H112 Evaluation of Arterial Injuries Using Contrast and Conventional X-Rays: A Practical Method for the Assessment of Arterial Injuries in Forensic Settings

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Learning Overview: After attending this presentation, attendees will understand the utility of using contrast injection and conventional radiography to identify and diagnose vascular injury in a routine autopsy setting.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing a practical and inexpensive method to identify vascular injuries during autopsy.

Postmortem vascular visualization, using various contrast agents, has been in use since the 17th and 18th centuries to study vascular anatomy. With advances in radiology, Multidetector Computed Tomography (MDCT) has been increasingly used for vascular and soft tissue imaging in forensic settings. The use of MDCT angiography is more common in European countries, but due to excessive costs, only a handful of medical examiner offices in the United States are equipped with MDCT. As a result, most medical examiner offices continue to use conventional radiography to aid in the assessment of vascular pathology in forensic settings. At the Office of the Chief Medical Examiner (OCME) for the State of Maryland, MDCT is available and has proven a useful tool in the assessment of traumatic injury at autopsy, although time constraints and/or staff training impedes the practical use of MDCT on a consistent basis. This study performed targeted arterial angiography as an adjunct to routine autopsy using conventional radiography. In forensic autopsies, identification and dissection of vascular regions can prove critical in determining a cause of death, but in many cases, access to these regions can prove time consuming, invasive, and at times, impossible. A goal of this study was to evaluate these hard-to-access vascular regions that remain cumbersome for forensic pathologists, especially in a busy metropolitan office. Another objective of this study was to concentrate on the practical and logistic aspects of visualizing the vascular anatomy and associated trauma, which could be used daily in a busy medical examiner's office.

Although numerous different contrast media are available for use in clinical and postmortem angiography, this study achieved excellent results using a water-soluble, barium-based contrast agent that is easily obtainable with minimal cost implications. To achieve better imaging quality, the vessels were flushed prior to contrast injection using tap water to remove any air bubbles or postmortem clots. There was no difference between using saline or regular tap water for flushing of the vessels.

Study cases were selected based on the likely presence of visualizing vascular trauma and included gunshot wounds, stab wounds, and motor vehicle/pedestrian injuries. In some cases, visualization of vascular injury was well-correlated with subtle gross autopsy findings that may otherwise have been overlooked. This study demonstrates that using contrast injection combined with conventional radiography provides medical examiners with an additional and inexpensive tool for assessing vascular injuries and associated trauma during autopsy.

Contrast Agent, Conventional X-Rays, Vascular Injuries