B174 Lessons From Inside the Barrel: A Forensic Case Report of a Double Gunshot Suicide

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After attending this presentation, attendees will understand the complexity and importance of the interpretation of biological traces in challenging forensic gunshot cases.

This presentation will impact the forensic science community by highlighting the value of precise and cross-sectional analyses of biological traces involving molecular methods in forensic settings and examinations.

A 45-year-old man was found dead, seated in the driver's seat of a vehicle parked next to a remote cemetery in the countryside. The right hand of the corpse was lying on its lap, closed around a .38 special Smith & Wesson® revolver. Behind the driver's seat, balanced between the front-seat pocket and the back seat row was a 9mm Glock® handgun, the barrel pointing toward the front. The corpse presented with a gunshot entry wound on the right temple with a corresponding gunshot exit wound above the left ear. Interestingly, a second gunshot entry wound was found at the back of the neck with an exit wound located on the chin, slightly to the left of the facial midline.

A thorough external examination of the corpse by forensic experts was performed onsite, during which backspatter was identified and collected on the right hand of the corpse, but not on the left. To complete the forensic investigations, an autopsy and post-mortem imaging (Computed Tomography (CT) and Magnetic Resonance Imaging (MRI)) were performed. In addition, both firearms seized onsite were subjected to endoscopy of the barrels, visualizing the biological stains inside and enabling their systematic and precise collection by DNA-free cotton swabs moistened with sterile, desalted water. Analysis of the collected biological material was performed in the context of a research project funded by the Swiss National Foundation which investigates the phenomenon of biological stains inside gun barrels after close-contact gunshots.

Interdisciplinary work involving forensic and criminal investigation experts allowed a reliable and comprehensive reconstruction of the incident, revealing that the two firearms had been fired simultaneously with close contact of both muzzles to the skin, confirming the act to be suicidal. Analyses of organ-specific regulatory RNA, more specifically microRNA (miRNA) in the biological traces collected from the right hand of the corpse and from the barrel of the .38 special Smith & Wesson® revolver, which had inflicted the shot to the right temple, revealed both blood-specific and brain-specific miRNA. Interestingly, on the swabs collected from the barrel of the Glock® handgun, which had equally been used with close contact to the skin at the back of the neck, causing extensive injury to the spinal cord, no organ-specific miRNA traces could be detected.

The presented case demonstrates the complexity of backspatter composition and distribution as a function of different gunshot wound locations, firearms, and munitions. Importantly, this case substantiates the reconstructive value of cross-sectional molecular analysis methods and points toward their increasing importance in forensic examinations in the future.

Firearms, Contact Shot, Backspatter