

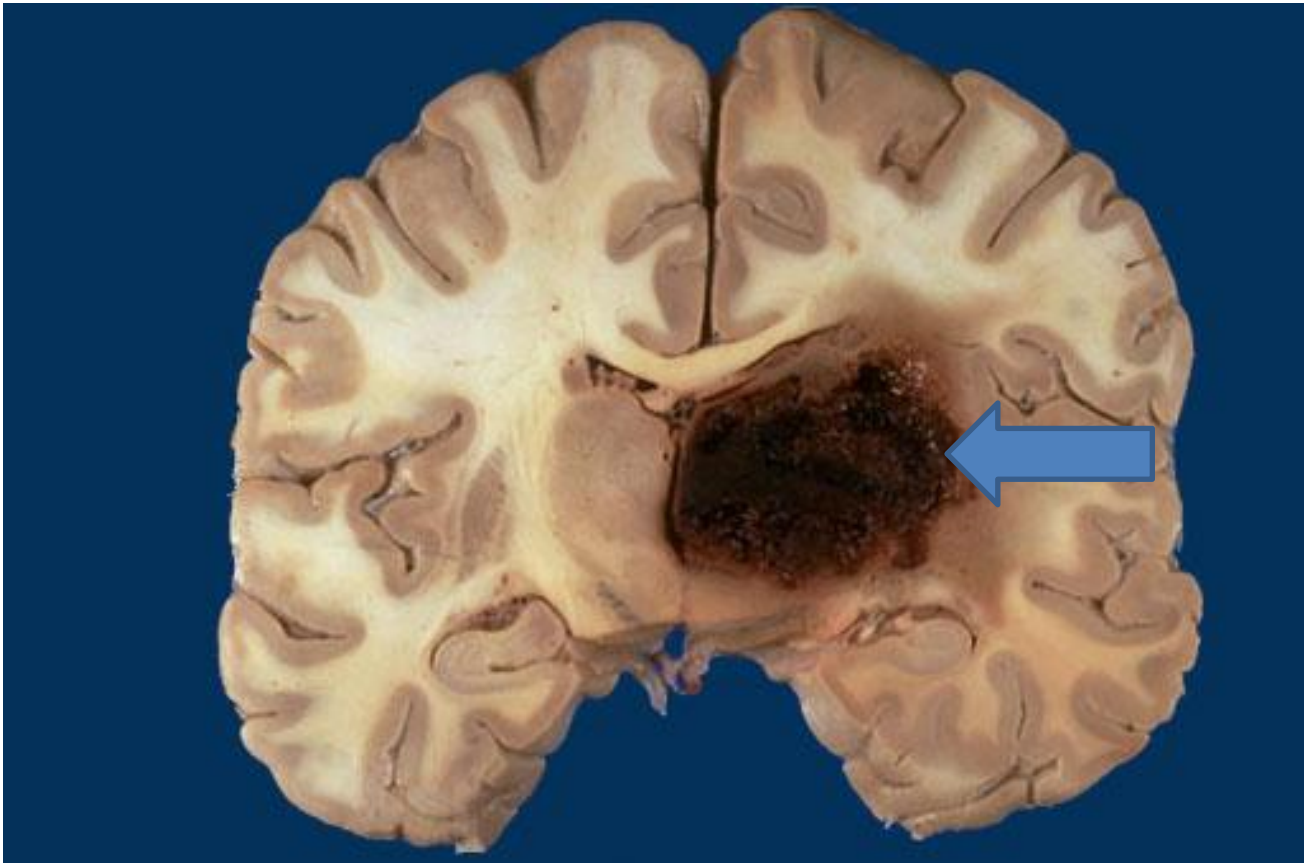
Pathoradiologic Study Guide

Central Nervous System

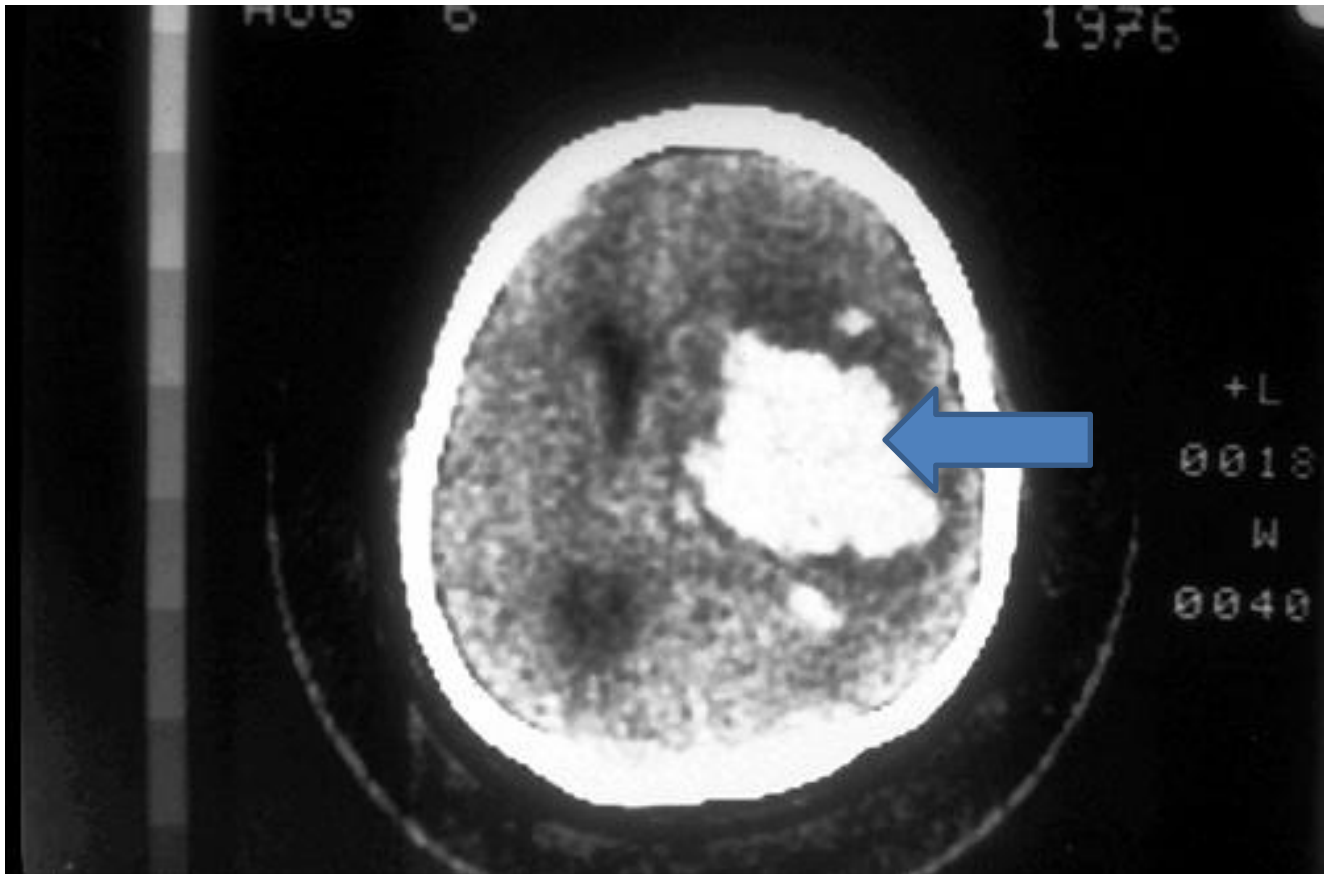
USMLE Step One Review Program

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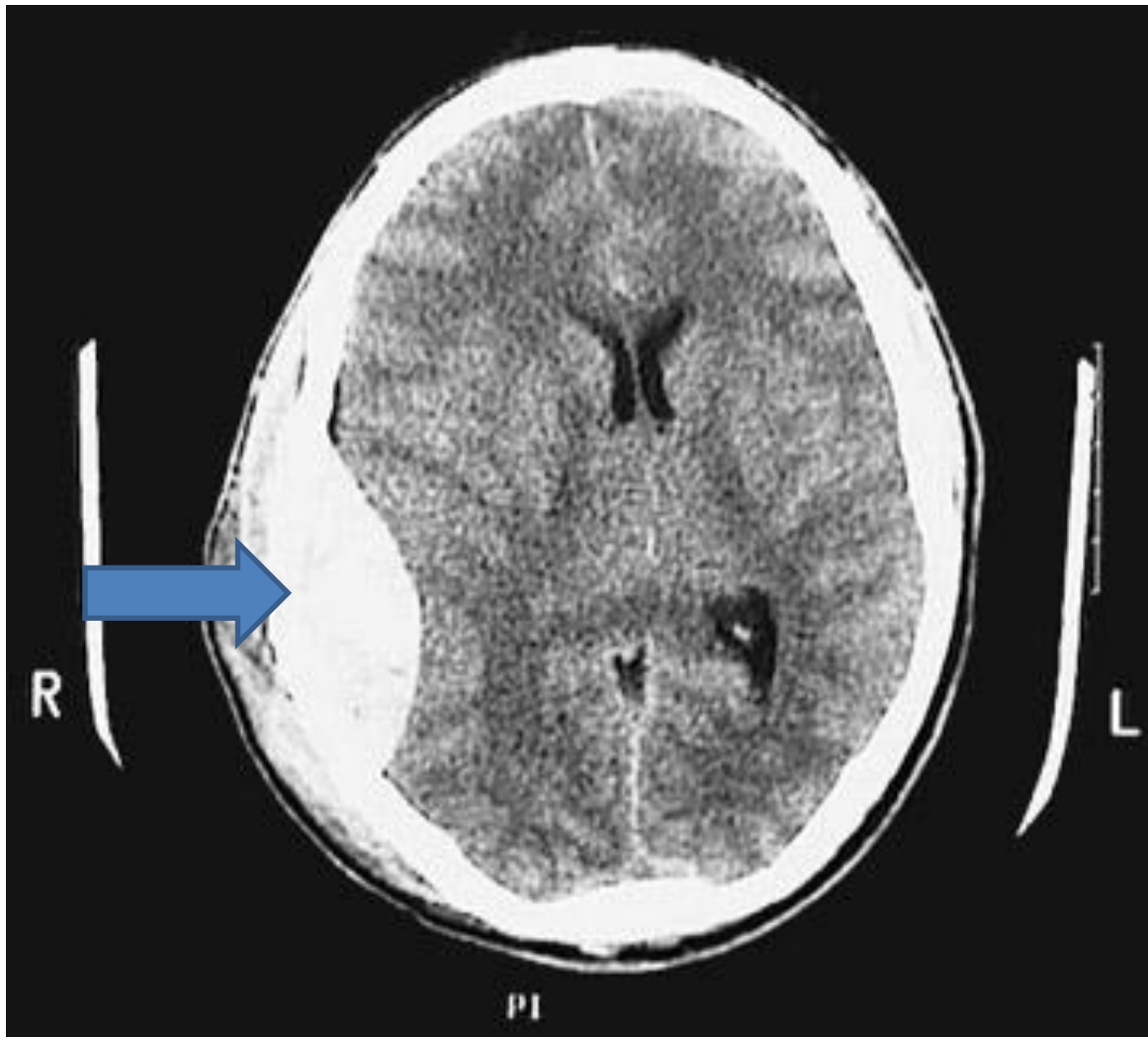
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Hemorrhages involving the basal ganglia area (the putamen in particular) tend to be non-traumatic and caused by hypertension, which damages and weakens the small