



Case #146

NAME Educational Activities Committee

Case provided by:

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1) An 80-year-old female with a history of unspecified cardiac disease (status post pacemaker placement) and chronic alcohol use was found outdoors deceased, last known alive two days prior. Gross photos of the brain are demonstrated.

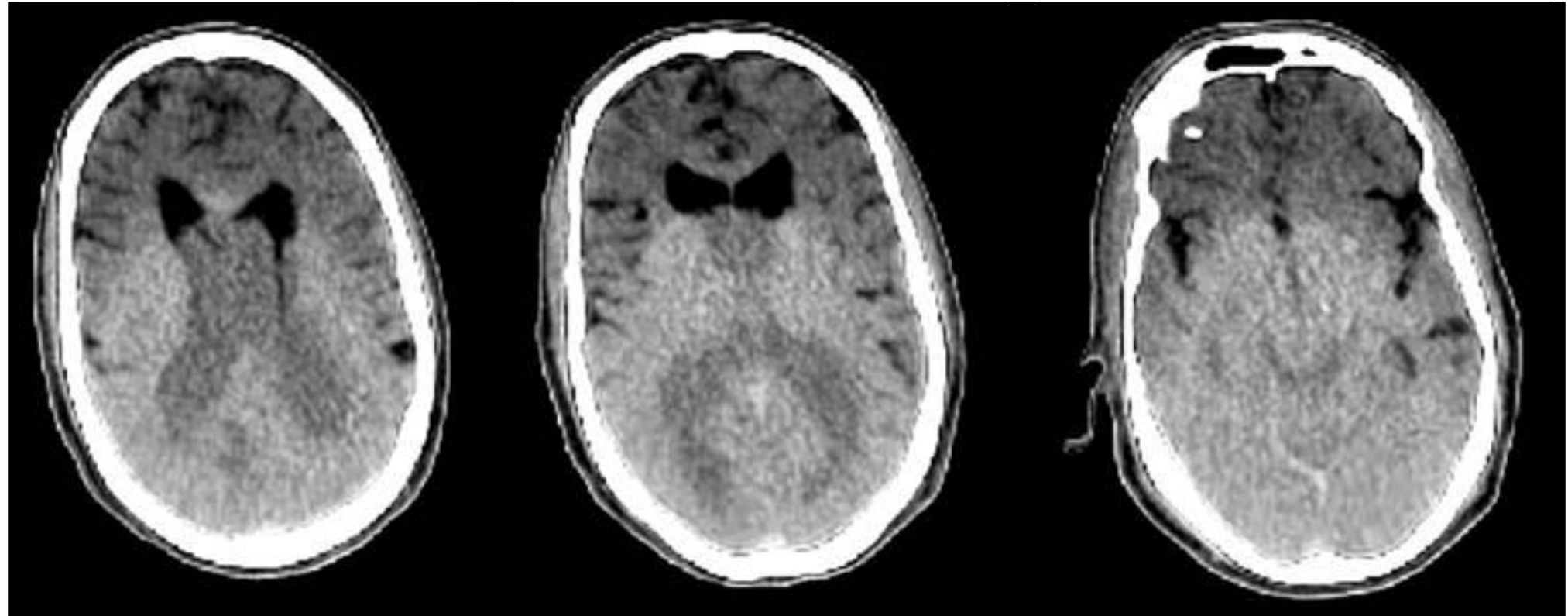
2) A 70-year-old male with a history of bilateral hand arthritis was discovered unresponsive outside his residence during a wellness check. Postmortem CT images of the brain are provided.

Assuming the brain findings in both cases represent the same radiology-pathology correlates, which of the following pieces of information would best explain the findings?

- A. Personality changes and/or memory loss
- B. Environmental conditions of the scenes
- C. Toxicology and/or prescription medication history
- D. History of malignancy

80-year-old female





70-year-old male

Answer...

