30-year-old female with fever and seizures

Jignesh Modi, MD

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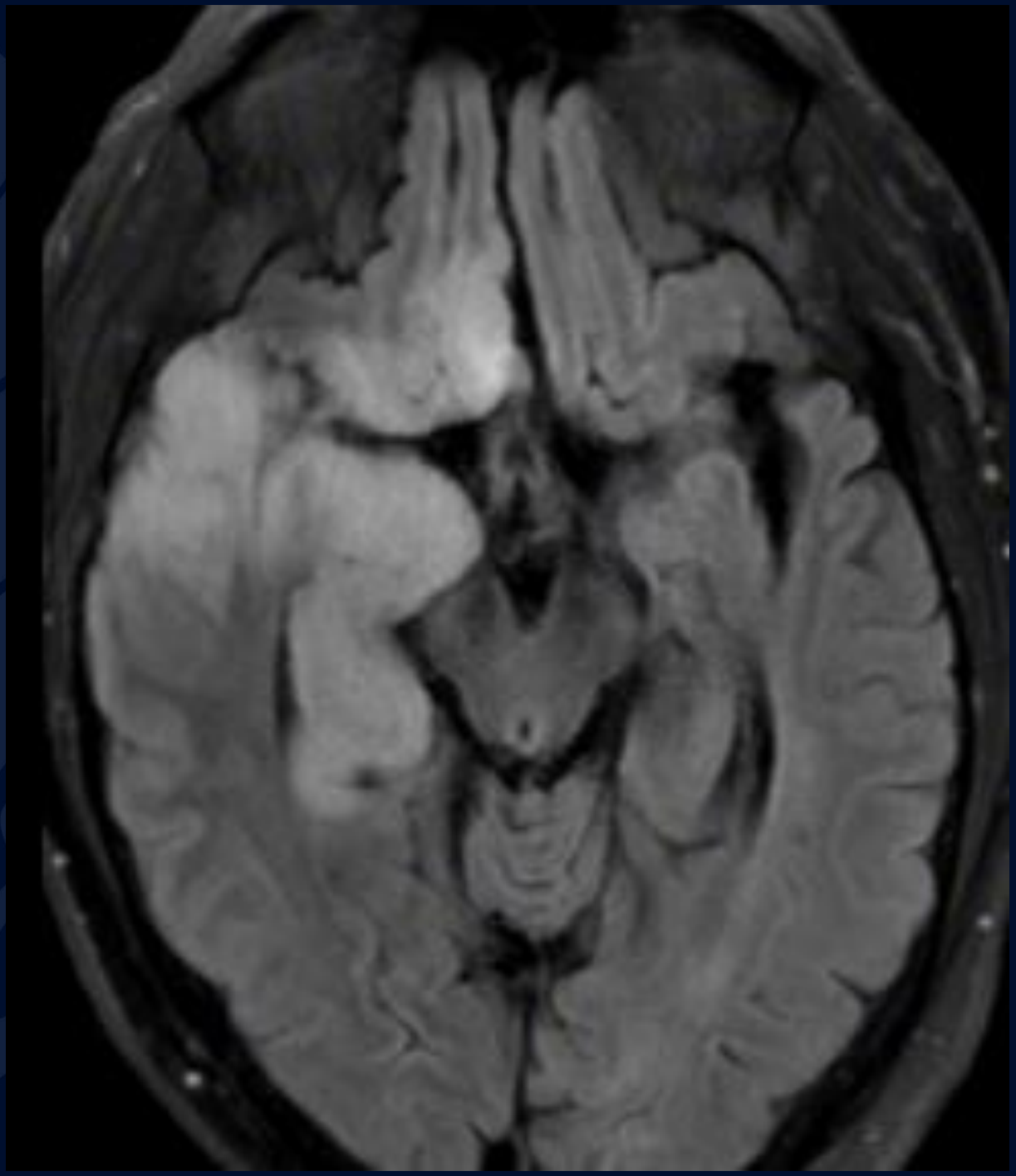

