H125 Massive Intracranial Bleeding Due to the Rupture of a Rare Spontaneous Pseudoaneurysm of the Middle Cerebral Artery in a Pediatric Patient: A Case Report With Clinical, Radiological, Gross, and Microscopic Findings

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Learning Overview: After attending this presentation, attendees will understand the features and appearance of a rare intracranial idiopathic pseudoaneurysm.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing the features of a rare cause of intracranial bleeding in a pediatric patient.

Pediatric pseudoaneurysms are a rare and underdiagnosed cause of intracranial hemorrhage. Regarding the head and neck districts, approximately 80% of the pseudoaneurysms affect extracranial vessels (mostly carotid and vertebral arteries), while only 20% are intracranial. The most common etiologies of pseudoaneurysm are trauma, infection, drugs, or neoplasm. Spontaneous/idiopathic pseudoaneurysms are rarely observed in the clinical and forensic practice.

A 14-year-old White female was brought to the hospital after she lost her consciousness while attending her morning school session. She had no pertinent familial history or history of traumas. According to her recent medical history, she had a heavy menstrual bleeding, with a three-week-long recurrent mild headache, and a lack of appetite started the night before. On arrival at the emergency department, the neurological examination showed a drowsy but easily arousable girl, with a Glasgow Coma Scale (GCS) score of 13 (E3V4M6). Physical and neurological examinations were unremarkable. A pregnancy test was negative. An Electrocardiogram (EKG) showed no cardiac rhythm alterations. Plain computed tomography of the brain without contrast showed an intra-axial hemorrhage in the right temporal lobe, 6cm in diameter, without evidence of skull fractures; it produced a mass effect, without deviation of the median line structures. Cerebral edema and subarachnoid hemorrhage were also noted. After the neuroradiological study, the GCS score decreased to 10 (E2V3M5).

The patient was referred to the Neurosurgery Department of a primary health care provider. Upon arrival, the patient underwent a plain computed tomography of the brain with contrast that showed an increase of the intraparenchymal hematoma in the right cerebral hemisphere with a 10-centimeter dislocation of the median line structures. The patient immediately underwent a decompressive craniotomy, and an external ventricular drainage was placed. A cerebral angiography was performed, showing an active bleeding from a right middle cerebral artery pseudoaneurysm, and an endovascular aneurysm repair was performed.

Despite the multiple neurosurgical operations, the patient died after three days of coma due to the massive intracranial bleeding.

At the postmortem examination, the young girl was an organ donor, but the whole brain was saved in formalin for a neuropathology consultation. At the examination of the fixed brain, a massive subarachnoid hemorrhage was observed on the right cerebral hemisphere, together with an extensive right temporal lobectomy as a result of the neurosurgical intervention. Following the right branches of the circle of Willis, the right middle cerebral artery was found: it showed the presence of a fusiform vessel dilatation, 2.5x1 centimeters in size, filled by surgical glue.

The microscopic examination of the vessel dilatation confirmed a pseudoaneurysm of the right middle cerebral artery, showing the loss of normal arterial architecture with intermittent disruption of the internal elastic lamina and vacuolar degeneration of the tunica media.

Unlike true aneurysms, pseudoaneurysms are typically found along a vessel wall, distal from a branch point. They differ pathologically from true or dissecting aneurysms. In pseudoaneurysms, there is a disruption of all three layers of the vessel wall with a contained hematoma. They have a specific wall formed by hematoma organization and fibrosis with the surrounding and connective tissue indicating vessel wall injury. Pseudoaneurysms must be distinguished from true saccular aneurysms because of their friable nature, the tendency of rupture, and different pathologic findings.

At the postmortem examination, a massive intracranial hemorrhage or a previous surgical manipulation of the brain may hide the existence of a vessel malformation. Therefore, in the case of pediatric intracranial bleeding, a multidisciplinary approach (clinicians, radiologists, neurosurgeon, pathologists, and neuropathologists) is required, and a careful inspection of the central nervous system structures is mandatory.

Pseudoaneurysm, Intracranial Bleeding, Pediatrics