B. Scene conditions

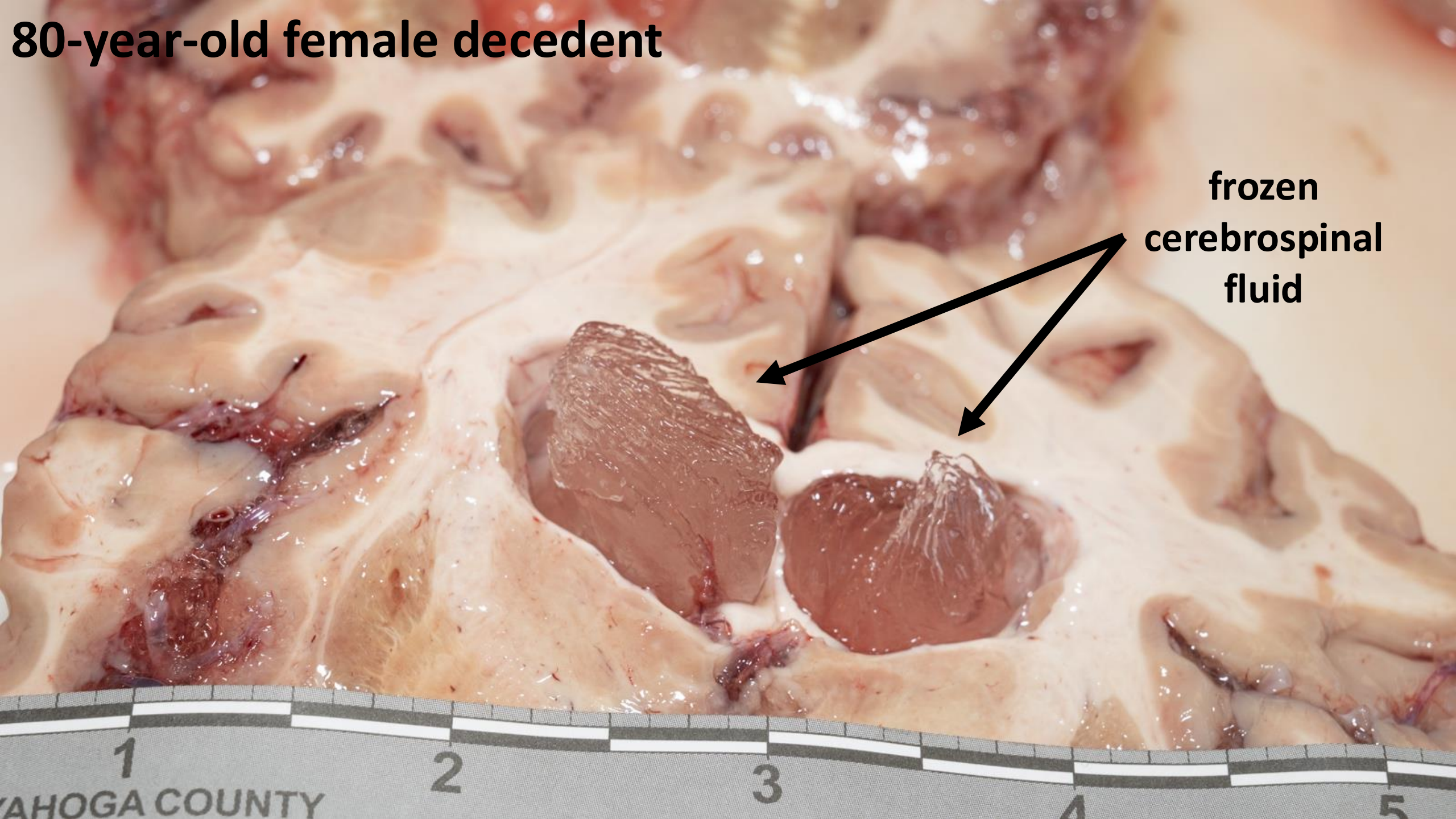
Freezing of a decedent's body—which can occur due to exposure to the elements or due to methods used for preservation—can cause visible changes on PMCT. Although research, including case reports, are limited, imaging of frozen bodies has revealed reduction in the density of watery fluid (e.g., cerebrospinal fluid, urine) and markedly reduced density of the frozen brain parenchyma. Geographic regions of thawing or thawed brain tissue demonstrate comparatively higher CT attenuation in a non-anatomic distribution.

