



Injury Mechanisms and Patterns in Trauma Patients Presenting to the Emergency Department

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I. INTRODUCTION:

Injuries are one of the most important public health issues worldwide and have a considerable contribution to the disease burden, especially in young adults. The resources required for the management of patients admitted to hospital is a constant concern for many levels of hospital staff and administration. Although the medical demands of patients admitted for elective procedures can be accommodated ahead of time, patients who require admission in an emergent setting and patients who are the victims of trauma can place unpredictable demands on hospital personnel and medical resources.

Mortality in these cases can be reduced with early diagnosis of injuries to their rapid resolution.

To describe the different trauma mechanisms causing injury in patients presenting to Emergency Department and identifying the pattern of these injuries

II. METHODS:

The study was conducted at the Emergency Department of Kemplegowda Institute of Medical Sciences(KIMS), Bangalore. KIMS is one of the busiest tertiary care teaching hospital in the city. KIMS hospital has one of the largest ED in the city.

The study was carried out for a period of 1.5 years (Jan 2019 to June 2020) and 100 patients who fulfilled the inclusion criteria were included in the study from the EDpatients.

Each patient presenting to our ED were evaluated at the time of presentation and detailed history were taken to elicit the mechanism of injury and physical examination were documented to determine the pattern of injury. Secondary survey

was done at regular interval to assess the severity and outcome of injury. Necessary point of care investigation were done such as abg, ecg, x-ray, ct scan, ultrasonography etc.

III. RESULTS:

In our study of 100 patients, 73% patients had Road Traffic Accident, 19% had a fall from height and 8% patients had assault.

73 patients of RTA, 57 patients(78.1%) were on Two wheeler, and 16 patients(21.9%) were in four wheeler study of these 57 Two wheeler RTA, 26 patients(45.6%) did not wear a helmet and 31 patients(54.4%) were using helmet. Also almost half of these patients had a skid and fall mechanism of injury from two wheeler. Of the 16 4-wheeler RTA, half the patients were in the front seat and half in the rear seat. Also only 3 patients(18.8%) were wearing seat belts and 8 patients(50%) were ejected from the vehicle.

In our study population, among 2wheeler RTA, 45 patients(78.9%) had extremity injury, 16 patients(28.1%) had head injury and 8patients(14.0%) had spinal injury. Among 16 head injury patients, 15 patients were not wearing helmets. Among 45extremity injury patients, 23 patients were wearing helmets and 22 patients were not wearing helmets. Similarly there were an almost similar distribution of patients with or without helmets among spinal injuries.

Among the 4wheeler RTA, 13 patients(81.3%) had extremity injuries. 10 patients(62.5%) had head injuries and of these 8 patients were not using seat belt, which was not statistically significant. Of the patients with 2wheeler RTA, patients with spinal injuries were higher in head on collision group(25%) than in the



non head on collision group(3.4%) which was also statistically significant, (p-value=0.002).

IV. DISCUSSION:

Injuries are one of the most important public health issues worldwide and have a considerable contribution to the disease burden, especially in young adults. There are more ROAD TRAFFIC INJURIES (RTIs) and more RTI-related deaths in India than any other country in the world. Patients with multiple injuries are prevalent, increasing the complexity of trauma care and treatment. Better understanding of the nature of trauma risk and outcome could lead to more effective prevention and treatment strategies

The most common mechanism of injury in our study was from road traffic accidents which constituted to about 73% of the study population, of which about 78% were 2wheeler RTA, which shows that maybe lack of proper safety measures in place and that two wheeler are more prone to injuries during an RTA. Among two wheeler accidents, the use of helmets among two wheeler RTA was 46.6% which was considerably lesser than expected among urban population presenting to our ED given the government regulations of mandatory use of helmets.

While the commonest pattern of injury noted in our study population of 2wheeler RTA was extremity injuries constituting to about 78.9%, followed by head injuries in about 28.1%, its interesting to note that among head injury patients about 94% were motorcycle riders without wearing a helmet which was statistically significant.

