Case #79

NAME Educational Activities Committee

Submitted by:

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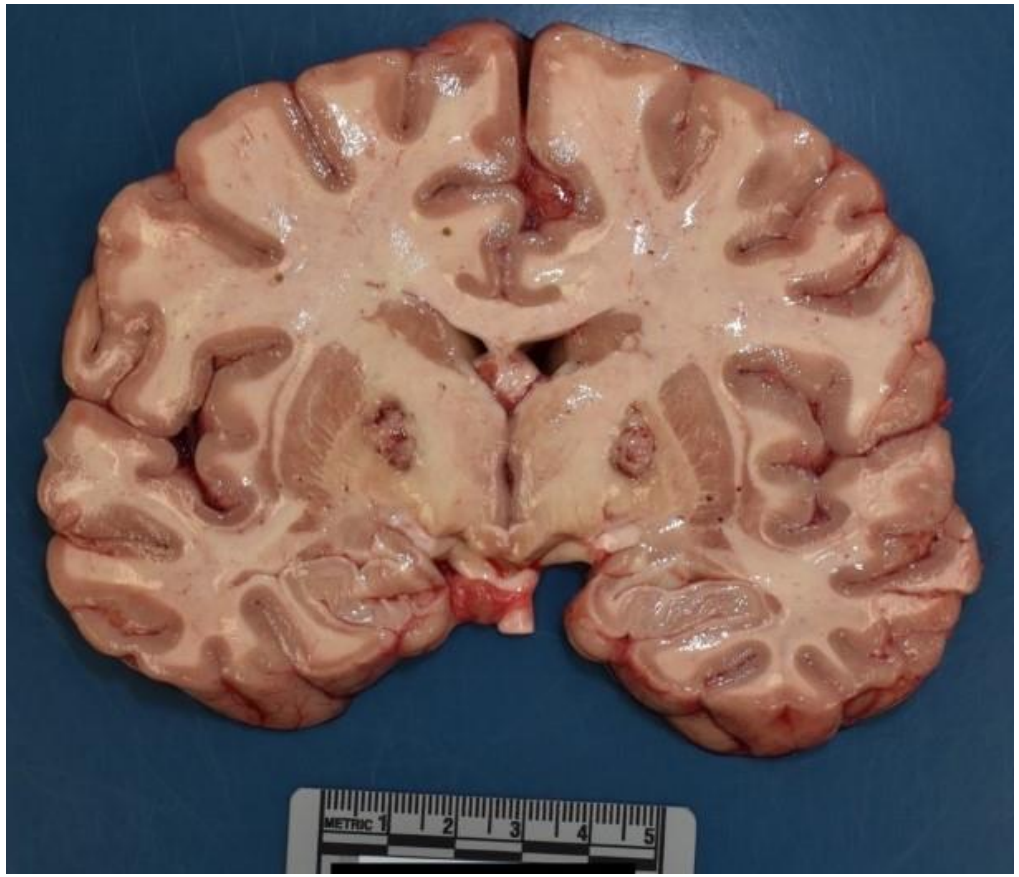
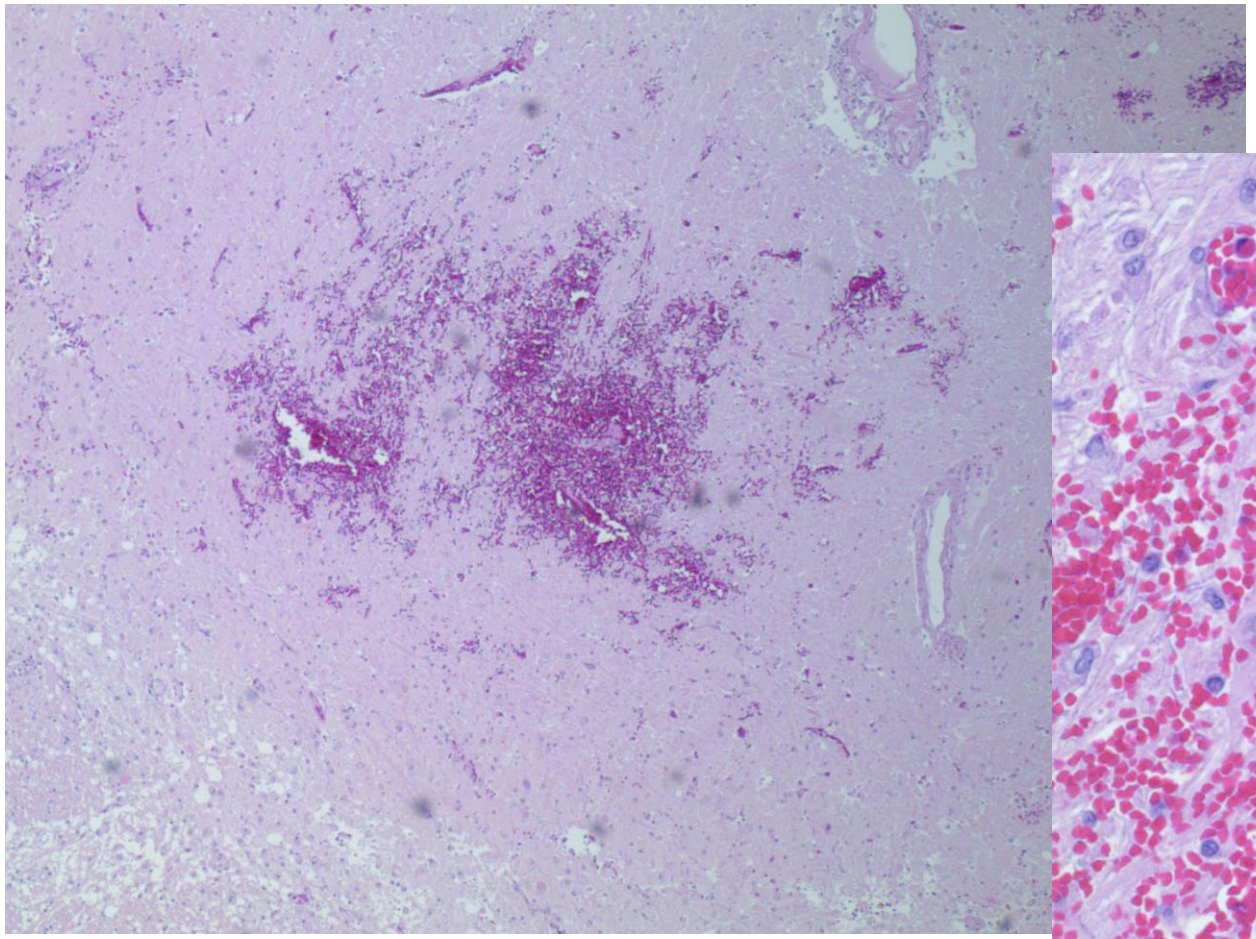
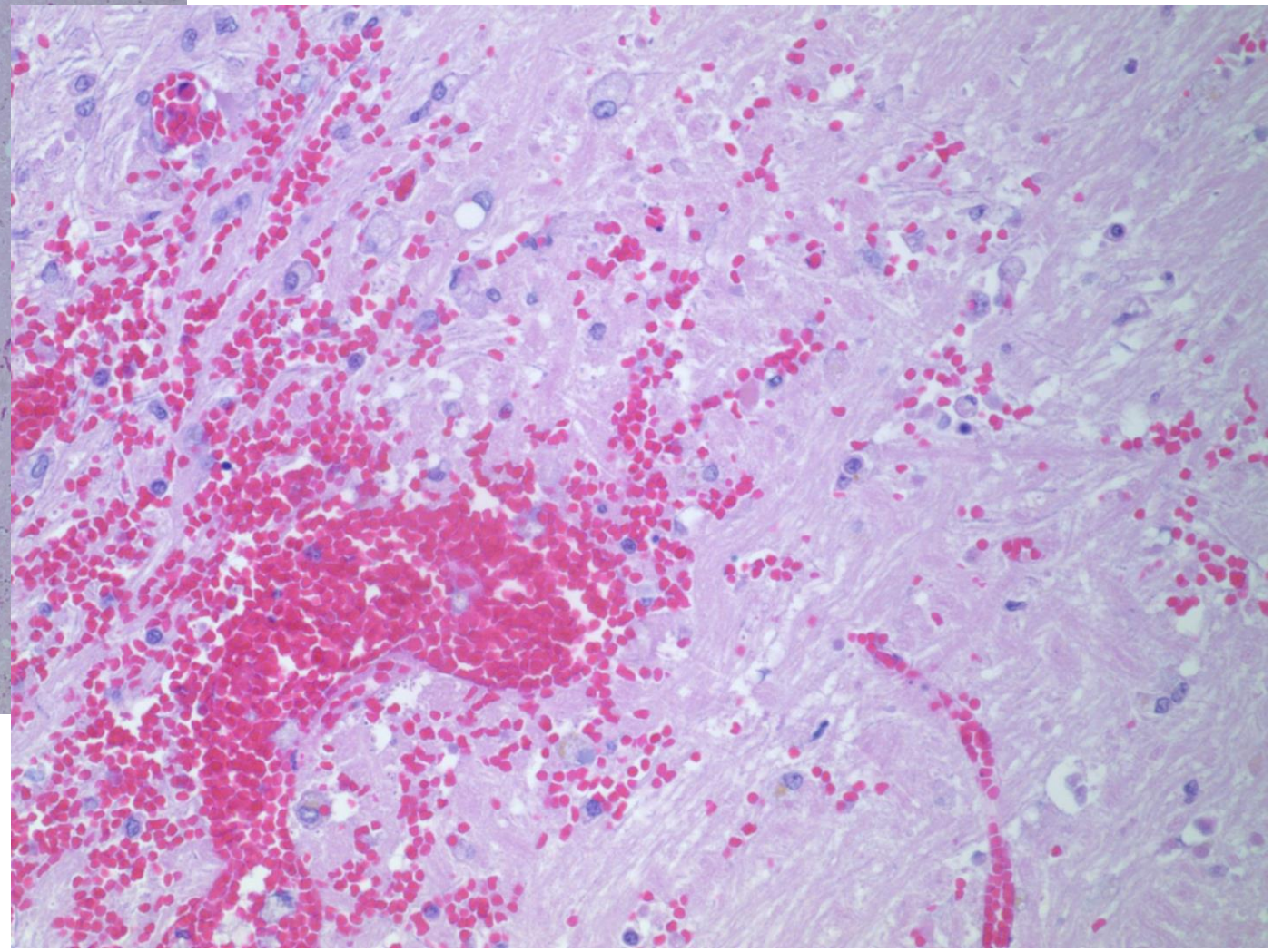