penetrating arteries. A mass effect with midline shift, often with secondary edema, may lead to herniation.



This computed tomographic (CT) scan of the head in transverse view demonstrates an area of hemorrhage arising in the basal ganglia on the left in a patient with a history of hypertension.



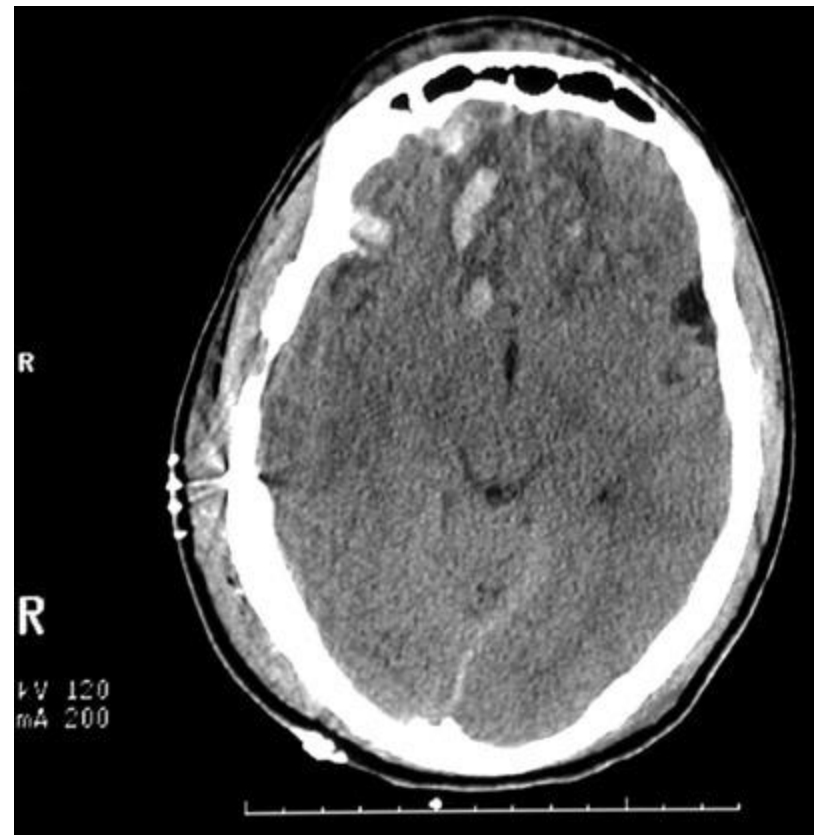
This is a sagittal head CT scan without contrast demonstrating a large epidural hematoma with right to left shift and ventricular narrowing.



