



PATTERN OF FATAL INTRA-ABDOMINAL INJURIES CAUSED BY BLUNT FORCE IN ALLEGED CASES OF ROAD TRAFFIC ACCIDENT- A ONE YEAR AUTOPSY BASED RETROSPECTIVE STUDY

Forensic Medicine

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ABSTRACT

Introduction- Intra-abdominal trauma is an injury to the organs of abdomen which can be caused either by sharp or blunt force. One of the most common cause of the blunt intra-abdominal trauma is road traffic accidents (RTA). **Objective-** This study aims to establish the pattern of fatal visceral injuries as a result of blunt abdominal trauma in relation to the various epidemiological factors. **Materials and Method-** This retrospective study was conducted over a period of 1 years from April 2015 to March 2016 at mortuary of Patna Medical College and Hospital (PMCH), Patna, Bihar. The total number of medicolegal cases subjected to post-mortem examination during this period was 2280; out of which 1332 (68.42%) cases were alleged to be of RTA. Details pertaining to cause of injury, pattern of injuries, cause of death and other informations were obtained from hospital case sheets, death summaries and post mortem examination reports. **Results-** The study revealed that out of 1332 alleged cases of RTA, only 561 cases with blunt abdominal trauma were included in this study. In our study, males (n=391; 69.69%) outnumbered females (n=170; 30.30%) and majority of the cases were in age group of 21-40 years (n=236; 42.06%). Most of the cases were from rural background (n=356; 63.45%). The most common cause of death was shock and haemorrhage (n=429; 76.47%). The study revealed that among 561 cases in the study period, the most frequent visceral and peritoneal injury reported was combined liver and spleen injuries (n=291; 51.87%); followed by liver injury (n=113; 20.14%) alone. Abdominal injury was found associated with other injuries like head, chest, limb injuries in 458 (81.63%) cases, among which the abdomen+head+chest association (n= 216; 38.50%) was most prevalent.

KEYWORDS

Autopsy cases, Intra-abdominal injuries, Blunt trauma, Fatal, Road Traffic Accidents (RTA).

INTRODUCTION

Abdominal trauma has been traditionally classified as either blunt or penetrating. Penetrating abdominal trauma is often subdivided into stab wounds and gunshot wounds.^{1,2} The recognized etiology of blunt abdominal injury involves road traffic accidents (RTA), fall from height, assault with blunt objects, sports injuries, bomb blasts, industrial accidents, animal hits etc.³ but eventually only those alleged to be caused by RTA were taken into consideration in this study. Mortality rates are quite higher among cases with blunt abdominal trauma than in those with penetrating wounds⁴. The most important reason for mortality and morbidity in such cases is that the abdominal cavity contains the vital organs like liver, kidneys, spleen, stomach, small intestine, large intestine, mesentery etc. which are quite vulnerable to trauma as they are not protected by any bony cage like rib cage and skull.⁵ Hence injuries to abdominal viscera and peritoneum deserve immediate attention.

The underlying mechanisms for blunt abdominal trauma is either or both tensile and shear strain. Tensile injuries indicate direct compression or stretching of tissue, as seen usually in liver, spleen, kidney and pancreas. During abrupt acceleration or deceleration, shear injuries occur at a point of attachment of an organ. The solid organs are more readily lacerated by blows as compared to hollow organs.

The incidences of blunt abdominal trauma are increasing day by day as the people are relying more and more on motor vehicles for the transportation ultimately leading to more number of accident. The reason of these injuries may also be attributed to the evolution and mass production of automobiles with powerful engines resulting into the highest impact on human body during collision⁶. Road Traffic Accident (RTA) is one among the top 5 causes of morbidity and mortality in South East Asian countries including India.⁷ The fatality rate in road traffic accident in India is one of the highest in the world and reported to be 20 times more than that reported

in developed countries.⁵ According to WHO, in few years trauma due to RTA will become the first or second leading cause of loss of productive years of life for both developed and developing countries.⁸ and will kill more than five million worldwide annually, accounting for 9% of global mortality.⁹ Hence, this study was conducted to determine the pattern and type of visceral and peritoneal injuries, along with its frequencies and associations in fatal blunt abdominal trauma.

