



Pathology Biology Section – 2011

G95 Use of Multidetector Computed Tomography (MDCT) in the Evaluation of Gunshot Wounds

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After attending this presentation, attendees will understand the process used by the Armed Forces Medical Examiner System (AFMES) to integrate MDCT into the evaluation of gunshot wounds. Attendees will be able to describe the advantages and limitations of utilizing MDCT in the evaluation of gunshot wounds.

This presentation will impact the forensic science community by detailing a novel approach to overcome the limitation of the visualizing entrance and exit gunshot wounds with MDCT.

Postmortem forensic imaging is a critical tool in the evaluation of gunshot wounds. Traditionally, fluoroscopy and digital/plan film x-rays have been utilized to document and locate bullets and bullet fragments in cases of gunshot wounds. In the last several years, traditional imaging techniques in conjunction with postmortem MDCT has made it possible to obtain precise three-dimensional localization of bullets and bullet fragments. In addition, this technique has been shown to be an effective method for aiding in the documentation of gunshot wound paths and evaluation of internal organ injury prior to autopsy.

One of the main limitations of utilizing MDCT in the evaluation of gunshot wound paths is the inability of MDCT to precisely locate the surface entry and exit wounds. Although the presence of gas in the soft tissue and disruption of tissue surfaces may be helpful in the precise location of these wounds, the collapse of the temporary cavities, compression of soft tissue defects and the position of the of the body on the scanning table can limit the detection of the entry and exit wounds.

In order to overcome this limitation, a novel technique was developed utilizing radio-opaque markers. Briefly, the body is first imaged by digital x-rays to identify any bullets or bullet fragments in the body or clothing. Next, digital photographs of the body and gunshot wounds are taken and the locations of the gunshot wounds are marked with a 1.5 millimeter radiopaque marker. The body is then imaged with MDCT. The resulting images are processed with imaging software to produce a three-dimensional image of the body with the precise location of the entry and exit wounds on the skin surface. Reconstructed images are manipulated to obtain any desired orientation of the body and wound pathway. These images can then be used to demonstrate the gunshot wound pathways in medicolegal proceedings. It must be noted that this technique does not overcome the limitation of MDCT in distinguishing entrance gunshot wounds from exit gunshot wounds. This distinction is made by combining the postmortem forensic imaging with the findings from the external inspection and internal dissection of the body. **Computed Tomography, Gunshot Wounds, Virtual Autopsy**