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Profile of Fatal Thoracic Injuries in and around Vijayapur, Karnataka

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Abstract

Introduction: Trauma is one of the leading preventable causes of death in developing countries, and is posing a major social health an health problem. Trauma affects generally the young people, and accounts for loss of more years of life, than lost due to cancer and heart diseases put together. *Material and Methods:* The present study was done for one year retrospective and two years prospective study from July 2014 to July 2016 at Al-Amen Medical College and District Hospital Mortuary, Vijayapur. *Results:* In the victims of chest injuries 63.0% were due to RTA, 16.35% due to railway accidents, and least is from due to sports injury in 0.92% of cases. Young adults between 21 to 30 years (36.54%) are more vulnerable to the fatal chest injuries. More number of victims died on the spot. In road traffic accidents maximum number of victims were pedestrians i.e, 27 cases (40.90%), followed by motor cyclists in 15cases (22.70%) and least in bicycle riders. *Conclusion:* In the victims of chest injuries 63.0% were due to RTA, 16.35% due to railway accidents. Young adults between 21 to 30 years (36.54%) are more vulnerable. Manner of death was commonly accidental in nature in 83 cases followed by homicidal and suicidal in 12 and 9 cases respectively. Peak time of occurrence chest injuries is between 6pm to 12 midnight and least between 12 midnight to morning 6am. More number of victims died on the spot. In road traffic accidents maximum number of victims were pedestrians i.e, 27 cases (40.90%), followed by motor cyclists.

Keywords: Chest Injuries; Blunt Trauma; Manner of Death; Visceral Injury.

Introduction

Trauma is one of the leading preventable causes of death in developing countries and is posing major health and social problem. Death related trauma rank third after cardiovascular diseases and cancer [1]. Trauma may lead to short or long-term disability. Since chest cavity contains the vital organs like lungs, heart, great vessels and supporting tissue, trauma to this region challenges the integrity and even the viability of the individual. Because of its size and anatomical position it is a major site of trauma in road accidents, railway accidents, fall from height and in sports injuries etc. Thoracic trauma causes 10-15% of all mortalities [2].

In case of thorax, blunt trauma can produce a wide spectrum of injuries extending from the fracture of bones like ribs, sternum and thoracic vertebrae and injuries of thoracic organs like contusions, lacerations and sometimes causing haemothorax, pneumothorax. Hence the presence of intrathorasic involvement may be overlooked. Chest injuries encountered with different manner (suicide, homicide, accident). Sometimes homicidal chest injuries are pleaded or disguised as suicide and even accidental chest injuries are disguised as homicidal to bring false charge of offence on enemies. With the growth in the population and modern needs the incidence of homicide is on increase in India.

Over all, road traffic accident is the major cause of blunt chest trauma in all over the world. Road traffic accident is an unplanned event occurring suddenly unexpectedly as unforeseen circumstance. The exponentially increasing number of automobile

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vehicles, poor adherence to traffic rules and regulations, abuse of alcohol are the cause of accidents. Accidents tragically are not often due to ignorance, but are due to carelessness, thoughtlessness and due to over confidence. Incidence of road traffic accidents has been increasing at the alarming rate throughout the world. Road traffic accidents are the third most preventable causes of death. In India over 1,45000 persons die annually due to traffic accidents,1.6 millions injured seriously and 4 lakhs disabled permanently. Every day there are 3300 deaths and 6600 serious injuries on the road in the world. Due to narrow roads and excess motor vehicles road traffic accidents result leading to blunt thoracic trauma. Chest injuries are the leading causes of death despite optimal use of available treatment facilities [2].

Homicides are also on rise because of increasing population, unemployment, industrialization, easy availability of the weapons and stressful living conditions.

Injuries of the chest are not always isolated but often associated with injuries to the other parts, viz, head, abdomen, pelvis, spine, extremities etc.

Material and Methods

The present study was done for one year retrospective and two years prospective study from July 2014 to July 2016 at Al-Amen medical college and district hospital mortuary, Vijayapur.

