Clinical Spectrum of Trauma at a University Hospital in Nigeria

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Abstract

Background and Objectives: Data on trauma in Nigeria requires updating just as trauma care needs coordination and organization. This study was done to examine the clinical spectrum of trauma and to propose measures for organization of trauma care.

Patients and Methods: A 2-year prospective report of an ongoing trauma research is presented. Data obtained from September 1999 to December 2001 (excluding September 2000 to December 2000) include name, age, sex, presenting diagnosis at the accident and emergency (A and E) unit, injury-arrival time, mode of transportation of patients to the hospital, and the outcome of care.

Results: Trauma patients comprised 2,913 of the 4,164 (70.0%) surgical patients seen in the A and E but 129 of 171 deaths (75.4%). Types of trauma were lacerations (585 patients, 20.1%), fractures (542, 18.7%), head injury (250, 8.6%), multiple injuries (249, 8.6%), burns (159, 5.5%), and others. Road traffic accidents (RTA) occurred in 1,816 patients (62.3%), falls in 308, assaults in 258, burns in 159, home accidents in 122, gunshot injuries in 107, industrial accidents in 73, and foreign body injuries in 70. There was no pre-hospital care. Transport to the A and E was done by relations, the police and a few Good Samaritans. Most of the patients reached the hospital in < 6 h. Common mortalities were from head injury (37 patients, 28.7%), multiple injuries (35, 27.1%), fractures (12, 9.3%), and burns (9, 7.0%). Of 106 deaths with timed records, 22 (20.7%), 56 (53.0%) and 28 (26.3%) occurred in 0–1 h, > 1–24 h and > 24 h, respectively.

Conclusions: The spectrum of trauma is predominantly RTA-related, hence, trauma care organization would include prevention of RTA, organization of pre-hospital care aimed at transport time of < 2 h, training volunteers from the populace and the police as emergency medical services technicians for resuscitation during transport and getting patients to hospital in optimal state, and an enhanced in-hospital care by designation and categorization of hospitals. These strategies, including continuous trauma research and funding, would go a long way in reducing mortalities from trauma, especially from RTA.

Key Words
Trauma · Nigeria

Eur J Trauma 2002;28:365–9
DOI 10.1007/s00068-002-1223-y

Introduction

Trauma care in Nigeria urgently requires coordination, data updating and strategizing for improvement in the quality of care and outcome. Adeloye & Odeku [1] were the first, to our knowledge, to report on traffic accidents in Nigeria. They predicted already in 1970 that "accidents are bound to assume more public health significance in years to come". More than 30 years after, they appear to have been proved right.

Historically, trauma care received significant mention in 1922 through the American College of Surgeon's Committee on Treatment of Fractures, now Committee on Trauma [2]. By 1955, Zollinger [3] who probably was the first in recorded literature to examine the quality of care of road traffic accident (RTA) victims stated that traffic injuries are surgical problems. Indeed, in 1966,

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Received: May 24, 2002; revision accepted: October 23, 2002

Figure 1. Front view of the Accident and Emergency Unit of the University of Ilorin Teaching Hospital, Ilorin, Nigeria.

Figure 2. Main entrance of the University of Ilorin Teaching Hospital, Ilorin, Nigeria.

the (American) National Academy of Services of the National Research Council, Committee on Trauma and Committee on Shock collected data on "accidental death and disability, the neglected disease of modern society" and clearly demonstrated the need for improvement in the care of critically injured trauma victims [4]. Fortuitously, in February 1976, a Nebraska surgeon, Dr. James Styner, crashed his airplane, which resulted in the death of his wife; he and his children suffered injuries, and the quality of care they all received was less than adequate. He championed an organized trauma care system for trauma patients. A Lincoln Medical Education Committee was later set up at the Nebraska Emergency Medical Services, which developed the Advanced Trauma Life Support (ATLS) course. The first ATLS course was organized in 1978 and then adopted by the American College of Surgeons in 1979. The ATLS has since become a requisite course for qualifying for fellowship examinations in surgery in the UK and the USA.

However, the West African College of Surgeons (the main licensing body for surgeons in West Africa), which till now does not require the ATLS course for fellowship examinations, had earlier in 1977 held its first international symposium on the subject of "Care of the injured" [5]. Ever since then, several individual reports on trauma care and research in Nigeria have appeared [6–9]. Further progress on trauma was made in 1985 when the second report of the (American) National Research Council, Institute of Medicine, was published – 19 years after the first. It alluded to the insufficient attention given to trauma and decried the lack of progress in controlling injury and called for allocation of a larger portion of federal funds for trauma research [10]. In the UK, serious deficiencies were identified in the emergency treatment of trauma patients in a retrospective review of 1,000 trauma deaths in England and Wales [11, 12]. The report identified 30% preventable trauma deaths (PTD). In the USA [13] and Italy [14], rates of 42.7% and 37%, respectively, have been reported. In Nigeria, a rate of 73.7% PTD has been observed (Solagberu et al. Preventable trauma deaths in a developing country, in press).

