

## AN AUTOPSY STUDY OF THORACO-ABDOMINAL INJURIES IN ROAD TRAFFIC ACCIDENTS

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Received: 14 March 2023, Revised and Accepted: 25 April 2023

### ABSTRACT

**Objectives:** More than 1.3 lacks people died on Indian roads, giving India the dubious honor of topping the list of road deaths across the world. With just 1% of the world's vehicles, India manages to account for 10% of its road fatalities. Since the thoraco-abdominal cavity contains the vital organs such as heart, lungs, liver, spleen, stomach, kidney, major blood vessels, and ribs, trauma to this region challenges the integrity and even the viability of the individual.

**Methods:** The present study was conducted in the department of forensic medicine and toxicology of a tertiary care center. The study was carried out during the period of 2 years from 1<sup>st</sup> October 2012 to 30<sup>th</sup> September 2014.

**Results:** Males between the age group of 21 and 30 years, i.e., 26 victims (26.53%), more vulnerable. Females were more vulnerable in the age group of 51–60 years, i.e., 5 victims (31.25%). Out of total 114 cases, total 48 victims were died on the spot or brought death to the hospital. Lungs were injured in maximum number of victims, i.e., 87 cases (76.31%), followed by the heart, i.e., in 24 cases (20.17%). Liver was the most commonly injured abdominal organ, in 67 cases (58.77%).

**Conclusion:** Maximum cases were spot death. It confirms the urgency to establish the good pre-hospital care and provision of efficient and prompt trauma services at site.

**Keywords:** RTA-road traffic accidents, Thoraco-abdominal injuries, Spot death, Brought dead, Survival period.

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### INTRODUCTION

Birth and death are the two extremes of the life, and death is the ultimate truth. However, unnatural death is known for its immense striking shock. Deaths due to road traffic accidents are one of the common forms of unnatural death and its history is as old as the invention of the wheel [1]. More than 1.3 lacks people died on Indian roads, giving India the dubious honor of topping the list of road deaths across the world. With just 1% of the world's vehicles, India manages to account for 10% of its road fatalities [2].

Since the thoraco-abdominal cavity contains the vital organs such as heart, lungs, liver, spleen, stomach, kidney, major blood vessels, and ribs, trauma to this region challenges the integrity and even the viability of the individual. It is a leading cause of death in approximately 25% of trauma patients and, when associated with other injuries, it causes death in additional 50% of multiple trauma patients, usually as a result of hypoxia and hypovolemia. When cardiac trauma is not involved, mortality from isolated penetrating chest injury is low (<1%), but if cardiac trauma is present, mortality rises to about 20% [3].

The present study is carried out to study the pattern of injuries in thoraco-abdominal injuries, along with the survival period.

### Aims and objectives

- To study the pattern of fatal thoraco-abdominal injuries in road traffic accidents.

### METHODS

The present study was conducted in the department of forensic medicine and toxicology of a tertiary care center. The study was carried out during the period of 2 years from 1<sup>st</sup> October 2012 to 30<sup>th</sup> September 2014.

### RESULTS

Table 1 shows the males between the age group of 21–30 years, i.e., 26 victims (26.53%), more vulnerable. Females were more vulnerable in the age group of 51–60 years, i.e., 5 victims (31.25%).

Table 2 shows the out of total 114 cases, total 48 victims were died on the spot or brought death to the hospital. Out of total 48 cases of spot death, maximum victims were died due to the injury to the thorax and abdomen region, followed by the injury to the thorax region only, i.e., 16 cases.

After applying the Pearson correlation, it was found that,  $p < 0.05$ , which shows the relation between above parameters was significant.

Table 3 shows that the lungs were injured in maximum number of victims, i.e. 87 cases (76.31%), followed by the heart, i.e., in 24 cases (20.17%). Ribs were fractured in 78 (68.42%) cases, followed by the sternum, in 17 (14.91%) cases.

**Table 1: Age wise and sex wise distribution of victims (n=114)**

Age groups in year	Male	Female	Total	Percentage
1–10	1	2	3	2.60
11–20	10	0	10	8.77
21–30	26	2	28	24.56
31–40	23	2	25	22.0
41–50	15	2	17	14.91
51–60	10	5	15	13.15
61–70	12	0	12	10.52
>70	1	3	4	3.50
Total	98 (85.96%)	16 (14.04%)	114	100

**Table 2: Correlation between survival period and region-wise involvement (n=114)**

Survival period	thorax	Abdomen	Thorax+abdomen	Total
Spot/BD	16	9	23	48
0-1 h	1	0	11	12
1-6 h	8	11	17	36
6-12 h	1	1	0	2
12-24 h	0	0	1	1
1-2 day	1	1	5	7
2-7 day	1	3	1	5
7-15 days	1	0	2	3
Total	28 (24.6%)	25 (21.9%)	61 (53.5%)	114

