ETIOLOGY, CLINICAL PRESENTATION AND OUTCOME OF TRAUMATIC BRAIN INJURY PATIENTS PRESENTING TO A TEACHING HOSPITAL OF KHYBER PAKHTUNKHWA

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ABSTRACT

Objectives: To determine the frequency of patients presenting to Department of Neurosurgery, Lady Reading Hospital, Peshawar with traumatic brain injury, and recognize its etiology, clinical and presentation and outcome.

Methodology: This observational study was conducted in the Department of Neurosurgery, Lady Reading Hospital, Peshawar from 1st September 2013 to 31st August 2014. Patients of all ages, both sexes and having brain injury secondary to trauma were included. Patients having other associated injuries along with TBI and minor head injuries treated without admission were excluded from the study. Different variables including age, gender, mechanism & type of injury and surgical outcome of patients were obtained. Data were analyzed by SPSS version 17 and was expressed by charts and tables.

Results: Out of 1338 patients, 827 (65%) were males and 466 (35%) were females. Age ranged from 1-80 years with a mean age of 40 ±9.65 years. Road traffic accidents (RTA) as a cause of injury was present in 45% of cases. Subarachnoid hemorrhage was found in 24% cases on the CT Brain. Surgical treatment was carried out in 50% of the patients. Mortality was 15%.

Conclusion: Patients withTBI frequently present to LRH. It was most common in young to middle aged people and leading cause was RTA. Sub-arachnoid hemorrhage was the commonest CT scan finding followed by depressed skull fracture. Most of these patients have mild type of head injury and are managed conservatively with good Glasgow coma scale on discharge.

Key Words: Traumatic brain injury, Road traffic accident, Sub-arachnoid hemorrhage, Depressed skull fracture

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INTRODUCTION

Traumatic brain injury (TBI) is one of the leading cause of mortality among all age groups, responsible for approximately 25% of all deaths in trauma patients[1]. Head injury in trauma patient is a worst prognostic factor. Among head injury patients, penetrating injuries causes more deaths than closed head injuries[2]. Road traffic accidents is the most common culprit responsible for head injury in all age groups[3]. Drug addiction is contributing to approximately 38% of patients with head injury[4]. Due to the usage of anticoagulant medications, an increase number of head injuries patients are from elderly age group now-a-days[5].

Head trauma is the number one killer in all trauma patients[6]. The survivors might develop some kind of neurological deficit or recover completely in some cases[7]. Permanent disability ranges from 10-100% in survivors depending on the severity of the injuries at the time of presentation which is responsible for more than 90,000 newly disabled patients every year[6,7]. This study was conducted to determine the frequency of different types, causes, morbidity and mortality of TBI patients. This might help in creating awareness and increase in understanding regarding strategies to prevent or minimize it and also to make resources available for its management.

METHODOLOGY

This observational study was conducted in the department of Neurosurgery, Lady Reading Hospital, Peshawar from 1st September, 2013 to 31st August, 2014. After taking informed consent from patients, documen-

tation was done according to the pre-designed proforma including age, gender, address of the patient, mechanism and type of injury and outcome of patient. Glasgow coma scale (GCS) was used for the assessment of patients. GCS at presentation was divided into mild (13-15), moderate (9-12) and severe (<8). CT scan was done in all traumatic brain injury patients. All admitted patients with traumatic brain injury of either gender and all ages were included in this study by consecutive sampling technique. While patients having other associated injuries along with TBI and minor head injuries treated without admission were excluded from the study. Data was analyzed by SPSS software version 17 and was expressed by charts and tables.

RESULTS

In this one year study, 1338 patients were included. Males had higher frequency (n=872, 65%) of TBI than females (n=466, 35%). Male to female ratio was 1.85:1. Sixty seven percent of patients were from Peshawar followed by Mardan 11%, Kohat 8%, Nowshera 6%, Swabi 5% and other cities 3%. These cities are about 1 hour distance from Peshawar and lack facilities for specialized neurosurgical care.

Age ranged from 1-80 years with a mean age of 40 ±9.65 years. The common age group was between 1-50 years (n=1021, 76%). Age-wise distribution is shown in figure 1).

The cause of head trauma was RTA in 45% of cases (Table 1). Sub-arachnoid hemorrhage was found in 24% of trauma patients (Table 2). Skull fracture was found in 23% of cases. Extradural hematoma (13%) was present in temporoparietal region in 52%, 40% in frontal region and 8% in occipital region. The proportion of contusion was highest in frontal region (47%), followed by Parieto-occipital (33%) and temporoparietal regions (20%).

