution (n= 222)*

Age	Frequency	Percentage
18-30years	151	68%
31-60years	71	32%
Total	222	100%

Table 2: *Gender distribution (N= 222)*

Gender	Frequency	Percentage
Male	206	93%
Female	16	7%
Total	222	100%

Table 3: *Socioeconomic Status (N= 222)*

Socioeconomic status	Frequency	Percentage
Poor	73	33%
Middle Class	131	59%
Rich	18	8%
Total	222	100%

Table 4: *Socioeconomic Status (N= 222)*

Occupation	Frequency	Percentage
Office Worker	51	23%
Field worker	78	35%
Student	93	42%
Total	222	100%

Table 5: *Education Level (N= 222)*

Education level	Frequency	Percentage
Illiterate	84	38%
Primary to secondary	102	46%
Graduate/ post graduate	36	16%
Total	222	100%

Table 6: *Tibial Diaphyseal Fracture (N= 222)*

Tibial diaphyseal fracture	Frequency	Percentage
Yes	75	34%
No	147	66%
Total	222	100%

quarter Hospital Kohat with history of motorbike accident within 48 hours. Detail patient history and clinical examination was done. Laboratory investigation and X-rays was confirmed the diagnosis of tibial diaphyseal fractures.

All X rays was reported by consultant radiologists having minimum of seven years of experience to avoid intra observer bias. All the above mentioned information including name, age, gender, socio-economic status, occupation, education level was recorded in a proforma. Strictly exclusion criteria had followed to control confounders and bias in the study results.

Data analysis: The collected data was entered into computer using SPSS version 20 for analysis. Descriptive statistics was calculated means + standard deviation for numerical variables like age. For categorical variables like gender, socio-economic status, occupation, education level and tibial diaphyseal fracture was calculated as frequencies. Tibia diaphyseal fracture was stratified among age, gender, socio-economic status, occupation, education level to see the effect modifications using chi square test with p value of < 0.05 as significant. All results were presented in the form of tables and figures.

Results:

In this study age distribution among 222 patients was analyzed as 151(68%) patients were in age range 18-30 years, 71(32%) patients were in age range 31-60 years. Mean age was 30 years with SD ± 12.33. (as shown in table No 1.)

Gender distribution among 222 patients was analyzed as 206(93%) patients were male while 16(7%) patients were female. (as shown in table No 2.)

Socio- economic status among 222 patients was analyzed as 73 (33%) patients were poor, 131 (59%) patients were middle class, 18(8%) patients were rich. (as shown in table no 3)

Occupation among 222 patients was analyzed as 51(23%) patients were office worker, 78(35%) patients were field worker, 93(42%) patients were student. (as shown in table No 4)

Education level among 222 patients was analyzed as 84(38%) patients were illiterate, 102(46%) patients had primary to secondary, 36(16%) patients were student. (as shown in table No 5)

Frequency of tibial diaphyseal fracture among

Table 7: *Stratification Of Tibial Diaphyseal Fracture W.R.T age distribution (N= 222)*

Tibial diaphyseal fracture	18-30 years	31-60 years	Total
Yes	60	15	75
No	91	56	147
Total	151	71	222

chi square test was applied in which P value was 0.0062

Table 8: *Stratification of tibial diaphyseal fracture w.r.t gender distribution (n= 222)*

Tibial diaphyseal fracture	Male	Female	Total
Yes	73	2	75
No	133	14	147
Total	206	16	222

chi square test was applied in which P value was 0.0616

Table 9: *Stratification of tibial diaphyseal fracture w.r.t socioeconomic status (n= 222)*

Tibial diaphyseal fracture	poor	middle class	rich	total
Yes	25	44	6	75
No	48	87	12	147
Total	73	131	18	222

chi square test was applied in which P value was 0.9946

Table 10: *Stratification of tibial diaphyseal fracture w.r.t occupation (n= 222)*

