



SHORT RESEARCH REPORTS

The Aetiology and Agents of Pre-Hospital Transportation of Patients with Femoral Shaft Fractures

Raphael O Ayorinde

University College Hospital, Ibadan, Nigeria

ABSTRACT

The femoral shaft is the part of the femur that consists of compact bone. Fractures involving the femoral shaft are recognised as disabling injuries and are a major cause of morbidity and mortality in patients with lower extremity injuries. This is because the fractures often result from high energy injuries and the injured patients frequently require help to be transported to hospital. This study reviewed the aetiology and agents of transportation in 69 patients who presented at the University College Hospital (UCH) in Ibadan, Nigeria, which is a low-income country (LIC). Most of the fractures resulted from road traffic crashes and the majority of the victims were transported by laymen, like drivers. It is believed that if basic training were to be given to this group of people, they would be useful in pre-hospital care in Nigeria's situation.

Key words

Aetiology, agents, pre-hospital, transportation, femoral shafts, fractures

Introduction

The femoral shaft is the part of the femur that consists of compact bone (Koostra, 1973). Fractures involving this bone are recognised as disabling injuries. Disability often results from limb shortening, malalignment, and prolonged immobilisation. These fractures ranked fourth among the first 20 leading non-



fatal injuries sustained as a result of road traffic collisions (Peden, Scurfield, Sleet, Mohan, & Hyder, 2004; Mock & Cherian, 2008). They usually result from high energy injuries except where there is underlying bone pathology. The burden that injuries place upon societies is particularly large in countries with limited resources.

It is well documented that high income countries (HICs) have well organised pre-hospital care, which has helped them to reduce the morbidity and mortality resulting from trauma. This is, however, not so in many countries classified as LICs, like Nigeria (The World Bank, 2009). Therefore, identifying the agents involved in pre-hospital transportation may help in the development of pre-hospital care strategies in Nigeria.

It is believed that defining the aetiology of these fractures will help in the understanding of this disabling injury and facilitating a practical approach in implementing preventive measures. These measures can then be targeted at different groups as suggested by the aetiology of each group.

Objective

This study describes the aetiology and agents involved in pre-hospital transportation of patients with femoral shaft fractures presenting at the Accident and Emergency Department of the UCH.

Materials and Methods

The investigation was a prospective, descriptive study of patients with femoral shaft fractures presenting at the Accident and Emergency Department of the UCH over a 12-month period. Consecutive patients presenting with fractures of the femur from October 2003 to September 2004 were recruited for the study. At presentation, a detailed history was obtained from each patient (or relative) and the information obtained included the patient's name, age, sex, aetiology, time of injury and the person(s) who brought the patient to the hospital.

Results

A total of 69 patients with 74 fractures presented at the Accident and Emergency Department of the UCH during the 12-month period. Of these, 49 (71.0%)

were males and 20 (29.0%) were females with a male to female ratio of 2.5:1. The age range was between 1 year and 70 years, with a mean age of 34 (± 19.7) years. Table 1 below shows the age distribution of the patients.

Table 1.
Distribution of patients by age

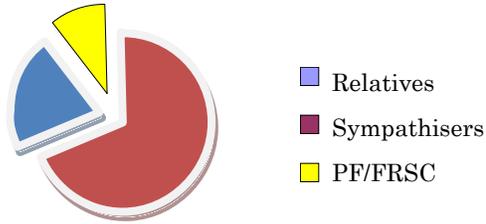
Age Range	Frequency	Proportion (%)
Less than 10	10	14.5
11–20	10	14.5
21–30	12	17.4
31–40	12	17.4
41–50	8	11.6
51–60	9	13.0
61–70	8	11.6
TOTAL	69	100

Thirty-five (50.7%) patients presented at the UCH from the accident scene, while the remaining 34 (49.3%) patients were referred from other health facilities. No patient presenting at the hospital directly from the accident scene received first aid treatment, and of the 34 referred patients, only 9 (13%) received some treatment before referral. The mean injury arrival time was 30 hours.

Of the 69 patients, 62 were brought to the UCH by the informal group; 47 (68.1%) were brought by their relatives, 15 (21.7%) by sympathisers/bystanders, and 7 (10.1%) by the formal group, namely, the Police and the Federal Road Safety Corp Officers (PF/FRSC). Of the 35 patients who presented from the accident scene, only 4 (11.4%) were rescued and brought to the hospital by the PF/FRSC (see Figure 1).