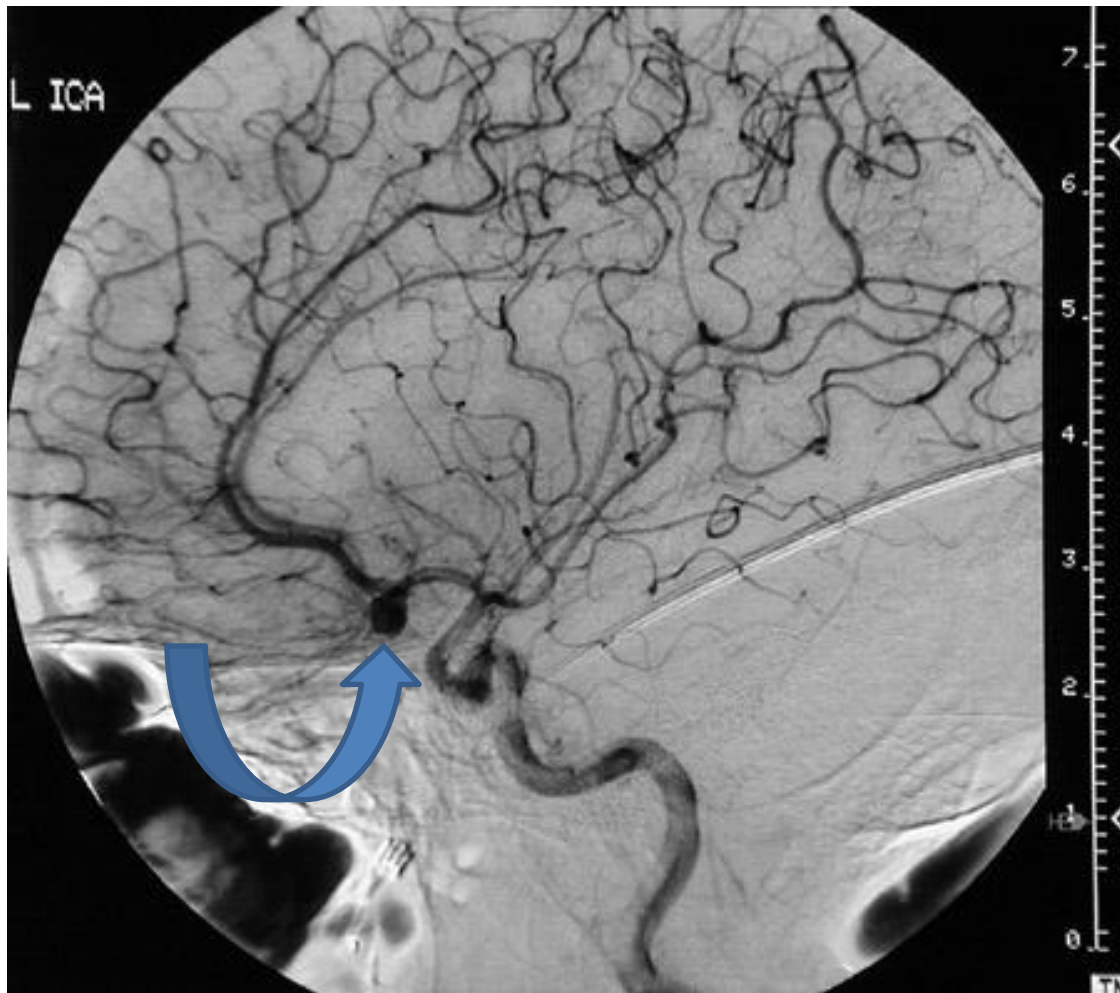
In this axial head CT scan without contrast there is a large epidural hematoma on the right, with a **"lens shaped"** outline as the smooth dura is indented against the underlying cortex. The acute blood collection appears bright on CT. This patient fell from a height and struck the right side of his head, severing the middle meningeal artery.



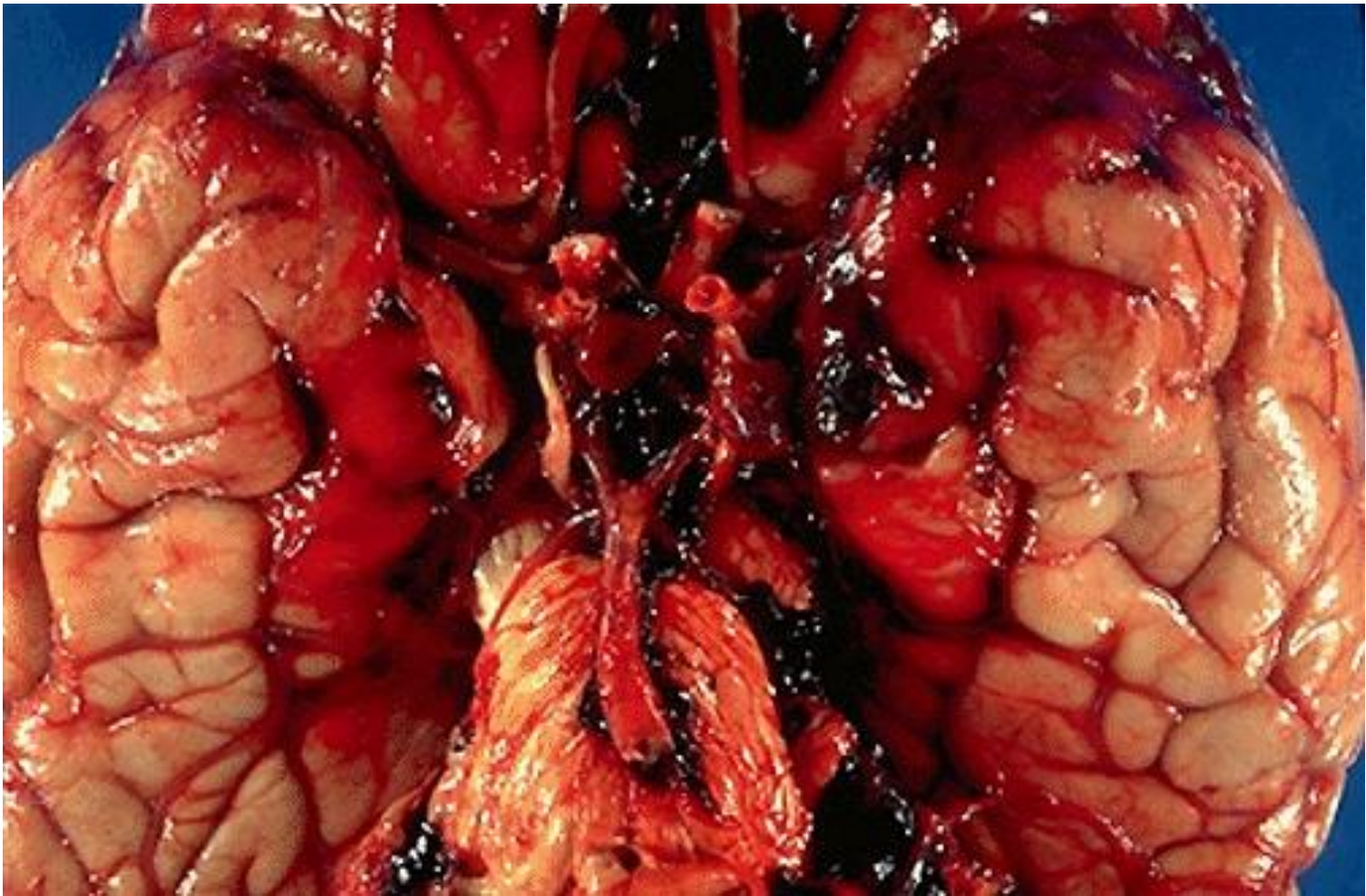
A coronal section through the frontal lobes reveals extensive contusions involving the inferior gyri. This was a **contracoup injury** from a fall backward, striking the occiput, in the bathtub by an elderly person.