Different neuro-surgical procedures were performed in 50% of patients as shown in table 3.

Mild TBI was present in 870 (65%) of patients (Figure 2). Eighty five percent of patients were discharged with GCS >13. The total mortality was 201 (15%). It was four times higher in males than females (161 versus 40). The peak incidence of mortality was highest between 2nd and 5th decades (56%). The Glasgow outcome score after three months is shown in Table IV.

DISCUSSION

Traumatic brain injury is the leading cause of death in all age groups. In various series the mortality is estimated to be about 20-30%. According to severity, the head injury is considered mild in 80%, moderate 10% and severe in 10% cases[8]. Literature review reveals that head trauma is more common in males as compared to females[9,10]. Our study also had the higher proportion of males as compared to females. The male: female ratio in our study was 1.85:1. This is similar to a study from USA which show ratio of >2:1 for males compared to females[11]. The possible reason for this was probably because the males are more at risk of trauma due to their exposure in day to day life.

In our study, the most common age group involved in head trauma was in the first decade of life, contributing to 20% of all patients, followed by 5th and 3rd decade

Figure 1: Age-wise distribution of TBI patients (n= 1338)

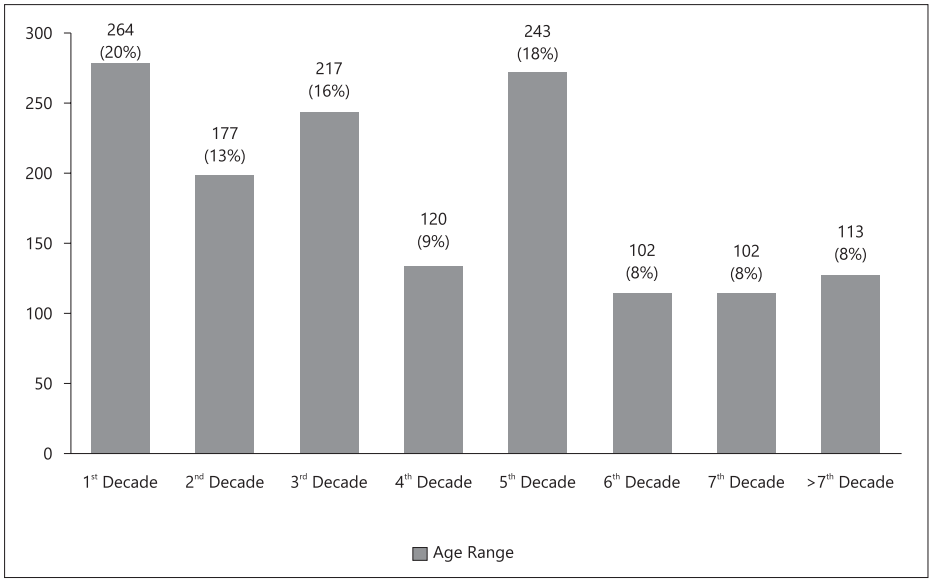


Table 1: Cause of injury (n=1338)

Cause of injury Patients	Frequency	Percentage
Road Traffic Accident (RTA)	602	(45%)
Fall from height (HOF)	455	(34%)
Fire arm injury (FAI)	214	(16%)
Physical assault	67	(5%)
Total	1338	100

Table 2: CT scan findings in head injury patients

Type of injury	SAH	DSF	Contusions	EDH	Pneumo-cephalus	SDH	DAI
No. of cases	326	308	244	170	110	106	74
Percentage	24.34%	23.02%	18.25%	12.70%	8.20%	7.93%	5.56%

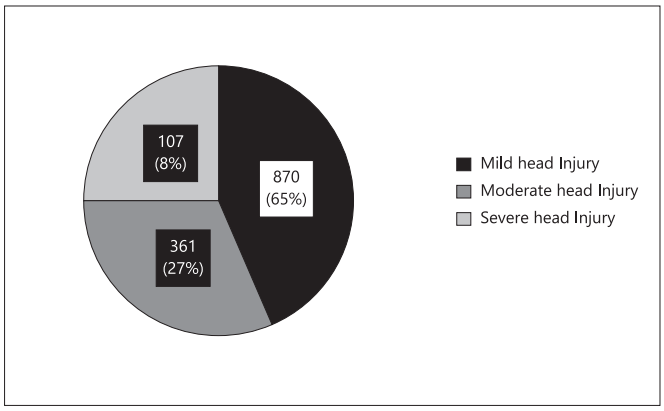
Table 1: Cause of injury (n=1338)

