



Pathology & Biology Section – 2008

G97 Concussive Head Injury and Alcohol

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Upon completion of this presentation, attendees will gain an appreciation of the combined effects of ethanol and concussive head injury in causing sudden death. A detailed review of autopsies of individuals whose cause of death was concussive head injury with alcohol will be presented along with outlines of the scene investigations and examination of the toxicology results.

This study is of use to the forensic community in supporting the theory that sudden death occurs from concussive injury of the brain in the presence of alcohol. Consideration of this entity can unquestionably impact the medicolegal investigation of some deaths.

The spectrum of diffuse brain injury ranges from mild concussive injury to diffuse axonal injury resulting in death. The cases of diffuse axonal injury are often apparent to the forensic pathologist at the time of autopsy as the associated markers of injury are often present. That is to say, in cases of sudden death from severe head injury, significant intracranial injuries are often present. However, there exist rare cases of head injury in which only soft tissue injury is found and there are no epidural, subdural or subarachnoid hemorrhages, or gross injuries to the brain, and yet sudden death has occurred. In these specific rare cases the blood ethanol levels are elevated. The proposed mechanism of death is that the combined effect of concussive brain injury and elevated blood alcohol produces postinjury apnea, leading to sudden death. Normally, concussive brain injury rarely causes postinjury apnea. However, the presence of elevated blood ethanol, a respiratory depressant, appears to potentiate fatal apnea in even mild concussive injury.

A computer search was used to identify all cases in the City of St. Louis and four of the adjacent counties in the past ten years. Eight such cases were found. The ages ranged from 23 to 64 years. Each of the individuals suffered blunt trauma about the head and/or face and had blood ethanol levels ranging from 0.18 to 0.40 g/dl. Two of the cases involved women who had been sexually assaulted and in which the manner of death was homicide. In each of these cases the thorough scene investigations and the circumstances surrounding their deaths exclude other possible causes of death.

Milovanovic and DiMaio published a series of cases of death due to concussion and alcohol in 1999. This review of autopsies in the St. Louis metropolitan area corroborates the findings of these authors and their description of the pathophysiologic processes that take place in such deaths and provides additional cases for review.

This study is of use to the forensic community in supporting the theory that sudden death occurs from concussive injury of the brain in the presence of alcohol. This diagnosis must be seriously considered in any death in which there is injury to the head without visible injury of the intracranial structures and the blood ethanol levels are elevated. Overlooking this cause of death may result in erroneous classifications of manner of death as natural or accidental, for example, when the manner may indeed be homicide. As such, consideration of this entity can unquestionably impact the medicolegal investigation of some deaths.

Blunt Head Trauma, Concussion, Alcohol