



G11 The Application of the Multi-Phase Postmortem CT-Angiography (MPMCTA) in a Rare Case of Spontaneous Rupture of the Right Common Carotid Artery in a Young Man

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The goal of this presentation is to analyze the value of the Multi-Phase Postmortem Computed Tomography- (CT) Angiography (MPMCTA) in cases of sudden and unexpected death related to cardiovascular pathologies.

This presentation will impact the forensic science community by demonstrating the necessity of a postmortem radiological examination and performing CT-angiography, especially in cases of sudden and unexpected death related to cardiovascular pathologies.

MPMCTA is a standardized technique consisting of a native non-contrast CT scan, followed by at least three angiographic phases (arterial, venous, and dynamic phase). The angiographic phases perfuse the vascular system with an oily contrast agent mixed with paraffin oil, infused through intravascular accesses in the femoral artery and vein. The highly radiopaque iodized oil is transported in paraffin oil through the vascular system analogous to the delivery of contrast agent by the circulating blood in clinical angiography. The three phases (arterial, venous, and dynamic) allow complete opacification of the vascular system such that small vascular lesions or abnormalities can be identified as the exact source of bleeding, which could potentially be missed during the autopsy. Indeed, angiography could reveal more vascular pathologies than conventional autopsy and make it possible to identify the type of hemorrhages (arterial or venous) and their sources.

A 38-year-old man was admitted to the emergency room with a few days' history of severe pain on the right side of the neck. At the clinical examination, he was found to have an expanding right-sided neck mass. During the clinical examination, he experienced multiple episodes of hematemesis and suddenly died, despite medical intervention. Twenty-four hours after the death, a complete autopsy was performed. MPMCTA was carried out which showed a ruptured right common carotid artery, with contrast agent leaking through the rupture and into the mouth. The subsequent autopsy confirmed large hemorrhagic clots extending to the right side of the neck, pharynx, and larynx. An infusion of saline pumped by a syringe filled the right carotid artery showing a 3.5cm rupture of the left wall of the oropharynx. All the cervical organs were fixed in formalin solution for an accurate examination. The source of bleeding was identified as a 2cm tear in the wall of the right common carotid artery penetrating to the right side of the oropharynx through its previously described rupture. Abnormalities such as aneurysm, thickness, or thinness of the arterial wall were not detected. The etiopathology of the lesions was identified through histological examinations performed on vascular and oropharyngeal samples using Hematoxylin-Eosin (H&E) and immunohistochemical staining.

Spontaneous rupture of the common carotid artery is a very rare, life-threatening event. In the scientific literature, rupture is usually secondary to underlying pathology, principally aneurysmal disease, tumor invasion, prior heavy radiation exposure, or existence of infected oro-cutaneous fistula. In the presented case, the angiography can be useful to obtain the exact location of the site of bleeding.

In conclusion, CT-angiography is a useful tool to visualize the entire vascular system as part of the postmortem examination. MPMCTA can detect the exact source of hemorrhage in cases of sudden and unexpected death related to cardiovascular pathologies. Despite recent advances in diagnostic imaging, a complete methodological forensic approach by means of autopsy and histopathological examinations play an irreplaceable role in defining the exact cause of the death.

Postmortem CT-Angiography, Carotid Dissection, Sudden and Unexpected Death