



Pathology Biology Section – 2010

G88 Radiological Interpretation of Postmortem CT-Angiography

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After attending this presentation, attendees will have the knowledge to distinguish normal from abnormal findings on postmortem CT-angiography, to recognize the traumatic and non-traumatic pathologies, to understand the differences between clinical and postmortem CT-angiography, and to know the limitation of diagnosis in postmortem CT-angiography.

This presentation will impact the forensic science community by demonstrating the key findings of traumatic and non-traumatic vascular lesions allowing for an accurate diagnosis of the cause of death.

Postmortem CT-angiography is a minimally invasive technique which enables the diagnosis of traumatic and non-traumatic vascular lesions with confidence. However, interpretation of postmortem CT-angiography varies from clinical CT-angiography and demands special knowledge from the interpreting radiologist.

This presentation will introduce the attendees to the general principles of postmortem CT-angiographic interpretation describing the normal and pathological presentation of the venous and arterial vascular circulation. After a short introduction on the technique of opacification we will first present the normal appearance of the organs during arterial opacification, followed by the normal appearance during the venous opacification and in the end during systemic continuous circulation with the help of a perfusion pump. The description of the pathologic findings will distinguish the traumatic and non-traumatic pathologies with special care, describing the false positive findings and how to distinguish them. The most common pathologies responsible for death and visible in CT-angiography are traumatic rupture of vessels, mostly aortic ruptures followed by aortic dissection and aneurismal ruptures. Traumatic organ lacerations are also a common finding, splenic lacerations being the most frequent, followed by renal and hepatic lacerations. These organ lacerations are by themselves most of the time not the cause of death, but accompany more vital lesions, such as aortic, cerebral and cardiopulmonary ones. On the venous side the most common pathology responsible for death are also ruptures due to trauma, followed by massive pulmonary embolism. This pathology is picturing the limitation of postmortem angiography because it is the origin of most of the diagnostic errors. The reason therefore is the presence of postmortem blood clots which are often situated in the pulmonary vessels and the heart chambers. While small exemplars of these clots can be rinsed out by an ongoing perfusion, large ones can not be removed and imitates the radiological image of thrombosis or embolism. The importance of imaging during active circulation will be discussed to distinguish embolism from postmortem thrombi, in the arterial as well venous circulation.

Conclusion: The advent of postmortem CT-angiography allows visualization of traumatic and non-traumatic lesions of the arteries and veins. Clear advantages of postmortem angiography over conventional autopsy are observed in detecting sources of bleeding. By the use of our method, which includes acquisition of data during a dynamic circulation, it is even possible to quantify blood loss. This is important to confirm if a lesion may have been the cause of death and if the injury may have led to an immediate or a delayed death. The main limitation of the technique is the inherent difficulty in differentiating pre and postmortem thrombi and emboli. Another difficulty, due to the same mechanism, is to distinguish aortic dissection from sedimented postmortem blood clots, mainly in the descending thoracic aorta. Because of all these challenges in vascular diagnosis, the help of an experienced angiographer has proven useful to us.

Postmortem Angiography, Postmortem CT, Forensic Radiology