



G11 Injuries to Abdominal Organs in Fatal Road Traffic Crash Victims

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After attending this presentation, attendees will have learned about the types and distribution of abdominal injuries detected in a study of fatal road traffic crash victims at a large department of forensic medicine. The types of injuries, their incidence, distribution, and relationship to the mode of transportation will be presented and the relevance to the forensic community will be discussed.

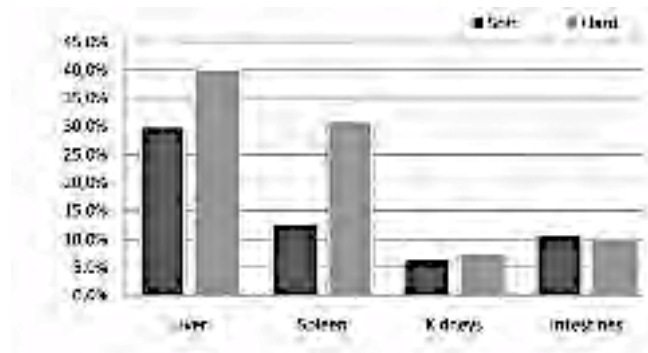
This presentation will impact the forensic science community by augmenting future forensic studies and supplying forensic scientific data for the purpose of improving traffic safety, injury prevention, and clinical management.

Introduction: In clinical settings, abdominal injuries can be challenging and knowledge of common topographic distribution of injuries may be helpful. There is literature suggesting that injuries to the abdominal organs are common following automobile accidents, and that the symptomatology of these injuries may range from significant to more occult clinical presentation. Abdominal injuries have been found to be common among people killed in road traffic crashes. The characteristics of fatal and non-fatal abdominal injuries are both correlated with the use of safety belts and the direction of impact. This study examined the impact of factors such as mode of transportation and type of crash scenario on abdominal injury in a group of people killed in road traffic crashes who subsequently underwent autopsy.

Methods: Autopsies performed during the period 2000-2004, involving road traffic crash victims were included. Data from autopsy and police records were retrieved from an internal database and evaluated with regard to the mode of transportation, the type of crash (i.e., passenger car, motorcycle, moped, and bicycles), and presence of injury to abdominal organs (i.e., liver, spleen, kidneys, and intestines/mesentery). Details concerning age, gender, influence of alcohol, and drugs/medication were retrieved.

Results: A total of 180 road traffic crash fatalities (133 passenger car occupants, 5 motorcycle, 19 moped, and 23 bicycles) were included. Overall, 53% of the subjects had injury to one or more abdominal organ, the liver being the most commonly affected, followed by the spleen, intestines, and kidneys. After grouping into "hard" (passenger car) and "soft" (MC, moped, and bicycle) victims, a significantly higher risk of injury to the spleen was found among car passengers *(RR=2.41 [1.10- 5.32], $p < 0.05$), whereas no statistically significant differences were found for other types of injury in relation to this grouping (Table 1). Frontal collision was the most common crash vector in passenger car crashes. For all types of abdominal organ injury lateral impact increased the likelihood of injury in passenger car victims. Injuries were more common among passenger car victims compared with other road users. Safety belt use was positively identified in 20 (36%) of a total of 55 recorded cases. Among the safety belt users, there was a higher risk of intestinal/mesentery injury, but a tendency towards a reduced risk of all other types of abdominal injury. Alcohol test was positive in 38% of 146 tested subjects (55/146), and 39% of 46 tested subjects (18/46) were positive for drugs/medication.

Table 1 Incidence of abdominal injuries according to mode of transportation by grouping "Soft group"; MC, moped and bicycles, "Hard group"; passenger car, n=180



Discussion: Injuries to the liver and spleen were found to be the most common abdominal injuries following fatal road traffic crashes. Interestingly, only minor differences were observed in the incidence of abdominal injury in car passengers versus less protected road users (motorcycle, moped and bicycle). The significantly higher risk of injury to the spleen among passengers in motor vehicles is probably due to the generally higher energy transfer to occupants in passenger car crashes. Similarly, the increased risk of injury in lateral impact is in agreement with previous studies. The high number of positive tests for alcohol and



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drugs/medication in this population is similar to figures reported in the literature. Although abdominal injuries are not necessarily fatal by definition, they often contribute significantly to the cause of death. The presence, location, and severity of these injuries therefore remain of importance to the medicolegal investigation.

Conclusions: This study showed that injuries to the abdominal organs are very common following fatal road traffic crashes. Injuries to the liver and spleen were the most common types of injury affecting about a third of the deceased. The incidence rates and distribution of abdominal injuries were found to correlate to the direction of impact and mode of transportation. Future investigations into the mechanisms and pathology of abdominal injury are needed in order to improve traffic safety issues, injury prevention and clinical management.

Abdominal Injury, Fatal Road Traffic Crash, Postmortem Investigation