H87 Challenging the Role of Autopsy — Results of a Multicenter Study to Validate Multi-Phase Postmortem CT-Angiography (MPMCTA)

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After attending this presentation, attendees will better understand Postmortem Computed Tomography-Angiography (PMCTA), in particular the recently developed method of MPMCTA, applied by an international group of dedicated scientists in a large-scale multi-centric study. Strengths and weaknesses of the method will be highlighted in comparison to autopsy and indications for performing MPMCTA will be proposed.

This presentation will impact the forensic science community by demonstrating the potential of the applied MPMCTA protocol to enhance postmortem evaluation of the cause of death. It provides a solid database to define indications for MPMCTA, conventional autopsy, or a combination of both. Results of previous studies are confirmed, indicating that in a variety of case categories, autopsy should no longer be considered the gold standard for postmortem diagnostics, but rather the combination of autopsy with contrast-enhanced postmortem imaging techniques like MPMCTA.

Purpose: Recently developed PMCTA greatly enhances postmortem diagnostics due to its ability to reliably discover even discrete vascular pathologies. While different technical approaches are pursued across the world, the need for validation and standardization of the method increases in order to facilitate its transition into forensic routine. With this goal, an international working group has performed a prospective multicenter study to validate previously published MPMCTA, define its indications, and evaluate its advantages and limitations, especially compared to conventional autopsy.

Method and Materials: Five hundred cases were included in this prospective multicenter study. All cases received MPMCTA followed by conventional autopsy. All CT images were read by a team of one forensic pathologist and one radiologist, both experienced in forensic imaging and blinded to autopsy results. All findings were recorded for each method and categorized by anatomical structure (bone, parenchyma, soft tissue, vascular) and importance for the forensic case (essential, useful, not important).

Results: The majority of findings were visualized with both techniques. MPMCTA was superior to autopsy at identifying skeletal and vascular lesions, where it detected a number of lesions essential to the forensic case which were not seen at autopsy. Conventional autopsy provided better information about essential soft tissue lesions and allowed distinguishing postmortem vs. antemortem vascular occlusions. Best results were obtained when combining both techniques.

Conclusion: Both MPMCTA and autopsy are able to detect potentially essential lesions not detected by the respective other method. This opens the path to defining indications for either one or the other method, or a combination. Combining both techniques increases the overall quality of postmortem diagnosis and in many cases augments diagnostic confidence regarding the cause of death. The results of this study provide researchers and practitioners with a solid data base and will help promote the transition of MPMCTA into daily routine for clinical and forensic pathologists.

Multi-Phase Postmortem CT Angiography, Forensic Radiology, TWGPAM