Pearson correlation (r)= 0.868; p<0.05; significant

**Table 3: Involvement of thoracic organs in victims (n=114)**

Organ	Cases (%)	Out of total
Lung	87 (76.31)	114
Heart	24 (21.05)	114
Bronchus	12 (10.52)	114
Trachea	4 (3.50)	114
Esophagus	3 (2.63)	114
Major vessels	4 (3.5)	114
Ribs	77 (67.54)	114
Sternum	17 (14.91)	114
Clavicle	13 (11.40)	114
Thoracic vertebra	6 (5.26)	114

**Table 4: Distribution of injury pattern of organs of the thoracic region (n=114)**

Organ	Contusion	Laceration	Total (%)	Out of
Right lung	45	25	70 (61.5)	114
Left lung	28	25	55 (48.24)	114
Heart	10	14	24 (21.05)	114
Bronchus	7	5	12 (10.52)	114
Trachea	1	3	4 (3.5)	114
Esophagus	0	3	3 (2.63)	114

**Table 5: Involvement of abdominal organs in victims (n=114)**

Organ	Cases (%)
Liver	67 (58.77)
Spleen	42 (36.84)
Kidneys	40 (35.08)
Intestine	15 (13.15)
Mesentery	12 (10.52)
Stomach	11 (9.64)
Pancreas	6 (5.26)
Diaphragm	6 (5.26)
Major vessels	3 (2.63)
Lumbar vertebrae	4 (3.50)

Table 4 shows that both the lungs were having a maximum injury of contusion, 64.29% cases in right lung and 35.71% in left lung. In all 24 cases of heart injury, laceration was more common injury, i.e., in 14 cases (58.33%), and contusion was involved in ten cases (41.67%).

Table 5 shows that the liver was the most commonly injured abdominal organ, in 67 cases (58.77%).

Table 6 shows that out of total 67 cases, liver injury and laceration were present in 77.61% of cases and contusion in 22.39% of cases.

**Table 6: Type of injury involved to abdominal organs**

Organ	Contusion	Laceration	Total
Liver	15	52	67
spleen	10	32	42
Right kidney	21	11	32
left kidney	19	6	25
Intestine	5	10	15
Mesentery	9	3	12
stomach	0	11	11
pancreas	1	5	6
diaphragm	2	4	6

## DISCUSSION

RTA causes mechanical trauma, resulting in morbidity, disability, and even mortality. The fatality rate in road traffic accident in India is the highest in the world and reported to be 20 times more than that reported in the developed countries [4].

Table 1 shows the male preponderance to the RTA victim was more than female, which is in accordance with the Khajuria *et al.* [5], Hanumantha *et al.* [4], and Lamb *et al.* [6], with the most vulnerable age group is between 21 and 30 years, which is in accordance with Kachare *et al.* [7], Murkey *et al.* [8], and Kumar *et al.* [9] The reason for these types of observations might be that age group 21-30 years and 31-40 years are more active and exposed to exterior world more frequently for education and job that's why they are more prone to hazards of modern automobile world.

In the present study, a maximum number of victims were died on the spot, which is in accordance with the Meera and Nabachandra [10], Murkey *et al.* [8]. In the present study, more commonly injured organs in thoracic region were lungs 76.31%, which is in consistent with the studies of Khichi *et al.* [11] (52.7%), Lamb *et al.* [6] (62%), and Murky *et al.* [8] (76%). This could be due to the larger size, mobility of lungs in the chest cavity which could be under acceleration and deceleration impact. In the present study, the rib fracture was the most common skeletal injury in the thoracic region, i.e., 77 cases (68.42%) are in consistent with the Singh and Dhatarwal [12] (44%) and Hanumantha *et al.* [4] 63.3%. This could be due to ribs are most exposed bone to trauma as they are spread over large area.

Although liver is second most frequently injured organ in traffic accident cases with abdominal trauma, it is the most common cause of death following abdominal injury. In the present study, liver was the most commonly involved organ in the abdominal region (58.77%), followed by the spleen (36.84%) (Tables 5 and 6). It is homologous with the previous studies by Lamb *et al.* [6] (70%) and Khichi *et al.* [11] (56.3%). Maximum type of injury to liver was of laceration 52 cases out of 67 total cases, i.e., 77.61% (Table 5). Hanumantha *et al.* [4] observed the same type of results in their study. Liver is most commonly involved organ due to its large size, fixed location, and solid consistency which make it an easy target for blunt injury.

## CONCLUSION

The study showed that most RTA deaths, brought to a tertiary care rural hospital, took place either on the spot or within 24 h of injury which is indeed very alarming. It confirms the urgency to establish the good pre-hospital care and provision of efficient and prompt trauma services at site.

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