All the cases that are autopsied were screened for chest injuries resulting from deaths due to road traffic accidents, railway accidents, assault, firearm injuries and fall from height. A detailed information and data pertaining to the cases were collected. After receiving the details, post-mortem examination was conducted.

Information pertaining to the time and manner of death was sought from the police personnel investigating the case. Some of the particulars of the victim were also obtained from the direct interrogation with relatives, friends and others along with the police. Following points were noted with respect to age, sex, cause or mode and manner of injury sustained, object causing the injury, frequency of organs involved, period of survival of the victim following the incident and the cause of death. All the findings thus obtained were noted down in a separate proforma for each case. Then the master chart is prepared. The statistical analysis of the data collected was done and presented results in the tabular forms, bar diagrams and pie charts. Photographs and x-rays taken whenever necessary. The results are analyzed, discussed and concluded.

Observations and Results

During the period of study 104 cases were due to chest injuries, in which 75 were males and 29 were females. The mortality rate is 13.61%.The male and female ratio is M:F=2.59:1.The mean average age is 35.97 years.

Table 1 describes that male preponderance over females noted in this study with males constituting 75 cases (72.12%) and females 29 cases (27.88%).

Table 2 shows age wise analysis of the victims of chest injuries showed a maximum number of deaths in the age group of 21-30 years(36.54%)followed by 31-40 (24.04%) and minimum deaths in the age group of 0-10 (0.96%) and above 60 years (5.76%).The average mean age is 35.97 years.

Table 3 reveals that blunt force is the most common agent causing the chest injuries in 96 cases (92.31%) and least is penetrating in 8 cases (7.69%). Blunt force trauma commonly associated with road traffic accidents.

The maximum number of cases were reported between 6pm to 12am 48 cases (46.15%), followed by the time interval of 12pm to 6pm, 35 cases (33.65%) and least is seen between 12 am to 6am of 2 cases (1.92%).

Table 5 shows that deceased died at the spot in 48 cases (46.15%) followed by succumbed on the way to the hospital in 33 cases(31.73%), in 21 cases (20.19%) died in the hospital and least in others, 2cases(1.92%).

External injuries on the chest were seen in 80 cases of which 42 cases are due to abrasions (52.50%), contusions in 20 cases (25%), lacerations in 13 cases (16.25%) and contused abrasions in 5 cases (6.25%).

Above Table shows that lung is the most common organ involved in 55 cases (53.40%). Contusion of lungs seen in 23 cases, laceration of lung in 31 cases and rupture in 1 case. Heart is injured in 31 cases (30.10%). Injuries to heart consist of contusion in 9 cases, laceration in 14 and rupture in 8 cases. And major blood vessels are involved in 17 (16.50%) cases. Aorta lacerated in 6 and ruptured in 8 cases. Superior vena cava lacerated in 2 cases and inferior vena cava in 1 case.

Table 8 shows that the injuries to the respiratory system were contusion of the trachea in 3cases, laceration in 2 cases followed by contusion of the bronchus in 2 cases, laceration in 7 cases. Laceration

of pleura seen in 51cases. Haemothorax was more common and seen in 61cases. Pneumothorax found in 9 cases. Contusion of pericardium in 2cases, laceration in 4 cases, and rupture in 1 case. Cardiac tamponade is seen in 4 cases (3.85%). Injuries to the oesophagus consists contusion seen in 4 cases and laceration in 3 cases. Injuries to the diaphragm seen in 8 cases. Contusion is seen over right diaphragm in 3 cases, laceration seen 2 on right side and 3 on left side.

The skeletal injuries are fracture of ribs in 77cases (64.71%), sternum in 26 cases (21.85%), clavicle in 11 cases (9.24%) and least in thoracic vertebra of 5 cases (4.2%).

