EPIDEMIOLOGICAL STUDY OF PATIENTS WITH PENETRATING ABDOMINAL TRAUMA IN TEHRAN-IRAN

H. Baradaran[1], J. Salimi[1], M. Nassaji-Zavareh[1], A. Khaji[1] and A. Rabbani[2]

1) Sina Trauma and Surgery Research Center, Sina Hospital, School of Medicine, Medical Sciences/University of Tehran, Tehran, Iran

2) Department of Surgery, Imam Khomeini Hospital, School of Medicine, Medical Sciences/University of Tehran, Tehran, Iran

Abstract- Trauma continues to be the most frequent cause of death in the first four decades of life and is a major public health problem in some countries. We performed an epidemiological study of penetrating abdominal trauma (PAT) to describe epidemiological characteristics of patients with PAT. In a cross-sectional study we evaluated patients with PAT admitted to emergency department in six general hospitals in Tehran. The data was collected through a questionnaire that was completed by trained physician trauma center. Statistical analysis was performed using the SPSS software. During the study period, 0.86% (69/8000) of our patients sustained PAT. Sixty-six (95.7%) patients were male and 3 (4.3%) cases were female. The peak age incidence was 15-29 years, with 43 (62.3%) patients. Stab wound was the leading cause of PAT in male and female, with 62 (89.9%) cases. Firearm was responsible for 7 (10.1%) cases. Young males are the most common victims. This is the most productive age group and this has grave implication for the national economy.

Acta Medica Iranica 2007; 45(4): 305-308.

Key words: Penetrating trauma, Abdominal injury, Mortality

INTRODUCTION

Trauma continues to be the most frequent cause of death in the first four decades of life (1). Today, trauma is a major public health problem in some countries (3, 4). Abdominal trauma is increasing day by day as a result of increase in number of vehicles on road, which are responsible for increase in road side accidents, and also as a result of increase in urban violence due to urbanization and industrialization (2). The global burden of disease study, sponsored by the World Health Organization (WHO), identified injury as responsible for 10.1% of the global death in 1999 and listed injury as a consistent health problem throughout all parts of the world. Also, injury was responsible for 15.2% of the disability adjusted life years lost in 1990. The WHO study projected a steady increase in violent deaths by the year 2020. At that time the prevalence of violent death will equal that of communicable and infectious diseases, the second leading cause of death, (5).

With increasing sophistication, vehicular traffic and social violence trauma is gradually assuming prominence as a major cause of morbidity and mortality. While penetrating injuries are a major health problem, little is known about their epidemiological characteristics in our country. The frequency of penetrating abdominal trauma (PAT) across the globe relates to the industrialization of developing nations and, significantly, to the presence of military conflicts. Therefore, frequency varies. We used all our sources to describe, epidemiology, management and outcome of patients in PAT.

Received: 26 Feb. 2006, Revised: 28 May 2006, Accepted: 26 Aug. 2006

*** Corresponding Author:**
Javad Salimi MD, Department of Surgery, Sina Hospital, School of Medicine, Medical Sciences/University of Tehran, Tehran, Iran
Tel: +98 21 66717422
Fax: +98 21 66705140
E-mail: mjsalimi@sina.tums.ac.ir

MATERIALS AND METHODS

This study was performed in Tehran, which is the most populated city in Iran with a population of 6758845 (1995). There is not any specific center of trauma in Tehran; therefore, the trauma patients are referred to hospitals of medical sciences universities. In this study population included PAT patients admitted to emergency departments of six hospitals affiliated to Medical Sciences University of Tehran during one year of study. Among 8000 patient's visits to hospitals, patients with PAT (69 patients) were entered the study.

The data was collected through a questionnaire, designed in Sina Trauma and Surgery Research Center (STSRC). The questionnaires were completed by trained physicians of trauma centers in different geographical regions of Tehran. Data obtained included patient demographics, mechanism of trauma, injury severity score (ISS), organ injuries, intensive care unit (ICU) admission and outcome of treatment. The injured organs classified based on ICD10 (International classification of disease and related health problems).

