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ORIGINAL RESEARCH

Clinical profile of traumatic head injury patients

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Abstract

Introduction: In India alone, nearly 1 million people get injured, nearly 200,000 people lose their lives and another 1 million require rehabilitation every year due to traumatic brain injury [3]. The public health burden it causes is huge, as most of these patients belong to the young and productive age group of the population. The aim of present study was to evaluate the clinical profile of the head injury patients reported in emergency department in tertiary care hospital.

Material and method: This was a prospective observational study include 70 patients reported at the Department of General Surgery, Rajindra Hospital, Patiala. A structured Performa was used to enter the detailed history, mode, and mechanism of trauma, vitals were recorded at presentation. Patients were managed according to ATLS protocol. Patients were followed up for 30 days post-admission.

Observation and results: Patients between the 3rd and the 4th decade of their lives predominated in our study population. The mean age was 36.3 years, and there was a male predominance (81.4%).RSA (n=56, 80%) was found to be the most common mode of TBI, followed by assault (n=9, 12.9%) and fall (n=5, 7.1%). This is probably due to rapid motorization and industrialization. As per our study, n=20 (28.6%) was intoxicated at the time of presentation. Substance abuse can lead to an increased chance of RSA, assault, or falling from a height

Conclusion: Since vehicular accident accounts for almost the majority of head injuries, there is an immediate need to enforce strict traffic discipline and to educate society to follow the laid down traffic rules.

Introduction

Head injury accounts for 3–4% of emergency department attendances worldwide. TBI accounts for around 1500 cases per 1,00,000 population per year in the United Kingdom[1]. Annual mortality attributable to head injury is estimated at 9 per 100 000, and it remains the leading cause of death and disability from childhood to early middle age, with an estimated 2% of the United States population suffering long-term disability as a result of head injury[2]. In India alone, nearly 1 million people get injured, nearly 200,000 people lose their lives and another 1 million require rehabilitation every year due to traumatic brain injury [3]. The public

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health burden it causes is huge, as most of these patients belong to the young and productive age group of the population. Even in the setting of quick and optimal care, TBIs result in substantial morbidity and account for approximately one third of all trauma related mortality. Those who survive this ordeal often experience permanent disability that ranges from mild deficits to conditions requiring permanent total dependent care[4]. Trauma is the most common cause of subarachnoid hemorrhage. Rupture of an intracranial aneurysm is the second most common cause of subarachnoid hemorrhage and is generally distinguished from traumatic subarachnoid hemorrhage by history and the distribution of blood on a CT scan. Although the hematoma itself can be compressive, it is usually the underlying contusion and axonal injury that predict the outcome of these injuries. Bleeding within the subarachnoid space is indicative of diffuse bleeding from brain tissue and in itself is not deleterious. Despite this, subarachnoid hemorrhages are not benign, and surveillance is mandatory to identify deterioration. Parenchymal contusions of brain tissue result from the direct transmission of energy to the cranium and underlying brain as well as from movement of the brain within the rigid cranial vault, resulting in contrecoup injury [5]. The aim of present study was to evaluate the clinical profile of the head injury patients reported in emergency department in tertiary care hospital.

Materials and methods

This was a prospective observational study was conducted at the Department of General Surgery, Rajindra Hospital, Patiala. Patients aged above 5 or more, presenting to the emergency surgery ward from March 2021 to December 2022 were included in the study. Patients who had not given consent to participate, malignant and fatal preexisting condition, Cervical spinal cord injury, Musculoskeletal paralysis, deafness and blindness, pre-existing conditions, history of eye surgery resulting in a change in pupil size and shape were excluded from the study. A structured Performa was used to enter the detailed history, mode, and mechanism of trauma, vitals were recorded at presentation. Patients were managed according to ATLS protocol. Patients were followed up for 30 days post-admission.

Statistical analysis

SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows. Data was described in terms of range; mean ± standard deviation (±SD), median, frequencies (number of cases), and relative frequencies (percentages) as appropriate. To determine whether the data were normally distributed, Kolmogorov-Smirnov test was used. A comparison of quantitative variables between the study groups was done using the Mann-Whitney *U* test for non-parametric data. For comparing categorical data, theChi-square ($\chi 2$) test was performed and an exact test was used when the expected frequency is less than 5. A probability value (*p-value*) less than 0.05 was considered statistically significant.

Observations

The present study was conducted in the Department of Surgery, Rajindra Hospital, Patiala, amongst 70 cases of traumatic head injury, during March 2021 to December 2022. The following results were observed.

