ORIGINAL ARTICLE

A Comparative Study on Mortality of Trauma – Our Experience in Peshawar

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ABSTRACT

Objective: To compare the mortality among different modes of trauma and different areas/parts of the body involved by trauma.

Study Design: Comparative descriptive study.

Place and Duration of Study: This study was carried out in the Department of Critical Care Medicine, Combined Military Hospital (CMH) Peshawar, from October 2015 to September 2017.

Materials and Methods: All the patients with trauma admitted to in the Intensive Care Unit (ITC) of CMH Peshawar were included in this study. All the data including their cause of injury and the areas involved were collected on computerized forms using Microsoft Access 2007 and patients were followed till their death or discharge from ITC. The data collection was prospective and cross-sectional.

Results: During the study period a total of 448 trauma patients were admitted in the ITC of CMH Peshawar. Males (93.3 %) outnumbered females (6.7%) by almost 14:1. Mean age of patients was 31 ± 13.4 years (range 1.5 to 88 years). The mean ITC stay of patients was 6.8 ± 6.5 days. Out of these 448 patients, 394 (87.9%) survived and were shifted from ITC to lower levels of care. The survival ratio was slightly higher in females compared to males with a *p*-value of 0.348. Patients who survived were relatively younger (30 years± 13) than the patients who expired (37 years± 15) with a *p*-value of 0.071. The trauma patients who survived stayed one day longer (7 days) than the patients who expired (6 days), *p*-value 0.057. Depending upon the cause of trauma, the highest mortality was seen in patients of burns (40%) followed by RTA (17.2%) and GSW (10.6) *P*-value 0.011. Similarly depending onthe area of the body involved highest mortality is seen in patients with burns (40%), followed by polytrauma (16.7%) and head injury (16.1%).

Conclusion: Trauma is a problem of young adults which can lead to disabilities and loss of life years in its victims. RTA is the commonest cause of trauma with a high fatality rate. Depending on body area involvement polytrauma and head injury due to any cause are common and carry a high mortality. Burns are the less common but the deadliest cause of trauma.

Keywords: *Area Involved, Cause, Pakistan, Trauma.*

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Introduction

Trauma is a major cause of morbidity and mortality worldwide, and it claimed 4.9 million lives in 2016.[1] The commonest causes are road traffic accidents (RTA), fall from height (FFH), improvised explosive device (IED) blasts, gunshot wounds (GSW)/firearm injuries (FAI), and burns etc. RTA is the commonest mode of trauma. According to the World Health Organization (WHO), RTA is the leading cause of death among young people between ages 15-29 years.[2] Globally, RTA fatality rate has been reported as 17.4 per 100,000 population, but it is 19.9 per 100,000 population in Eastern Mediterranean region

(Pakistan has been categorized in this region), which is second highest after the African region with a rate of 26.6 per 100,000 population.[2] IED is increasingly used in modern conflicts and are one of the most prevalent modes of fatal battlefield injuries. The pattern of injuries suffered by victims of IEDs depend on whether they were target of explosion or were present at some distance from the center of explosion.[3] FAIs besides causing high death toll can lead to significant morbidity. The public health significance of these firearm injuries is profound, both in terms of its clinical and social implications.[4] Globally, in 2016, 251,000 deaths resulted from firearms injuries caused by events not related to war.[5] It has been estimated that FAIs are responsible for 90 deaths per day.[4] Falls are the second most common cause of injury-associated mortality after traffic accidents and lead to a significant percentage of blunt trauma cases and emergency department (ED) admissions.[6] The likelihood of death following a FFH is significantly increased by presence of chest and/or head injuries and spinal injuries.[6,7] Electrical injuries constitute an estimated 4% of admissions to burn units in developed countries, and up to 27% in developing countries.[8,9] Electrical injuries can affect every organ system in the body and can cause thermal, electrophysiological, traumatic, and metabolic derangement.[8] The objective of this study was to compare the mortality among different modes of trauma and different areas/parts of the body involved in trauma.

