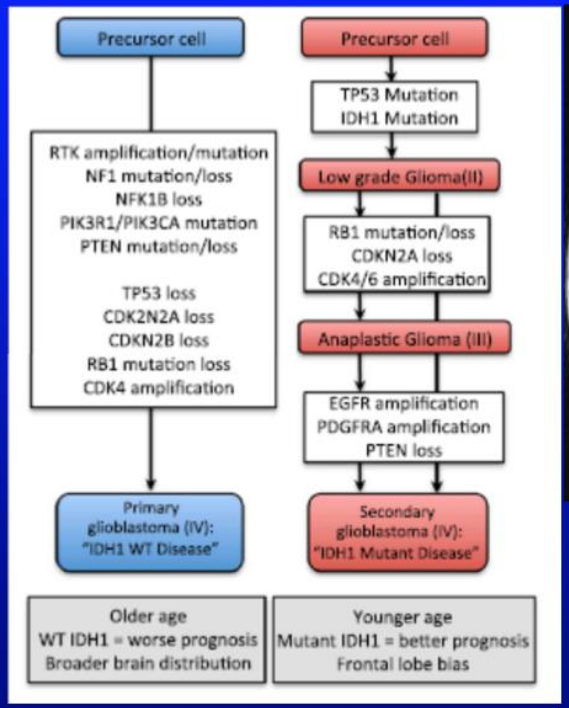
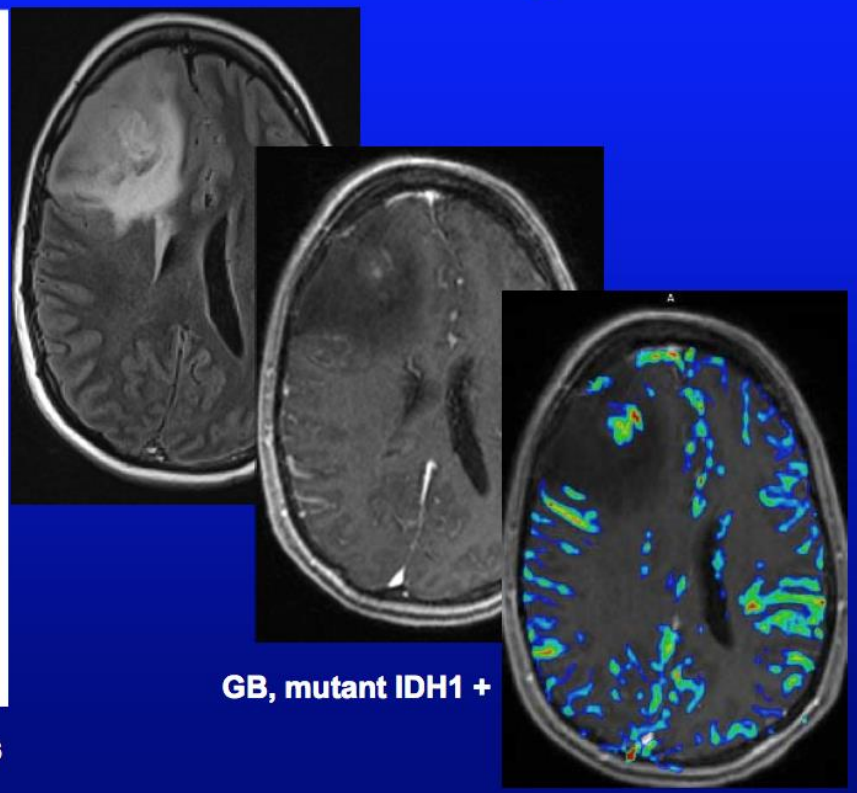
Glioblastoma

- Rapidly enlarging malignant astrocytic tumor characterized by necrosis and neovascularity
- Most common of all primary intracranial neoplasms
- Supratentorial white matter most common location
- Cerebral hemispheres > brainstem > cerebellum
- Viable tumor extends far beyond signal changes
- WHO grade IV

GBM

Genetic Alterations and Gliomagenesis





GB, mutant IDH1 +

Dunn et al, Genes & Development 2012; 26: 756

GBM (4 types)

- Proneural
  - IDH 1 – not as aggressive
  - Large and ugly, with less enhancement.
- Neural
- Classical
- Mesenchymal
  - Necrosis and enhancement, with little surrounding abnormal T2 signal