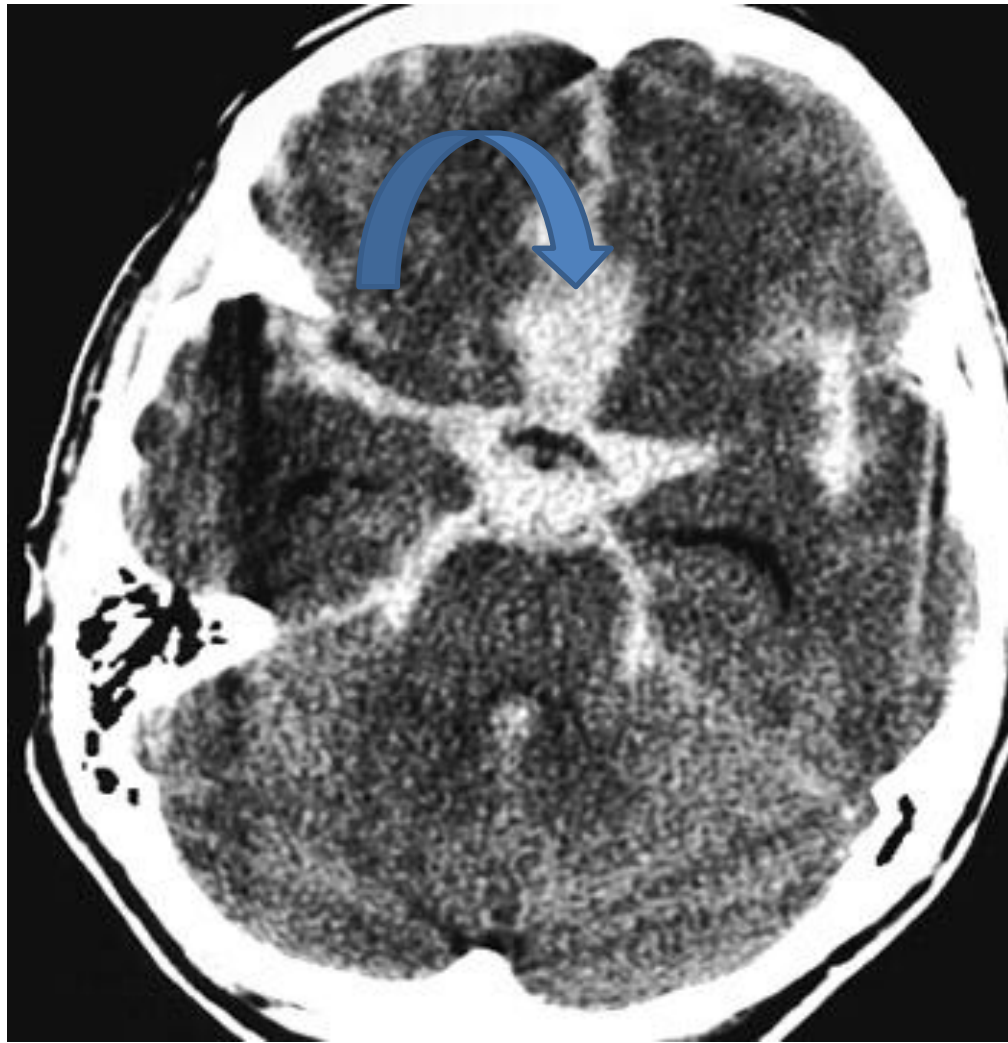
In the views above and below this head CT scan without contrast reveals brighter areas that represent subfrontal contusions resulting from a contracoup injury sustained in a fall backwards.



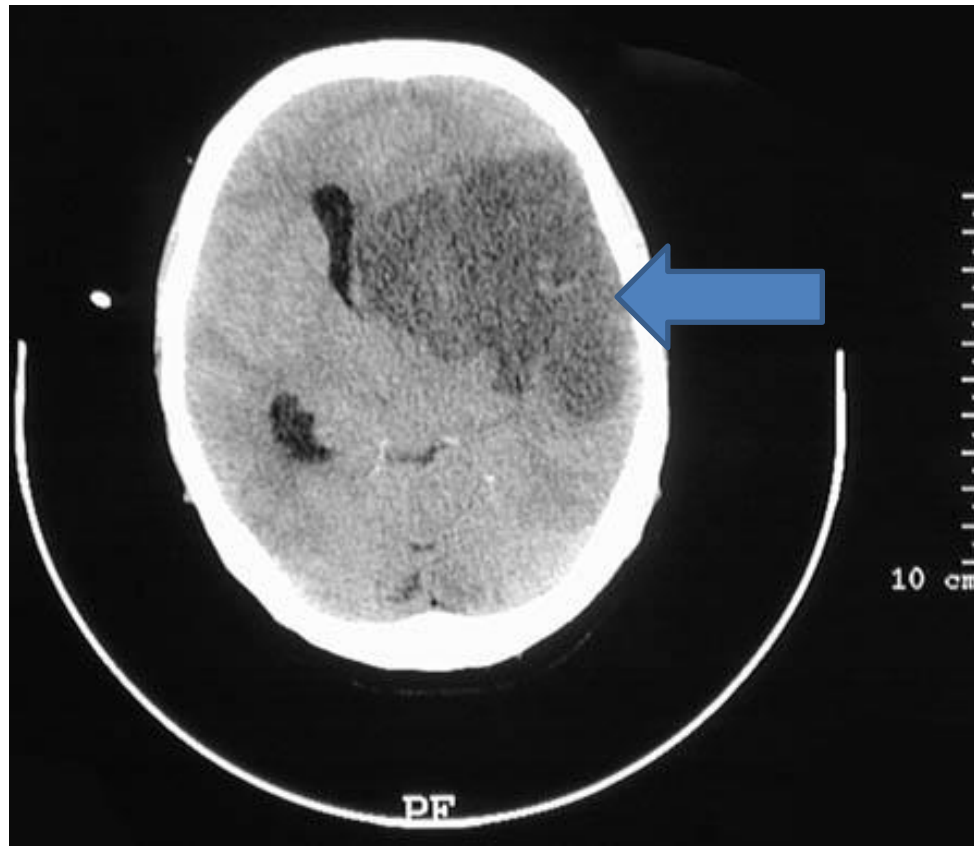
The cerebral angiogram above and below demonstrates a berry aneurysm involving the anterior communicating artery of the circle of Willis at the base of the brain.



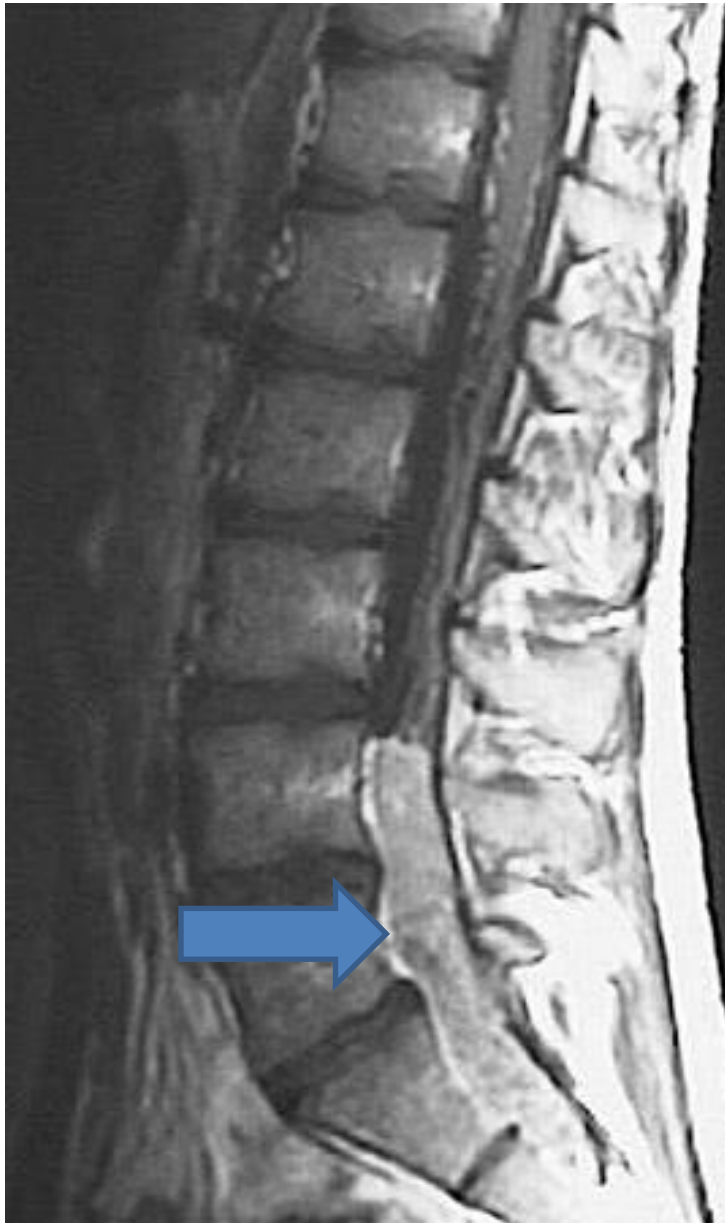
The subarachnoid hemorrhage from a ruptured aneurysm is more of an irritant producing vasospasm than a mass lesion.