Spinal injuries were significantly higher among 2wheeler RTA having a head on collision which shows that this mechanism has a much higher destructive forces on impact than patients with skid and fall.

In our study of 4wheeler RTA, though there was no difference in injury pattern between front or back seat passengers, about 81% patients were not using seat belts. There was no difference in the observed number of extremity injury among both groups, there was a significantly higher number of head injury cases among patients not wearing seatbelts. Chest trauma was also higher among patients not using seat belts

Though in our study the proportion of patients with assault was less constituting less than 10%, most had a penetrating pattern of injury and mean age was lesser than other mechanisms of trauma (24 years).

In our study of patients with high energy fall constituting a fall from more than at least 6 feet, extremity injuries were commonest (63.2%) followed by spinal injuries (36.8%) possibly because of downward compressive forces

V. CONCLUSIONS:

Thus our study helped to describe the mechanisms of trauma presenting to our ED and the possible patterns associated with the different mechanisms and hence help in better allocation of resources for each case at the time of presentation.

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TABLE 1:

Distribution of study patients based on Mechanism of Injury			
Variable	Category	n	%
Mechanism of injury	RTA	73	73%
	Fall from Height	19	19%
	Assault	8	8%

TABLE 2:

Distribution of RTA patients based on Type of Vehicle used (n=73)			
Variable	Category	n	%
Type of Vehicle	2-Wheeler	57	78.1%
	4-Wheeler	16	21.9%

TABLE 3:

Distribution of Type and Wear of Helmet among 2-Wheeler RTA patients			
Variable	Category	n	%
Skid	Yes	28	49.1%
	No	29	50.9%
Helmet	Yes	26	45.6%
	No	31	54.4%

TABLE 4:

Distribution of Patient Placement and Type among 4-Wheeler RTA patients (n=16)			
Variable	Category	n	%



Patient Placement and Type	Front seat	8	50.0%
	Rear seat	8	50.0%
	Seat belt	3	18.8%
	Ejected from vehicle	8	50.0%

TABLE 5:

Comparison of Pattern of Injury among 2-wheeler RTAs based on Helmet wear using Chi Square Test								
Variables	Category	Wearing Helmet (n=26)		Not Wearing Helmet (n=31)		Total		P-Value
		n	%	n	%	n	%	
Pattern of Injury	Extremity injury	23	88.5%	22	71.0%	45	78.9%	0.11
	Spinal injury	3	11.5%	5	16.1%	8	14.0%	0.62
	Head injury	1	3.8%	15	48.4%	16	28.1%	<0.001*
	Chest injury	1	3.8%	0	0.0%	1	1.8%	0.27
	Abdomen Injury	0	0.0%	0	0.0%	0	0.0%	..

TABLE 6:

Comparison of Pattern of Injury among 4-wheeler RTAs based on Seat Belt wear using Chi Square Test								
Variables	Category	Wearing Seat belt (n=3)		Not wearing Seat belt (n=13)		Total		P-Value
		n	%	n	%	n	%	
Pattern of Injury	Extremity injury	3	100.0%	10	76.9%	13	81.3%	0.36
	spinal injury	0	0.0%	0	0.0%	0	0.0%	..
	head injury	2	66.7%	8	61.5%	10	62.5%	0.87
	Chest injury	0	0.0%	1	7.7%	1	6.3%	0.62
	Abdomen Injury	0	0.0%	0	0.0%	0	0.0%	..

TABLE 7:

Comparison of Pattern of Injury based on Head on collision in 2 & 4-wheeler RTAs using Chi Square Test				
Type of Vehicle	Pattern of Injury	Head on collision (n=28)	No Head on collision (n=29)	P-Value



		n	%	n	%	
2-Wheeler	Head injury	10	35.7%	6	20.7%	0.21
	Spinal injury	7	25.0%	1	3.4%	0.02*
		Head on collision (n=6)		No Head on collision (n=10)		
		n	%	n	%	
4-Wheeler	Head injury	4	66.7%	6	60.0%	0.79
	Spinal injury	0	0.0%	0	0.0%	..