G47 Logistic Challenges in the Initiation and Development of a Forensic Computed Tomography Scanning Service at a United States Medical Examiner's Office

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After attending this presentation attendees will become familiar with the process that the medical examiner's office (OCME) went through to develop protocols for specific forensic indications, in order to train autopsy technicians and forensic investigators and to initiate scanning of decedents.

This presentation will impact the forensic science community by demonstrating how the early experience gained from the development of a PMCT service in a medical examiner's office will be valuable for other forensic institutions planning to introduce a similar service.

The use of postmortem CT (PMCT) examination as part of the investigation of death is gaining interest in the forensic community.[1-6] PMCT may be utilized to complement and in some selected instances, to replace conventional autopsy. PMCT has potential in cases of blunt or penetrating trauma, elder or child abuse, drowning, burns, suicide, unknown cause of death, unidentified remains, decomposed remains, as a triage tool in mass fatalities, and in cases of cultural or religious opposition to autopsy. In suspected accidental or natural death, PMCT can be used as a triage tool to determine if cases may or may not need conventional autopsy. It can also be used as a tool for 3D documentation of complex findings, especially in blunt trauma. To date, several medical examiners offices in the United States have implemented PMCT scanning as part of their practice.

There are many variables to consider when incorporating CT scanning into forensic practice. One must consider economic factors including the purchase or lease cost of the scanner, maintenance contracts, and the operational expenses of scanning. The need for availability in a 24/7 operational environment prompted the initiation of a training program to teach autopsy technicians and forensic investigators how to operate the CT scanner. This training program was supervised by a part time CT technologist with forensic experience. Input was also provided by forensic radiologists from the University of Maryland.

A Lightspeed RT16 Widebore CT scanner with a wide aperture gantry was installed in January 2011. Three basic scan protocols were created, (whole body, head only, dental), adaptable for a wide variation in body sizes. All protocols were tailored to be completed in a 15 minute timeframe. Most 3D reconstructions were created as needed on a separate dedicated 3D server by forensic pathologists or radiologists. All protocols were easily accessible in electronic format on the scanner desktop for step-by-step reference by the autopsy technicians and forensic investigators both during and after training completion. PMCT training was provided in real time by the CT technologist and backed up by a visual presentation on the scanner desktop.

After installation of the CT scanner, nine staff members (six autopsy technicians and three forensic investigators) successfully completed the training program in PMCT applications in an 8-10 hour period each. In order to assure that all trainees produced high-quality diagnostic images upon training program completion, a grading system for technical quality of trainee-performed examinations was used, coupled with ongoing quality assurance. Establishing a radiation safety program and guidelines was an important additional component of the training program. Interpretation of PMCT studies has been performed by on-site forensic imaging fellows and state medical examiners with oversight by off-site forensic radiologists with internet access to the imaging studies. As experience accrues, more complex techniques such as postmortem angiography may be introduced.

In summary, this experience describes the development of forensic indications and basic protocol development for PMCT in a U.S. medical examiner's office. It also demonstrates that autopsy technicians and forensic investigators can be appropriately trained in the technical aspects of PMCT in a short timeframe, thus addressing the economic challenge of providing this service over a 24/7 timeframe. Close co-operation between the OCME staff and both an experienced CT technologist and radiologists interested in forensic imaging has been an important part of this process.

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