MATERIALS AND METHOD

This retrospective study involves cases of blunt abdominal injury with alleged history of RTA and subjected for post mortem examination at mortuary of Patna Medical College and Hospital (PMCH), Patna, Bihar from April 2015 to March 2016. The total number of cases considered for study were 561. Clinical history like time of admission, and deaths and other relevant data was collected from the hospital case sheets and death summaries. Preliminary details and history of the cases and cause of injury was gathered from the inquest report. Detailed description regarding pattern & nature of injuries, complications, cause of death and mechanism of death were collected from the study of the autopsy cases and reports. All observations about age, gender, demography and other brief facts of the cases were recorded in specially predesigned format and the data prepared was analysed under discussed objectives.

STATISTICAL ANALYSIS

Statistical analysis was done by chi-squared, Student's t-test and Kaplan-Meier for survival where applicable. The data was entered in the Microsoft excel sheet and the statistical analysis was done by using SPSS software version 25 and the results were calculated in percentages. Descriptive statistics was performed using frequency and percentages which was presented in the form of tables and charts. Pearson correlation coefficient was done and P value is considered significant at <0.05.

OBSERVATION AND RESULTS

The study showed that among the total 2280 autopsies conducted over a period of 1 years from April 2015 to March 2016, there were 1332 deceased reported to be alleged case of Road Traffic Accidents (RTA), and among them 561 cases were with blunt abdominal trauma. Since there is minimal bony protection for underlying organs, the abdomen is more vulnerable to fatal injuries. In our study males (n=391; 69.69%) outnumbered females (n=170; 30.30%). The most common age group affected with blunt abdominal injuries was that of 21-40 years (n=236; 42.06%) followed by 41-60 years (33.33%) as depicted in chart 1. There were only 95 cases (16.93%) below 20 years and 43 (7.66%) cases above 61 years. Majority of the cases were from rural background (356 cases, 63.45%) as compared to urban background (205 cases, 36.54%). As depicted in chart 2, the majority of the victims in Road Traffic Accidents were bike riders (193 cases, 34.40%) followed by 129 cases of pillion riders (22.99%) and 107 cases of pedestrian (19.07%). 104 cases (18.53%) were cyclist while 28 victims (4.99%) were occupant of four wheeler. Shock and haemorrhage was the most common cause of death seen in 429 cases (76.47%) as compared to 132 cases of septicemia (23.52%). As depicted in Table 2, it was noticed that the most common injury in the study population was combination of both liver and spleen (n=291; 51.87%), followed by liver alone (n=113; 20.14%), spleen alone (n=87; 15.50%), combination of intestine and mesentery (n=12; 2.13%) and involving almost all intra abdominal viscera (n=58; 10.33%). In the present study, association of blunt abdominal trauma with trauma in other regions like head, chest, extremities was also considered. It was detected that as many as 81.63% (n=458) cases had shown association, while 103 cases (18.63%) had shown no association i.e. intra-abdominal trauma alone. As depicted in Table 1, the commonly associated extra-abdominal injuries in the study population were seen in combination with head and chest injury (n=216; 38.50%) and, with head injury (n=133; 23.70%), with chest injury (n=91; 16.22%) and with multiple injuries involving head, chest, pelvis, spine along with limb injury with fractures (n=18; 3.20%). Regarding period of survival among the cases, it was found that maximum number (n=272; 48.48%) of cases died within the time period of 0-6 hour followed by 6-24 hours (n=107; 19.07%) and 1-3 days (n=92; 16.39%). Least number of cases died after 1 week (n=33; 5.88%) followed by after 4-7 days (n=57; 10.16%).

