G95 Arteriovenous Malformation and its Implications in Forensic Pathology: A Case Report

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After attending this presentation, attendees will gain better knowledge and understanding of the four types of vascular malformations (morphology, usual location, outcome) and their implication in forensic pathology.

Sudden deaths from the rupture of an arteriovenous malformation (AVM) are rare in forensic pathology practice. This presentation will impact the forensic community and/or humanity by illustrating the importance of understanding this entity to avoid confusing an AVM with child abuse.

The goal of this presentation is first to differentiate the four major groups of vascular malformations of the brain, which are arteriovenous malformation (AVM), cavernous angioma, venous angioma and capillary telangiectasia, and secondly, to describe their implications in forensic pathology.

AVMs consist of tangled masses of tortuous arteries and veins devoid of intervening capillaries that frequently extend from brain parenchyma into the subarachnoid space. Cavernous angioma is a tightly packed collection of hyalinized vascular channels most commonly found in the cerebellum, pons and subcortical regions. Venous angioma is composed of varicose veins generally located in the cerebral white matter. Capillary telangiectasia appears as a collection of small-caliber, very-thin-walled channels most likely found in the pons. Cavernous hemangioma is the only malformation lacking intervening brain parenchyma. AVM and cavernous angioma often cause hemorrhages. On the other hand, venous angioma and capillary telangiectasia are typically asymptomatic.

AVM is a rare cause of sudden death. In forensic context, six cases of such deaths have been reported, in three different papers. In five of these reported cases, children aged 5 to 10 years old complained of headache and went to lay down, and later found dead from a ruptured AVM within the cerebellum. The other one is an 8-year-old boy found dead in a swimming pool after rupture of an unsuspected brain AVM.

Presented here is the case of a 14-year-old girl who died from a ruptured arteriovenous malformation of the brain. The girl was in good health except for asthma. The eldest of nine, she lived in a family that was part of a marginal community. Her parents were members of a group that allowed child beating and refused all vaccination and modern medicine.

The girl was found dead in the morning, lying on her bed, her legs hanging off the side. Child brutality was suspected at first sight because of a bluish coloration on the side of her face, which was later proven to be livor mortis. On the previous morning, she was feeling fine and went to school. At noon, she started to feel sick. She vomited twice and complained of headache and nausea. Her body temperature was normal. She went home and went to bed by 6 pm, and later found dead the next morning.

External examination of the 60-pound and 4-foot-5 girl revealed nothing worthy of note. At internal examination, the 1580-gram brain showed massive edema with intracerebral hemorrhage and secondary necrosis around the left lateral ventricle, extending to the ventricle with widening of the latter. Microscopically, the lesion was composed of different caliber thick-walled vascular channels surrounded by intervening reactive cerebral parenchyma, with gliosis and hemosiderin deposits. The abnormal vessels extended into the subarachnoid space in some areas. The rest of the autopsy was unremarkable except for mild lung congestion. Toxicological analysis reveals only a therapeutic dose of acetaminophen. The death was attributed to a rupture of a cerebral AVM and the manner of death was ruled natural.

The present case is a reminder that the forensic pathologist should be able to recognize an AVM and know how to differentiate it from the others types of cerebral vascular malformations. Although rare, it can be a cause of sudden death, and should be considered in the differential diagnosis of intracerebral hemorrhage, and not confused with trauma, especially in children.

Sudden Death, Arteriovenous Malformation, Forensic Pathology

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