



BS5 Practical Aspects of Developing and Incorporating a Postmortem Computed Tomography (PMCT) Service Into a Medical Examiner's Office

*Lauren Edelman, MD**, Travis County Medical Examiner, Austin, TX 78724; *Keith Pinckard, MD, PhD*, Travis County Medical Examiner, Austin, TX 78724

Learning Overview: After attending this presentation, attendees will understand the concepts and considerations involved in incorporating PMCT into the practice of a medium-sized, regional medical examiner's office, including staffing, scanning protocols, triage of cases, study interpretation, and novel and alternative data storage solutions. Developing and incorporating a PMCT service is a complex project, with broad implications for many aspects of an individual office.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing a framework and blueprint that can be used to incorporate and implement this burgeoning technology within the scope of death investigation for medical examiner's and coroner's offices.

The services of a consultant were engaged as part of the budget request associated with purchasing a Computed Tomography (CT) scanner. The consultant provided guidance for technical and structural considerations critical for drafting the purchasing bid documents and review of the bids for the purchase of the CT scanner and associated equipment. After installation by the vendor, the consultant also provided the basic scanning protocols that are programmed into the scanner for ease of use and include protocols for standard adult, bariatric, pediatric, charred remains, skeletal remains, and decomposed remains. This is a key component, since standard protocols that are provided by CT scanner vendors are designed for clinically based studies on living patients.

As part of the purchasing contract, forensic autopsy technicians, none of whom had formal radiology technology training, received in-person instruction in the practical aspects of operating the equipment. Performing the scans with the appropriate protocols requires minimal direct management by the forensic autopsy technicians. Once the protocols are in place and validated, scanning proved to be relatively simple and straightforward. Scanning is performed during routine working hours on a rolling basis as decedents are brought into the office; scans are completed prior to the processing and external examination of the body. All decedents who are physically capable of fitting into the CT scanner are imaged. The rationale for this is two-fold. First, scanning every decedent as a matter of routine may guide how the pathologist approaches the case. Second, scanning creates a permanent 3D radiographic record of the body that can be reviewed long after the body has been permanently altered by autopsy.

The scans are reviewed and interpreted by the forensic pathologists as a group during a morning conference prior to performing examinations and again individually when medical examiner reports are written. The medical examiners in the office received training in CT interpretation by two physicians with prior PMCT experience who were already on staff. The learning curve of CT interpretation is very steep; familiarity with visualizing cross-sectional anatomy in three dimensions simultaneously comes surprising quickly. Furthermore, because all decedents are scanned, each pathologist gets immediate feedback by comparing autopsy findings to what was observed on the scans—a practice that rapidly builds interpretive skills and confidence. Once the medical examiner staff is comfortable with reading CT scans, decisions can be made regarding which types of cases may be able to be supplanted by PMCT.

A novel cloud-based storage and image-viewing software solution was purchased rather than a traditional Picture Archiving and Communication System (PACS). It has virtually identical capabilities, including permanent long-term storage with system redundancy, at a fraction of the cost of a standard PACS solution. Per this research, PACS is a vastly more sophisticated and ultimately far more expensive solution than what is actually required for death investigation purposes. For offices affiliated with medical centers, it may be possible and cost-effective to "partner" and obtain a node on a hospital's PACS. However, offices without this benefit have struggled to devise a system tailored to the unique needs of death investigation without the associated burdensome cost of a PACS—a cost factor that may deter an office from obtaining PMCT capability altogether. Per this research, this is the first office to pilot and utilize this type of storage and viewing solution.

As more death investigation offices around the country begin to integrate CT imaging as part of the physician's toolkit, it is critical to share operating procedures and innovative solutions to common problems to assist others in participating in this exciting advancement in the field of forensic pathology.

Postmortem Imaging, Computed Tomography, PACS