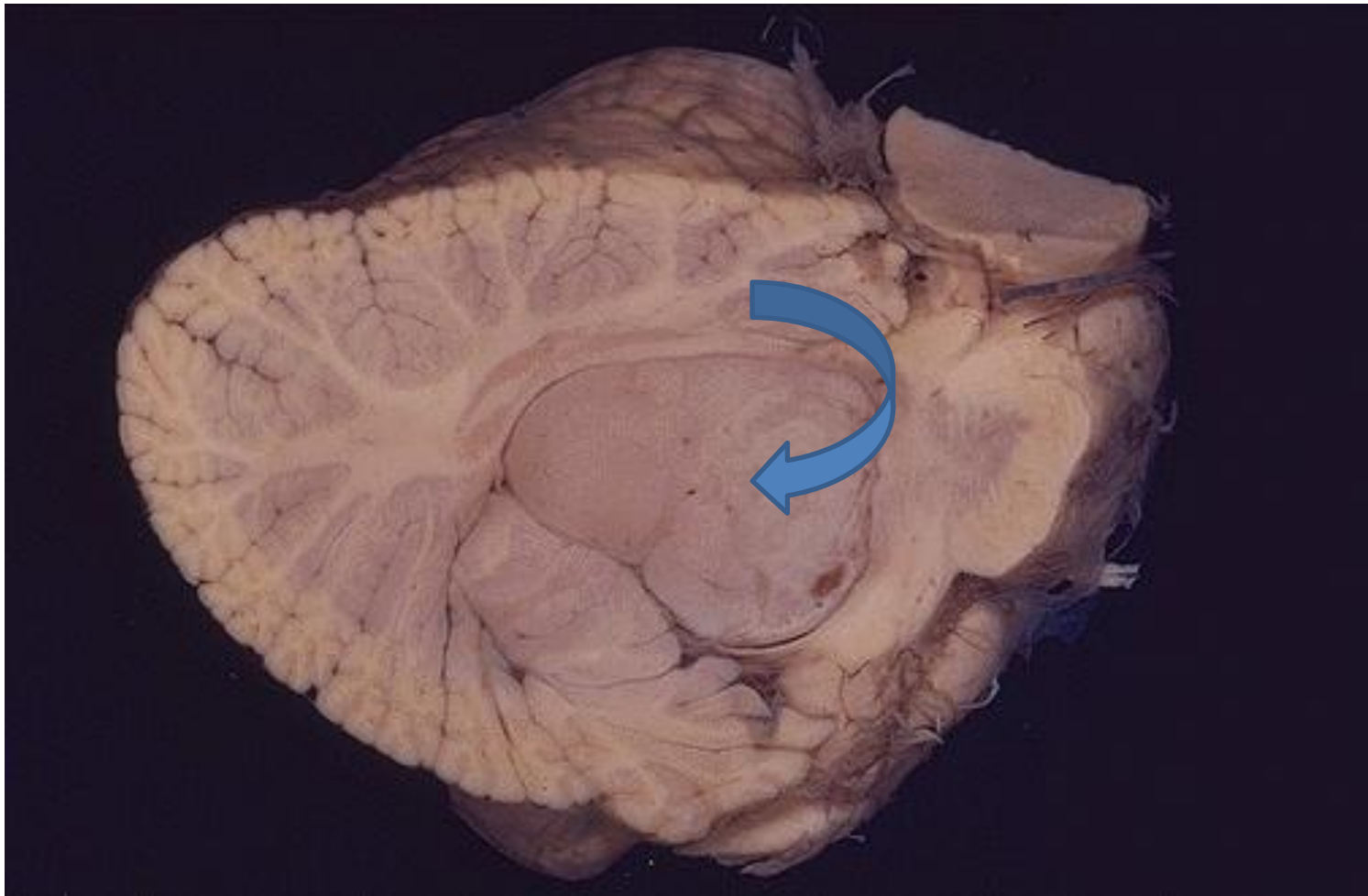
This CT scan reveals bright areas at the base of the brain, more toward the anterior aspect, representing subarachnoid hemorrhage in a patient who had a ruptured berry aneurysm involving the anterior communicating artery.



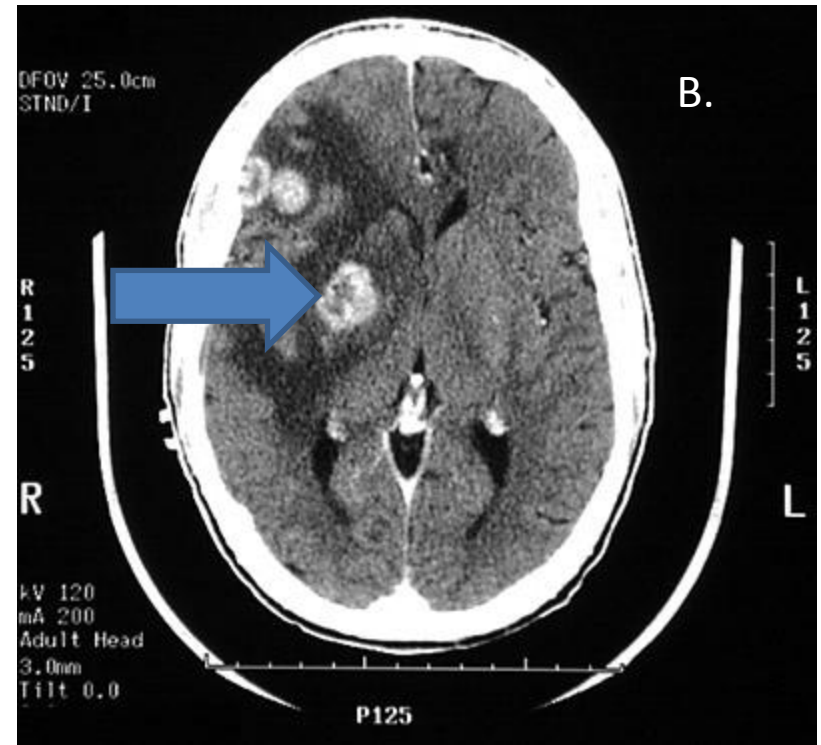
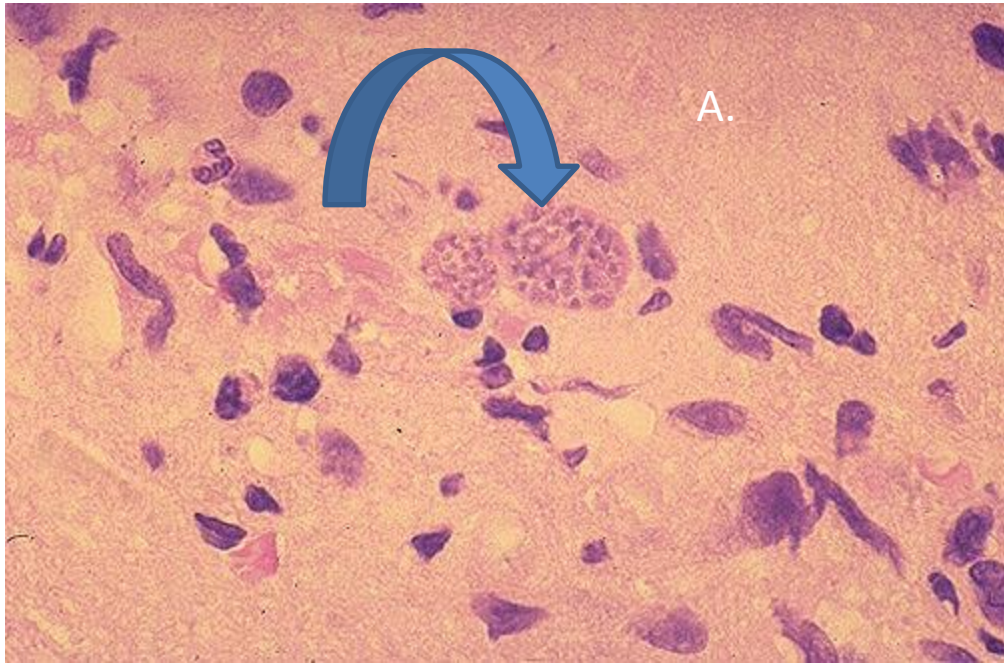
This CT scan reveals an area of massive infarction of the left cerebral hemisphere, mostly in the right middle cerebral distribution, that is of recent formation, with brain swelling and a midline shift to the right compressing the ventricular system.



