



## Pathology/Biology Section - 2014

### **G85 Contribution of Antemortem Computed Tomography Findings to Cause of Death Determination: A Case of an Unusual Fatal Stroke**

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After attending this presentation, attendees will understand how detailed interpretation of antemortem Computed Tomography (CT) helps to understand the chronology of events leading to death and helps to explore anatomic locations that are difficult to access during autopsy, such as the base of the skull.

This presentation will impact the forensic science community by showing a unique case report in which the antemortem CT was essential to understand the remarkable association of vascular lesions.

**Case Report:** A 32-year-old man was found fully awake next to his car by a pedestrian, after what appeared to be a car accident. His Glasgow Coma Scale was 15 at the time of initial observation by the paramedics. The initial clinical assessment revealed a facial trauma with a left malar wound and no abnormal neurological signs. He lost consciousness suddenly one hour after initial observation and was intubated. A whole body CT scan was performed and showed a complex left side facial fracture, a metallic foreign body in the cavernous segment of the internal carotid, associated with an occlusion of the left internal carotid. At first, circulation in the left brain was possible through the Circle of Willis. Twenty-four hours later, another brain CT scan was performed and showed an extension of the occlusion, similar to a carotid artery dissection, ischemic signs in left cerebral hemisphere, a pseudo-aneurysm of the C4 portion of the left internal carotid, and a carotido-cavernous fistula. Twelve hours after this scan, the victim died from a massive stroke of the left cerebral hemisphere.

An autopsy was performed and confirmed that the left malar abrasion was in fact a gunshot entrance wound, the metallic foreign body being a projectile (.22 LR). The left cerebral hemisphere was congestive, edematous, and ischemic. Neuropathology confirmed the anatomical findings of autopsy. Toxicology was negative.

**Discussion:** The literature provides few case reports of stroke following a gunshot wound. Generally, these occurrences are linked to pellet embolism and the entrance wound is located in the neck area. The vascular lesions concern the common carotid and occasionally the internal carotid. Traumatic carotido-cavernous fistulas are also a rare vascular lesion. Some cases are described in the neuro-surgical literature. The military literature highlights the fact that gunshot wounds associated with internal carotid lesions are very infrequent. According to this research, this case is the first which associates internal carotid dissection, pseudo-aneurysm of internal carotid, and carotido-cavernous fistula. If no antemortem CT had been performed, it would have been difficult to find all these vascular lesions during the autopsy, as this anatomic area (base of skull) is difficult to reach by dissection.

**Conclusion:** The antemortem brain CT scan permitted better understanding of the chronology of events that lead to death:

- facial gunshot wound
- occlusion and dissection of the left internal carotid due to the projectile in his intra-cavernous portion
- consciousness related to the substitute vascular network (Circle of Willis)
- decrease of intra-cerebral circulation due to extension of the dissection, pseudo-aneurysm, and carotido-cavernous fistula
- ischemic lesions of the whole left cerebral hemisphere
- death due to an increase of the intracranial pressure, edema, and ischemic lesions.

#### **Fatal Stroke, Computed Tomography, Multiple Vascular Lesions**