Therefore, it is apt to examine the current status of trauma in Nigeria using our hospital as a prototype trauma care center. The way forward lies in organization of trauma care by regional care systems [15], designation and categorization of hospitals [16], formation of trauma teams [17], and compulsory certification of ATLS course locally for all doctors who care for trauma patients and who do not have it. Trauma research, strong political will and adequate funding of trauma would change the present gloomy picture positively.

Patients and Methods

For 2 years, from September 1999 to December 2001 (excluding September 2000 to December 2000 when there was residents' doctors industrial strike action), data was collected at the Accident and Emergency (A and E) unit of the University of Ilorin Teaching Hospital, Ilorin, Nigeria (Figures 1 and 2). Information obtained on a trauma research register included name, age, presenting diagnosis, the patients' outcome of care, and time interval between arrival and death in the A and E. The 2nd year had further analysis to include mode of transporting the patients to the hospital, the injury–arrival interval, and the status of the road user in cases of RTA whether as driver, pedestrian, cyclist, or passenger. The results were analyzed retrospectively.

The clinical circumstances of death were noted, as there was no routine postmortem examination done, due to cultural and religious restrictions militating against clinicians' request.

Results

4,164 patients attended the surgical A and E in the 24 months covered by the report; 2,913 of them (70.0%) were trauma patients, comprising 1,728 and 1,185 patients in the 1st and 2nd year, respectively. 171 deaths were recorded with 129 (75.4%) of these being trauma-related. Table 1 shows the spectrum of etiology of trauma encountered, with RTA being the most common. It also shows analysis of the injury–arrival time (documented for only 1,185 trauma patients seen in the second 12 months of the study), with most of the patients (73.2%, 867 of 1,185) reaching the hospital in < 6 h. In addition, Table 1 shows the method of taking the patient to the hospital. For instance, RTA patients were mostly brought by relations or the patients themselves (258 out of the 586, 44.0%), the police or the Federal Road Safety Corps (FRSC) members (205 of 586, 35.0%) or by Good Samaritans (123 of 586, 21.0%). For each of these, about three quarters arrived in < 6 h, suggesting no predominant group. The distribution of the 643 recorded road users was as follows: 86 drivers (13.3%), 169 pedestrians (26.3%), 376 passengers (58.5%), and twelve motor cyclists (1.9%). This shows that the passengers were more than four times as many as the drivers and the pedestrians nearly twice as many as the drivers. There was no pedal cyclist. The age range of the drivers who comprised 82 males and two females (M : F = 42 : 1) was 18–55 years (mean 34.2 years), while that of the pedestrians with 101 males and 68 females (M : F = 1.5 : 1) was 1–80 years (mean of 25.6 years). The overall age range was 3 months to 97 years (mean 37.1 years).

Table 1. Clinical spectrum of trauma and analysis for injury–arrival time and who brought the patients to the hospital.
Note: the Good Samaritans (GS), as well as the police and self-relations (Self-Re) are valuable as "pioneers" for training in emergency medical services in Nigeria since they have been involved in transporting patients so far. The future should aim at getting patients to the hospitals in < 2 h, a remarkable improvement over the present 6 h. NA: not available.

Trauma type	Number of patients n (%)	Injury–arrival time < 6 h/6–24 h/ > 24–48 h/> 48 h	Who brought patients to hospital Self-Re/police/GS
Road traffic accident	1,816 (62.3)	534/60/28/62	258/205/123
Falls	308 (10.6)	88/12/8/46	52/0/4
Assaults	258 (8.9)	90/14/4/14	20/44/4
Burns	159 (5.5)	39/6/0/19	56/0/1
Home accidents	122 (4.2)	30/11/1/4	8/22/0
Gunshot injuries	107 (3.6)	32/1/0/7	Analysis NA
Industrial accidents	73 (2.5)	44/2/1/7	Analysis NA
Foreign body (orifice)	70 (2.4)	10/7/0/4	Analysis NA
Total	2,913 (100.0) for the 24 months	867/113/42/163 Total = 1,185 (2nd year only)	

Superficial (skin) trauma (585 of 2,913 patients, 20.1%) and fractures (542, 18.6%) were the two most common injuries seen, and both constituted more than a third (38.7%) of the trauma in the A and E (morbidity) but only about a tenth (10.1%) of the deaths – skin trauma (0.8%), fractures (9.3%). Comparatively, the morbidity from head injuries (250 patients, 8.6%) and multiple injuries (249, 8.6%) was 17.2% (a little more than a sixth of the trauma patients), but both were responsible for more than half of the mortalities (55.8%) in the A and E – 37 of 129 (28.7%) head injuries and 35 of 129 (27.1%) multiple injuries.

Table 2 shows the time interval between arrival and death – recorded for only 106 of the 129 deaths (82.2%). A fifth of the deaths occurred within 1 h of arrival, half of the mortalities (53.0%) after 1 h but < 24 h while a quarter (26.3%) after 24 h. On clinical grounds, head injury deaths were probably more from secondary factors like hypoxia and hypotension than from primary brain injury because they were the two most common problems encountered in the A and E. The multiply injured patients suffered injuries in more than one region of the body; head injury and fractures (96 of 249, 38.6%) were the most common followed by head injury and chest injury (55 of 249, 22.1%).