In both presented cases, the decedents were found outside of their residences during the winter months and were exposed to freezing temperatures.

The close-up gross photo of the brain better reveals the frozen cerebrospinal fluid within the lateral ventricles.

80-year-old female decedent

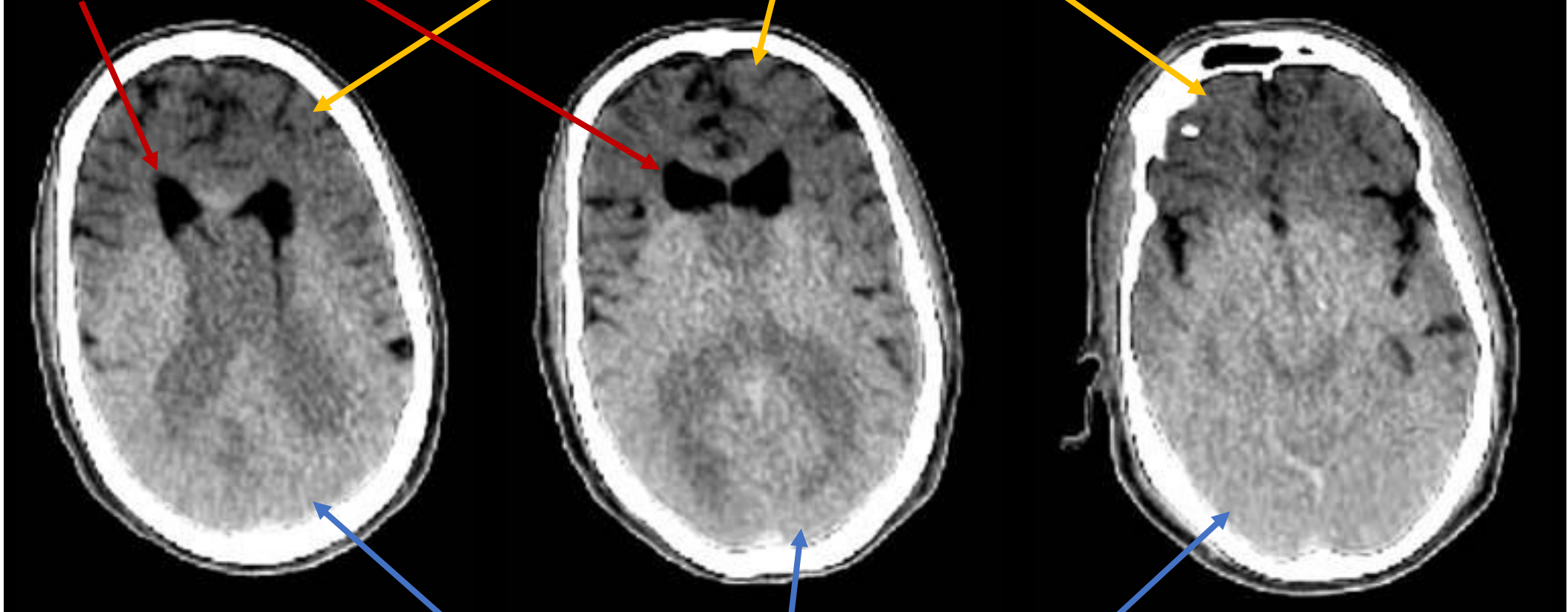
**frozen
cerebrospinal
fluid**



70-year-old male decedent

frozen cerebrospinal fluid
lowest density (darkest)

frozen brain tissue
low density (dark)



thawing brain tissue
and cerebrospinal fluid
higher density (brighter)

Other responses...