Treatment Given	Frequency	Percentage
Observed	668	(50%)
Craniotomy	260	(20%)
Bone elevation	219	(16%)
Decompressive craniotomy	191	(14%)
Total	1338	100

Table 4: Glasgow outcome score after 3 months (n=1338)

Glasgow Outcome Score	Number of Patients	Percentage
5	670	50.11
4	247	18.47
3	120	8.91
2	100	7.47
1	201	15.03

Figure 2: Severity of head injury



of life. These results differed from other studies which showed that 3rd and 4th decade is the most common age group for head trauma patients[12,13]. Other studies showing that the people of 3rd and 7th decade of life are highly at risk[14,15]. Raja et al[16] and Jooma et al[17] in two separate studies estimated second and fourth decade respectively as the most vulnerable age group in Pakistan. A significant relationship between age and post-traumatic outcome has been reported[18].

In our study, we found that the commonest cause of TBI were RTA in 45% cases followed by falls 34%, FAI 14% and assault 15% cases. RTA is the common cause of head injury in adults while falls are the commonest cause of head injury in children less than 10 years of age. In developed countries motor vehicle drivers are the most common victims whereas in developing countries like Pakistan, pedestrians and motorcyclist are the common victims[19]. RTA especially involving motorcyclist are the leading cause of morbidity and mortality[20,21]. In Pakistan, RTA involving motorcyclists is the most important factor need to be considered for safety surviillance[22,23]. The safety surveillance programmes can certainly reduce the number of trauma patients as evident from the traffic safety regulations in Taiwan where implementation of the motorcycle helmet law decreased the incidence of motorcycle-related TBI by 33%[24].

In our study, a large number of patients were having TBI secondary to firearm injury probably because of lack of education and ease of access to the weapons[25]. Penetrating brain injuries are usually secondary to firearm and is responsible for high mortality[26-28]. Our series showed RTA as a major cause of head trauma which is consistent with studies from Ghana and Nigeria[29,30]. A study in Brazil includes assaults and FAI being the commonest cause of head trauma[31], which is different to findings from our study.

In present study, the most common injury type on the basis of GCS was mild head injury (65%) followed by moderate (27%) and severe (8%). We found 50.11% patients in group 5 and 18.47% in group 4. It is argued that GCS 13 should be classified as moderate head injury because of increased association with abnormal CT findings[32-34]. In one study mild head injury was 90% while moderate and severe head injury in 5% respectively[35], while in another study 80% were mild, 11% moderate and 9% severe TBI[36].

In our study SAH (24%) was the major CT finding followed by depressed skull fracture in 23% cases. In a study done in India, highest number of patients were having only scalp lacerations (40.4%), followed by contusion (8.8%), EDH (3.2%), SDH (4.2%) and depressed fracture (3%)[37]. Surgical treatment was carried out in 50% of our admitted patients with TBI. Craniotomy was the major surgical treatment performed in 20%, followed by bone elevation for DSF 16% and decompressive craniotomy in 14% cases.

The mortality rate from head injury was 15% and is similar to study from Nigeria[38]. This was slightly better than the 19.8% mortality from head injury reported in Emejulu study[36]. The results of a study done in India showed 13% mortality at arrival to the hospital and 27% mortality after admission to the hospital[37]. A study done in Karachi showed 4.5% mortality due to TBI[10]. In these studies, mortality in males were higher (4 times) as compared to females (161 versus 40). The reason for increased mortality in males is probably due to the increased exposure to trauma because the stay outside their homes for longer durations than females[40].

CONCLUSION

Patients withTBI frequently present to LRH. It was most common in young to middle aged people and leading cause was RTA. Sub-arachnoid hemorrhage was the commonest CT scan finding followed by depressed skull fracture. Most of these patients had mild type of head injury and were managed conservatively with good Glasgow coma scale on discharge.

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CONTRIBUTORS

NH conceived the idea, planned the study, and drafted the manuscript. NUH, FA and ZK helped acqui¬sition of data and did statistical analysis. SK and SA helped acquisition of data. MA critically revised the manuscript and supervised the study. All authors contributed significantly to the submitted manuscript.