H89 Thanatology of the Vascular System and Its Influence on Postmortem Computed Tomography (PMCT) and Multi-Phase Postmortem CT-Angiography (MPMCTA)

Coraline Egger, MD, CMU, HUG, Rue Michel-Servet 1, Genève CH - 1211, SWITZERLAND; Paul Vaucher, MSc, Institute of Legal Medicine, Rue Michel-Servet 1, 1211 Geneva 4, SWITZERLAND; Pierre Bize, MD, Dpt of Diagnostic and Interventional Radiology, Rue du Bugnon 46, Lausanne, AE, SWITZERLAND; Bruguier Christine, Ch. du Bugnon 21, Lausanne, SWITZERLAND; Patrice Mangin, MD, PhD, Centre Universitaire, Romand de Medecine Legale, Rue du Bugnon 21, Lausanne CH-1011, SWITZERLAND; and Silke Grabherr, PhD, Centre Universitaire Romand de Médecine Légale, Rue du Bugnon 21, Lausanne 1011, SWITZERLAND*

After attending this presentation, attendees will understand the complexity of blood distribution in postmortem imaging, especially due to collapsed vessels and the presence of gas in the vascular system. To avoid misinterpretation of PMCT images, knowledge of thanatological changes is important.

The goal of this presentation is to describe postmortem changes of the vascular system by investigating blood distribution, gas presence, and collapsed vessels on PMCT and their influence on MPMCTA.

Postmortem changes of the human body are broadly described in thanatology; however, there is little knowledge about the influence of postmortem reactions on the vascular system. Radiological non-invasive methods have opened new perspectives in exploring the inside of bodies and can contribute to the understanding of thanatology.

MPMCTA allows the detailed visualization and investigation of the vascular system. By applying this standardized technique, the quality of the postmortem exam can be significantly increased, especially concerning the detection of vascular lesions such as stenosis, malformation, or laceration of vessels; however, the presence of remaining blood can create artifacts that have to be recognized as such because they can imitate vital embolism or vascular occlusion.

In a first study, the postmortem MDCT data of 118 human bodies was studied. Cases with internal/external bleeding or corporal lesion allowing contamination with external air were excluded. Major vessels and heart cavities were systematically explored. Presence of gas was semi-quantitatively assessed by a trained radiologist.

Collapsed veins were observed in 61.9% of cases (CI95% 52.5 to 70.6), and arteries in 33.1% (CI95% 24.7 to 42.3). Vessels most often affected were for arteries: common iliac (16.1%), abdominal aorta (15.3%), and external iliac (13.6%); and, for veins: infra-renal vena cava (45.8%), common iliac (22.0%), renal (16.9%), external iliac (16.1%), and supra-renal vena cava (13.6%). Cerebral a. and v., coronary a., and subclavian v. were not affected. The presence of collapsed vessels was associated to a minor degree of alteration. Concerning the presence of gas, it has been observed that arteries and veins follow the same pattern of appearance of gas for the quantity and location.

A recently performed study describing artifacts due to remaining blood was carried out in 54 cases of MPMCTA. Essentially, this study has shown that artifacts visible in the vascular system during MPMCTA always appear in the same localizations. The main artifacts observed were first, filling defects of the cardiac cavities and pulmonary arteries and second, contrast agent layering in the coronary arteries and the right atrium. Thanks to this reproducibility and stability, it is possible to recognize those phenomena as artifacts and guarantee a proper radiological interpretation of the images.

By comparing the results of the two studies, the thanatological changes of the vascular system are the origin of the artifacts that can be recognized in PMCT and especially in MPMCTA. In order to prove this hypothesis, a future study is necessary superimposing the results of PMCT and MPMCTA on the same cases.

In postmortem imaging, collapsed vessels and gas in the vascular system are common and knowledge of thanatological changes is important in order to avoid misinterpretation. Due to postmortem changes, blood distribution is complex. These thanatological changes also influence MPMCTA; the remaining blood distribution is the reason for the presence of artifacts in the vascular system after angiography.

Thanatology/Postmortem Changes, Vascular System, PMCT

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