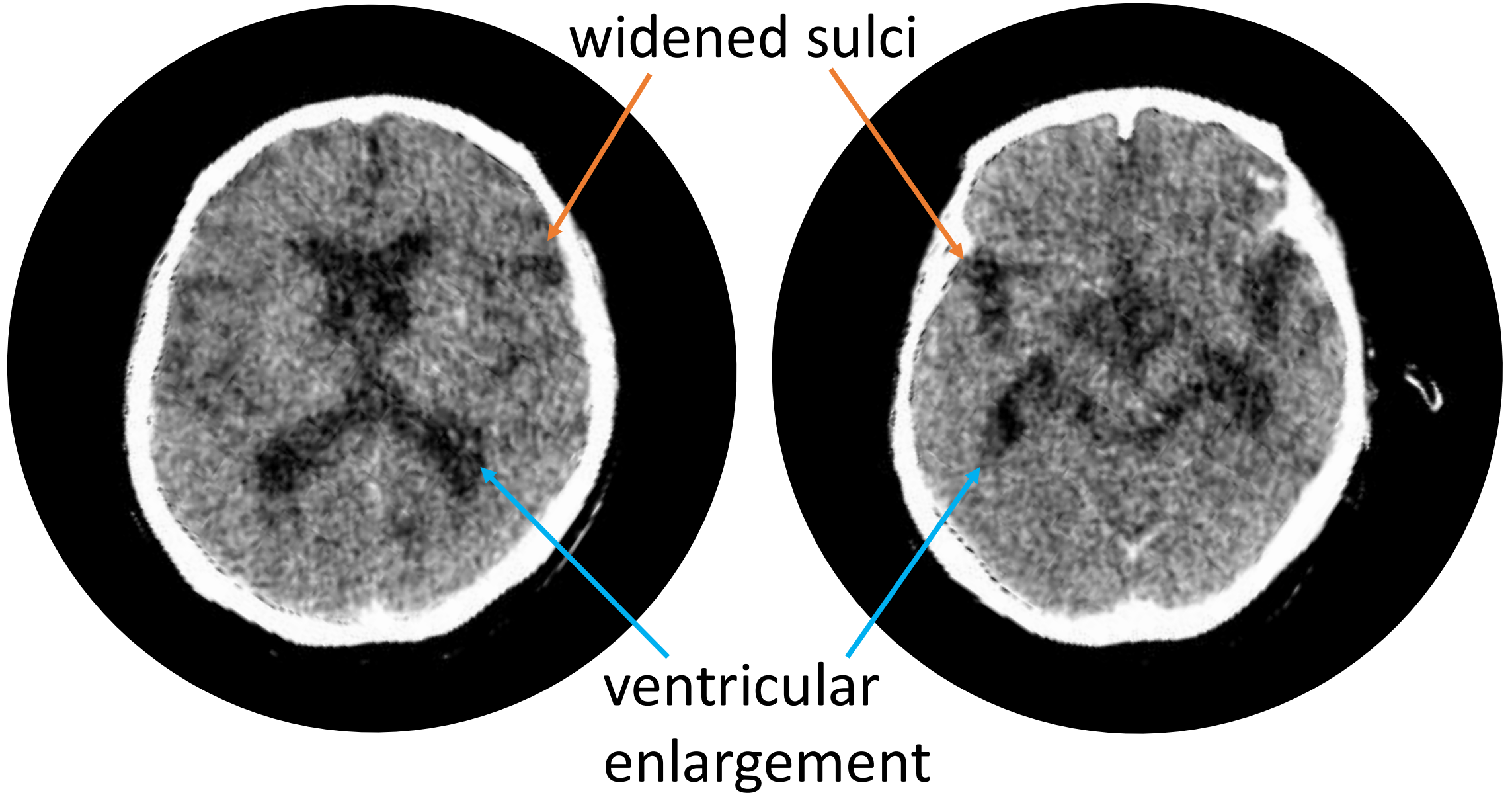
A. Personality changes and/or memory loss

Given the decedents' ages, dementia is an important consideration.

On PMCT, dementia is associated with parenchymal atrophy, which may be diffuse or limited to a particular anatomic distribution depending on the type of dementia. Attenuation changes in both the cerebral parenchyma and cerebrospinal fluid in a non-anatomic distribution, however, is not a feature. Particularly, there is no associated change in the gross appearance of the cerebrospinal fluid.

While vascular dementia, specifically, is associated with areas of encephalomalacia and gliosis, which appear as focal areas or larger anatomic regions of cerebral hypoattenuation/parenchymal destruction on PMCT, this also is not associated with a change in the attenuation of cerebrospinal fluid.

