K23 Blood Transfusions and Their Influence on the Evaluation of Postmortem Alcohol Levels in Biological Fluids in Road Traffic Accidents: Case Report And Review of Literature

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After attending this presentation, attendees will understand the relationship between blood transfusions and postmortem alcohol levels in biological fluids.

This presentation will impact the forensic science community by discussing drunk driving and its social consequences.

Introduction: Traffic accidents are an important cause of death, particularly among young people. To drive under the influence of alcohol and/or drugs is the cause of many of these accidents. In particular, the alcohol concentrations are measured in a corpse through the toxicological postmortem analysis on the body fluids. The blood represent the biological liquid that allows verification of drunk driving at the time of the accident. In particular, the concentration of alcohol in the blood is subject to variations due to different etiological factors. Blood alcohol levels in the corpse are altered by the putrefactive phenomena. Also, blood transfusions may influence the concentration of blood alcohol levels. This medical practice is performed to restore hemodynamic parameters in patients with critical conditions, usually after a traffic accident. The exact determination of blood alcohol levels is very difficult to determine during the autopsy examination of the corpse which has been exposed to the blood transfusion procedure.

Objective: The goal of this study is to examine the influence of blood transfusion on blood alcohol levels in cases of deaths from traffic accidents. In particular, the focus is on the reliability of postmortem toxicology data in subjects during the last stages of life who have been transfused to be resuscitated.

Case report: The study investigates a 36-year-old subject, hospitalized in the emergency room for traumatic shock after a traffic accident. He underwent surgery for left nephrectomy because of renal laceration, but died of these injuries: left temporo-parietal hemorrhage with subarachnoidal hemorrhage; bilateral hemothorax; fracture of the right clavicle; multiple rib fractures with bilateral pulmonary parenchymal contused injuries; fractures of the fifth dorsal vertebra without spinal cord injury; and, liver and intestinal lesions.

Results of Toxicological Investigations: Toxicological analysis performed on body fluids showed high levels of ethanol in bile, vitreous humor, and blood, as well as high levels of methadone. The values of ethyl alcohol in the blood were of 2.29g/l. Because of blood transfusion, the concentration of alcohol in vitreous humor had to be estimated. In effect, the vitreous humor levels should be in equilibrium with blood levels. The vitreous humor levels were the lesser affected of the two because the blood had been diluted by transfusion. Additionally, because the value of ethyl alcohol in the vitreous humor reaches a chemical equilibrium with a ratio of about 1:1 including the lymph and circulatory fluids, the vitreous humor levels were less affected. Many calculations were carried out to evaluate the value of ethyl alcohol in the blood at the time of the first transfusion. This result is shown through the application of appropriate correction factors that have considered the amount of blood transfused (1400ml), the weight of the subject, the metabolism of alcohol, the metabolic capacity medium, and the time elapsed from ingestion to accident. These calculations have determined the value of hypothetical blood alcohol at the time of the car crash before transfusion (1.28g/l).

Conclusions: In this case, it was possible to determine the concentration of blood alcohol levels over and above the cut-off. It has been concluded that the person was driving under the influence of alcohol. This investigation is essential for judicial purposes, in particular when it comes to an accident involving people who are the driver's responsibility. The study allows evaluation of a theme that has great social impact—it is very important to evaluate the conduct of the driver at the time of the incident.

Alcohol, Blood Transfusion, Toxicological Investigation

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