

INCIDENCE OF ADULT OPEN TIBIAL SHAFT FRACTURES. 6-YEARS STUDY IN LAHORE GENERAL HOSPITAL LAHORE, PAKISTAN

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ABSTRACT

Introduction: Significant number of open skeletal injuries treated in surgical emergencies comprise of Open tibial fractures. We have conducted a study to evaluate the incidence of open tibial fractures presented in Lahore General hospital

Methodology: Retrospective data of patients admitted in Orthopaedic emergency was analyzed from 2011 to the end of 2016. This study was designed to update the incidence within population, implication of cultural values and life style.

Results: Present study results showed significant increase in incidence as compared to evidence available in literature.

Conclusion: We recommend preventive measures including education and putting in place health & safety measure, in order to reduce these injuries.

Key words: Open Tibial fractures.

INTRODUCTION

In different populations variation in incidence of various fracture sites are important as they indicate different cultures and lifestyles in each region¹. One of these fractures is the tibial shaft fracture. Few studies regarding incidence have been undertaken on this injury. This study was designed to provide an update on incidence of open tibial shaft fractures in adults during 2011 to 2016 in Lahore General Hospital, a major referral educational orthopaedic center in Pakistan. Nowadays, the incidence of tibia fractures is increased. The severity of the fractures is intensified, and despite invention of new surgical techniques, the rate of complications is not substantially reduced². Serious complication of injury is compartment syndrome³. Major treatment problem is extensive defects of soft tissues⁴. Fracture healing will be more difficult if soft tissue trauma is more severe⁵. Open tibial fractures are generally classified according to Gustilo classification¹². There is much less information available regarding the incidence of open tibial shaft fracture in adults in our region as there is no local study about this. In our experience working in emergency department the incidence is much higher in our region as compared to the data described in textbook and in literature. So we

conducted a retrospective study in Lahore General hospital Pakistan to see the incidence of open tibial shaft fractures in adults.

METHODOLOGY

This study is a retrospective review of the record of the patients brought in the emergency department of orthopaedic in Lahore General hospital during the period from the beginning of 2011 to the end of 2016. Data was collected in terms of total number of patients, patients presented with fracture of tibia and number of patients presented with open tibial shaft fractures. Open tibial fractures were classified according to Gustilo classification of open fractures. A literature search was performed to know the studies quoting the incidence of open tibial fracture in different countries.

RESULTS

In 2011 total number of patients brought in emergency Lahore General Hospital were 10456. 208 patients had tibial fractures and out of which open tibial shaft fractures were 86 (table-1). So, the incidence was 41.3% (table-2). Similarly, in 2013 it was 36.6%, in 2014 it raised to 44.4% in 2015 it was 49.3% and in 2016 it was 49.6%. As we can see from the data

calculated that there is gradual increase in the incidence of open tibial shaft fractures in adults from 2011 to 2016 in our region.

Table-1: Number of tibial fractures

Year	Total No. of patients	No. of tibial fractures	Open	Close
2011	10456	208	86	122
2012	10255	304	105	199
2013	10932	456	167	289
2014	13533	693	308	385
2015	20672	968	478	490
2016	23316	1157	574	623

Table-2: Percentage of open & close tibial fractures

Year	Open tibial fractures	Close Tibial Fractures
2011	41.3 %	58.7%
2012	34.5 %	65.5%
2013	36.6 %	63.3%
2014	44.4 %	55.6%
2015	49.3 %	50.7%
2016	49.6%	50.4%
TOTAL	42.6 %	57.4%

DISCUSSION

From this study, open tibial fractures occur with a frequency of 42.6 per 100 new tibial fracture patients seen in the emergency orthopaedic department. This is in contrast with the Edinburgh trauma unit number of 44 per 100,000 new Accident and Emergency patients⁶. The overall incidence of open tibial fractures ranges from 3% to 13% described in various text books. In United States incidence of tibial fracture is 21.3%⁷. In Nigeria incidence is 31%⁸. In Malaysia tibia fibula fracture incidence is 18.7%⁹. In Hungary¹⁰ tibial shaft fractures present 15% of all fractures, which means about 2500 cases per year. About 75% of these would be Gustilo grade II or above and thus with an increased likelihood of joint participation between orthopaedic and plastic surgical specialties in the treatment.

Our retrospective 6-year series showed that, the high energy inflicted to the soft tissues (and thus necessity for a plastic surgical opinion) was not fully appreciated in 8% of cases, as after subsequent analysis from the case notes of the mechanism of injury, the soft tissue wound description at the time of initial surgery and the radiographic fracture pattern, it was clear that the injuries were under-graded at the time of treatment, in these cases. Knowledge of the mechanism of injury is