Table 1: Sex-wise distribution of the victims

Sex	No. of victims	Percentage
Male	75	72.12
Female	29	27.88
Total	104	100

Table 2: Age-wise distribution of the victims

Age group (years)	No. of Victims		Total	Percentage
	Male	Female		
0 – 10	1	0	1	0.96
11 – 20	6	2	8	7.69
21 – 30	30	8	38	36.54
31 – 40	16	9	25	24.04
41 – 50	10	6	16	15.38
51 – 60	8	2	10	9.61
>60	4	2	6	5.76
Total	75	29	104	100

Table 3: Agent causing injuries

Agent	No. of cases	Percentage
Blunt force	96	92.31
Penetrating force	08	7.69
Total	104	100

Table 4: Diurnal variations

Time interval	No. of cases	Percentage
6am to12pm	19	18.27
12pm to 6pm	35	33.65
6pm to 12pm	48	46.15
12am to 6am	2	1.92
Total	104	100

Table 5: Place of death

Place	No. of cases	Percentage
Spot deaths	48	46.15
Brought dead	33	31.73
Hospital deaths	21	20.19
Others	2	1.92
Total	104	100

Table 6: Pattern of External Injuries

Type of injury	Chest wall	
	No. of cases	Percent
Abrasion	42	52.50
Contusion	20	25.00
Laceration	13	16.25
contused Abrasion	5	6.25
Total	80	100

Table 7: Type of organ involved

Type of organ involved	No. of cases	Percentage
Lung	55	53.40
Heart	31	30.10
Major blood vessels	17	16.50
Total	103	100

Table 8: Injuries to the chest

Tissue	Contusion	Laceration	Rupture	Total
Trachea	3	2	0	5
Bronchus	2	7	0	9
Pleura	0	51	0	51
Haemothorax	0	0	0	61
Pneumothorax	0	0	0	9
Pericardium	2	4	1	7
Oesophagus	4	3	0	7
Right diaphragm	3	2	0	5
Left diaphragm	0	3	0	3

Table 9: Involvement of Skeleton

Bone	Right	Left	Both	Total	
				No. of cases	Percentage
Clavicle	6	5	00	11	9.24
Ribs	19	17	41	77	64.71
Sternum	00	00	00	26	21.85
Thoracic vertebrae	00	00	00	05	4.20
Total	00	00	00	119	100

Table 10: Associated injuries

Associated Injury	No. of victims	Percentage
Head injury	32	30.76
Abdomen	21	20.19
Long bone fractures	21	20.19
Pelvic fracture	3	2.88

Table 11: Pattern of multiple organs involved:

Number of organs injured	No. of cases	Percentage
One organ	24	27.59
Two organs	36	41.38
Three organs	16	18.40
Four organs	11	12.64
Total	87	100

Table 12: Mode of death:

Mode	No. of Victims		Total	Percent
	Male	Female		
Road traffic accidents	45	21	66	63.50
Railway accidents	12	5	17	16.35
Homicide	8	2	10	9.62
Fall from height	7	1	8	7.70
Firearm injury	2	0	2	1.92
Sports injury	1	0	1	0.96
Total	75	29	104	100

Table 13: Status of victims in RTA:

Type of road user	No. of cases	Percentage
Pedestrians	27	40.90
Two wheeler rider	15	22.70
Passenger	10	15.15
Two wheeler pillion rider	9	13.64
Driver	4	6.06
Bicycle rider	1	1.51
Total	66	100

Table 14: Relationship with fall from height:

Height in feet	No. of cases	Percentage
<10 ft	05	62.50
11-20 ft	02	25.00
20-30 ft	00	0.0
30-40 ft	01	12.50
Total	08	100

Table 15: Manner of death:

Circumstances	No. of Victims		Total	Percent
	Male	Female		
Accidental	58	25	83	79.80
Homicidal	10	2	12	11.54
Suicidal	7	2	9	8.65
Total	75	29	104	100

Table 16: Cause of death:

Cause	No. of victims	Percentage
Hemorrhage and shock	49	47.12
Combined Hemorrhagic shock and coma	25	24.03
coma	17	16.35
Respiratory failure	6	5.77
Cardiac tamponade	4	3.85
Cardiac Rupture	2	1.92
Septicemia	1	0.96
Total	104	100

Table 10 reveals that head injuries seen in 32 cases (30.76%), followed by abdomen injuries in21 cases (20.19%), 21 cases (20.19%) due to long bone fractures and pelvic fractures in 3 cases (2.88%). Injury to the chest alone was found in 28 cases (26.92%).