Axial Flair

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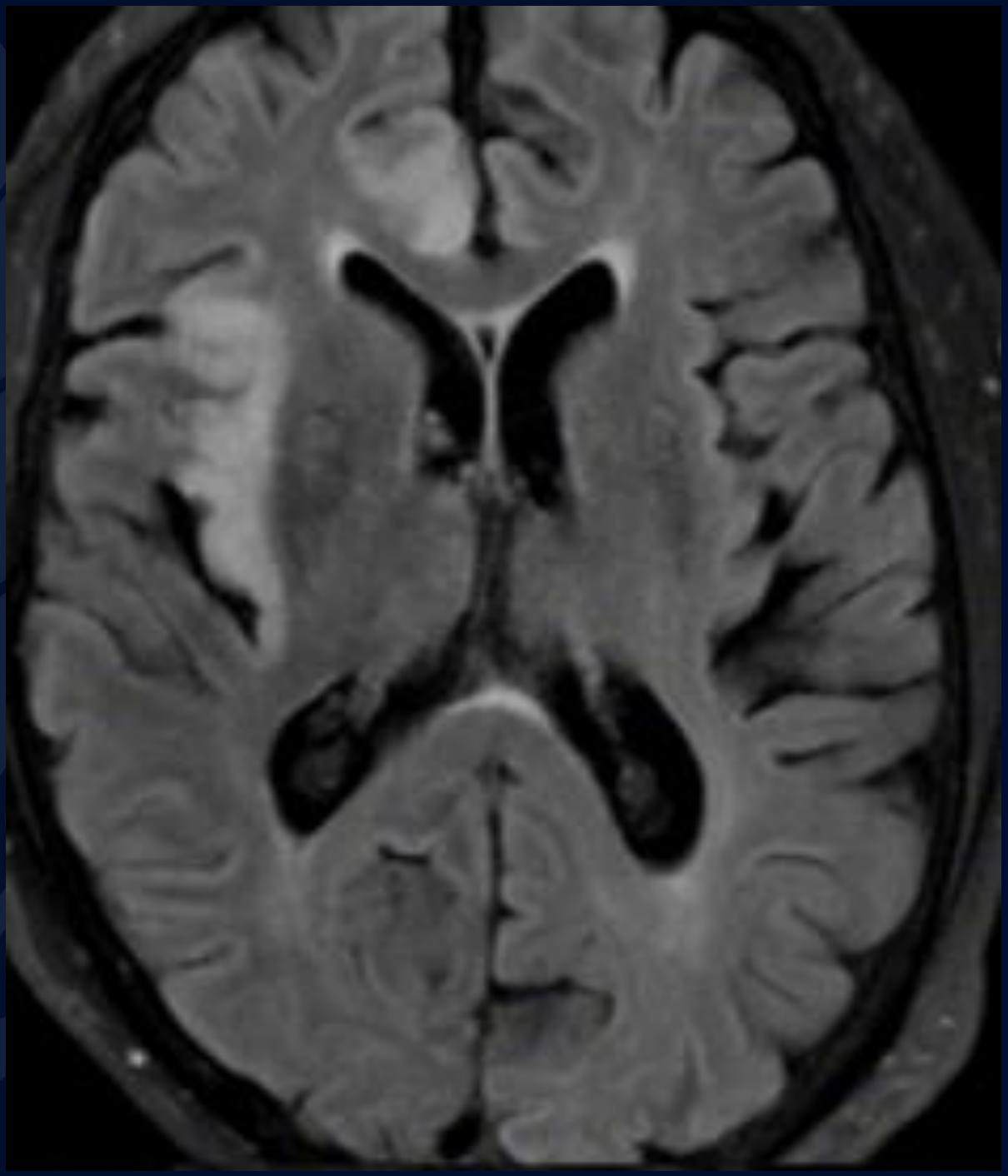

