Original Research Article

Pattern of Injuries in Driver and Pillion Rider in Fatal Cases of Motorised Two Wheeler Accidents

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Abstract

Background: Road traffic injuries are the major health problems and leading cause of death and injury around the world. This study was conducted in order to observe the pattern of external injuries and internal injuries. In many set ups there may not be adequate facilities for investigations like imaging. If it is possible to know the common patterns in external and internal injuries it would be possible to give appropriate care and prioritise the treatment.

Methods: An autopsy based prospective study was conducted during the period 2011 to 2013 in the Department of Forensic Medicine after obtaining ethical clearance The pattern of external and visceral injuries in cases of motorised two wheeler accidents were observed and documented.

Conclusion: Out of 37 cases examined at autopsy Among external injuries Abrasions are commonly seen involving the whole body.

Among Visceral injuries Contusions are seen more in Lungs followed by Kidney Spleen, Heart and Liver.Among laceration Liver has the most followed by lung and Spleen.

Key words: two wheeler, accidents, external, visceral injuries

Introduction

Road traffic injuries are one of the major health problems and leading cause of death and injury around the world.[1] This study was conducted in order to observe the pattern of external injuries and internal injuries. The pattern of head injury has been studied and published earlier. However this study also tells regarding the external as well as internal findings in the whole body in cases of motorised two wheeler accidents. It also gives details regarding the patterns in various months and days.In manyhospital set ups there may not be adequate facilities for investigations like imaging. If it is possible to know the common patterns in external and internal injuries it would be possible to give appropriate care and prioritise the

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treatment. Knowing the pattern of the injurysustained in the driver and the pillion rider of motorized two wheelers fatalities help in reconstructing injuries especially in hit and run cases. Knowing the risk factors and contributing factors, helps to develop safety measures since they are preventable to some extent if properly implemented. The study can be extrapolated to learn about the internal findings based on the pattern of external injuries. This can help in triaging cases and also perform the investigations and procedures which can help to save the life of the persons involved.

Materials and Methods

The study was a prospective cross sectional study on the cases autopsied during the period November2011 to June 2013. It was conducted in the Department of Forensic Medicine and Toxicology, Vydehi Institute of Medical sciences and Research Center, after obtaining ethical clearance from the Institutional Ethics Committee of Vydehi Institute of Medical Sciences and Research Centre, Bangalore 24-10-2011 with reference number EC/Reg No. ECR/747/Inst/KA/2011 The sample size was calculated based on similar studies conducted in the past

The data was anonymised. The inclusion criteria was all fatalities due to motorised two-wheeled vehicular accidents, The exclusion criteria was all fatalities in which information on nature of vehicle was not available

Results and Discussion

Two wheeler accidents showed 31% of the total no of Road traffic accidents in Whitefield areaof Bangalore, India.(37 cases out of 84 autopsies)

Table 1: showing the distribution of external injuries on the body

	Abrasion	%	Contusion	%	Laceration	%	Others	%
Head and neck	17	45.95	10	27.03	11	29.73	12	32.43
Upper limbs	24	64.86	13	34.14	7	18.92	7	18.92
Chest	15	40.54	6	16.22	0	0	1	2.70
Abdomen	9	24.32	7	18.92	4	19.81	1	2.70
Lower limbs	18	48.64	7	18.92	8	21.62	1	2.70
Total number of cases	37							

Table 2: Combination of external injuries

	Abrasion	%	Contusion	%	Laceration	%
Head -Chest	27	72.97	17	45.95	12	32.43
Head- Abdomen	21	56.76	13	35.14	15	40.54
Head -Limbs	11	29.73	6	16.22	21	56.76
Chest-Abdomen	17	45.95	11	29.73	3	8.11
Chest - Limbs	26	70.27	18	48.65	12	32.43
Abdomen- Limbs	26	70.27	18	48.65	12	32.43
Combination	27	72.97	18	48.65	21	67.76
Total no of cases	37					

Table 3: Showing injuries to visceral organs

	Contusion	%	Laceration	%	Others	%
Heart	1	2.70	0	0	2	5.41
Lungs	18	48.64	5	13.51	5	13.51
Spleen	3	8.11	3	8.11	0	0
Kidney	5	13.51	0	0	3	8.11
Liver	1	2.70	9	54.32	0	0
Total no of cases	37					

Table 4: Showing amount of blood collection in pleural and peritoneal cavities

	Pleural cavity	Peritoneal cavity
0-500ml	13	2
500-1000ml	5	5
>1000ml	3	3
Total no of cases	37	

Table 5: Showing pattern of external limb injuries

	Abrasion	%	Contusion	%	Laceration		Others	
Upper Limbs	23	62.16	13	35.14	7	18.92	5	13.51
Lower Limbs	17	45.95	8	21.62	9	24.32	3	8.11
Total no of cases	37							

