H65 A Comparison of Postmortem and Antemortem Computed Tomography (CT) for the Identification of Adults With Unique Anatomical Variations

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After attending this presentation, attendees will recognize the utility of CT comparison in the identification of human remains using antemortem-postmortem CT comparison of unique anatomical variations. Furthermore, attendees will recognize the ability of the forensic pathologist to make these comparison-based identifications.

This presentation will impact the forensic science community by exploring additional skeletal features that would facilitate the identification of human remains using CT, especially fragmented or incomplete human remains from cases of mass fatalities.

Identification of human remains, whether complete or partial, is a critical and challenging task for a forensic pathologist.[1] Although DNA analysis remains a steadfast tool in the identification of fragmented, commingled, or partial human remains, time and cost constraints make it particularly prohibitive. Historically, radiological examination for identification has proven useful in comparing various anatomic structures including, but not limited to, cranial features, osseous structures, soft tissues, and teeth.[2-5] Compared to other modalities, radiological examination, more specifically analog imaging, is more cost-effective and has been widely used in the medical examiner setting as a means of identification.

At the Office of the Chief Medical Examiner (OCME) for the State of Maryland, postmortem CT is routinely used as an adjunct tool for diagnostic or identification purposes. Postmortem CT has been extensively used for its utility in identification based on comparison of anatomical variations, including nasal turbinates and sinuses, cranial sutures, degenerative and idiopathic changes of the spine, and anomalous or unusual development of skeletal structures.

To broaden the spectrum of potential identifying characteristics, a study was conducted by retrospectively and prospectively collecting cases with postmortem CT images obtained in the OCME office from 2015 through 2017. The final cases were then selected based on the availability of antemortem CT images to specifically assist for additional morphological features that could be useful in confirming the identities of incomplete remains. Once all images were obtained, a unique identifier was assigned to each postmortem CT image for the purpose of blinding the designated forensic pathologist, with experience in forensic radiology, who would perform the comparison. The results were qualitatively assessed for accuracy and reliability for identification purposes. CT scanning has proven to be a useful and scientific method of identification, especially in cases of limited radiographic studies or partial anatomic remains available for identification.

This study demonstrates that identification of human remains, even in a fragmented state, could be performed by a forensic pathologist with limited CT experience, in a medical examiner setting.

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