Original Article

Brain Injury

Traumatic Brain Injury: Experience at Divisional Headquarter Teaching Hospital, Mirpur, AJK

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ABSTRACT

Objective: Traumatic brain injury is one of the leading causes of morbidity, mortality and severe economic loss; especially in the patients who are in productive years of life. The objective of our study was to find out the etiological pattern and distribution of traumatic brain injury at Mirpur, Azad Kashmir.

Study Design: Prospective study.

Place and Duration of Study: This study was carried out at surgical wards at DHQ hospital, Mirpur from Nov 2012 to April 2013.

Materials and Methods: In this study epidemiological and clinical data of all the patients with traumatic brain injury admitted in surgical wards at DHQ hospital, Mirpur were included.

Results: A total of 309 patients with traumatic brain injury were admitted. The age range was between 3 years to 80 years. The mean age was 23.8 years. The most commonly affected age group was between 25-30 years (89.3%). Males were predominant (81.9%). Students involved constituted 44.7% of patients. Commonest mode of trauma was pedestrians hit by motorized vehicles (70 %) followed by physical assaults (15.9%). Majority of the patients (88.3 %) were from local district and 70.2 % reached the hospital within two hours of trauma. 46.6 % of the patients had a GCS of 13-15 on arrival. 3.9% had subdural hematoma while 1% of patients had skull fractures and intracerebral bleeds. Overall mortality was 5.8%.

Conclusion: Road traffic accidents are the leading cause of traumatic brain injury affecting the young population at Mirpur and led to 5.9% mortality and 9.5 % total dependency in the affected population. Better traffic control system and awareness can reduce the incidence of traumatic brain injuries.

Key Words: Head injury, Traumatic brain injury.

INTRODUCTION

Traumatic brain injuries (TBI) are the major cause of morbidity and mortality especially in the young age group in the second to fourth decade of life[1]. The urbanization of developing countries leading to rapid motorization has resulted in increased incidence of motor vehicle accidents[2].

It is estimated to cause an annual loss of $30 billion in developed countries[3]. It is also estimated that more than 1.7 million head injuries are encountered in the US alone[4].

The incidence of TBI has been estimated as more than 600 per 100,000 cases by WHO[5], leading to about 90 per 100,000 admissions in US hospitals. The annual incidence of head injury in Pakistan has been estimated at 50/100,000 population based on data from public sector hospitals[6].

After injuries the major challenge encountered is to protect the patient from secondary damage following trauma which includes proper pre hospital care, transportation to the hospital by trained ambulance personals and rapid and rational management in the hospital. Unfortunately in our country due to poor traffic control, there is a high incidence of road traffic accidents. Lack of pre hospital care and poor transportation by untrained personals leads to increased morbidity and mortality .There is need for public awareness, campaigning, and enforcement of traffic rules to reduce the incidence of road traffic accidents. The present study is aimed to highlight the pattern and distribution of traumatic brain injuries in order to improve treatment strategies and prevention.

MATERIALS AND METHODS

In this prospective study of all the patients with traumatic brain injury admitted in the surgical wards of DHQ hospital Mirpur from Nov 2012 to April 2013 were included. The patients who were discharged from emergency department were excluded. A total of 309 patients were included in the study. All the patients were managed according to ATLS protocol. After initial resuscitation and stabilization patients were subjected to neuroimaging along with the imaging of other relevant systems. Canadian CT head rules were followed for imaging of the patients with GCS ?13-15[7].

Head injury was classified as mild when GCS at presentation was 13 – 15, moderate, when GCS was 9-12 and severe with GCS less than 8. The data collected were about age, sex, residence of patient, mode of trauma, time since trauma and hospital arrival, Glasgow

Coma Scale, concurrent injuries and length of hospital stay. CT scan findings, type of management and outcome were also noted. At the time of discharge, outcome was graded according to Glasgow outcome scale.

