

## F10 A Double Truth: When Scientific and Judicial Conclusions Are Divergent

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**Learning Overview:** The goal of this presentation is to evaluate the correspondence between scientific evidence and the final judgment of the court.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by demonstrating that scientific truth does not always correspond to procedural truth.

The present study compares three similar cases of suspected homicidal drowning in which the same complete methodological approach led to different court decisions.

The first case concerns the death of a 29-year-old girl found dead in the bathtub of her apartment. External examination of the body revealed bruising on the neck and forearms, conjunctival petechiae, and froth exuding from the mouth. The autopsy showed petechiae on temporalis muscles, epicardium, visceral pleura, hemorrhages of the neck muscles, and reddish froth in the trachea. Histological analyses showed zones of contraction-band necrosis in the myocardium, pulmonary edema, and emphysema. The immunohistochemical analysis showed positivity for anti-CD15, anti-tryptase, and anti-IL15 antibodies on neck muscles, confirming the vitality of neck lesions. The analysis of a sample of femoral bone marrow, using a phase-contrast microscope, showed the presence of diatoms. According to the evidence deriving from a complete methodological approach, death was attributed to drowning in a subject with vital neck compression signs. The court sentenced the boyfriend of the girl who confessed to having stunned the victim by strangling her in a fit of rage; he then placed the body in the bathtub to revive her. After realizing that the girl was dead, he left the apartment.

The second case refers to the death of a 23-year-old man found as a corpse in a river. The external examination showed the presence of abrasions and bruises of the face, lacerations of the labial mucosa, and fracture of the left upper incisor tooth. The autopsy showed the presence of subarachnoid hemorrhage, multiple rib fractures, laceration of an ileal loop with leakage of fecal material, multiple lacerations of the liver parenchyma, and hemorrhagic infiltration of the adipose capsule of the right kidney. Histological and immunohistochemical exams confirmed the vitality of the lesions. The diatom test was positive. Scientific evidence suggested that the victim had been beaten, then died by drowning. During the interrogation, the compatriots of the victim confirmed they had beaten the boy and then threw him into the river while he was still alive. In light of these declarations, the court sentenced them.

The third case is related to a 16-year-old girl found dead on the shores of a lake. The external examination of the corpse revealed froth exuding from the mouth and a linear excoriation on the left side of the neck. No other signs of external traumatic injury were found. The autopsy revealed sand in the pharynx and larynx and frothy fluid in the trachea and the main bronchi. Histological study of the heart showed diffuse foci of lymphomononuclear inflammatory infiltrates in the interstitial space with cytotoxic necrosis of myocells. Histological analysis of the skin sample of the neck lesion showed the absence of the epidermis and of hemorrhagic extravasations in the underlying layers; immunohistochemical examination revealed the absence of inflammatory cell infiltrates. This evidence suggested a postmortem production of the lesion. No diatoms were found in the bone marrow. Toxicological tests were negative for alcohol and drugs. The death was attributed to heart failure in a subject with active lymphocytic myocarditis. Despite the scientific evidence provided by the forensic pathologist, the judge requested the expertise of a pulmonologist. He claimed the death was due to drowning because of the presence of foam in the airways, even if it is a non-pathognomonic sign of drowning. The court sentenced the boyfriend of the victim, who was the last to see her alive. The final verdict of the judge ruled that the boy had killed the girl by holding her head underwater.

Forensic evidence is crucial in criminal investigations to reconstruct critical elements of a crime. The presented study shows that scientific evidence and judgments of the courts does not always coincide.

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### Scientific Evidence, Methodological Approach, Drowning