80-year-old female decedent with advanced dementia and diffuse parenchymal atrophy





FOR COMPARISON:

**28-year-old decedent with
normal parenchymal volume**

- narrow ventricles
- thin, barely perceptible sulci
in the setting of postmortem
cerebral edema

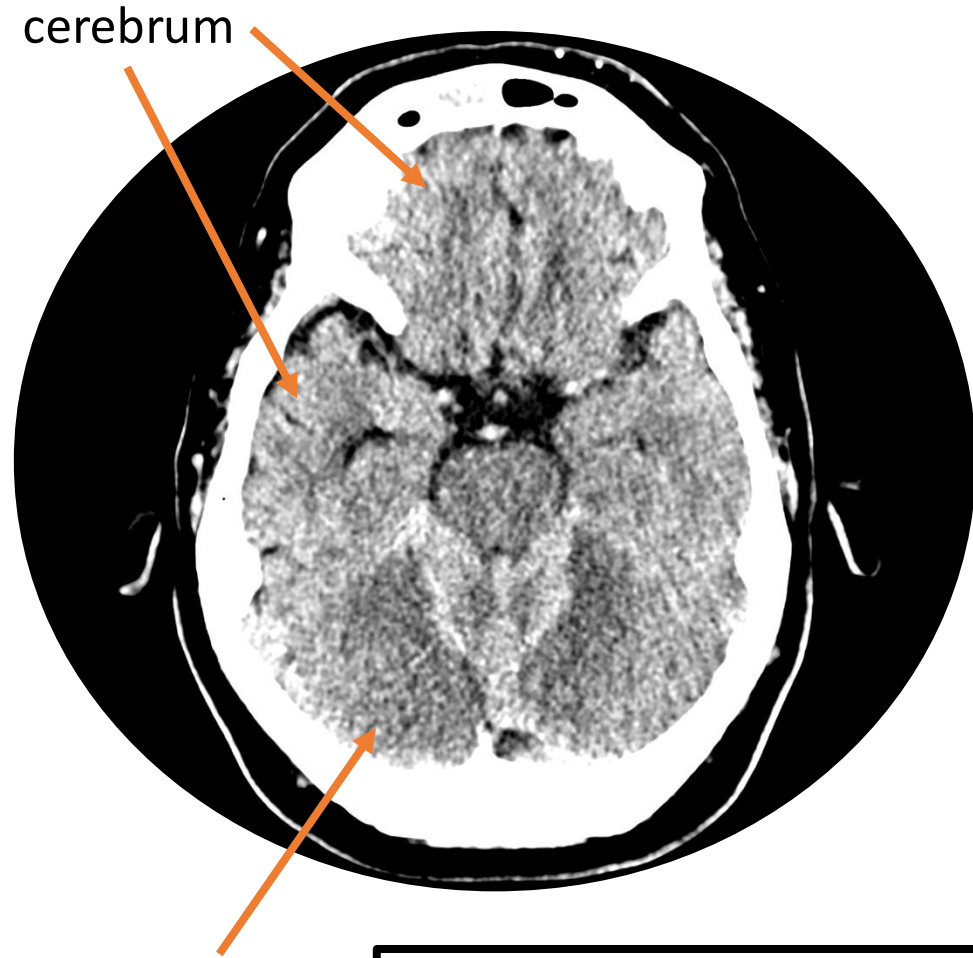
C. Toxicology and/or prescription medication history

Long-term alcohol abuse is associated with brain parenchymal atrophy, but not with variable attenuation changes in a non-anatomic distribution on PMCT.