Data were analyzed using SPSS version 17

RESULTS

A total of 309 patients with traumatic brain injury were admitted. The age range was between 3 years to 80 years. The mean age was 23.8 years. The most commonly affected age group was between 25-30 years (n 135, 43.7%), followed by 13-24 years (n 114, 36.9 %) while 10% of patients were between 31-60 years (Table 1). There were 253 male (81.9%) and 56 female (18.1%) (Table 2).

Table No. 1: Age Groups

Age	Group	Frequency	Percent
	3-12	27	8.7
	13-24	114	36.9
	25-30	135	43.7
	31-60	31	10.0
	>60	2	.6
	Total	309	100.0

Table No.2: Sex

Sex	Frequency	Percent
Female	56	18.1
Male	253	81.9
Total	309	100.0

Table No.3: Occupation

Occupation	Frequency	Percent
Student	138	44.7
Unemployed	87	28.2
Office /Mental worker	15	4.9
Laborers	40	12.9
House wife	24	7.8
Retired	5	1.6
Total	309	100.0

Students were the most common victims (n 138, 44.7 %) followed by unemployed community (n 87, 28.2 %). Laborers were involved 12.9%. Mental/office workers were 4.9 % and retired personals were 1.6 %. (Table 3)

Majority of the patients (N 273, 88.3%) belonged to local district followed by other districts (n 24 7.8%) about 3 hours drive from Mirpur.

Commonest mode of trauma was pedestrians hit by car/four wheel vehicle (n 138 44.7%) followed by hit by motor bike (n 79 25.6 %). Forty nine patients (15.9%) were injured in physical assaults. Thirty (9.7%) patients had a fall. Twelve patients (3.9%) were injured in a motorbike crash. One patient (0.3%) had firearm injury. (Table 4)

Table No.4: Mode of Trauma

	Frequency	Percent
Motor bike driver	12	3.9
Hit by motor bike	79	25.6
Hit by four wheel vehicle	138	44.7
Fall	30	9.7
Physical assault	49	15.9
Firearm	1	.3
Total	309	100.0

Table No.5: GCS

GCS	Frequency	Percent
3-8	24	7.8
9-12	141	45.6
13-15	144	46.6
Total	309	100.0

Table No.: Outcome

		Frequency	Percent
Valid	Good recovery	241	78.0
	Moderate disability	21	6.8
	Severe disability	29	9.4
	Expired	18	5.8
Total		309	100.0

Majority of the patients (n 217, 70.2 %) reached in hospital within two hours of trauma. 76 patients (24.6%) presented between 2-6 hours. 0nly 16 patients (5.2 %) presented after 6 hours.

Fifteen patients 5% had compromised airway on arrival. 46 patients (15 %) were hypotensive. 24 patients (7.8 %) had breathing difficulties due to chest trauma.

Majority of the patients (n 144 46%) had minor head trauma with GCS 13-15. There were 141 patients (45.6%) with a GCS between 9-12. Twenty four patients (7.8%) had severe head trauma with a GCS of 8 or below. (Table 5)

Majority of patients (n 203 65.7 %) had closed head injury, 85 patients (27.5 %) had scalp laceration, skull was exposed in 18 (5.8%) whereas brain was exposed in 3 (1%) patients. Forty two patients (13.6 %) had ear bleeding, 9 patients (2.9 %) had CSF otorrhoea. Thirty

six patients (11.7 %) had nasal bleed. Twenty two patients (7.1%) had associated abdominal injuries. Associated limb injuries were found in 135 patients (43.7 %). Fracture pelvis was present in ten patients (3.2%).

CT scan brain was performed in237 (76%) patients. It was normal in 207 patients. Twelve patients (3.9 %) had traumatic subdural hematoma and subarachnoid hemorrhage while 3 patients (1%) had intracerebral bleeds.

Three patients had neurosurgical intervention with craniotomy and evacuation of subdural hematoma. Rest of the patients had conservative management from neurosurgery point of view.