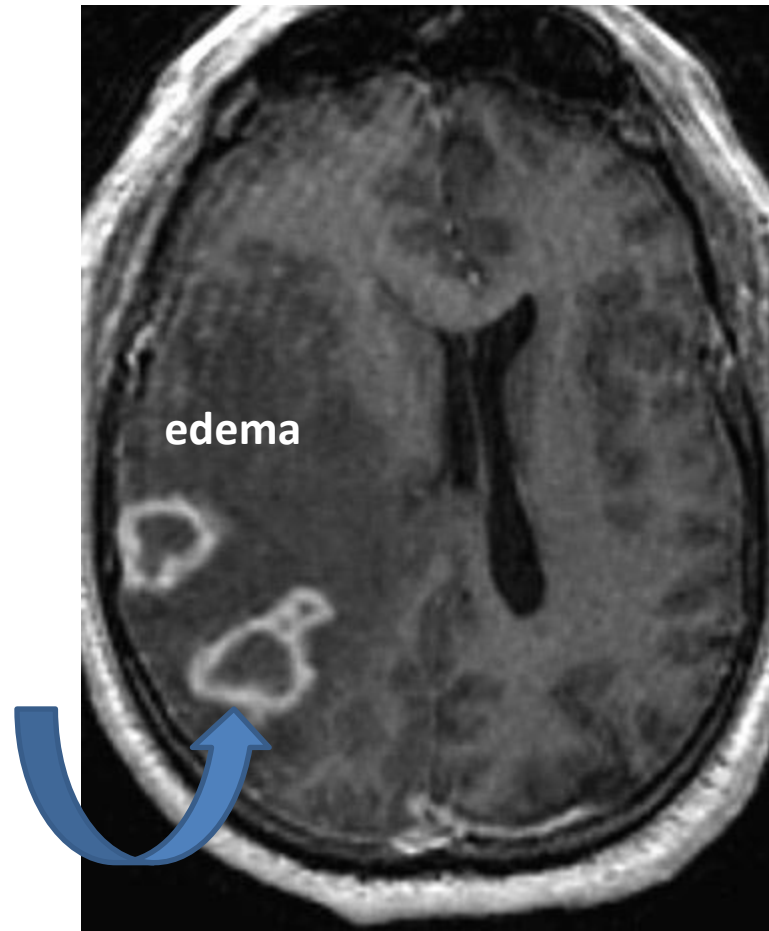
This magnetic resonance imaging (MRI) scan in sagittal view demonstrates a lobulated mass extending down from the level of L4. This is a myxopapillary ependymoma, the most common neoplasm at this site, and a common place for an ependymoma.



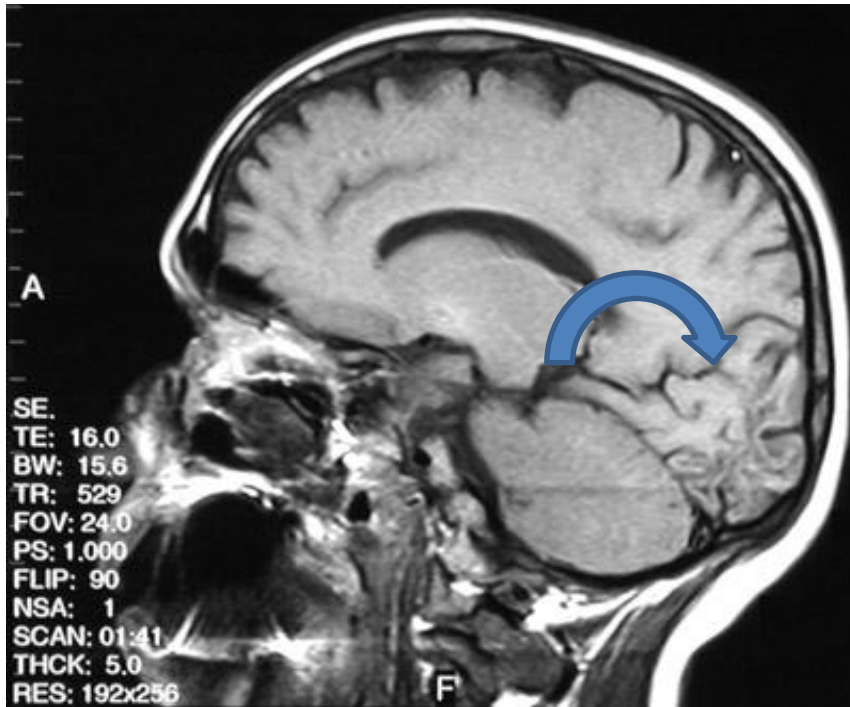
In this sagittal view there is an ependymoma arising from the ependymal lining of the fourth ventricle, filling and expanding the fourth ventricle above the brainstem, and bulging into the cerebellum. Ependymomas are **benign** histologically.