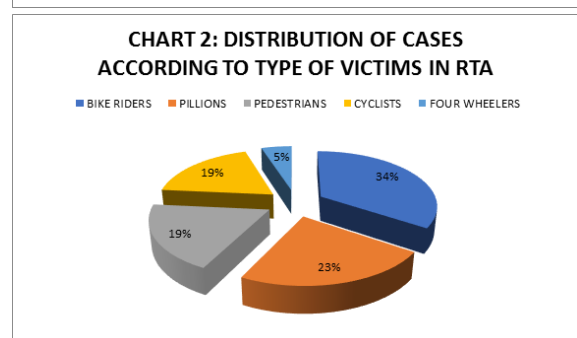
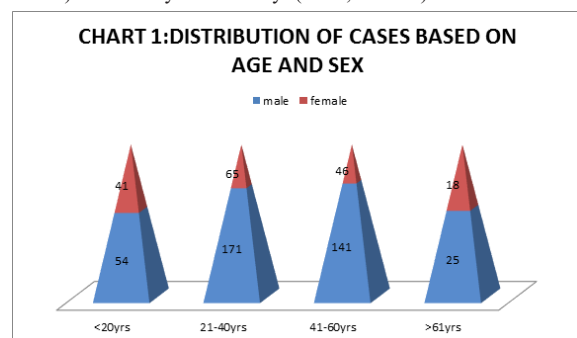


Table 1: Distribution Of Study Population Based On Involvement Of Other Cavities Or Organs

CAVITIES OR ORGANS INVOLVED	NO. OF CASES (PERCENTAGE)
ABDOMEN+HEAD+CHEST	234 (41.70%)
ABDOMEN+HEAD	133 (23.70%)
ABDOMEN	103 (18.36%)
ABDOMEN+CHEST	91 (16.22%)

Table 2: Frequency Of Viscera And Peritoneal Injury In The Study Population

VISCERA INJURED	NO. OF CASES (PERCENTAGE)
LIVER + SPLEEN	291 (51.87%)
LIVER	113 (20.14%)
SPLEEN	87 (15.50%)
LIVER + SPLEEN + KIDNEY+INTESTINE	58 (10.33%)
INTESTINE & MESENTERY	12 (2.13%)

DISCUSSION

The result of this study was in consistent with the findings of Sah D et al¹⁰; Gushinge M et al¹¹ and Kannan RR et al¹² studies in most of its aspects. Shubhendu K et al also negate with the findings of present study, by showing only 8.78% cases of abdominal injury alone, i.e. without an associations while most of the cases were associated with some extra-abdominal trauma as well. The findings in the present study was also supported by Panchal HA et al⁶, where the common age group affected were from 20-40 yrs. Although the findings differed from the study conducted by Singh M et al¹³, where the most common visceral injury noted was liver alone (40%); and from Santhosh CS¹⁴ study where hollow viscous and mesenteric injury was most common (81.81%) followed by liver (63.63%).

CONCLUSION

Injuries in blunt abdominal trauma have a wide variety of spectrum. It can range from no any organ injury to multi-organ injury. The study revealed that among 561 cases of fatal blunt abdominal trauma, combination of liver and spleen injuries (51.87%) was common observation, followed by liver injury (20.14%) alone. Abdominal injury was associated with other injuries like head, chest and limb fracture in 81.63% (n=458) cases. So, each poly-trauma patient has to be thoroughly investigated in addition to clinical examination.^{25,26} This studies have also identified a number of other associated risk factors, including sex, age, type of victim, residents, cause of death and the length of the interval between sustaining abdominal injury and death. Most of the victims were males inhabiting rural area and with the predominance of age group from 21-40 years. Most of the deaths occurs within 6hrs of sustaining the injury and were most commonly caused by shock and hemorrhage.

PREVENTION:

More protective gears are required to be provided in two wheelers apart from helmet to ensure more safety to the riders as well as pillion. The power of the automobile should be regulated from time to time by the competent authority to avoid attaining speed above its safety standard. Overloading and rash driving should be avoided as far as possible. In the four wheelers the stirring wheel is the leading cause of blunt abdominal trauma. Proper automobile design with adequate spacing; fastening seat belt and air bags has minimised such trauma to a great extent leading to minimum number of fatalities. Further, in order to minimize mortality in cases of blunt abdominal trauma, other risk factors for mortality need to be systematically identified and studied.

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Ethical Clearance: Taken from Institutional Ethical Committee.

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