Table 2. Time of death among trauma patients.

Time of death (h)	Number of patients n (%)
0–1	22 (20.7)
> 1–24	56 (53.0)
> 24	28 (26.3)
Total	106 (100.0)

Discussion

The problems of trauma care envisaged by Zollinger [3] since 1955 are still prevalent in our community probably reflecting the level of socioeconomic and infrastructural developments. This cannot be due to a lack of awareness as the study by Adeloye & Odeku [1] clearly predicted these problems for Nigeria already in 1970. This present study is significant in calling our attention as surgeons to the need to involve policy makers and stakeholders in the overall strategy of combating problems of trauma care. Indeed, in the USA, which has consistently championed most of the progress in trauma care, Representative Edward Markay (D, Mass) spearheaded an effort to address the problem of trauma care at the National Institutes of Health in 1993, yielding the enactment of Section 303 of the Public Law 103.43 for improved research on all phases of trauma from diagnosis to rehabilitation [18]. The example provided by this legislation should be replicated in all countries if similar progress as seen in the USA is expected.

We have shown that RTA is the highest cause of trauma in this study and in our preliminary report [9]. The present profile is similar to that obtained in a university hospital in the USA [19]. The most common cause of death is also RTA, especially through head injury. In a previous report on children, the deaths were more from secondary factors than from primary brain damage [8]. Other published reports had mentioned violent traumas from gunshot and assaults, rather than RTA, as most common cause of trauma encountered [20]. Assaults from secret cult activities among Nigerian students are another form of trauma which previous reports from Nigeria had not documented [1, 6, 9, 21]. This takes the form of machete cuts and/or gunshot injuries. The menace is rampant in Nigerian tertiary educational campuses and would require a separate study to characterize fully. Therefore, the types of injuries encountered seem to vary from one university hospital to another but generally, soft tissue lacerations and bone injuries are the most common [1, 9, 19]. Mortalities are higher for head injuries (morbidity 8.6%, mortality 28.7%) and multiple injuries (morbidity 8.6%, mortality 27.1%) – a reflection of poor oxygen availability, scarcity of blood and insufficiency of fluid use to combat hypoxia and hypotension, respectively. The absence of pre-hospital care and transport might have worsened the status of these patients on admission.

It has been shown that improvement in transport time strongly affects survival especially as noted during military traumas (wars). Hardaway [22] reported a 5.8% mortality when transport time was 12–15 h during World War II as opposed to mortalities of 2.4% during the Korean War and 1.7% during the Vietnam War when transport times were 4–6 h and 1–6 h, respectively. It is noteworthy that 73.2% of the trauma patients in the 2nd year reached the hospital in < 6 h. For a developing country trauma care in the absence of organized transport, this is a feat that should be improved upon to < 2 h with organization of transport. There is sufficient basis for the training of personnel that routinely takes the victims to the hospital on proper resuscitation expected to prevent some of the deaths occurring at the scene of accident, during transport or early in the A and E after admission. The main goals of pre-hospital care are to protect the airway and support circulation such that preventable deaths are reduced substantially [23]. The lack of post-mortem studies in this report is a limitation, but it has been suggested that regions lacking mandatory autopsies can perform death studies by using hospital records [24, 25]. However, measures to combat the cultural and religious impediments on autopsies are urgently needed.

The pedestrian victims in this report follow documented literature findings with the majority being children below the age of 15 years. Adeloye & Odeku [1], Ebong [7], and Oyemade [26] reported 62.0%, 51.7% and 57.0% child-pedestrians in their studies, respectively. The highest rate of 90.0% has only been reported by Adesunkanmi et al [21] in 1998. Drivers were the least injured in RTA in terms of numbers, as shown here, and most were males. Asogwa [27] had shown the penchant of these young drivers for youthful exuberance and consumption of alcohol and kola nut.

Prevention of deaths from trauma, which is predominantly RTA-related, can be seen from a three-pronged approach: prevention of accidents, improvement in the care given (pre-hospital, emergency room and in-hospital care), and improved trauma research and data collection. The developed countries seem to have narrowed the problems to the first two [29], whereas all three still constitute problems for the developing countries, Nigeria inclusive – hence, the attempt in this paper to present trauma data on Nigeria on a continuous basis. It is instructive that nearly three quarters of the deaths occurred within 24 h (Table 2) lending itself to the suggestions of improving pre-hospital care and transport, and the care in the A and E.

The traditional approach of preventing accidents by looking at them as hosts (road users), agent (vehicle),

and environment (road and its conditioning features) is well established [27, 28]. Both vehicles and drivers are by law licensed for identification and fitness. In a developing country like Nigeria where some licences are issued without a driving test and where they ought to be withdrawn officially when drivers and/or vehicles are found unfit for the road and this is not done, then the prescription for accidents is inevitable. Therefore, strategies for minimizing RTA would include removing or minimizing the corruption in the system of issuance of licences and enhancing enforcement of traffic laws. This perhaps explains why several suggestions and calls in the literature for reducing RTA have not yielded any tangible result. The clinical spectrum of trauma as documented here is significant for the future, so that any change in pattern is easily recognized.

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