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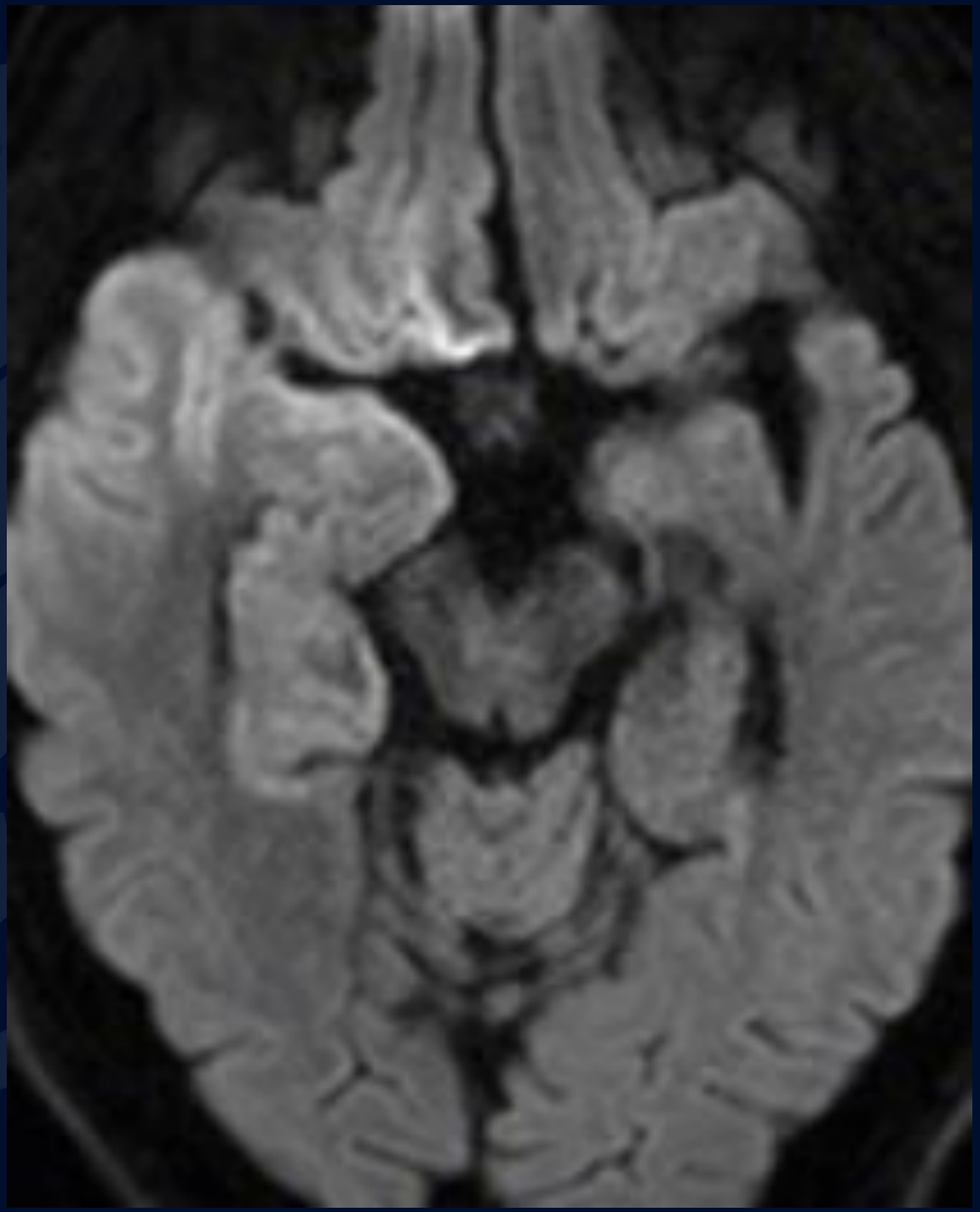

