G105 Utilizing Multi-Detector Computerized Tomography to Evaluate Concrete-Encased Human Remains

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After attending this presentation, attendees will recognize the value of postmortem multi-detector computerized tomography (MDCT) evaluation of an unusual case of human dismemberment followed by encasement in concrete; appreciate the value of MDCT osseous examination and documentation; learn methods to utilize MDCT analysis of concealed biologic remains and review procedures utilized for orientation and extraction of human remains from concrete.

This presentation will impact the forensic science community by expanding the scenarios in which the use of MDCT may be utilized to improve postmortem evaluation and will demonstrate opportunities to utilize MDCT in medical examiner/coroner facilities where MDCT is reasonably available.

The Mesa County Coroner's Office is situated in rural Western Colorado at Community Hospital in Grand Junction, Colorado. Because the morgue is located within the hospital, state of the art radiographic equipment and ancillary staff are available.

Case Report: the decedent is a 41-year-old male homicide victim whose dismembered remains were concealed with concrete in two five- gallon plastic buckets. According to police reports, the decedent was killed by his son who later confessed and led police to his father's remains which had been stored in a shed for approximately two months following the homicide and dismemberment. Unable to determine the veracity of the reported circumstances, the presence of human remains was confirmed using MDCT. The remains were limited to the decedent's head with cervical spine, hands, feet, and heart. The imaging also served to establish preliminary forensic findings, namely the presence of a bullet in the left orbit. In addition, fractures of the left and right orbital plates were noted, while the remainder of the calvarium was intact. Other osseous findings include a fracture of the left distal second metacarpal and left distal first phalange, as well as a metal plate in the left orbit. In order to remove the remains from the buckets with minimal damage, the outside of the buckets were marked to indicate the orientation of the remains. A circular saw with a concrete cutting blade was used to cut into the concrete along predetermined planes of predetermined depth. The properly oriented concrete incisions allowed for coronal separation around the head providing anterior and posterior intact concrete mold halves. External examination of the head revealed that the skin and portions of soft tissue had been removed prior to encasement. The ears and eyelids were missing, and the eyes were sunken and softened due to decomposition. A small caliber, slightly deformed bullet was recovered from the left frontal sinus/superior orbital ridge. Due to the intentional removal of the decedent's facial skin and postmortem change, the entry wound was not visible and range of fire could not be determined; however, absence of soot from sections around the remaining soft tissue likely exclude a contact gunshot wound. In the absence of postmortem MDCT or conventional radiographs, it is entirely possible that the presence of a gunshot wound could have been overlooked. While the extent of brain decomposition precluded its examination, the MDCT and gross examination findings indicate that the bullet did not penetrate the cranial cavity. Examination of the outer table of the left orbital ridge of the calvarium revealed hemorrhage in the soft tissue. Neck and throat examination indicate the unlikelihood of strangulation based on the presence of an intact hyoid bone, thyroid cartilage, and thyroid cornu and absence of hemorrhage of the laryngeal mucosa. Because of the limited amount of remains available for examination, trauma to the remainder of the decedent's body could not be evaluated and therefore the cause of death was classified as undetermined. The manner of death was classified as homicide. Positive identification of the remains was established by comparison with antemortem dental records and confirmation of an orthopedic metal plate in the left brow.

In summary due to the location of our morgue facility, MDCT is readily available and was utilized to confirm the presence of human remains concealed in concrete. Furthermore, MDCT permitted orientation of the remains for optimal removal, documented orthopedic devices to augment identification, and assisted in the evaluation of injury. This defendant pled guilty and the case did not appear in court. If court proceedings had ensued, the use of a three dimensional volumetric MDCT rendering would have been utilized to present information to the jury. It is believed, a three dimensional volumetric rendering provides objective detailed visual imagery without the graphic, frequently repulsive appearance of wound photographs, and MDCT is useful in the evaluation of selected postmortem examinations.

Multi-Detector Computerized Tomography, Gunshot Wound, Homicide

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