Tibial diaphyseal fracture	Office worker	Field worker	Student	Total
Yes	17	26	32	75
No	34	52	61	147
Total	51	78	93	222

chi square test was applied in which P value was 0.9861

Table 11: *Stratification Of Tibial Diaphyseal Fracture W.R.T Education Level (N= 222)*

tibial diaphyseal fracture	illiterate	primary to secondary	graduate/ post graduate	total
Yes	29	35	11	75
No	55	67	25	147
Total	84	102	36	222

chi square test was applied in which P value was 0.9043

222 patients was analyzed as 75(34%) patients had tibial diaphyseal fracture while 147(66%) patients did not had tibial diaphyseal fracture. (as shown in table no 6)

Stratification of tibial diaphyseal fracture with respect to age, gender, socio-economic status, occupation, education level is given in (as shown in table no 7,8,9,10,11)

Discussion:

Tibia is one of the long bone of the body.[1] Due to its superficial location tibial fractures are common.[2,5] Due to increasing population and changing human habits the number of accidents and high energy trauma is rising.[3,13] Management of open fracture tibia is a complex problem and is a challenge for both Orthopaedic and plastic surgeons and requires the widest experience, the greatest wisdom, and the nicest of the clinical judgement in order to choose the most appropriate treatment for particular pattern of injury.[4,5,14] Different options for management of tibial fracture are irrigation, debridement, external fixation, plating and intramedullary nailing.[6]

Our study shows that among 222 patients with motor bike accidents, the mean age was 30 years with SD ± 12.33. Ninety three percent patients were male while 7% patients were female. Thirty four percent patients had tibial diaphyseal fracture while 66% patients didn't had tibial diaphyseal fracture.

Similar results were observed in another study conducted by Khan BM et al[15] in which there were 100 males and 16 females who presented with history of motorcycle accidents. Tibial fractures predominated at 29.3%, with 25% of these being open and the rest closed due to motor bike accidents.

In another study conducted by Jaña Netoab FC et al[16] had reported that 81% with fracture type IIIA, 12% IIIB and 7% IIIC; 85% males; mean age 32.3 years; and 57% victims of motorcycle accidents. The frequency of tibial shaft fractures were significantly more prevalent (47%) due to motor bike accidents. Eight patients were subjected to amputation: one primary case and seven secondary cases. Types IIIC (75%) and IIIB (25%) predominated among the patients subjected to secondary amputation. The MESS index was greater than 7 in 88% of the amputees and in 5% of the limb salvage group.

In another study conducted by Amin MQ et al[17] had reported that a total of 2120 patients were included in the study. 1980 (93.4%) were male and 140 (6.6%) were females. Male to females ratio were 14.14:1 with mean age of 33.28 ± 21.02. Between 0-20 years, 519 (24.5%) of patients were admitted, 1021(48.2%) of patients

were between 21-40 years, 467(22.0%) were between 41-60 years and only 113(5.33%) were above 60 years. Type A2 in 444(20.9%) were the most common pattern of fracture found. These trauma were most common in months of May, June and July and motorbike accidents were the main cause. The frequency of tibial diaphysial fractures was 38%. The mid shaft of tibia is the most commonly fractured i.e. 1038 (49.0%) followed by distal part i.e. 611(28.8%) and the least is the proximal i.e. 471(22.22%).

Our study also concluded that the trauma is increasing every year. 10.90% were in 2011, 18.02% were in 2012, 18.40% were in 2013, 21.65% of patients were admitted with tibial fractures in 2014 and 31.04% in 2015. Weiss et al,[18] have shown that the incidence of tibial diaphyseal fractures in Sweden declined from 18.7/105/year in 1998 to 16.1/105/year in 2004 and in 2007/8 it was 14.3/105/year. The reason behind this is the increasing population and the availability of motorbikes on low cost in Pakistan. The poor people of Pakistan can afford its price and hence it is the main culprit. Similar in South Korea the study conducted between 2005-2009 there is decreasing incidence in tibial shaft fractures.[19]

Conclusion:
Our study concludes that the frequency of tibial diaphysial fractures was 34% among patients presenting with motorcycle accidents.

Conflict of interest: None

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Role and contribution of authors:
Dr Khabeer Ahmad Khattak, collected the data, referecnes and did the initial write up.

Dr Basit Hussain, collected the data and helped in introduction writing.

Dr Nadeem ur Rehman, collected the references and data, and helped in interpretation of data.

Dr Imtiaz Ahmad, collected the referecnes and helped in discussion writing.

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