Above table shows that two organs are involved more commonly in 36 cases (41.38%) followed by one organ involvement in 24 cases (27.59%) and least involvement in four organs 11 cases (12.64%)

Table 12 reveals that most common circumstance causing chest injuries are road traffic accidents in 66 cases(63.50%) followed by railway accidents in 17 cases (16.35%), homicide in 12 cases (11.54%), 8 cases (7.70%) due to fall from height and 1 case due to sports injury(0.96%).

Table 13 shows that in road traffic accidents it was observed that pedestrians were involved in 27 cases (40.90%) formed the major victims of chest injuries followed by the two wheeler riders in 15 cases (22.70%) and least in bicycle riders 1 case (1.51%)

The Table 14 shows that chest trauma due to fall from height were seen maximum in cases of fall from height of less than 10 feet in 05 cases(62.50%), followed by fall from height of 11 to 20 feet in 02 cases(25%) and in 30 to 40 feet height, 01 case (12.50%). Most of victims are young adult males within age group of 21 to 40 years. Fall from height constitutes 7.69% of total chest trauma.

The manner of death is maximum in accidents in 83 cases (79.80%) followed by homicidal in 12 cases (11.54%) and suicidal in 9 cases (8.65%).

Death was due to severe bleeding in 49 cases (47.12%) followed by combination of coma and hemorrhagic shock in 25(24.03%) cases and least is septicemia in 1 case (0.96%).

Discussion

In the present study of chest injury it was observed that majority of the victims were in the age group of 21 to 30 years in 36.54% cases, followed by the age group 31 to 40 years 24.04% cases. Early and late ages show minimum cases.

Firas Yazigi et al documents in his study that until age 40 chest trauma constitutes 20-25% of causes of deaths due to trauma and our studies are consistent with their study [1]. J.J. Moar observed that 46.2% of the victims are in the age group of 21 to 30 years and their results are in agreement with our studies [3]. Husaini Numan et al revealed in his study that 82.6% of the victims are males and mostly in the age group of 21 to 40 years. Their results are comparable with our studies [4]. The present study is consistent with the results of Dean T. Mason et al [5], Amit Sharma [6], B. Suresh Kumar Shetty et al [7].

In the present study, it was observed that males dominated females in the ratio of 2.59:1. This dominance of the males has also been reported by various workers- Ibrahim Al-Koudmani et al have opined that chest trauma is a major health problem especially among the young males as it is associated with high mortality [8]. Dean T. Mason et l has include 86% males are associated with chest injury [5].

In the present study it is found that agent responsible for majority of chest injuries is the blunt force in 96(92.31%) cases and penetrating force is least in 8(7.69%) of cases.

Mohamed Fouad Ismail et al conducted study over a period of 10 years involving 472 victims. They states that causes of penetrating chest trauma in 2.1% and blunt chest trauma in 97.9% of cases. This study is comparable with our study [9].

In 104 cases of deaths due to chest injuries it was found that 48 cases (46.15%) have died on the spot and 33cases (31.73%) were succumbed to their injuries on their way to the hospital and 21cases (20.19%) were died while undergoing treatment in the hospital.

This is near to the studies done by C.R.Vasudeva Murthy et al. In their study they have noticed that in 57.69% cases victims died on the spot [10]. MeeraTh et al mentions in their study that 59 victims (47.2%) died on the spot [11].

In the present study it is observed that lung is the most common organ involved in the majority of the victims i.e., 55 cases(53.40%), followed by heart in 31cases(30.10%). In our studies contusion of lungs seen in 23 cases and laceration in 31 cases and rupture in 1 case. Injuries to heart consist of contusion in 9 cases, laceration in 14 and rupture in 8 cases.

B.Suresh Kumar Shetty et al mentions in their study that lungs(61%) is the most common organ involved in the chest trauma and is consistent with our studies [7]. Present study is partial in agreement to the studies conducted by Mohamed Fouad Ismail et al as they mentions that pulmonary contusions seen in 27.1%, lacerations in 6.9% of cases [9]. Our results are contrast with the study done by K. Moghissi in which he finds only 4.4% of lung lacerated due to blunt chest trauma [12].

