H66 Sudden Unexpected Deaths Due to Intracranial Meningioma: A Presentation of Six Fatal Cases and a Discussion of the Mechanisms of Death

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After attending this presentation, attendees will have a better understanding of the importance of sudden death due to undiagnosed meningiomas in subjects in apparently good health found dead in the absence of known causes.

This presentation will impact the forensic science community by highlighting the pathological theories that explain sudden deaths due to meningioma.

Intracranial tumors usually produce clinical signs and symptoms due to a combination of local tissue compression and damage, edema, and the alteration and shift of intracranial structures. An individual may present with focal neurological signs and symptoms as a result of the particular location of the neoplasm or with generalized symptoms due to increased intracranial pressure that may include headache, nausea and vomiting, altered mental status, papilledema, and seizures. The severity of these clinical manifestations is often progressive and directly related to tumor growth. Death usually occurs after a variable period of time characterized by a declining clinical course. Occasionally, sudden death due to asymptomatic intracranial neoplasms may be encountered in forensic settings.

Meningiomas arise from the dura mater and are composed of neoplastic meningothelial (arachnoidal cap) cells. Many meningiomas are found incidentally following neuroimaging for unrelated reasons. Family history studies suggest a role for inherited susceptibility for meningioma in addition to multiple genetic abnormalities involving different genes.

Deaths due to meningiomas are routinely diagnosed in clinical practice because this neoplasm tends to present with the typical progression of neurological deficits. On the other hand, sudden unexpected death due to meningiomas are rarely described in the literature. Six fatal cases of previously undiagnosed intracranial meningiomas from the Cook County Medical Examiner's Office from 1998 to 2014 are presented.

Case 1: Meningioma of the cerebellopontine angle.

Case 2: Meningioma of the middle cerebral fossa in the area of the left temporal lobe.

Case 3: Suprasellar meningioma.

Case 4: Meningioma of the basilar portion of the occipital bone.

Case 5: Meningioma (based on clinical history — not specified).

Case 6: Intraventricular meningioma.

The most common explanation of the mechanism of sudden death due to intracranial neoplasms — despite their vast biological and morphological diversity — is a rapid increase in intracranial pressure produced by the mass effect of the neoplasm. Increased intracranial pressure may in turn lead to seizures, acute hydrocephalous, brain edema, hypothalamic dysfunction, herniation due to mass effect, and brainstem compression with death due to direct involvement of respiratory and cardiac centers. Other mechanisms of death include acute intracranial and intra-tumoral hemorrhage and benign neoplasms that grow in the vicinity of vital centers (such as the hypothalamus) disrupting thermoregulation or neural discharge in autonomic pathways leading to cardiac suppression or lethal arrhythmias.

Forensic pathologists must keep in mind that sudden unexpected death caused by intracranial meningiomas, although extremely rare, may be encountered in the forensic setting. In cases of sudden death due to intracranial meningiomas or other intracranial neoplasms, consultation with a neuropathologist may be useful. Accurate diagnosis of the tumor may assist family members of the deceased by identifying any genetic or environmental risk factors and benefit public health by providing information about the natural evolution of untreated disease.

Sudden Death, Meningioma, Mechanisms of Death

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