

THE ROLE OF POST-MORTEM COMPUTED TOMOGRAPHY (PMCT) IN MASS DISASTER AND IDENTIFICATION OF VICTIMS

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Cases of natural catastrophe or mass disaster of other origin always present a situation of acute crises in which the fast intervention of first aiders, security and police are demanded. Once there is no more possibility to save lives and emergency units withdraw, there is often need of forensic pathologist. Their role is to identify victims, to diagnose their causes of death and to help investigating the mechanism that lead to the catastrophe. In order to be able to intervene rapidly, the forensic pathologists have to be organized and need to have a detailed plan of intervention that is ready at any time. Therefore organizations like DVI (Disaster Victim Identification) units exist. The aim of such teams is the coordination of the intervention of specialized persons and their formation. Their role is also to increase the quality of the intervention and to propose different and new approaches that could be useful for investigating such catastrophes.

During the last years, the use of modern imaging techniques such as radiological methods have pioneered post-mortem investigations. The most rapid way to investigate and document the inside of the body is Post-mortem Computed Tomography (PMCT). The obtained radiological data enable visualization of foreign bodies such as medical implants, projectiles and many more. It also gives a detailed overview about the skeletal system including its pathological changes due to existing diseases or due to the acute event that lead to death. Although the visualization of soft tissue such as muscles and organ parenchyma is limited by using PMCT alone, it still allows to identify major traumatic lesions and preexisting modifications of the anatomy due to malformation or pathologies.

For these reasons, the implementation of PMCT in the investigation of victims of mass disasters is extremely useful. In a first step, the radiological images give information about the identity of the victims. Today, different possibilities for performing a radiological identification of bodies exist. If ante-mortem radiological data are available, information such as old fractures, surgical intervention, malformations, tumors and metastatic spreading or even degenerative changes can be used to identify a victim. Other possibilities are the comparison of the paranasal sinuses or the pattern of sesamoid bones. Additionally, if no hint to the victim's identity is available, the use of anthropological methods for estimating sex, age and size of the investigated body is possible by examining the "virtual skeleton" on the CT-images.

Once the first acute intervention including the identification of the victims is done, the PMCT-data remain available for a detailed investigation including the definition of the cause of death. Many studies have shown the utility of PMCT for investigating especially traumatic death, such as it is mostly the case in mass disaster. Also more complex reconstructions are possible based on PMCT-data such as the reconstruction of bullet's trajectories in cases of ballistic trauma, as it can be observed in terrorist outrages for example. Those digital data can be explored even a long time after the body has been restituted to the family, allowing a good compromise between a rapid identification and restitution and the possibility to perform medico-legal investigations.

As all the described advantages are obvious, the use of PMCT for investigating mass disasters has already been proposed and several DVI-teams include the performance of a PMCT-scan in their protocol. In order to avoid transporting the bodies to centers that have a CT-unit, even mobile CT-units are proposed that can be rapidly brought to the scene of the disaster as there are installed inside of trucks.

This presentation will give an overview of the possibilities that PMCT offers in cases of mass disaster, with a special regard to methods of radiological identification. A real cases shall underline the explanations and demonstrate the feasibility of the approach.

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