Materials and Methods

This is a comparative descriptive study with a prospective, cross-sectional data collection technique. All the trauma patients who were either admitted directly or shifted from other wards to the Intensive care unit (ITC) CMH Peshawar, from Oct 2015 to Sep 2017, were included in this study. CMH Peshawar is a tertiary care hospital on the battlefront. It is well equipped and manned to receive war causalities. So our study mostly included war casualties and other trauma patients reporting during that period. As per the procedure, complete record of the patient's profile, mode of trauma, medical examination, vital signs, laboratory investigations and treatment was maintained. Plain radiographs, computed tomography (CT) and magnetic resonance imaging (MRI) scans were also performed as per requirement. All the patients were followed till their outcome from ITC. As the hospital has no central database system, so the data for this study was collected on computerized forms using Microsoft Access 2007, especially designed for these patients, by the critical care team. Data was analyzed by using SPSS version 21. Descriptive statistics were summarized using means and frequency tables with percentages; the chi-square test was used as test of significance.

Results

A total of 448 patients of trauma, admitted in ITC of CMH Peshawar were included in this study. Mean age of patients was 31 ± 13.4 years (range 1.5 to 88 years). The Mean duration of stay in ITC was 6.8 ± 6.5 days. The male-to-female ratio in our study was almost 14:1 with a total of 418 male (93.3 %) patients and 30 females (6.7%).

RTA was the commonest mode of trauma (42.9%) followed by IED blasts (33.5%), GSW (19%), other blasts (2%), FFH (1.6%) and high voltage burns (1%) - (Table 1).Extremities were the most common anatomical location involved by trauma (34.8%), followed by head injures (34.6%), polytrauma (20.1%), chest injuries (8.3%) abdominal injuries (1.1%) and burns (1.1%) - (Table 2).

Out of 448 patients, 394 (87.9%) survived and were shifted from ITC to lower level of care which includes surgical wards and surgical high dependency unit (HDU). Survival ratio was slightly more in females as compared to males with a *p*-value of 0.348. Patients who survived were relatively younger (30 years$\pm$ 13) than those who expired (37years $\pm$ 15) with a *p*-value of 0.071. The trauma patients who survived stayed one day longer (7 days) than the patients who expired (6 days), *p* value 0.057. Depending upon the cause of trauma, the highest mortality was seen in patients of burns (40%) followed by RTA (17.2%) and GSW (10.6%), *p* value 0.011. Similarly depending upon the area involved highest mortality is seen in patients with burns (40%), followed by polytrauma (16.7%) and head injury (16.1%).

Then we saw a speedy development and approval of several vaccines based on different technologies in record time, leading to the largest ever vaccination campaign. People were relieved when the vaccine rollout began, and they were available.[5,6]

Pakistan, a lower middle-income country with a

population estimated to be more than 200-220 million[7] received Sinopharm vaccine from China, which was manufactured in the most conventional way by attenuating the virus.[7] Initially, like

Table 1: Different causes of trauma and outcome of patient in hospital

S. No	Cause of trauma	Shifted n (% within cause)	Expired n (% within cause)	Total n (% of total)
1.	RTA	159 (82.8%)	33 (17.2%)	192 (42.9%)
2.	IED	140 (93.3%)	10 (6.7%)	150 (33.5%)
3.	GSW	76 (89.4%)	9 (10.6%)	85 (19.0%)
4.	Fall	7 (100%)	0 (0.0%)	7 (1.6%)
5.	Blast others	9 (100%)	0 (0.0%)	9 (2.0%)
6.	Burns	3 (60%)	2 (40%)	5 (1.1%)
7.	Total	394 (87.9%)	54 (12.1%)	448 (100%)

Table 2: Different areas involved due to trauma and outcome of patient in hospital