Image 1





Images 2a, 2b

1. A 48-year-old woman with a history of drug use was brought to the emergency department for a suspected overdose. Narcan was administered on scene, without response. She was placed on comfort care and later died after family withdrew care. Based on the gross and microscopic findings seen above, the most likely cause of death was:

- ◯ Vasculitis
- ◯ Wilson disease
- ◯ Cocaine toxicity
- ◯ Infective endocarditis
- ◯ Carbon monoxide toxicity

Answer…

E. Carbon monoxide toxicity (CORRECT RESPONSE, 48.67% of responses)

Though rarely seen at autopsy, bilateral necrosis of the globus pallidus is described as a classic finding in carbon monoxide (CO) toxicity with a prolonged survival time (>48 hours). The gross image of a coronal section through the brain showed bilateral necrosis and hemorrhage of the globus pallidus (GP). Histologic images also depicted areas of intraparenchymal hemorrhage, which are usually described as petechial hemorrhages of the white matter (often corpus callosum). The globus pallidus may be selectively injured in CO poisoning because it has a high metabolic rate and is more vulnerable to hypoxic or ischemic injuries since they rely heavily on a continuous supply of oxygen. Other areas of the brain that could be affected in severe cases include the hippocampus and substantia nigra. In cases of acute CO poisoning in which there is no substantial survival time, one does not normally observe these lesions.

Other responses:

A. Vasculitis (8.45% responses)

There are several different vasculitides that may affect cerebral vasculature, which may cause headaches and eventually strokes. However, the distribution of lesions is not confined so specifically to the globus pallidus.

B. Wilson disease (3.6% responses)

Wilson disease, also termed hepatolenticular degeneration, is a hereditary disorder causing copper buildup in the liver and several brain regions, including the putamen, pons, midbrain, and thalamus. Involvement in the brain is bilateral. Manifestations generally begin at an earlier age than the patient in the question stem. If left untreated, Wilson's disease can lead to serious complications such as liver disease, neurological defects, and psychiatric symptoms.

