



## Pathology/Biology Section - 2013

### G24 Usefulness of CT Scan Before Autopsy in Case of Firearm Homicide

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The goal of this presentation is to explain the advantage of a CT scan for autopsy in known cases of gunshot wounds.

This presentation will impact the forensic science community by discussing how CT is currently the preferred radiological investigation before an autopsy in case of homicides by firearm.

The objective of this presentation is to highlight the interest of the use of a scanner in gunshot wounds, but also to show its limits. The use of a scanner before autopsy identifies projectiles or projectile fragments in the body, highlights the bone's and other organ's damages (liver, heart, lungs, brain), defines intracorporeal trajectories, and sometimes establishes a chronology of the different shots. The scanner is useful in order to conduct an autopsy in good conditions and to make adapted samples for microscopic examination. Indeed, the autopsy allows taking some sample tissues (entrance and exit wounds), but also aids in the recovery of projectiles (wads and pieces of bullet jacket).

The scanner also offers the advantage of being interpreted by other experts if necessary, which can sometimes prevent exhumations in cases of disagreement. The interest is also to use scanner pictures at trial that are as representative as photographs of injuries but psychologically less aggressive to the victim's families.

In France, it is necessary for the judges and investigators to know the different shooting distances and define the positions of the victim and the perpetrators during gunfire. To illustrate this, several cases are presented of wound ballistics for which a scan was performed prior to autopsy. The interpretation is immediately made by a radiologist and a pathologist after the acquisition of computer data and a 3D reconstruction is completed, printed, and given to the pathologist before autopsy.

This presentation will be illustrated with many pictures and photographs of entrance wounds, bone lesions (vertebrae, ribs, skull), and exit wounds. The cases presented in this session show an obvious superiority of CT compared to conventional radiology, including digitized radiographs.

Thus, after the scanner, the external examination, and the autopsy, forensic medical examiners or pathologists must be able to define or estimate:

- The initial trajectories (between the muzzle and the victim)
- The firing angles and the direction of the passing projectile
- The skin distances
- The intracorporeal trajectories
- The sequence of shots
- The possible displacements of the victim during the gunfire

The limits of this approach are mainly related to its lower efficiency compared to conventional radiography combined with the autopsy, when a number of projectiles are grouped in a limited area (e.g., skull), or when multiple trajectories intersect with one another.

In conclusion, CT is currently the preferred radiological investigation before an autopsy in case of homicides by firearm. In France, it is gradually replacing conventional radiography, even if the cost is higher (300 € for a body scanner - 200 € for an autopsy). But the limitations of its use are related to the fact that all forensic services do not have console access to a CT scan and radiologist. Also, psychologically, it is difficult to convince doctors, nurses, and patients that the same CT scan can be used all day long for either living or deceased persons

**CT Scan, Gunshot Wounds, Autopsy**