Injuries to the bronchus is seen in 9 cases (8.65%) consisting of contusion in 2 cases and laceration in 7cases. Injury to the trachea is seen in 5 cases. They are commonly seen in road traffic accidents and in railway accidents. Majdi Ibrahim et al states in their study that tracheobronchial injury is a rare injury and usually occurs after blunt chest trauma and is consistent with our study.1[3] Our study is also in accordance with observations of B.T.Stewart et al [14].

In present study it is observed that rib bone fracture is the most common skeletal injury in the chest region i.e, 77 (64.71%) cases followed by the injury to the sternum in 26(21.85%) cases, clavicle is injured in 11(9.24%) cases and thoracic vertebra is injured in 5(4.20%) cases.

Husaini Numan et al mentions in their study that Pattern of thoraco-abdominal injuries shows that the commonest injury of thoracic region was fracture of ribs and is in accordance with present studies [4]. It is also consistent with the studies of K. Moghissi [12], C. R. Vasudeva Murthy et al [15], Colin Bane [16].

In the present study injury to the chest alone was found in 28 cases (26.92%). Associated injuries to two and more body parts i.e., head, abdomen and limbs were found in majority (70%) of the cases. Long bone fractures are seen in 21 cases (20.19%).

Present study is comparable with the studies of Sangeet Dhillon et al [17] where they have noticed head injuries in 31 victims and 23 cases associated with long bone factures.

In the present study deaths due to chest injuries caused by road traffic accidents were seen in 66 cases (63.50%). It is in accordance with the studies of Recep Demirhan et al [18] as they have documented that in 65% of cases blunt injury mostly related to the traffic accidents was the cause of chest trauma. It is to nearer to the studies of K.K.Aggarwal et al as they mentions in their observations that road traffic accident deaths accounted for 55.48% [19] .

In the present study it is observed that the maximum number of victims were pedestrians i.e., 27(40.90%) cases, followed by two wheeler riders in 15 cases (22.70%) and least were found in bicycle riders.Mohamed Fouad Ismail et al have noticed that pedestrian injuries is seen in 38.3% of cases and is near to our studies [9].

The chest injuries due to fall from height were less than 10 feet is seen in 5 cases followed by fall from height of 11-20 feet in 2 cases and 30-40 feet in 1 case. Manner of deaths in fall from height is due to accidental fall. It accounts for 7.69% of total thoracic traumas.Our finding is near to the studies of Mohamed Fouad Ismail et al where they documented that fall from height constitutes 6.7% of total thoracic traumas [9].

In the present study fire arm injury over the chest is seen in two cases. In our study it is found that

fracture of ribs and penetrating injury to heart and lungs were seen. Our study is similar to the study conducted by the Mahmut Tokur et al studied two cases and mentions that penetrating heart injuries were produced by fire arm injuries and penetrating trauma resulting from the free ends of fractured sternum and ribs [20]. Present study results are consistent with the studies of Ira A.Ferguson [21].

In the present study it was noted that the main cause of death was hemorrhagic shock in 49 cases (47.12%), followed by combination of coma and hemorrhagic shock in 25cases (24.03%), coma in 17 cases (16.35%) and least is septicemia in 1 case (0.96%). Sangeet Dhillon et al noticed in their studies that hemorrhagic shock was the cause of death in majority of the victims [17]. Meera Th et al States that the commonest cause of death was hemorrhagic shock as a result of intra thoracic and abdominal bleeding in 44%of the cases [11].

Conclusion

In the victims of chest injuries 63.0% were due to RTA, 16.35% due to railway accidents, and least is from due to sports injury in 0.92% of cases. Young adults between 21 to 30 years (36.54%) are more vulnerable to the fatal chest injuries. Manner of death is commonly accidental in nature in 83 cases followed by homicidal and suicidal in 12 and 9 cases respectively. Peak time of occurrence chest injuries is between 6pm to 12 midnight and least between 12 midnight to morning 6am. More number of victims died on the spot. In road traffic accidents maximum number of victims were pedestrians i.e, 27 cases (40.90%), followed by motor cyclists in 15cases (22.70%) and least in bicycle riders.

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