essential; in order to grade these fractures correctly, as this will often give the only indication of the level of energy transfer to the soft tissues. Indicators of high energy from the history include any road traffic accident (drivers, passengers or pedestrians), falls from height, any crush injury or fire arm/blast injuries. Examination indicators are imprints or tattooing from tyres or dirt, crush or burst wounds, de-gloving injuries or signs of compartment syndrome. Radiographic features include comminution of bone, wide separation of the fracture fragments, segmental fractures, air in the tissues or more than one fracture in the same limb. It is crucial that both the orthopaedic and plastic surgical consultant be informed on the night of admission in these cases due to poor outcome often associated with high-energy injuries, so that a joint treatment plan can be started⁶. It is recommended that all open tibial fractures should be taken as an orthopaedic emergency and first orthopaedic procedure commenced within 6 hours of admission⁶. There was a trend towards external fixation for those fractures associated with the greatest soft tissue trauma. In open fractures, compartment syndrome requiring fasciotomy does occur. Fasciotomy¹¹ depends on both the diastolic blood pressure and the actual compartment pressure. If the differential pressure is less than 30 mmHg, then fasciotomy is recommended. Increase in tibial fractures is due to increase in motor traffic accidents (MTAs), which is associated with increase in mortality rate. Latest World Health Organization (WHO) statistics shows further 60% increase in the 10 year period from 2004(2500 deaths)-2014(4000 deaths)¹³. However, these figures are gross undervalues due to significant under-reporting of MTAs¹³. There are many causes for this dramatic rise of mortality rates like increase in urbanization of population, bad road quality, rash driving, poor law enforcement of regulations and driving under addictions¹⁴. Increasing number of motorcycles especially motorcycle taxis without valid driving licenses and safety equipment for these motorcycles has been thought to have contributed to the rise in mortality and morbidly rates¹⁵. In recent years WHO has focused more on public health initiatives to reduce the increasing prevalence of MTAs in developing countries. Infact, a lot of work needs to be done as over 85% of MTAs occur in low to medium income countries¹⁶. In Tanzania over 65% of MTAs were due to rash driving¹⁷. There is an imperative need for primary prevention policies to be implemented in order to educate the public on road safety, to develop new legislation and to enforce existing road traffic laws.

To date there is no study conducted in Pakistan to know incidence of open tibial fracture.

CONCLUSION

There is a change in causation of tibial fracture most being due to motorbike and pedestrian injuries in our region leading to a much more increase in incidence of open tibial shaft fractures as compared to the figures available in limited literature. Open tibial fractures in adults are an orthopedic challenge. Further research is needed to improve our understanding of the interaction between age, severity of injury, concomitant injuries, type of fracture fixation and soft-tissue management as they relate to outcome. Therefore, carefully designed prospective, cohort, multicenter studies including a large number of patients with open or closed tibial fractures would be of great value. Clear criteria and indications for treatment should be followed and documentation of several variables (e.g. soft-tissue condition, concomitant injuries, fracture configuration, timing of surgery) should be included. Preventive measure including education, improving life style, health education and better safety measures should be taken. Strict implementation of traffic and civil laws, rules and regulations should be considered to overcome this problem. This study limitation was that it included only patients of one hospital so sample size was small. Require multicenter study to calculate a more reliable incidence.

REFERENCES

1. Epidemiology of adult tibial shaft fractures: a 7-year study in a major referral orthopedic center in Iran. Madadi F, Vahid Farahmandi M, Eajazi A, Daftari Besheli L, Madadi F, Nasri Lari M. *Med Sci Monit.* 2010 Apr 28;16(5):CR217-21
2. [Clinical and experimental assessment of the current treatment of tibial shaft fractures]. Wiegand N. *Orv Hetil.* 2010 Apr 11; 151(15):627-35. Hungarian.
3. Acute compartment syndrome. McQueen M. *Acta Chir Belg.* 1998 Aug;98(4):166-70.
4. Importance of an early tissue transfer in the treatment of complicated injuries of lower extremities. Nejedlý A, Tvrdék M, Kletenský J, Pros Z. *Acta Chir Plast.* 1994;36(1):11-4.
5. The significance of soft tissue trauma for fracture healing: a prospective study on 70 tibial shaft fractures. Rommens PM. *Acta Chir Belg.* 1992 Jan-Feb;92(1):10-8.
6. British Orthopaedic Association/British Association of Plastic Surgeons. *The Management of Open Tibial Fractures.* London: BOP/BAPS, 1997.
7. The most frequent traumatic orthopaedic injuries from a national pediatric inpatient population. Galano GJ, Vitale MA, Kessler MV, Hyman JE, Vitale MG. *J Pediatr Orthop.* 2005 Jan-Feb;25(1):39-44.
8. Ege Üniversitesi Tıp Fakültesi Ortopedi ve Travmatoloji Anabilim Dalı, İzmir, Turkey, ozkayin@yahoo.com
9. Comparison of fracture patterns between rural and urban populations in a developing country. Saw A, Sallehuddin AY, Chuah UC, Ismail MS, Yoga R, Hossain MG. *Singapore Med J.* 2010 Sep;51(9):702-8.
10. Clinical and experimental assessment of the current treatment of tibial shaft fractures. Wiegand N. *Orv Hetil.* 2010 Apr 11;151(15):627-35. Hungarian.
11. McQueen MM, Court-Brown CM. Compartment pressure monitoring in tibial fractures - the pressure threshold for decompression. *J Bone Joint Surg Br* 1996; 78: 99-104.
12. Kim PH, Leopold SS. Gustilo-Anderson Classification. *Clinical Orthopaedics and Related Research.* 2012;470(11):3270-3274. doi:10.1007/s11999-012-2376-6.
13. World Health Organisation (WHO) Road safety country profiles Tanzania 2007. Accessed 28th July 2016.
14. Museru LM, Mcharo CN, Leshabari MT. Road traffic accidents in Tanzania: a ten year epidemiological appraisal. *East and Central African Journal of Surgery.* 2002;7(1):23-26.
15. Sumner SA, Pallangyo AJ, Reddy EA, Maro V, Pence BW, Lynch C, Turner EL, Egger JR, Thielman NM. Effect of free distribution of safety equipment on usage among motorcycle-taxi drivers in Tanzania-A cluster randomised controlled trial. *Injury.* 2014;45(11):1681-6.
16. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.*
17. Boniface R, Museru L, Kiloloma O, Munthali V. Factors associated with road traffic injuries in Tanzania. *Pan African Medical Journal.* 2016;23:46.