Table No. 1: Relation Between Age Distribution And Outcome

		Outcome						Total	Chi-square value	p-value
		Death		Full Recovery		Recovery with disability				
Age group (in	< 30	2	25.0%	22	43.1%	2	18.2%	26		
	31-50	6	75.0%	22	43.1%	6	54.5%	34		

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years)	> 50	0	0.0%	7	13.7%	3	27.3%	10	5.870	0.209
Total		8	100.0%	51	100.0%	11	100.0%	70		

As per Table No. 1, Maximum number of deaths were noted in the 31-50 age group, (n=6, 75%). In the group <30 years (n=2, 25%) deaths were reported and no deaths were reported in the age >50 years. In the 31- 50 age group, (n=6, 54.5%) had recovery with disability and (n=22, 43.1%) had full recovery. In the <30 years age group, (n=2, 18.2%) had recovery with disability and (n=22, 43.1%) had full recovery. In the >50 years age group (n=3, 27.3%) had recovery with disability and (n=7, 13.7%) had full recovery.P value was 0.209 and chi square value was 5.870. On analysis, the age of the patient was found to be stastically insignificant in relation to outcome of patient

Table no.2: Sex distribution in study population

Sex	No. of cases	Percentage
Female	13	18.6%
Male	57	81.4%
Total	70	100.0%
P value	0.276	

As per table no.2, Out of 70 patients, 13 (18.6%) were female and 57 (81.4%) were male. The sex of the patient was found to be statistically insignificant (p=0.2).

Table No. 3: Relation Between Outcome And Mode Of Injury

		Outcome						Chi- square value	p-value
		Death		Full Recovery		RecoveryWith Disability			
Mode Of Injury	Assault	0	0.0%	9	17.6%	0	0.0%	4.774	0.311
	Fall	0	0.0%	4	7.8%	1	9.1%		
	RSA	8	100.0%	38	74.5%	10	90.9%		
Total		8	100.0%	51	100.0%	11	100.0%		

As Per Table no.3, All the deaths in the study (n=8,100%) were associated with RSA. All patients with head injury due to assault made full recovery. Chi- square value was 4.77 and p value was 0.311. Mode of injury was found to be stastically insignificant in relation to outcome of patient.

Table No. 4: Relation Between Substance Abuse And Outcome

		Outcome						Total	Chi-square value	p-value
		Death		Full Recovery		RecoveryWith Disability				
ubstanceAbuse	NO	6	75.0%	36	70.6%	8	72.7%	50	0.077	0.962
	YES	2	25.0%	15	29.4%	3	27.3%	20		
Total		8	100.0%	51	100.0%	11	100.0%	70		

As Per Table No. 4, No significant relation was found between substance abuse and outcome of TBI, (p value =0.962).

Table no.5: Relation of outcome to the type of traumatic brain Injury

	Total Number of Patient (Percentage)	Outcome			Chi-square value	p-value
		No. of patients who died	No. of patients who fully recovered	No. of patients who recoveredWith Disability		
Total	70(100%)	8 (100.0%)	51	11		

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				(100.0%)	(100.0%)		
EDH PRESENT	52 (74.3%)	No	4 (50.0%)	38 (74.5%)	10 (90.9%)	4.063	0.131
	18 (25.7%)	Yes	4 (50.0%)	13 (25.5%)	1(9.1%)		
SDH PRESENT	34 (48.6%)	No	2 (25.0%)	27 (52.9%)	5 (45.5%)	2.212	0.331
	36 (51.4%)	Yes	6 (75.0%)	24 (47.1%)	6 (54.5%)		
SAH PRESENT	33 (47.1%)	No	5 (62.5%)	25 (49.0%)	3 (27.3%)	2.572	0.276
	37 (52.9%)	Yes	3 (37.5%)	26 (51.0%)	8 (72.7%)		
HC PRESENT	45 (64.3%)	No	6 (75.0%)	33 (64.7%)	6 (54.5%)	0.858	0.651
	25 (35.7%)	Yes	2 (25.0%)	18 (35.3%)	5 (45.5%)		
ICH PRESENT	66 (94.3%)	No	8 (100.0%)	48 (94.1%)	10 (90.9%)	0.720	0.698
	4 (5.7%)	Yes	0 (0.0%)	3 (5.9%)	1 (9.1%)		
FRACTURES OF CRANIUM	50 (71.4%)	No	8 (100.0%)	35 (68.6%)	7 (63.6%)	3.723	0.155
	20 (28.6%)	Yes	0 (0.0%)	16 (31.4%)	4 (36.4%)		
OTHER INJURIES	54 (77.1%)	No	6 (75.0%)	41 (80.4%)	7 (63.6%)	1.464	0.481
	16 (22.9%)	Yes	2 (25.0%)	10 (19.6%)	4 (36.4%)		

