



G83 Visualization of Myocardial Infarction in Postmortem Multi-Phase CT-Angiography

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After attending this presentation, attendees will understand how the use of Multiphase Postmortem Computed Tomography Angiography (MPMCTA) can help to identify myocardial infarction by detecting a myocardial enhancement after the use of the contrast agent Angiofil®.

This presentation will impact the forensic science community by showing the feasibility of identifying myocardial infarction on MPMCTA. This presentation describes the aspect of the radiological image in comparison with macroscopic and histological findings.

MPMCTA is a minimally invasive technique for postmortem angiography permitting the visualization of the vascular system of the head, thorax, and abdomen in detail. To execute this technique, the cannulation of the femoral vessels of one side is necessary in order to inject the oily contrast agent Angiofil®. After the performance of one native (without contrast agent) Computed Tomography (CT) scan, three angiographic phases are realized: arterial phase; venous phase; and, dynamic phase. For each phase, a CT-scan is executed after the injection of a specific amount of contrast-agent mixture following the standardized protocol of MPMCTA. By comparing the images obtained after the different phases, vascular diagnosis can be performed with very high sensitivity, e.g., in coronary arteries in cases of sudden cardiac death. In some of the cases examined, a pathological enhancement of the myocardium could be observed that seemed to correspond to the morphological finding of myocardial infarction. The goal of this study is to investigate the possibility of identifying a myocardial infarction by MPMCTA.

Twenty-five cases of myocardial infarction (group 1) on which pre-autopsy MPMCTAs had been performed were retrospectively selected. In all cases, the diagnosis was performed by macroscopic and histological analyses. A control group of 25 cases without any macroscopic or histological signs of myocardial infarction (group 2) were then selected. MPMCTA was performed in all cases following a standardized protocol in three phases. The presence or absence of myocardial enhancement and its distribution was investigated by a forensic pathologist together with a board-certified radiologist blinded to the results of previous investigations. This was done first in a subjective manner (enhancement present or not, according to the observers) and second in an objective manner by measuring the mean attenuation in Hounsfield Units (HU) of the myocardium in images of the different phases of angiography.

In all cases of group 1, a pathological enhancement of the myocardium was observed in regions which correlated with the localization of the infarction. Such a pathological enhancement was stated when the mean attenuation was ≥ 95 HU in the arterial phase. In some cases, the enhancement was especially pronounced (more than 200 HU). This phenomenon was mostly observed in subendocardial regions. In these cases, a chronic infarction could be observed. While the arterial phase mostly showed a diffuse enhancement of the concerned myocardium, it was more concentrated in the subendocardial layer during the venous and dynamic phase. No pathological enhancement was observed in the cases of group 2. The mean attenuation in those cases was ≤ 95 HU in the arterial phase.

By investigating the presence of a pathological enhancement of the myocardium in the arterial phase of MPMCTA with the contrast agent Angiofil®, it is possible to recognize a myocardial infarction. In these cases, mean attenuation in the concerned region is \geq than 95HU in the arterial phase. The following phases can be used to better describe the localization of the infarction and possibly recognize old infarctions.

Postmortem Angiography, MPMCTA, Myocardial Infarction