S. No	Cause of trauma	Shifted n (% within cause)	Expired n (% within cause)	Total n (% of total)
1.	Head Injury	130 (83.9%)	25 (16.1%)	155 (34.6%)
2.	Polytrauma	75 (83.3%)	15 (16.7%)	90 (20.1%)
3.	Extremities injuries	145 (92.9%)	11 (7.1%)	156 (34.8%)
4.	Abdominal injuries	5 (100%)	0 (0.0%)	5 (1.1%)
5.	Chest injuries	36 (97.3%)	1 (2.7%)	37 (8.3%)
6.	Burns	3 (60%)	2 (40%)	5 (1.1%)
7.	Total	394 (87.9%)	54 (12.1%)	448 (100%)

Discussion

Trauma in addition to causing high morbidity and mortality puts a lot of economic burden on individuals and countries.[10-12] A clear relationship exists between the severity of trauma injuries and overall cost of treatment.[11] In addition to the direct medical costs from injury, non-medical and indirect costs make this burden much higher, up to 97% of GDP per capita.[12] As trauma is disease of young population, this makes the financial burden of injuries far more than the immediate medical cost associated with the injury.[12] In the United States trauma is the single most important cause of potential years of life lost for persons under age 65.[13] The Eastern Mediterranean region of WHO, which includes Pakistan, has some of the highest rates of injury related deaths and disabilities due to RTAs, violence and wars etc.[14] Due to the rapidly increasing population and the recent war on terrorism in Pakistan, the incidence of trauma cases has increased tremendously. In Pakistan trauma accounts for the second leading cause of disability, fifth for healthy years of life lost and eleventh for premature death.[15]

Male predominance among trauma victims is seen globally.[3,6,15] The likely reason for a very high male to female ratio in our study is that the law enforcing agencies mostly consist of male gender in Pakistan and CMH Peshawar receives the main bulk of casualties from operational areas. The female patients received during the study period were the civilian patients and affected families. The higher survival of females in this study might be due to the lesser severity of injuries in females than males. Trauma is mostly a disease of the young, as in our study with the mean age of patients of 31 ± 13.4 years which is comparable with other studies from Pakistan and internationally.[2,3,4,1516]

The cause of trauma varies according to the conditions in which the study is undertaken. If the country is at war and the study is carried out in a military setup like our study, then the cause will mostly include battle field injuries. RTA remains the commonest cause of trauma the world over.[2] In one of local studies, RTA accounted for 48.7% of all the trauma patients while another study carried out in Qatar by Bener et al. showed that RTAs constituted 36.7 percent of their trauma patients.[17,18] Our study is consistent with these studies showing a frequency of 42.9% due to RTA. An IED blast injury constituted 33.5% of our patients while 2% of patients had other blast injuries. Weintrob et al showed the incidence of IED blast injuries to be 54.6% in similar conditions.[19] Incidence of GSW in our study was 19% which is comparable with the international studies. Hoencamp et al. showed that the incidence of GSW injuries in North Atlantic Treaty Organization (NATO) coalition forces in Iraq and Afghanistan was 18%.[20] Falls was the leading mechanism of non-battle field injuries followed by RTAs among deployed US service members.[21] On the other hand in our study we had more RTAs and incidence of FFA was quiet low (1.6%). High voltage burns constituted 1.1% of our patients in our study while Tugcu H et al from Turkey reported an incidence of 3.5% electrocution fatalities among military personnel between 1994 and 2013.[22]

The area of body involved in trauma also depends upon the conditions in which the study was

undertaken. Our study was done in a military setup during war-on-terror; in this study the extremities were the most common part of the body involved, followed by head Injuries and polytrauma. Similar findings were seen in a review of military casualties in which limbs were the most common part involved, followed by head and neck.[23] Lee et al. on the other hand found that the head was the most common part of body involved in trauma (72.2%). Extremities, polytrauma, chest, abdominal and soft tissue injuries were 20.5%, 40.5%, 16.6%, 8.5% and 20.4% respectively.[24]

Conclusion

Trauma is a problem of young adults which can lead to disabilities and loss of life years in its victims. RTA is the commonest cause of trauma with a high fatality rate. Depending on body area involvement polytrauma and head injury due to any cause are common and carry a high mortality. Burns are the less common but deadliest cause of trauma.

Limitations of the Study

It is a single-center study, in addition cross-sectional observational data was used to capture injury trends.

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