H133 Postmortem Computed Tomography (PMCT) and Initial Experiences in Postmortem Angiography in Pediatric Cases

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After attending this presentation, attendees will understand the role of PMCT in investigating the cause of death in pediatric cases, especially when compared to conventional autopsy. Attendees will also better understand the newest ongoing research and initial experiences in the field of PMCT-angiography.

This presentation will impact the forensic science community by demonstrating the advantages and limitations of PMCT for investigating pediatric cases and explain why modern research in PMCT-angiography may increase the quality of the postmortem examination.

Performing a postmortem Multidetector Computed Tomography (MDCT) scan has already become routine in some forensic institutes, especially in Switzerland. In order to also investigate the vascular system, different techniques of PMCT-angiography have been tested. Such radiological techniques also play an increasing role in in-hospital deaths where consent of next of kin is needed to perform autopsy. Such consent is often difficult to obtain in cases of deceased children. Consequently, radiological methods could be an alternative to investigate the cause of death.

In order to define the performance of PMCT compared to conventional autopsy in children, a retrospective study was performed at a medical center in Switzerland on a group of 26 children aged 0 years to 12 years old who received both conventional autopsy and PMCT. All reported findings were extracted from radiological and autopsy reports and compared to each other. All findings were grouped according to their importance for the final diagnosis of the cause of death and to the anatomical structure in which they were found (organs, vascular system, soft tissue, and skeletal system).

Overall, a significantly larger number of findings were detected at autopsy compared to PMCT. Autopsy proved to be superior to PMCT notably at detecting organ, soft tissue, and vascular findings, while PMCT was superior in detecting bone findings; however, for findings essential to define the cause of death, no statistically significant difference between these methods was found.

The results of this study led to the conclusion that PMCT is less sensitive for detecting findings than conventional autopsy; however, essential findings can mostly be seen with both methods and PMCT is superior to autopsy for detection of bone lesions in the postmortem investigation of children.

In order to increase the quality of the radiological exam, contrast agent can be applied that enhances soft tissue and organs and allows the investigation of the vascular system. In adult postmortem imaging, this leads to a significant increase of the sensitivity of the exam. The most widespread technique of postmortem angiography today is the so called Multi-Phase Postmortem CT-Angiography (MPMCTA). Different studies have already proven that the use of this method increases the sensitivity of the radiological exam significantly, especially concerning the detection of lesions of the vascular system and soft tissue. Depending on the findings, the sensitivity of the PMCT-angiography is even higher than the one of conventional autopsy. Therefore, the performance of pre-autopsy MPMCTA has already become a new gold standard, especially in cases in which the source of a hemorrhage should be detected or a modified vascular anatomy is the result of a surgical intervention.

Although the technique is well described for adult PMCT-angiography, no pediatric cases have yet been reported and no protocol has been established in order to perform this type of investigation on children. This study started to adapt this technique on infants. Two first cases of six-year-old and seven-year-old children have already been investigated by adapting values of perfusion and using the same or adapted technical equipment as for adult cases. The results of these promising experiences are reported and modifications of technical equipment and perfusion protocols based on these experiences are proposed.

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This presentation shows the advantages and limitations of PMCT in investigating cases of infant death. Although it is highly advantageous for cases of traumatic death, it shows clear deficits for investigating natural death. These limitations may be overcome by performing postmortem angiography, as is already the case for adult death investigations.

Forensic Imaging, Postmortem CT, Postmortem Angiography

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