

The benefits of the computed tomography in the forensic medicine

Radiological imaging methods represent one of the complementary examination methods supplementing conventional autopsy in addition to histological, toxicological, biochemical, microbiological, and serological examination in forensic medicine. The basic and commonly available radiological imaging method in forensic practice is X-ray imaging. With the development of modern radiological imaging methods (especially computed tomography and nuclear magnetic resonance), these modern methods have been gradually applied to the field of forensic medicine. The rapid development of radiological imaging methods in recent years (especially computed tomography and nuclear magnetic resonance) has caused the gradual application of these modern methods in the field of forensic medicine. Post mortem CT (pmCT) examination is now a common part of forensic medicine in the most developed world countries (Switzerland, Denmark, Australia, Japan, Germany, Italy, France and others) and since 2015 this examination has been available at two departments of forensic medicine in the Czech Republic. The primary aim of the study was to evaluate the benefits of pmCT examination in routine forensic practice in three comprehensive groups of individuals who died as a result of drowning, stab wound or gunshot injury, who underwent pmCT examination before a classic autopsy. Another goal was to determine the basic methodology of pmCT examination in these three specific diagnostic categories.

The results of the study showed that pmCT examination allows the display of a set of typical morphological diagnostic findings characteristic for drowning, namely water emphysema, the presence of fluid in the paranasal sinuses, the presence of fluid in the airways, Wydler's mark and hemodilution in the left heart compartments.

PmCT examination can show gross skin injuries in cases of stab wounds. Minor and superficial traumatic changes (especially hesitation marks) are in most cases below the resolution of pmCT. On the other hand, pmCT is useful in the detection of fluid in body cavities (especially in the thoracic cavity), the presence of air (gas) in soft tissues and body cavities, the diagnosis of air (gas) embolism, the recognition of bone injuries and imaging foreign bodies (broken sharp weapons) in the body of the deceased.

Based on the results of the study, it was found that pmCT examination is a valuable diagnostic method for gunshot injuries. PmCT allows to assess the presence and number of bullets in the body, differentiate the entry wound and the exit wound, reconstruct the bullet path, and in most cases determine the cause of death. PmCT examination provided a limited information in determining the range of firing (contact – intermediate – distant), and in cases where bone structures are not affected. Due to the absolute indication of imaging examination in cases of gunshot injuries, pmCT examination can be considered as the method of choice.

Key words: post-mortem computed tomography – forensic medicine – forensic radiology – autopsy – drowning – stab wound – gunshot wound