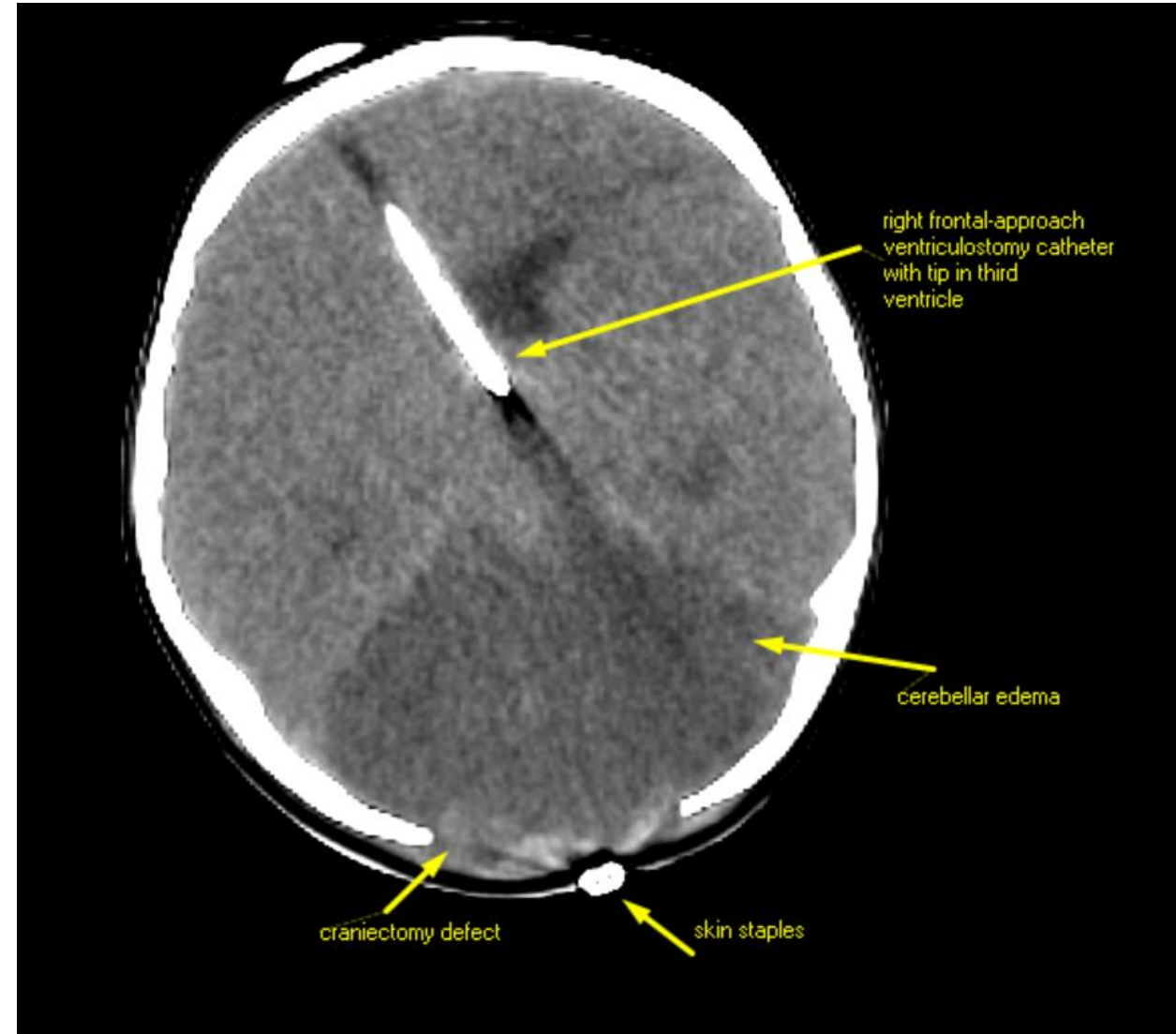
Overdose of certain drugs/medications may be associated with cerebral or cerebellar edema, which presents with brain parenchymal swelling and effacement of the ventricles and sulci on PMCT, but not with geographic attenuation changes in a non-anatomic distribution.

Neither are associated with a grossly solidified appearance of the cerebrospinal fluid.