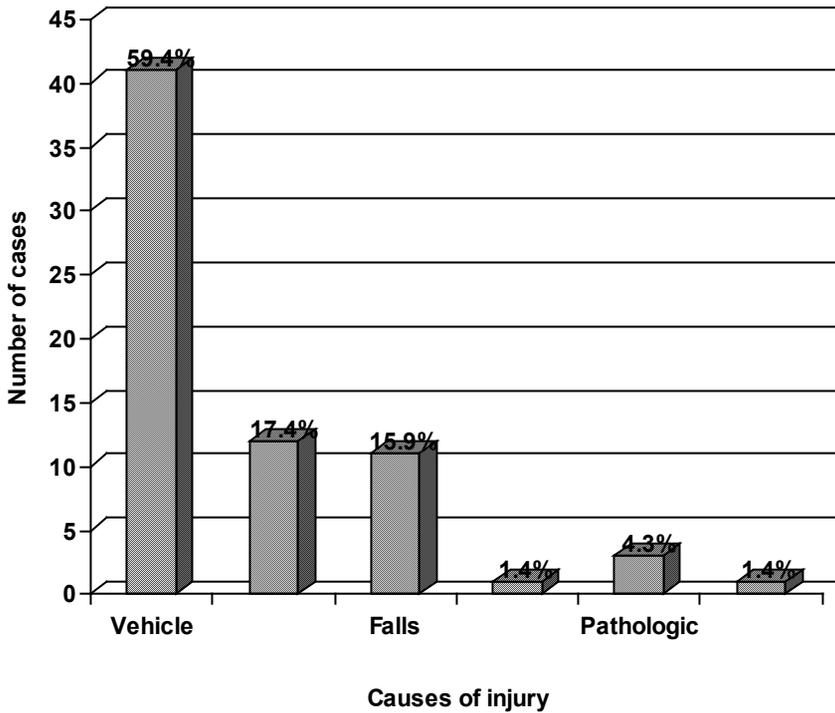


Figure 1
Distribution of patients by groups involved in transportation



Vehicle injury (41 = 59.4%) was the most common cause of injury (pedestrian in children and passenger in adults). This was followed by motorcycle injury (12 = 17.4%) and falls (11 = 15.9%). There was one case of fracture resulting from birth trauma (see Figure 2).

Figure 2
Aetiology of femoral shaft fractures



Pedestrian-vehicular crash (6 = 46.2%) was the most common cause of femoral shaft fracture in patients aged 15 years and younger, while passenger-vehicular crash (23 = 41.1%) took the lead among other causes in patients older than 15 years. The age specific causes are as shown in Table 2 below.

Table 2
Aetiology by age of patients with femoral shaft fractures

Aetiology	≤ 15 years		> 15 years		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Pedestrian-vehicular crash	6	46.2	12	21.4	18	26.1
Passenger-vehicular crash	0	0.0	23	41.1	23	33.3
Pedestrian-motorcycle crash	1	7.7	1	1.8	2	2.9
Passenger-motorcycle crash	1	7.7	9	16.1	10	14.5
Falls	3	23.1	8	14.3	11	15.9
Gunshot	0	0.0	1	1.8	1	1.5
Pathological fracture	1	7.7	2	3.6	3	4.3
Birth trauma	1	7.7	0	0.0	1	1.5
Total	13	100.0	56	100.0	69	100.0

Discussion

A total of 69 patients with 74 fractures were recruited during the 12-month period of the study. This is more than the number of patients reported per year by previous studies in Nigeria (Koostra, 1973; Oginni, Mattew, Thomas, & Adigun, 1993; Oyemade & Oluwole, 1973). The reason for this may be that the present study was prospectively conducted, while those studies were retrospective. It also may suggest that there is a higher prevalence of these fractures, as predicted by Oyemade and Oluwole (1973).

The increasing rate of occurrence of these fractures has a significant financial implication on the average Nigerian. The direct cost of operative treatment for femoral shaft fractures in the UCH is about \$1000, whereas the minimum wage of a Nigerian worker is about \$100. This leaves the victim and his/her caregivers poorer and often unable to attend to other equally important aspects of life. It is also of note that many patients with these injuries might have presented at other health facilities, especially traditional bone setters,

who are unable to provide modern care, thus leaving many patients with significant morbidity. A population-based survey in Ghana revealed that 0.83% of Ghanaians had injury-related disabilities. Most of these disabilities (78%) were due to extremities injuries (Mock, Tiska, Adu-Ampofo, & Boakye 2002).

The male preponderance is demonstrated with an M: F ratio of 2.5:1. This is in agreement with previous studies (Katchy et al., 1992; Koostra, 1973; Oginni, Mattew, Thomas, & Adigun, 1993; Ogunlade, Omololu, Alonge, & Salawu, 2003). The preponderance of males suggests that they may be more active and more engaged in activities that predispose them to injuries.

The occurrence of femoral shaft fractures cuts across all age groups. The youngest patient was a day-old baby with a fracture resulting from birth trauma, during a breech delivery. Oguachuba (1992) reported a 2-month old baby as the youngest patient in his series, while the youngest was a 3-year old in Ogunlade et al.'s (2003) series. Femoral shaft fractures at birth appeared to be uncommon. The peak age groups were between 20 and 40 years which are productive years, but these may be lost to morbidity or mortality. This is of great economic loss to these patients and the country at large.

