Mortality pattern according to autopsy findings among traffic accident victims in Yazd, Iran

Yashar Moharamzad, Hamidreza Taghipour, Nader Hodjati Firoozabadi, Abolfazl Hodjati Firoozabadi, Mojtaba Hashemzadeh, Mehdi Mirjalili and Abed Namavari*

Objective: To describe mortality pattern and to determine undiagnosed fatal injuries according to autopsy findings among road traffic accident victims in Yazd, Iran.

Methods: In this retrospective study, 251 victims of road traffic accidents who were admitted to a tertiary trauma hospital over a two-year period (2006 and 2007) and received medical cares were included. Hospital records were reviewed to gather demographic characteristics, road user type, and medical data. Autopsy records were also reviewed to determine actual causes of death and possible undiagnosed injuries occurred in the initial assessment of the emergency unit or during hospitalization.

Results: There were 202 males (80.5%) and 49 females (19.5%). The mean (±SD) age of fatalities was 34.1 (±21.5) years. Pedestrian-vehicle accidents were the most common cause of trauma (100 cases, 39.8%). The most common cause of death was central nervous system injury (146 cases, 58.1%). The other causes were skull base fractures (10%), internal bleeding (8%), lower limb hemorrhage (8%), skull vault fractures (4%), cervical spinal cord injury (3.6%), airway compromise (3.2%), and multifactor cases (5.1%), respectively. Thirty-six fatal injuries in 30 victims (12%) mainly contributed to death according to autopsy, but were not diagnosed in initial assessments. The head (72.2%) and cervical spine (13.8%) regions were the two most common sites for undiagnosed injuries.

Conclusion: Training courses for emergency unit medical staff with regard to interpreting radiological findings of head and neck and high clinical suspicion for cervical spine injuries are essential to improve the quality of early hospital care and reduce the mortality and morbidity of traffic accident patients.

Key words: ***Accidents, traffic; Autopsy; Wounds and injuries; Iran***

Chin J Traumatol 2008; 11(6):329-334

Road traffic accident trauma is considered as a major cause of morbidity and mortality among young population worldwide.[1] A considerable number of injured patients die after arrival at hospital, where assessments and treatments delivered are supposed to be complete and effective enough to decrease the rate of deaths.[2] Initial assessments (vital signs and consciousness level), cardiopulmonary resuscitation (CPR), surgical procedures, and diagnostic devices such as radiological imaging that are usually simultaneously provided at emergency units guide the medical staff to an emergency response and an appropriate management of severely injured trauma patients. Factors such as wearing seat belt, changes in vehicle design and composition of the vehicle fleet during the past two decades have resulted in changes of trauma pattern among traffic accident victims.[3] In Iran, heavier passenger car models, which resisted deformation in crashes, have been replaced partially by smaller, more light-weight and four wheel drive vehicles.[4] Therefore, the authors think that there is still a profound need to determine injury patterns and early medical cares in road traffic accident victims, especially those who lose their lives following arrival to hospital. In addition, finding out undiagnosed fatal injuries according to autopsy findings, as an accurate tool, can improve the quality and accuracy of early hospital medical cares for traumatic patients. This is especially considered important in developing countries such as Iran due to the high rate of deaths from road traffic accidents per 100,000 population (25.8) compared to that of the world population (19.9).[5]

Trauma Research Center, Baqiyatallah Medical Sciences University, Tehran, Iran (Moharamzad Y, Taghipour H, Hodjati Firoozabadi N and Hashemzadeh M)

Yazd Forensic Medical Center, Yazd, Iran (Hodjati Firoozabadi N, Hodjati Firoozabadi A and Mirjalili M)

Department of Ophthalmology and Visual Sciences, University of Illinois, Chicago, USA (Namavari A)

*Corresponding author:Tel: 98-21-88053766, E-mail: nader.hodjati@gmail.com

Chinese Journal of Traumatology 2008; 11(6):329-334

The purposes of the current study were to describe early hospital cares for fatal traffic crashes' patients in a tertiary referral hospital and find out mortality pattern according to postmortem reports, as an accurate tool, in Yazd, Iran.

METHODS

The city of Yazd, located in the center of Iran, is the capital of Yazd province with an estimated population of 432 194 people including its suburbs in 2006. The Shahid Rahnemoon general hospital is the main tertiary referral center for admission of traumatic patients. It is an affiliation of Shahid Sadoughi University of Medical Sciences and Health Services. In the emergency unit of this hospital, a general physician with the aid of surgery interns and nurses performs primary evaluations of traumatic patients including Glasgow coma scale (GCS), intravenous access, limb stabilization, hemorrhage control, etc. If there is a need for CPR, this team is accompanied by an extra CPR team consisting of an anesthesiologist and operation room staff for resuscitation of patients. There is also an on-call attending general surgeon ready for any emergent surgical operation. Further consultations are requested with other specialties like orthopedic surgeons, neurosurgeons and urologists, if applicable. Diagnostic imaging services such as plain X-ray, computed tomography (CT) scan and ultrasound are accessible through out the day (24 hours), and are provided by a diagnostic radiology resident.

This retrospective study was performed in Forensic Medical Center of Yazd, which serves for all over the province and besides to medico-legal activities and judgements, dead patients who were needed to be autopsied are referred to this center. Based on Iranian laws, all traumatic deaths are needed to be referred to medico-legal centers to determine the accurate mechanism of death. According to unpublished data obtained from the Yazd Forensic Medical Center, about 11 678 referrals have been registered due to road traffic accidents in 2006 and 2007. Of these cases, 910 were dead cases and autopsy was performed for all of them. Inclusion criteria consisting of victims that were transported to the Shahid Rahnemoon Hospital, had vital signs on arrival and underwent initial assessments, resuscitation, and medical cares. Those victims that had lost their lives before arrival to hospital, or were transferred to other medical centers were not included in this study. As a result, a total of 251 eligible victims were assessed and their hospital records and reports of autopsies were retrospectively evaluated by a trained general physician to obtain the following variables: demographic characteristics, road user type (pedestrian, motorcyclist, car occupant, autobus or minibus occupant and truck occupant), GCS on admission to the emergency unit for revealing the conscious state of the patient that was classified into severe (< 8), moderate (9 to 12) and mild (13 to 15), intensive care unit (ICU) admission, operative procedure, and hospital stay duration (time from arrival to death).

To determine the severity of the injuries, Abbreviated Injury Scale (AIS) and Injury Severity Score (ISS) were calculated using autopsy findings. AIS is a simple numerical method for ranking and comparing injuries by severity, developed in the 1960s from an aid to investigate road traffic accidents in the United States.[6] Baker et al.[7] described the ISS, which gave a much better correlation between overall severity of injury and probability of survival. In ISS, the body is divided into six separate regions (head and neck, face, chest, abdominal and pelvic contents, extremities and pelvic girdle, and external regions). It assigns each a severity value from one (minor) to six (nearly fatal). The score was calculated by squaring and summing the three highest squares on the AIS from different body regions. The ISS was considered as mild (1-8), moderate (9-15), and severe (16-75).[8]

The actual causes of death according to autopsy reports were classified as central nervous system (CNS) injury, skull vault fractures, skull base fractures, cervical spinal cord injury, airway/ventilation compromise, and hemorrhage from extremities or internal bleeding (hypovolemic shock).

A fatal injury that contributed to death according to autopsy report and was not diagnosed upon initial assessments or during hospitalization, either in clinical examinations or in diagnostic imaging workups was documented.

For statistical analysis, descriptive indices such as frequency, percentage, mean and standard deviation (±SD) were used to express data. Comparison of categorical variables was done with the Chi-square test. *P*