Statistical analysis was performed using the SPSS software (version 11.5 for windows). Statistical analysis using the Chi square and $P < 0.05$ was accepted as being statistically significant.

RESULTS

During the study period, 0.86% (69/8000) of our patients sustained PAT. Sixty-six (95.7%) patients were male and 3 (4.3%) cases were female with a male to female ratio of 22:1. The range age of patients was 8 to 63 years with mean age 27.12 years (SD, ±10.6) with median of 24. The peak age incidence was 15-29 years, which accounting for 43 (62.3%) patients and was followed by patients aged 30-44 years accounting for 17 (24.6%). Thus patients aged 15-44 years accounted for 87% of the admissions.

The most common mechanism of injury in our patients was stab wound with 62 (89.9%) cases. Firearm was responsible for 7 (10.1%) cases (Table 1). All of cases of firearm injury occurred in males. The most common cause of injury was assault which occored in 53(76.8%) patients, followed by accidental and self-inflict injury which occurred in 9(13%) and 7 (10.1%) cases, respectively.

Table 1. Mechanism of trauma

Mechanism of Trauma	Frequency	Percent
Stab wound	62	89.9
Firearm	7	10.1
Total	69	100.0

Twenty-four (35.3%) cases of 69 PAT occurred in street and 18 (26.5%) cases occurred in home. Five (7.2%) cases were occupational trauma and 5 (7.2%) cases were recreation and sport center trauma. Twenty (32.3%) cases of stab wounds occurred in street, 14 (2.6%) cases in home and 5 (8.1%) cases in recreation and sport center. Twelve (17.4%) patients were office worker, 10 (14.5%) cases were jobless, 10 (14.5) cases were student and 10 (14.5%) cases were simple worker. Most of PAT occurred in summer holidays. During two intervals of day (8 AM to 12 PM) and (6 PM to 10 PM), we were faced with the highest number of PAT.

Organ Injury

Large and small intestine was the organ most commonly injured in stab wound and firearm (with 9 cases for each one). Injury of liver occurred in 3 (42.7%) and 4 (6.5%) cases in firearm and stab wound, respectively, a statistically significant difference ($P < 0.05$).

Severity

On analysis of injury severity, 42 (60.9%) patients had mild injury (ISS < 7), 15 (21.7%) patients had moderate injury ($7 \leq ISS \leq 12$) and 12 (17.4%) patients had severe injury (ISS > 12). ISS RANK as trauma mechanism is shown in Table 2. Unfortunately 2 (13.3%) patients with ISS RANK 2.00 and 3(25%) patients with ISS RANK 3.00 died.

Table 2. ISS RANK as mechanism of trauma

	Mechanism of trauma		
ISS RANK	Stab wound	Firearm	Total
1.00 count	39	3	42
2.00 count	14	1	15
3.00 count	9	3	12
Total count	62	7	69

Abbreviation: ISS, injury severity score.

Morbidity and Mortality

The overall mortality rate was 7.25% (5 patients) all of which occurred in males. Stab wound was responsible for 4 cases of death and firearm responsible for 1 case. Two of these deaths were due to injury of colon; one from injury of liver, one from injury of femoral artery and one from unspecified intra-abdominal organ's injury. Two of these death occurred in emergency department, one in surgery ward and two in ICU. Five (7.2%) patients had ICU admission.

DISCUSSION

PAT in Tehran affected mainly young men with 89.9% of the injuries due to stab wound. Overall, males were affected 22 times as female and patients aged 15-44 years accounted for 87% of study population. This is the most productive age group and this has grave implication for the national economy and for families who depend on these young men and women for survival. Young males are the most common victims because they have more outdoor activities. Similar finding have been in earlier series (6). Low socioeconomic classes of society, interpersonal violence and poor preventive maintenance (at work, sport center . . .) are the main factor resulting in PAT in our study. In our study, frequency of firearm was 10.1%. It seems that there is a different between the most frequent mechanisms of PAT according to the fact that firearm injuries are more prevalent in western countries (9, 12), but in our country, stab wound are more prevalent (13).