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Herpes Encephalitis

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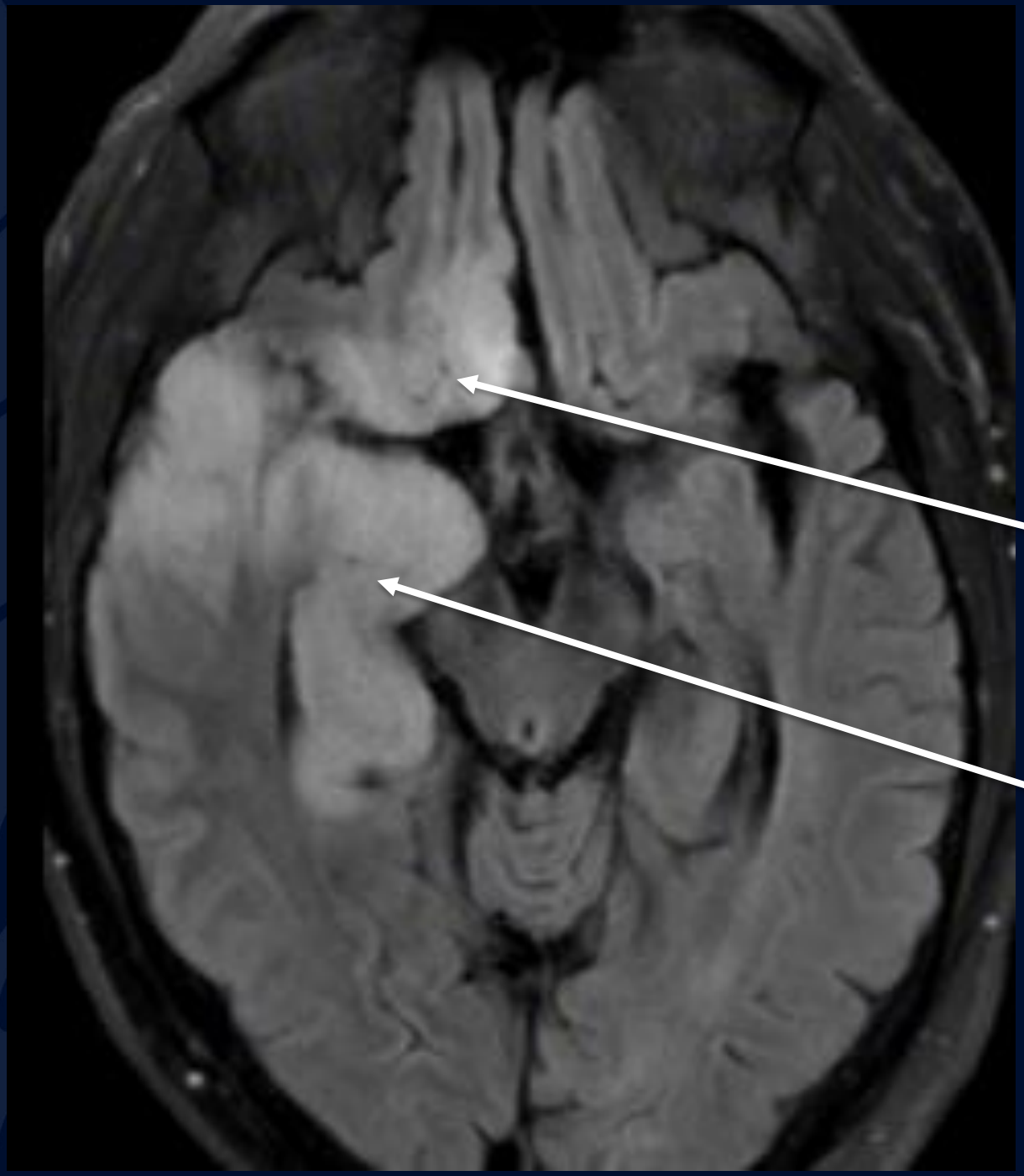

Axial Flair

Inferior frontal lobe involvement

Anterior and medial temporal lobe involvement

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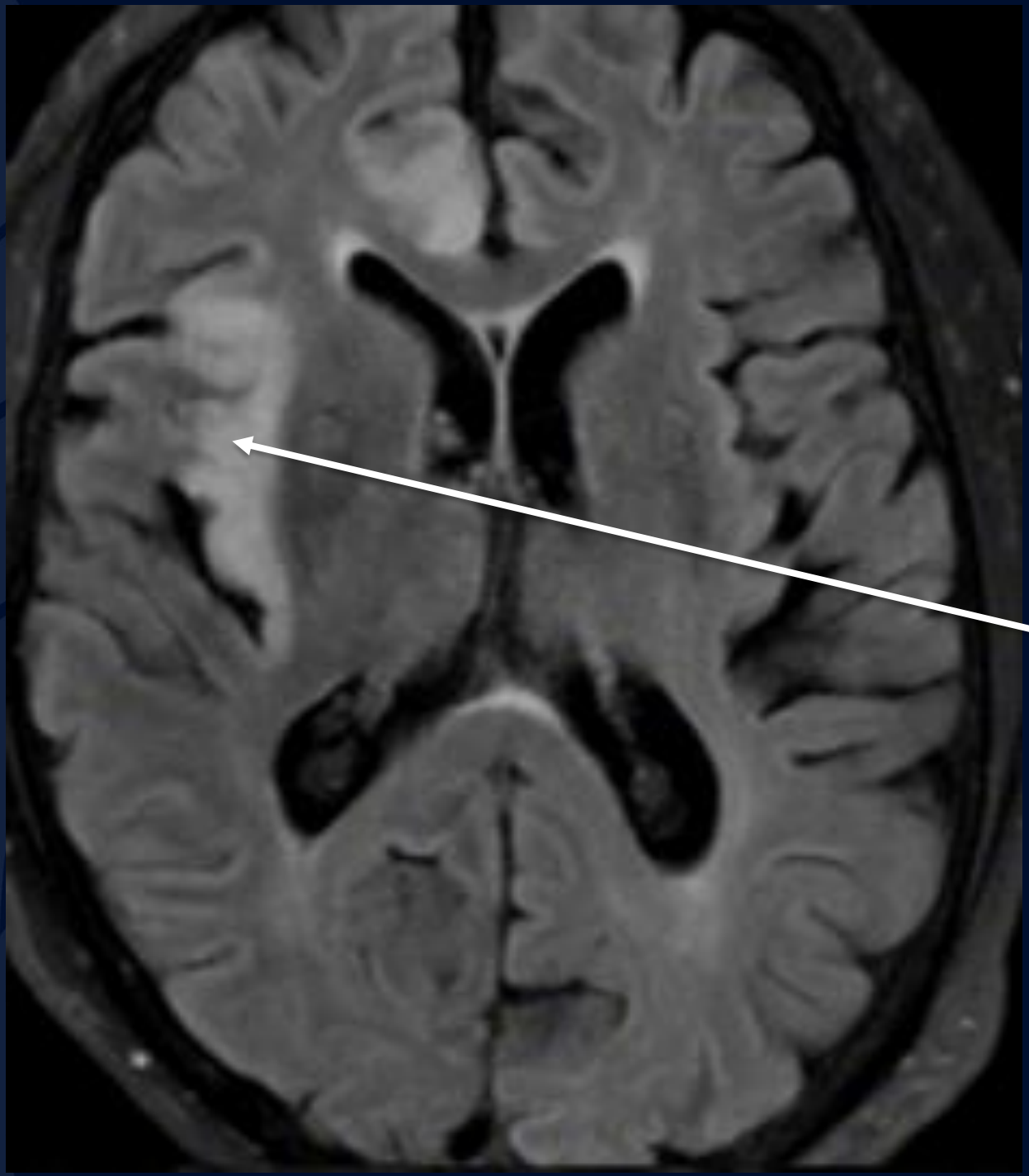