65-year-old male patient (living) urine tox positive for fentanyl



hypodense (dark) appearance of cerebellum compared to the cerebrum indicates the presence of cerebellar edema

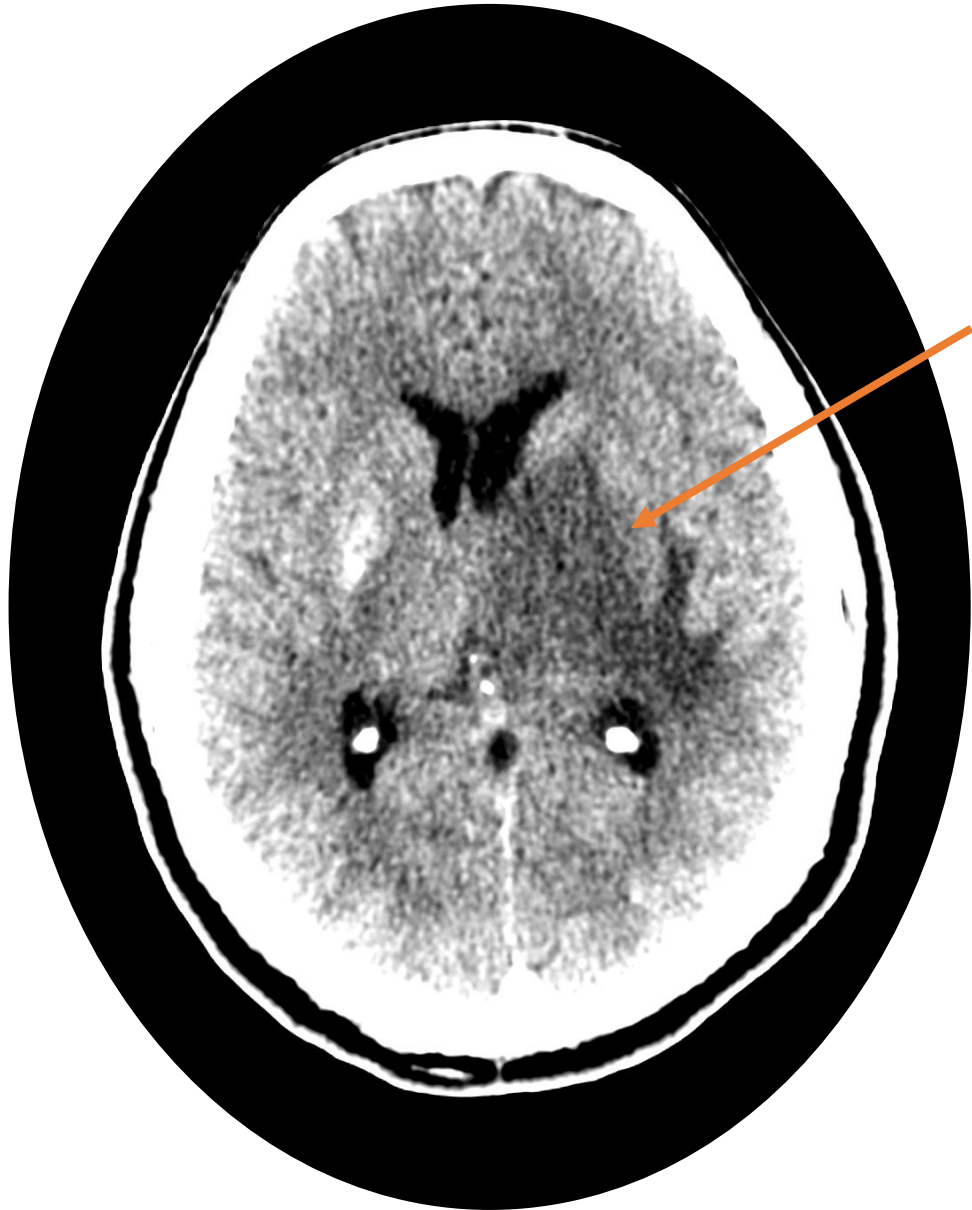


4-year-old male decedent exposed to fentanyl

D. History of malignancy

Appearance of brain cancer depends heavily on the cancer type; glioblastoma, for example, is known to cross midline, and a tumor such as a colloid cyst may rupture into the ventricular system, but geographic brain parenchymal and cerebrospinal fluid changes in a non-anatomic distribution are not consistent with a neoplastic process.