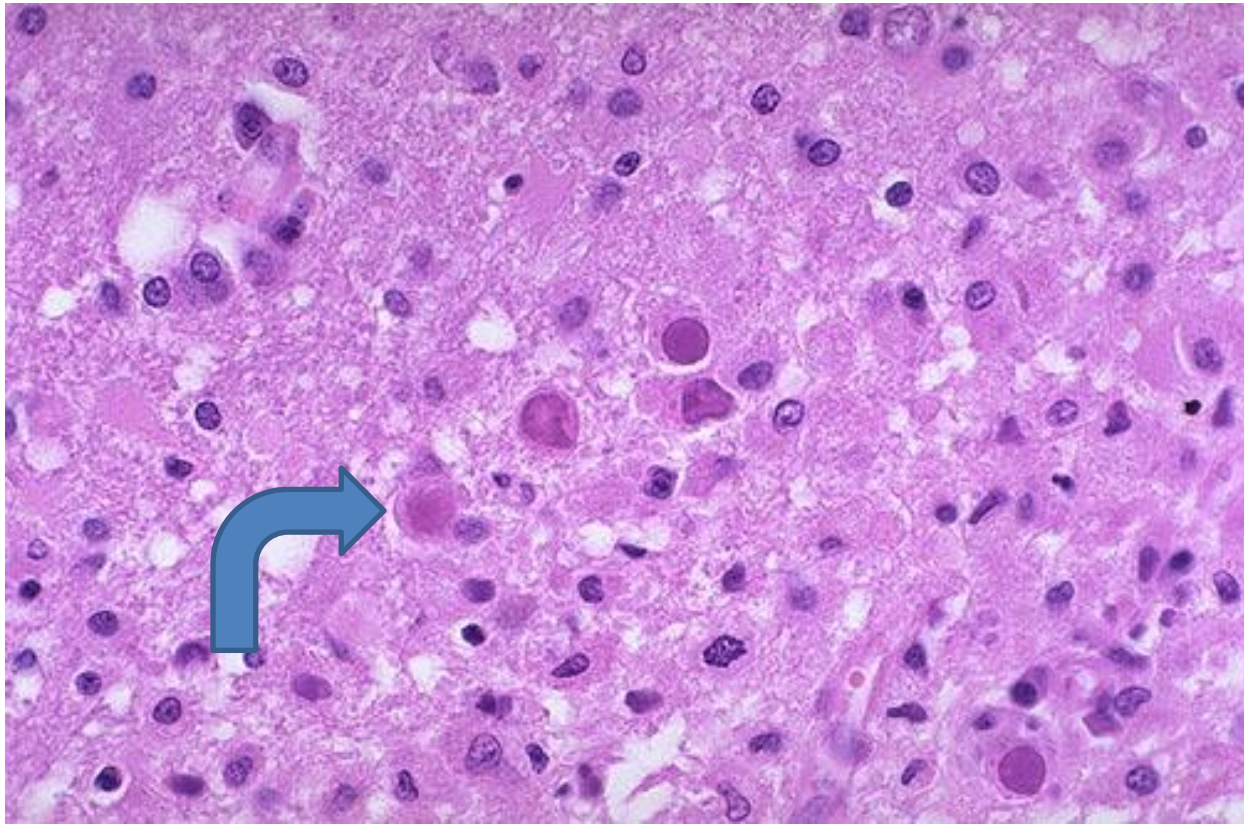
- A. This is a microglial nodule with toxoplasma pseudocysts as a consequence of infection with *Toxoplasma gondii*. Pseudocysts consist of an infected cell forming the cyst wall and containing the developing bradyzoites. This infection occurs in immunocompromised patients, such as in persons with AIDS. Toxoplasmosis of the brain produces small, usually multiple, abscessing lesions.
- B. This cerebral CT scan in axial view demonstrates several ring enhancing lesions with surrounding edema that are typical for toxoplasmosis.



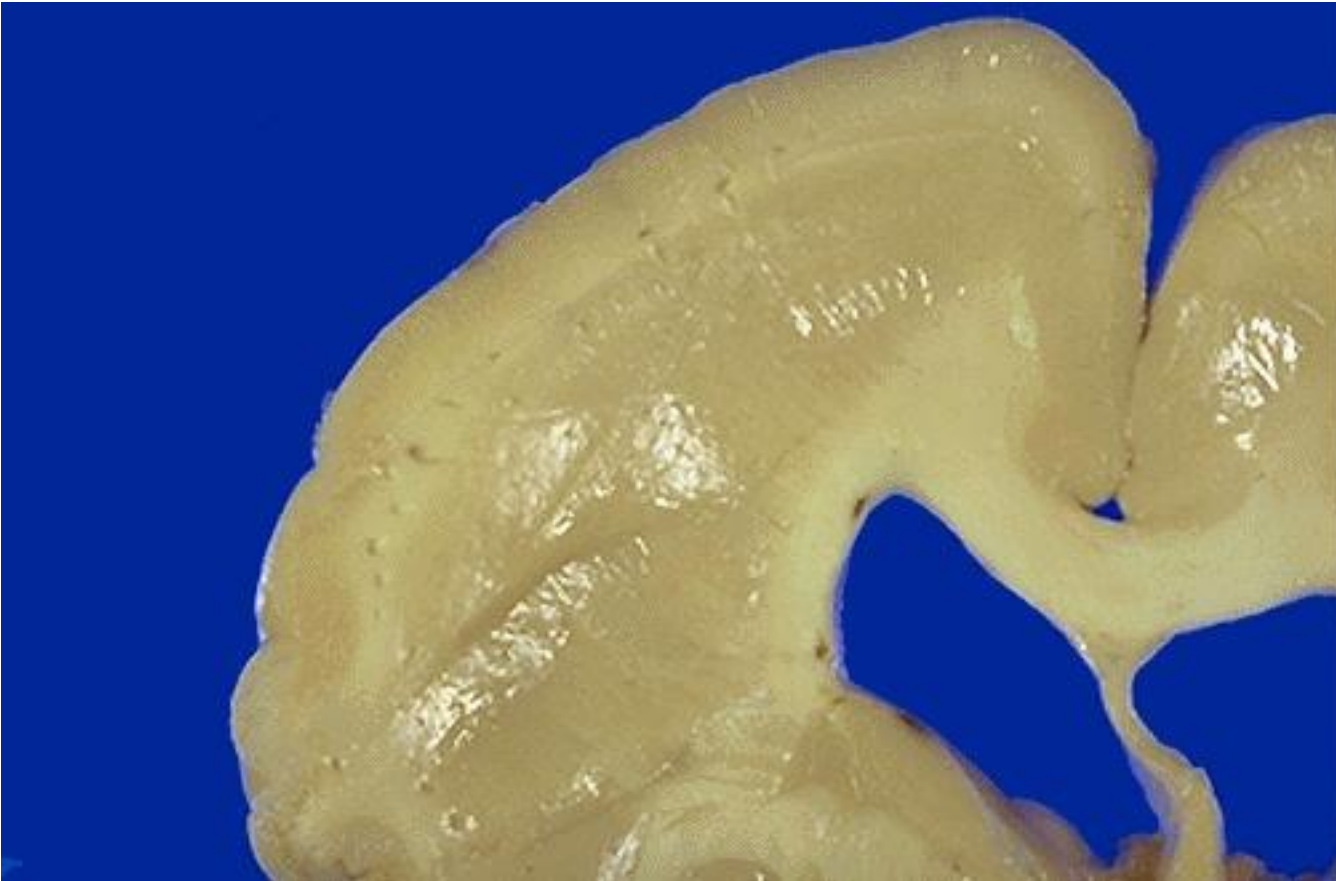
This axial view MRI scan demonstrates tuberculomas in the right hemisphere which have central lucency from caseous necrosis and a brightly enhancing, somewhat irregular border from granulomatous inflammation. There is prominent adjacent edema producing marked effacement of the lateral ventricles on the right.



In the sagittal T1 weighted MRI scan above can be seen an area of pronounced right occipital encephalomalacia that also appears in the T2 weighted FSE MRI scan below in axial view. This patient with AIDS proved to have progressive multifocal leukoencephalopathy (PML), an infection caused by the JC papovavirus in immunocompromised patients.