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Insular cortex involvement

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Herpes Simplex Virus

- Most common cause of sporadic viral encephalitis with nonspecific clinical findings of fever, headaches, and focal neurological deficits.
- 90% due to HSV-1, 10% due to HSV-2.
- Initially there is often unilateral involvement of the limbic system, medial temporal lobe, insular cortex, and inferolateral frontal lobe. May progress to asymmetric involvement bilaterally.
  - Basal ganglia are typically spared, helping to distinguish from a middle cerebral artery infarct.
- Extra limbic involvement is more prevalent in children. Most commonly involve the parietal lobe with sparing of basal ganglia. Affected areas eventually result in marked cystic encephalomalacia and volume loss.

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Anatomy

- Complex system that consists of the limbic lobe, cortical areas and subcortical nuclei that have connections to the limbic lobe.
- Key structures of the limbic system include the hippocampus, parahippocampus, cingulate gyrus, basolateral nuclei of amygdala, septal nuclei, nucleus accumbens hypothalamus (mammillary bodies), anterior nucleus of thalamus.
- The limbic system also involves connections with the midbrain and olfactory system.

Imaging Features

CT

- CT findings may be absent or subtle early in the disease process. When present, findings consist of subtle low density within the anterior and medial parts of the temporal lobe and island of Reil (insular cortex).
- Later in the disease process, CT findings often become more apparent and may progress to hemorrhage.
- Contrast enhancement is uncommon during the first week. After that, patchy low-level enhancement may be seen.

Imaging Features

MRI

- **T1** hypointensity due to edema. If complicated by subacute hemorrhage, there may be areas of hyperintense signal.
- **T1 C+ (Gd)** enhancement is usually absent early in the disease.
  - Enhancement occurs later and is variable in pattern, gyral enhancement is most common.
- **T2** hyperintensity of affected white matter and cortex.
  - More established hemorrhagic components may be hypointense.
- **GRE/SWI**: may demonstrate blooming if hemorrhagic (rare in neonates, common in older patients).

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Treatment & Prognosis

- IV antivirals (ie. acyclovir)
- If appropriate, antiepileptics and agents to reduce intracranial pressure.
- Mortality dramatically depending on how early treatment is instituted. In a previously healthy young patient with herpes encephalitis presenting with lethargy, mortality is 25%.
- Older patients or those who are comatose at the time treatment is initiated invariably have a much poorer outcome.
- Overall mortality is over 70% with only 2.5% of affected patients ever fully recovering.

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