The most commonly injured organs associated with PAT are the small intestine (9 cases), large intestine (9 cases). The small intestine, colon and liver are the organs most frequently damage by penetrating trauma (7). Of all trauma patients admitted to a hospital, over half go to general medical/ surgical care; about 21% go to ICU, while 20% go directly to surgery (8). Sixty-eight (98.6%) patients admitted in general surgery service and 1(1.4%) patient admitted in orthopedic service. Five (7.2%) patients had ICU admission. Previous studies have shown the number of injured organs and the degrees of injury depend on the severity of trauma. When the severity of trauma increases, the number of injured organs, morbidity and mortality also increase (9). In our study, numbers of serious abdominal organ injuries were 33 cases. Forty-two (60.9%) patients had mild injury (ISS<7), 15(21.7%) patients had moderate injury (7≤ISS≤12), 12 (17.4%) patients had sever injury (ISS>12). Two patients with ISSRANK 2.00 and 3 patients with ISSRANK 3.00 died. The overall mortality rate for PAT in our series was 5 (7.25%) patients that are few different from other series (12). The low rate of mortality in this study should be interpreted with caution because of the fact that the dominant mechanism of PAT in our country is stab wound while in western countries firearm (gunshot or shotgun) wounds are more prevalent (11). In conclusion, 1) stab wound is the most common cause for PAT followed by firearm, 2) young males are the most common victims because they have more outdoor activities, 3) large and small intestine are the most common injured organs in PAT, 4) overall mortality rate is 7.25%. The low rate of mortality is resulted the most common cause of trauma in Iran, that's stab wound but in other parts of the world, firearm (shotgun or gunshot) is the most common causes.

Conflict of interests

The authors declare that they have no competing interests.

REFERENCES

1. Smith GS, Barss P. Unintentional injuries in developing countries: the epidemiology of a neglected problem. Epidemiol Rev. 1991; 13:228-266.
2. Zwi A. The public burden of injury in developing countries. Tropical Diseases Bulletin 1993; 60: 5-45.
3. Feliciano DV. Pattern of surgery. In: Feliciano DV, Moore EE, Mattox KL, editors. Connecticut: Trauma. Stamford 1996; 85-105.
4. Hoyt DB. Trauma. In: Greenfield LJ, Mulholland MW, Oldham KT, Zelenock GB, Lillemoe KD editors. Surgery: scientific principles and practice. 2nd ed. Philadelphia: Lippincott-Raven, 1997. P.267-279.

5. Lewis J Kaplan, Roy Alson, Francisco Talavera, Eric Legome, John Halamka, Jonathan Adler. Abdominal Trauma, Penetrating. e Medicine 2004. Available at: www.emedicine.com/emerg/topic2.htm. Accessed Feb 28, 2006.
6. Naaeder SB. Pattern of Abdominal injuries in Korle-Bu Teaching Hospital Accra. Ghana Med. 1990 Sep; 24: 186-190.
7. Nicholas JM, Rix EP, Easley KA, Feliciano DV, Cava RA, Ingram WL, Parry NG, Rozycki GS, Salomone JP, Tremblay LN. Changing patterns in the management of penetrating abdominal trauma: the more things change, the more they stay the same. J Trauma. 2003 Dec; 55(6):1095-1108
8. American college of surgeons. National Trauma Data Bank Annual Report 2003. Available at: www.facs.org/trauma/ntdb.html. Accessed June 17, 2004.
9. Moore EE, Dunn EL, Moore JB, Thompson JS. Penetrating abdominal trauma index. J Trauma. 1981 Jun; 21(6):439-445.
10. Aldemir M, Tacyildiz I, Girgin S. Predicting factors for mortality in the penetrating abdominal trauma. Acta Chir Belg. 2004 Aug; 104(4):429-434.
11. Zautcke JL, Morris RW, Koenigsberg M, Carmody T, Stein-Spencer L, Erickson TB. Assaults from penetrating trauma in the State of Illinois. Am J Emerg Med. 1998 Oct; 16(6):553-556.
12. Moini M, Rezaishiraz H, Zafarghandi MR. Characteristics and outcome of injured patients treated in urban trauma centers in Iran. J Trauma. 2000 Mar; 48(3):503-507.