Majority of the patients (n 241, 78%) had good recovery and were back to their routine work. 21 patients had moderate disability and were able to look after themselves. Twenty nine patients (9.4%) had severe disability while 5.8 % expired. (Table 6)

DISCUSSION

Rapid industrialization and urbanization has resulted in a silent epidemic of head injury[8].

Conventionally head injuries are classified as mild (GCS 13-15), moderate (GCS 9-12) and severe (GCS less than 8). In our study 82% of patients were males. Male gender is an independent risk factor for traumatic brain injuries[9] but Bazarian JJ et al., found poorer outcome after mild TBI in females[10].

Eighty percent of our patients were between 13-30 years. The age incidence of traumatic brain injury is bimodal with one peak at 15-24 years and another after 65 years[11]. Raja et al., and Jooma et al., in two separate studies estimated second and fourth decade respectively as the most vulnerable age group from the same region[12, 13].

In another local study carried out by Umerani et al., most of the patients were in third decade of life[14]. The shift of the age group to lower side in our study is apparently due to more involvement of teenagers in driving.

Most of the patients reached hospital within 2 hours of trauma. There are no first aid services at the site of scene and almost all of the patients are brought in private transport. Five percent of patients had compromised airway and 15% were hypotensive. It is need of time to improve ambulance services with trained paramedics for safe rapid transfer of critically ill patients to hospital to reduce morbidity and mortality.

The commonest cause of head injury in our study was road traffic accidents. There were about 70% pedestrian hit by vehicle. This can be attributed to lack of traffic rules awareness, and neglect of safety measures. In two other studies carried out in Pakistan by Hyder et al.,[15] and Umerani et al.,[14] demonstrated proportional increase in RTA associated death with increasing motorization in Pakistan. Moreover, wearing helmets and seat belts are not compulsory and certain cars are even made without seatbelts[12].

Fall from height is a common cause of TBI especially in children and females in Pakistan[12,13]. This is principally attributed to flaw in designing with fenceless roofs. Thirty patients (9.7%) in our study had fallen from heights. Children are especially prone to fall from stairs due to negligence of family. They may also fall while climbing trees and fences. Additionally fall from poles is an occupational hazard in the absence of adequate safety precautions.

Helmets have proven efficacy in preventing TBI for two-wheel riders (16). Twelve (3.9%) of our patients were injured in motor bike crash. None of our patient was wearing helmet whereas in other two local studies less than 1% of patients were wearing helmet[14]. In another local publication helmet usage has been estimated less than 3 %(17). In a study by Rastogi et al., two wheeler related accidents were the most common (40.3%) cause of head trauma[18]. Head injuries due to assault are very common in our area due to illiteracy and poverty. Commonly used weapons are rods, axe or even firearms. In our study 49 patients (14.9%) were injured in physical assaults. Blunt trauma usually results in depressed skull fractures[14]. Penetrating brain injuries (PBI) are commonly caused by firearms and carry a worse prognosis[19, 20]. They carry high mortality if they are suicidal or there is bi-spheric involvement or intraventricular extension.

During the first 24 hours following Traumatic brain injury CT scan is the imaging modality of choice[21, 22]. In a study Umerani et al., CT scan was performed in 756 (84.65%) patients, out of which only 75 (9.92%) had positive CT findings (14). The incidence of subdural hematoma has been reported at about 5%[23] and the mortality as high as 1 out of 5 cases[24]. The mortality reported is 6.4% in study by Agrawal et al.,[2]. In a study carried out on autopsy basis death was due to injury to the head in 386 (66.4%) victims[25].

Outcome of the patients with traumatic brain injuries and length of stay in ICU and hospital has been found significantly less in the patients who were properly transported to hospital from the scene of accident[26].

CONCLUSION

1: Road traffic accidents are the leading cause of traumatic brain injury affecting the young population at Mirpur and led to 5.9% mortality and 9.5 % total dependency in the affected population.

2: Pedestrians hit by motor vehicles is the major etiology of traumatic brain injury in our study

3: Better traffic control system and awareness can reduce the incidence of traumatic brain injuries.

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