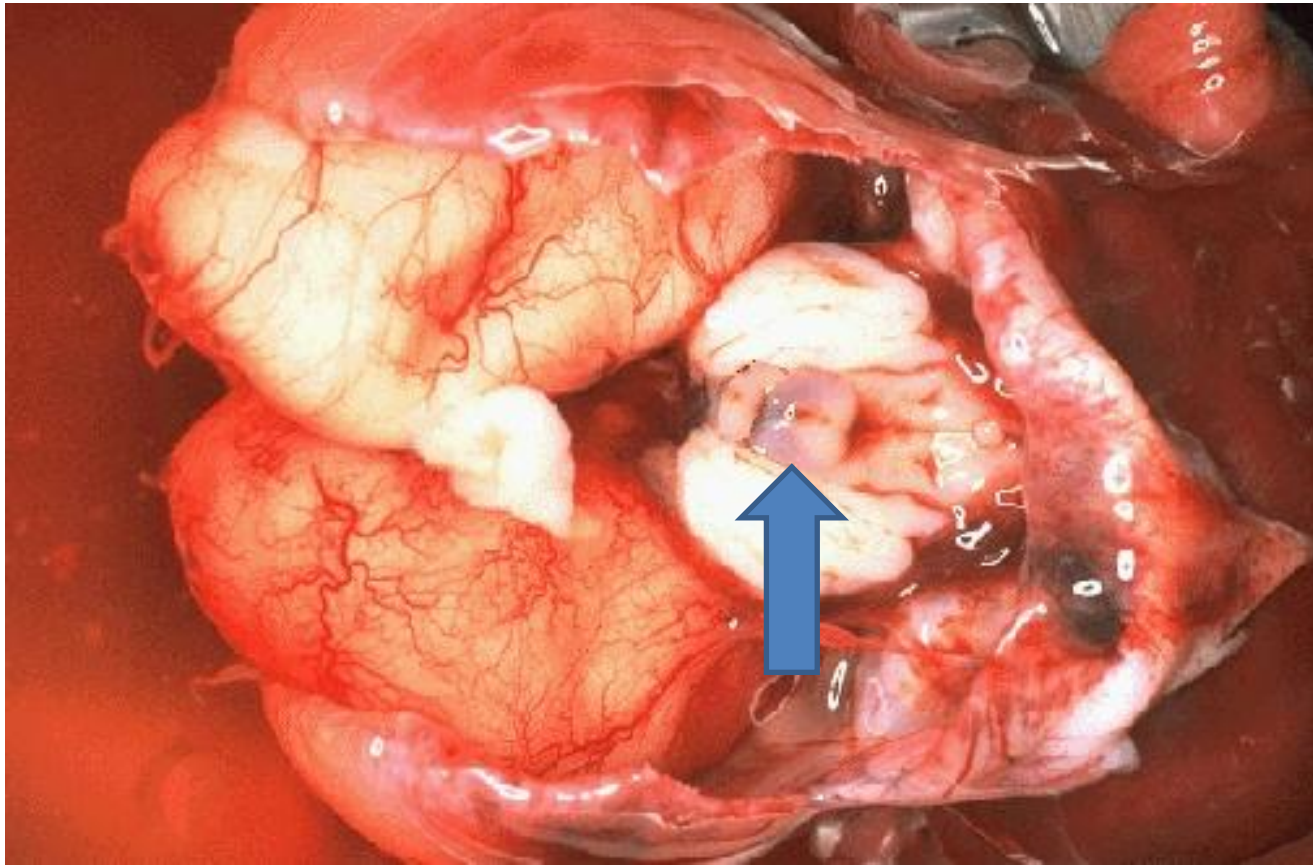
Microscopically, progressive multifocal leukoencephalopathy (PML) lesions appear with perivascular monocytes, astrocytosis with bizarre or enlarged astrocytes (with occasional mitotic figures), and central lipid-laden macrophages. At the periphery of the lesions are large "ballooned" oligodendrocytes infected with JC virus that have enlarged dark pink "ground glass" nuclei containing viral antigen.



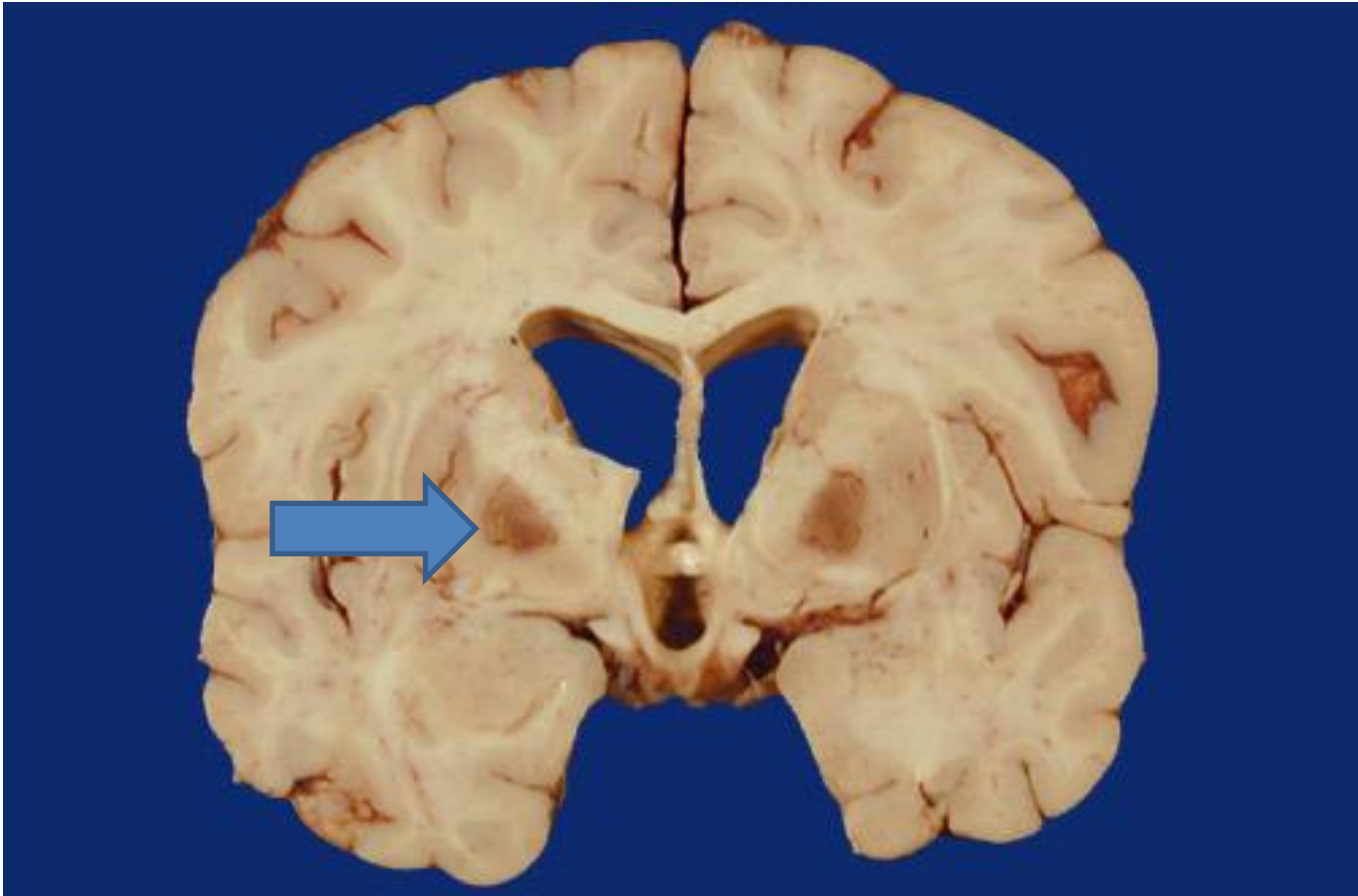
The smooth surface of the brain seen here is called lissencephaly. This would be normal for a fetus under 20 weeks gestation, but abnormal later in development.



An Arnold-Chiari malformation occurs when there is elongation and flattening of the cerebellum and medulla with protrusion down a large conical foramen magnum.



An Dandy-Walker malformation occurs when there is enlargement of the posterior fossa with absent or rudimentary formation of the cerebellum, which is replaced instead by a large midline cystic region representing the expanded fourth ventricle.



The globus pallidus bilaterally exhibits evidence for toxic injury with a red discoloration from hyperemia, edema, and necrosis as a consequence of carbon monoxide poisoning. The poisoning may be chronic, with neurologic symptoms appearing somewhat acutely.



The small petechial hemorrhages in the mammillary bodies seen here are characteristic for Wernicke's disease, another complication of chronic alcoholism with thiamine deficiency.

The end

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