G55 Multislice Computed Tomography in Two Fatal Stab Wound Cases With Knife *In Situ*

Antonio Nieddu, MD, Department of Forensic Pathology, University of Sassari,, Sassari, ITALY; Stefano D Errico, MD, PhD, Department of Forensic Pathology, University of Foggia, viale degli Aviatori, Foggia, 71100, ITALY; Francesco Meloni, MD, Department of Radiology, ASLNU3, Nuoro, ITALY; and Gabriela Perilli, MD, and Cristoforo Pomara, MD, PhD, Department of Forensic Pathology, University of Foggia, Viale degli Aviatori 1, Foggia, 71100, ITALY*

The goal of this presentation is to present two fatal cases with multiple sharp injuries in which MSCT was performed before autopsy. The relevance of imaging contribute in forensic analysis in the assessment of penetrating injuries and sharp trauma casualties facilitating autopsy planning and increasing the overall detection frequency of traumatic findings is underlined and surprising images collected with knife in situ makes the case peculiar

This presentation will impact the forensic science community by demonstrating the relevance of MSCT as a valuable tool in detecting lethal stab and incised wounds and their course through the body and the hereby injured structures. Postmortem imaging does not replace autopsy, but rather aims at providing additional information for a more carefully planning of autopsy (virtuous autopsy). The autopsy can be improved upon but not replaced. Description of macroscopic features like margins, edges remain as indispensable for a correct framing of the death.

Fatal injuries due to sharp trauma are common in everyday forensic practice, be it in a homicidal, a suicidal, or in an accidental setting. The main common denominator of the injury-inflicting objects in sharp trauma is that they can pierce and slice the human body and thus cause internal damage. Death due to this harming of the body's integrity is manifold; exsanguination by injury of blood vessels is the most frequently encountered form. In the assessment of sharp trauma, issues such as the wound morphology, which may help to determine the type of weapon involved, the number, and location of the injuries, the wound channel, the injuries inflicted to the soft tissues and the skeleton and viscera in order to undertake a reasonable incident reconstruction. Traditional forensic autoptic approach provided by dissecting layer by layer has been generally integrated involving X-ray to detect gross injuries of bones or to detect foreign bodies but it reduces a three-dimensional corpse to a two-dimensional image, thus complicating reconstructive attempts. With the invention of spiral computer tomographs, two-dimensional reconstructions of radiological images in every possible plane or even three-dimensional reconstructions are possible. These multislice computed tomographs (MSCT), which have become everyday clinical standard, have been implemented in forensic pathology with promising results also in the assessment of sharp injuries. Two fatal cases with multiple sharp injuries are presented; MSCT was performed before autopsy in both.

Case 1: A 50-year-old man went to the local military police reporting to have killed his wife after a quarrel and that the cadaver was outside in the car. The cadaver of a 52-year-old woman was found sitting normally in the front passenger side of the car, wearing clothes. A knife handle came out from the left thorax in the precordial area. The prosecuter was immediately alerted and a crime scene investigation was performed by forensic pathology crew. Bloody stains were collected from the car. The knife had a plastic handle with a pointed 16.5 cm long single edge blade 74 gr in weight. MSCT scan was performed before autopsy. A complete postmortem examination was performed two days after death. Multiple stab wounds were recorded in the neck (four), in the precordial area (one) where the knife was found, in the left thorax (one), and in the abdomen (five). Defense wounds of palm of hands were also recorded. Gross examination of the head was unremarkable except for a mild cerebral edema. Neck wounds went deep into the muscle layers except for two in which cartilage of trachea and body of the 7th cervical vertebra were interested. The wound in the precordial area went deep into the pericardium and the anterior wall of the right ventricle stopping in correspondence of the left atria where a small laceration of the wall was observed. Abdominal injuries included hepatic lacerations and wounds to the anterior and posterior wall of the stomach. Histological examination with H&E stain revealed mild cerebral edema and acute emphysema was also recorded at microscopic examination of lungs. Samples of heart wounds were collected revealing typical aspect of cutting edge lesions. Intraparenchimal hepatic hemorrhages were also observed. Vessels were generally poor of blood.

Case 2: A 44-year-old man affected from psychiatric disorder attempted suicide by means of multiple stab wounds inflicted to the thorax and abdomen and incised wounds to the flexor surface of wrists, bilaterally. He was found unconscious by rescuers and immediately taken to the local hospital; resuscitation maneuvers were unsuccessful. At external examination multiple stab wounds to thorax (seven) and abdomen (seven) were recorded. In the precordial area the handle of the knife was sticking out and left *in situ*. Multiple superficial cuts observed in the flexor surface of the wrists, bilaterally were interpreted as hesitation marks. An incised wound through the muscular layer of the left arm was also detected lacerating radial artery. MSCT was performed before autopsy in order to study the channel of injuries in the thoracic and abdominal cavities. The corpse was placed in the supine position on the CT-table for the non-contrast CT. Non-contrast CT was performed with the knife *in situ*. Two- and three-dimensional (2D and 3D) reconstructions were calculated and assessed by both, a radiologist and a forensic pathologist experienced in postmortem imaging. The non-contrast postmortem CT of the thorax displayed position of the knife through the sternum and surprising images were collected. There was a small gas collection in the subcutaneous fat, at the level of the entry wound. The blade of the knife passed through the sternum. The knife was plastic handle with a pointed 9.8cm long single edge blade 65gr in weight. Autopsy was performed the day after death. Mild hemorrhagic infiltration of subcutaneous fat was observed in correspondence of the thoracic and abdominal wounds; thoracic wall

examination was unremarkable except for sternum. No blood was collected in the thoracic and abdominal cavities. Pericardium was also unremarkable. Heart was normal in size and volume, with conical shape, as well as lungs except for a mild edema, with white foam on the main bronchi. Abdominal viscera examination was unremarkable. A complete laceration of left radial artery was recorded. A complete histopathological study with H&E stain was performed. Toxicological examination was negative for substances of abuse. Hemorragic shock from laceration of the left radial artery was indicated as the cause of death.

Experience with sharp injuries demonstrate the relevance of MSCT as a valuable tool in detecting lethal stab and incised wounds and their course through the body and the hereby injured structures. Postmortem imaging does not replace autopsy, but rather aims at providing additional information for a more carefully planning of autopsy (virtuous autopsy). The autopsy can be improved upon but not replaced. Description of macroscopic features like margins, edges still remain as indispensable for a correct framing of the death.

Sharp Injuries, MSCT, Autopsy