Motor vehicular injury accounted for the majority (41 = 59.4%) of femoral shaft fractures in this study. The affected adults were mainly passengers while the affected children were mainly pedestrians; similar findings were reported by Katchy et al. (1992) and Oginni et al. (1993). However a previous report on femoral shaft fractures among children from Ibadan by Ogunlade, Omololu, Alonge, & Salawu (2003) stated falls as the predominant cause of these fractures in children. This difference could be explained by the recent reports by Bridgman and Wilson (2004) which noted that most femoral shaft fractures in children resulted from falls, but there was a variation of occurrence. This is such that up to the age of eight, falls were predominant, but thereafter traffic accident was predominant. In this study, only four patients were younger than eight.

Low energy injury resulted in fractures of the shaft of femur in three (4.3%) patients in this study. These comprised chronic osteomyelitis of the femur in a child, metastatic carcinoma of the prostate and giant osteoid osteoma. These patients gave a history of having severe pain in their thighs before falling down, which suggested that the patients probably fractured their bones before falling.

Transporting these patients from the scene of acute event to the hospital is a critical element of pre-hospital care (Kobusingye et al., 2005). When patients fracture their femur, as in many injured patients, they are unable to transport themselves without the help of others. It is noted that almost the same proportion of patients who were brought directly from the accident scene were initially transferred to other health centres before being referred to the UCH. However, a significant proportion (16%) of the patients referred did not receive any treatment from the referral centres. The reasons were either that there was no attending “doctor” on duty or there were no facilities for treatment. These facts bring to the fore the paucity of qualified physicians in peripheral hospitals. This can be explained by the fact these physicians prefer to work in federal hospitals because the pay is better and other working conditions are usually more satisfactory. It should also be noted that some of the peripheral hospitals are actually manned by nurses and other paramedics who usually are not trained in basic trauma care. Recently, some Nigerian health institutions organised basic trauma courses for the doctors and nurses in their institutions. A government policy that makes these courses compulsory for all peripheral doctors and nurses would likely reduce the number of patients who are referred to tertiary health centres without receiving first aid treatment.

Most patients were brought to the UCH through the informal sector. No patient brought from the accident scene received any first aid before arriving at the UCH. This is because patients were rescued and transported by untrained people. At present there is no formal pre-hospital care system in Nigeria. The PF/FRSC, who is sometimes involved in transporting patients, do not receive formal training in basic trauma care. The adoption of basic training on airway management, bleeding control and splint application as done in Ghana (Mock, Tiska, Adu-Ampofo, & Boakye, 2002) for laymen like drivers should be applied to these groups.

Conclusion

Femoral shaft fractures affect both children and adults with road traffic injury being the most common aetiology. It affects all age groups, with most being in the productive age. Patients with these injuries present late with no organised pre-hospital transport. Emphasis should be laid on primary prevention of femoral shaft fractures and public enlightenment on safe rescue methods while working to establish organised pre-hospital transport of these patients.

REFERENCES

- Bridgman, S., & Wilson, R. (2004). Epidemiology of femoral fractures in children in the West Midlands region of England 1991 to 2001. *Journal of Bone and Joint Surgery*, 86B, 1152–1157.
- Katchy, A.U., Nwankwo, O.E., & Chukwu, O. (1992). Fractures of the femur. A report of two hundred consecutive cases. *Medicare Journal*, 5(6), 3–6.
- Kobusingye, O.C., Hyder, A.A., Bishai, D., Hicks, E.R., Mock, C., & Joshipura, M. (2005). Emergency medical services in low and middle income countries: recommendations for action. *Bulletin World Health Organization*, 83, 626–631.
- Koostra, G. (1973). Femoral shaft fractures in adults: A study of 329 consecutive cases with a statistical analysis of different methods of treatment. *Journal of Bone and Joint Surgery*, 51B, 310–313.
- Mock, C.N., & Cherian, M.N. (2008). The global burden of musculoskeletal injuries. *Clinical Orthopaedics and Related Research* 466, 2306–2316.
- Mock, C.N., Tiska, M., Adu-Ampofo, M., & Boakye, G. (2002). Improvements in pre-hospital trauma care in an African country with no formal emergency medical services. *Journal of Trauma*, 53, 90–97.
- Oginni, L.M., Mattew, R., Thomas, F., & Adigun, A. (1993). Femoral shaft fractures in Ilesha, Nigeria. *Nigerian Medical Journal*, 2(4), 62–64.
- Oguachuba, H.N. (1992). Comparing the early result of open and closed treatment of fractures of the femur under tropical climate condition. *Nigerian Medical Journal*, 20, 13–16.
- Ogunlade, S.O., Omololu, A.B., Alonge, T.O., & Salawu, S.A. (2003). Domiciliary treatment of femoral shaft fracture in children. *West African Journal of Medicine*, 22(1), 67–71.
- Oyemade, A.A., & Oluwole, S. (1973). The pattern of fractures in an African community. *Nigerian Medical Journal*, 8(1), 21–24.
- Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan, E. et al. (2004). *World report on road traffic injury prevention*. Geneva: World Health Organization.
- The World Bank (2009). Data and statistics: Country groups. Retrieved March 28, 2009 from <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20421402~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>