33-year-old male patient (living) with glial neoplasm



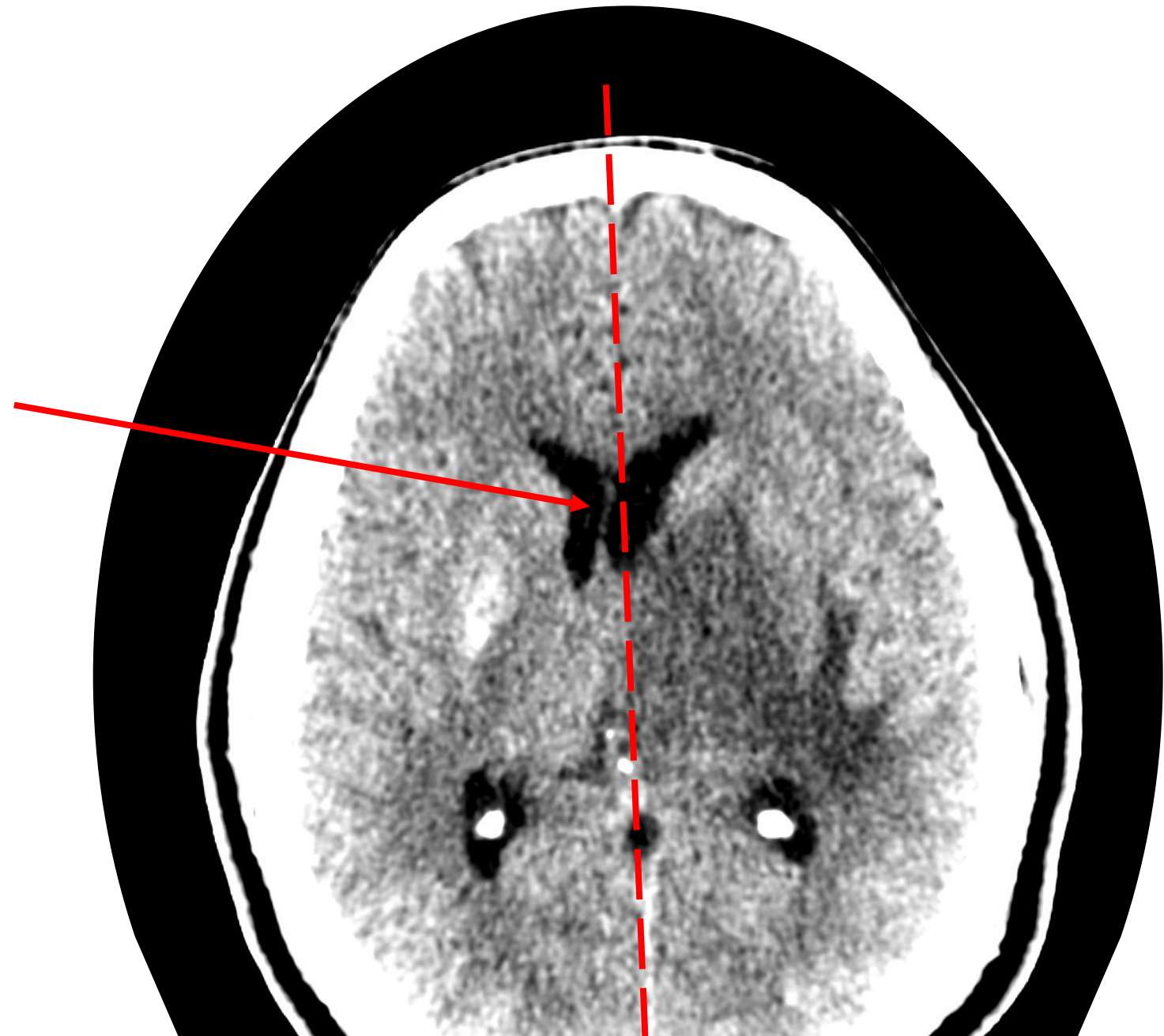
ill-defined mass
with associated
edema which
invades/expands
the parenchyma
and displaces the
ventricles



*note the gray-
white matter
differentiation
seen in living
patients (like this
one) is lost on
PMCT

33-year-old male patient (living) with glial neoplasm

mass effect from the tumor and associated edema results in midline shift (in this case, from left to right)



REFERENCES

REFERENCES

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