Table 6: showing pattern of fractures of skeletal bones

	Skull & facial bones	%	Upper limbs	%	Ribs and Sternum	%	Vertebra		Pelvis		Lower limbs	
Drivers	22	59.46	6	16.22	19	51.35	7	18.92	7	18.92	11	29.73
Pillion riders	4	10.81	0	0	5	13.51	2	5.41	1	2.70	1	2.70
Total no of cases	37											

Table 7: showing types of skull fractures

	Fissured/ linear	%	Comminuted	%	Depressed	%	Diastatic/ Sutural	%	Hinge	%
Driver	14	37.84	6	16.22	2	5.41	3	8.11	5	13.51
Pillion rider	2	5.41	1	2.70	1	2.70	0	0	2	5.41
Total no of cases	37									

Table 8: Showing pattern of Brain injuries

	EDH	%	SDH	%	SAH	%	SDH+SAH	%	Others/ IVH	
Driver	0	0	3	8.11	4	10.81	10	27.03	4	10.81
Pillion rider	0	0	1	2.70	2	5.41	1	2.70	0	0
Total no of cases										

Table 9: Showing pattern of brain injuries

	Contusion	%	Laceration	%	Edematous	%	Drained out	%
Driver	5	13.51	4	10.81	3	8.11	4	10.81
Pillion rider	2	5.41	1	2.70	1	2.70	0	0
Total number of cases	37							

Most common type of the external injury noticed were Abrasions which were in the upper limbs followed by contusions. And contusions were also more in upper limbs. This in turn is followed by lacerations which involved head and neck and finally by limb and abdominal injuries.

On considering internal injuries in both driver and pillion rider base of the skull fracture is most commonly noticed and temporal bone is most commonly involved in fractures followed, parietal bones and occipital bone. Next common fracture was noticed in ribs and sternum followed by lower limb bones and pelvic bone. On considering the type of fractures to the skull bone fractures, a fissure fracture was most. Injuries to Kidneys, Spleen, Heart and Liver were seen in that order.

Among Lacerations that of Liver was the most common followed by of Spleen and then of Lungs. Type of Intracranial Haemorrhage most commonly noticed was SAH followed by SDH. Among injuries to the brain contusion was commonly noticed followed by Laceration. Severe Brain Trauma with part or most of it fallen out or drained out in few cases were there.

In the current study cause of death most commonly noticed was Shock and Hemorrhage, next common being Blunt Injury. The most common areas of involvement were Head and Neck followed by Chest and Abdomen

Discussion

According to WHO[1] yearly nearly 1.19 million people dieas a result of road traffic accidents. According to Saukko and Knight[2], the extent of an injury sustained in a road crash is directly proportional to the degree of acceleration or deceleration to which the occupant of the vehicle is subjected. A fracture of the skull with associated brain injury is the most common cause of death but multiple injuries constitute a typical feature of fatal motor cycle accident.

Zettas et al [3]in their article describes the term 'motorcycle radius' as they found that severely comminuted intra articular fractures of the distaltibia and radius were numerous. Many studies showthat head injury as the commonest cause of death[4,5] with lower limb injuries being the most common injury.[6,7,8].

In a study during one year period of medico legal autopsies conducted on 950 cases of fatal road traffic accidents at the mortuary of SRN Hospital, MLN Medical College, Allahabad by Kual et al .[9] Mostly lowerextremities 27.39% and pelvis 25.99% received the primary impacts; the head and neck 55.62% the secondary impacts, while secondary injuries were mostly located in the lower extremities 28.38%. Largest number of injuries was recorded in lower extremities 804 number, followed by head & neck 748 numbers. According to Shetty et al [10]Externalthoracic injuries were more common than internal thoracic injuries in the thoracic region. In the abdominal region, internal injuries were more common than external injuries. In a study conducted in Gwahati[11]skull fracture was present in 22(64%) pillion riders and in only 16(38%) in riders. Rib fractures were seen in 33.3% of riders and 17.64% of pillionriders. Laceration to the brain was seen in 16(38%) riders and 18(52.94%) pillion riders. Laceration to the liver and spleen constituted 19% each in riders while it was 14.7% and17.6% respectively in pillion riders. Laceration of the heart was seen in 3 riders (7.14%)and 2 pillion riders (4.76%). In internal injuries lungs (61%) and kidneys (23%) were the most commonly involved organs in the thoracic and abdominal regions respectively.

Conclusion and Acknowledgement

This study shows the distribution of injuries to the various parts of the body. As described head injury forms a major cause of death and injuries to extremities are also common. This can help in planning the policies for protective gears. Strict traffic rules with respect to road safety and safety training and education to the public is important to reduce the burden of complications caused by the same.

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