C. Cocaine toxicity (26.13% responses)

Cocaine toxicity is associated with intracerebral hemorrhage and stroke; however, this is less likely to be located in the globus pallidus. Image 3 shows a pontine hemorrhage from a cocaine overdose. Rarely, 3,4-methylenedioxymethamphetamine, cocaine, opiates, and cyanide poisoning can cause bilateral globus pallidi lesions, but this is less common than carbon monoxide. Interestingly, necrotic lesions in the bilateral globus pallidi have been documented in 5-10% of individuals addicted to opiates.

D. Infective endocarditis (13.15% responses)

Infectious endocarditis is a consideration in patients with suspected illicit drug use, especially of the right-sided valves. It presents with fever, immunological phenomena (e.g., Osler nodes), and vascular phenomena (e.g., septic emboli) that typically affect the areas supplied by one of the major cerebral vessels (e.g., middle cerebral artery, anterior cerebral artery).

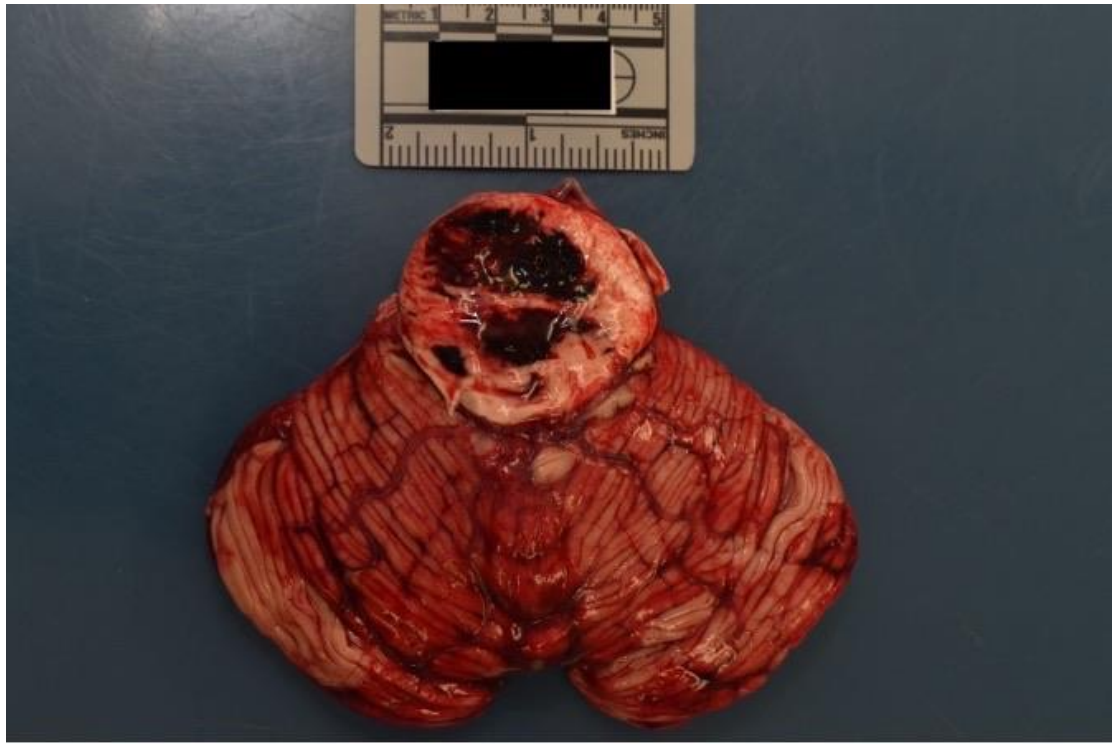


Image 3

References

Prockop LD, Chichkova RI. Carbon monoxide intoxication: an updated review. J Neurol Sci. 2007;262(1-2):122-130. doi:10.1016/j.jns.2007.06.037

Alquist CR, McGoey R, Bastian F, Newman W 3rd. Bilateral globus pallidus lesions. J La State Med Soc. 2012;164(3):145-146.