



## Pathology Biology Section – 2011

### **G106 Use of Multidetector Computed Tomography (MDCT) in the Medicolegal Investigation of Human Remains After a Natural Disaster**

*Howard T. Harcke, MD\*, Armed Forces Institute of Pathology, 6825 16th Street Northwest, Washington, DC 20306; and Edward L. Mazuchowski, PhD, and Philip J. Berran, JD, Office of the Armed Forces Medical Examiner, 1413 Research Boulevard, Building 102, Rockville, MD 20850*

After attending this presentation, attendees will understand the process used by the Armed Forces Medical Examiner System (AFMES) to integrate multi-detector computerized tomography (MDCT) in the handling of human remains recovered from the natural disaster in Haiti. Attendees will be able to describe strengths and limitations of the process model employed.

This presentation will impact the forensic science community by offering one alternative for processing human remains following a natural disaster or other mass casualty event.

A disaster mortuary is established both to identify victims and determine cause and manner of death. Conventional radiography has been routinely used to screen for foreign bodies, personal effects and anatomic, dental, or surgical findings. MDCT has proved to be a useful technique in support of forensic examination in military and civilian mortuaries. The disaster in Haiti provided the AFMES the opportunity to utilize MDCT in the processing of victims of that event.

The three step processing model used employed: (1) digital radiography and whole body MDCT; (2) visual external inspection of the body; and, (3) forensic autopsy if steps one and two did not establish reasonable explanation for cause and manner of death or produced findings that required internal examination (e.g., ballistic fragments, external wounds).

There were 28 cases received and 27 processed using the model (one case did not have MDCT). In 20 cases MDCT and visual inspection showed evidence of blunt force injury and no suspicious findings. The medical examiner did not perform an autopsy and cause/manner of death was "blunt force injury/accident." In 19 of 20 non-autopsied cases MDCT gave more information than digital radiology, the exception being a case where disarticulated bones were received. Key findings were skeletal injuries to the head/neck, spine, thorax, and pelvis. In seven cases MDCT and visual inspection was judged inconclusive and complete autopsy was performed. These cases were signed out as "probable positional asphyxia/accident" (2), "cardiac arrhythmia/natural" (2), blunt force injury/accident" (2) and "complications of a natural disaster/accident" (1). None of the 27 cases showed internal metallic fragments or suspicious external wounds. In 23 of 27 cases, moderate to severe decomposition was present and our prior forensic experience was helpful in distinguishing changes related to postmortem decomposition, recovery and handling from acute injury sustained during the event.

In conclusion, the use of MDCT together with external visual inspection by a medical examiner provided sufficient information to establish cause and manner of death in 74% of the cases sent to the AFMES during recovery operations in Haiti. This related directly to the ability of MDCT to determine findings consistent with blunt force injury not apparent on digital radiographs. This model using MDCT and visual inspection offers a rapid alternative for investigating human remains recovered after a natural disaster. It is believed that MDCT alone without external visual inspection by a medical examiner would not be adequate. It is also recognized that a medical examiner may deem a full autopsy to be required for a variety of other reasons (e.g., statutes, policy directives).

**Computed Tomography, Natural Disaster, Virtual Autopsy**