As per table no.5, Findings of NCCT head were noted, and also,injuries other than TBI were noted. Out of 70 patients included in the study, 37patients had SAH (52.9%), 36 patients had SDH (51.4%), 25 patients had HC (hemorrhagic contusion) (35.7%), 18 patients had EDH (25.7%), 4 patients had ICH (5.7%). In 20 Patients, fractures of the cranium were noted (28.6%). 16 patients had other injuries also (22.9%). Out of 8 patients who died fromthe study pool, EDH was present in 4 (50%), SDH was present in 6 (75%), SAH was present in 3 (37.5%), HC was present in 2 (25%) and other injuriesin 2 (25%). ICH and fractures of the cranium were not present in any of the patients who died. Out of the 11 patients who recovered with a disability, 6 (54.5%) had SDH, 8 (72.7%) had SAH, and 5 (45.5%) had HC. None was found to be statistically significant

Table no. 6: Hospital stay of the study population

HospitalStay (indays)	No. of patients	Minimum (no. ofdays)	Maximum (no. ofdays)	Mean(no. ofdays)	Z	p- value
	70	1.0	20.0	2.8	-0.118	0.906

As per table no.6 the mean value of hospital stay was 2.8, the maximum being 20 days. Hospital stay was statistically insignificant (p-value 0.906)

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Table no.7: Outcome of TBI patients at the end of 30 days

Outcome	No. of patients	Percentage
Death	8	11.4%
Full recovery	51	72.9%
Recovery with disability	11	15.7%
Total	70	100.0%

As per table no.7, Follow-up of all patients was done after 30 days. Status of their health as noted at the end of 30 days. 51 patients recovered completely without any disability (72.9%). 11 patients had some sort of mentalor physical disability as a result of traumatic brain injury (15.7%). 8 patients succumbed to their injuries.

Discussion

The present study was conducted in the Department of Surgery, Rajindra Hospital, Patiala, amongst 70 cases of traumatic head injury, admitted to the emergency surgery ward for assessment of traumatic head injury patients and their outcome. In our study, the mean age was 36.3 years. And male: female was 57:13. Maximum patients were from the 30-50 years age group (n=34, 48.6%) followed by the <30 years age group (n=26, 37.1%). Out of 70 patients, 57 (81.4%) were male. The demographic profile is consistent with most studies. Kumar et al[6] reported that the commonest age group affected was between 21-40 years and the male/female ratio was 7.5:1. Suresh et al[7] reported that 72% of patients with traumatic head injury were male. Furman et al[8] reported mean age of 39.4±17.3 out of which 74.4% were male. Saika et al[9] reported Age in years (mean±SD) 38.31±15.73 Gender – Male: Female 114:20. As per our study, RSA (n=56, 80%) was found to be the most common mode of TBI, followed by assault, of which 9 cases were reported (12.9%) and 5 cases were due to the fall of the patient (7.1%). All the death in the study (n=8) were associated with RSA. Our results were consistent with Ghelichkhani et al[10] the most important mechanisms of trauma are RSA (60%), followed by falling from a height (13.3%). Similarly, in a study by BrunsJr. and Hauser[11] in Australia, road traffic accidents (40%), sports or recreation (25%), and falls (21%) accounted for the majority of TBIs an France, the main causes of head trauma were traffic accidents (60%) and fall (33%). Out of all the patients included in our study, 20 (28.6%) patients were found to have a history of substance abuse (the most common being alcohol) at the time of TBI. This is consistent with the study by Weil et al that estimates between 30% and 50% of patients treated for TBI to be intoxicated at the time of injury, with even greater intoxication estimates for patients injured in motor vehicle accidents and assault. Out of 70 patients included in the study, 37 patients had SAH (52.9%), 36 patients had SDH (51.4%), 25 patients had HC (35.7%), 18 patients had EDH (25.7%), 4 patients had ICH (5.7%). In 20 patients, fractures of the cranium were noted (28.6%). 16 patients had other injuries also (22.9%). At the end of 30 days, our results were consistent with the study by Sadaka et al[12] in which a total of 51 patients were enrolled, TBI included intracranial bleeding/ contusions (n = 27), subarachnoid hemorrhage (n = 27), subdural hematoma (n = 24), concussion (n = 5), and epidural hematoma (n = 2). 15 patients had other associated injuries. Our results were not comparable to Alnaami et al[13]. In our study, the mean value of hospital stay was 2.8, the maximum being 20 days and the minimum patient staying only for 1 day. In a study by Bayraktar et al[14] mean length of hospital stay (days) was 8.41 ± 3.76. Outcome of TB In our study 51 patients recovered completely without any disability (72.9%). 11 patients had recovered with a mental or physical disability as a result of traumatic brain injury (15.7%). 8 patients succumbed to their injuries (mortality 11.4%). Our results were comparable to the study by Furman et al[8] and Büyükcam et al[15] Overall mortality observed was higher in a study by Khanal et al[16] Wijdicks et al[17] and lower in Sadaka et al[12] study.

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Conclusion

Road side injuries are the common occurrence and are the major cause of morbidity and mortality in traumatic head injury patients. Since vehicular accident accounts for almost the majority of head injuries, there is an immediate need to enforce strict traffic discipline and to educate society to follow the laid down traffic rules.

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