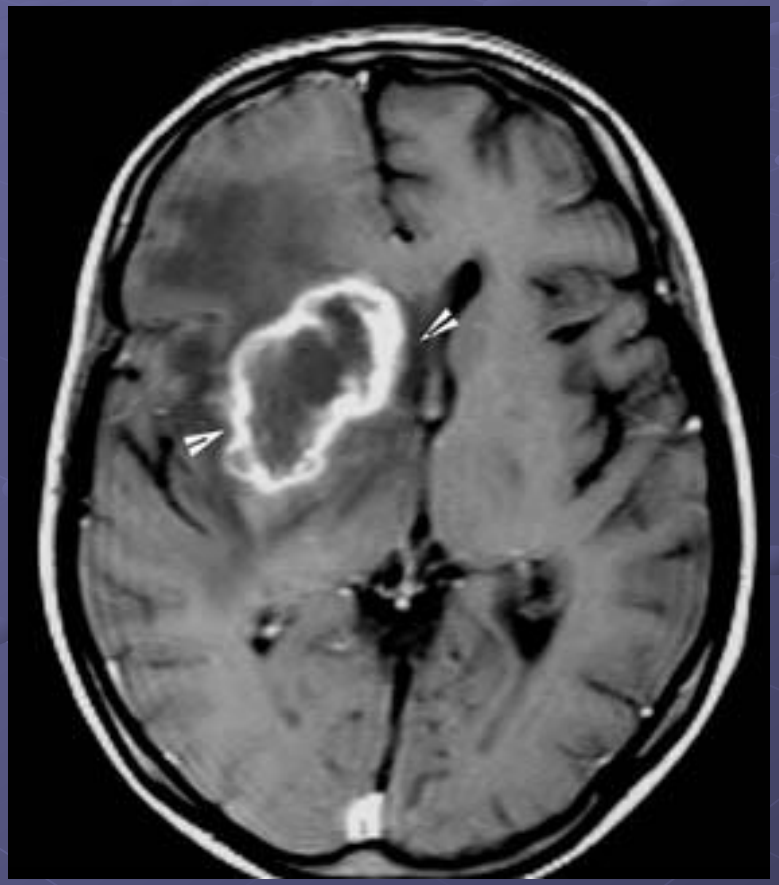
Clinical issues

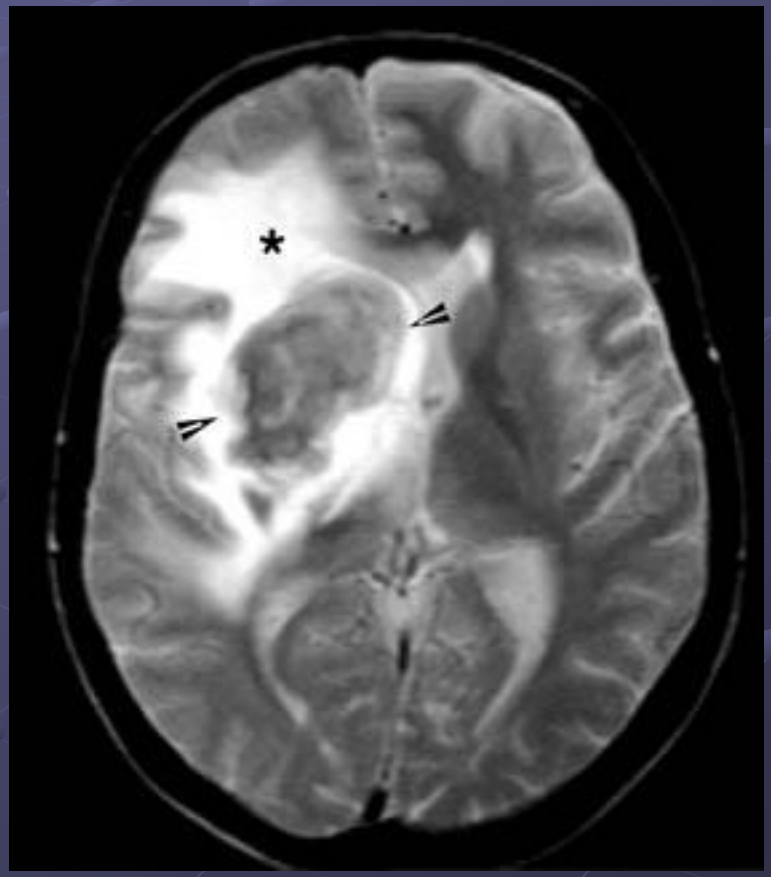
- Symptoms vary with location: Seizures, focal neurologic deficits common
- Peak: 45-75 years, but may occur at any age
- Represents 12-15% of all intracranial neoplasms
- 60-75% of astrocytomas
- Relentless progression, survival often < 1 year
- **Stupp protocol** standard of care for the treatment
  - Radiotherapy
  - concomitant chemotherapy with temodar (temozolomide), an alkylating agent.
- Methylation (and thus deactivation) of MGMT is an important predictor of favorable response to temozolomide.

Imaging

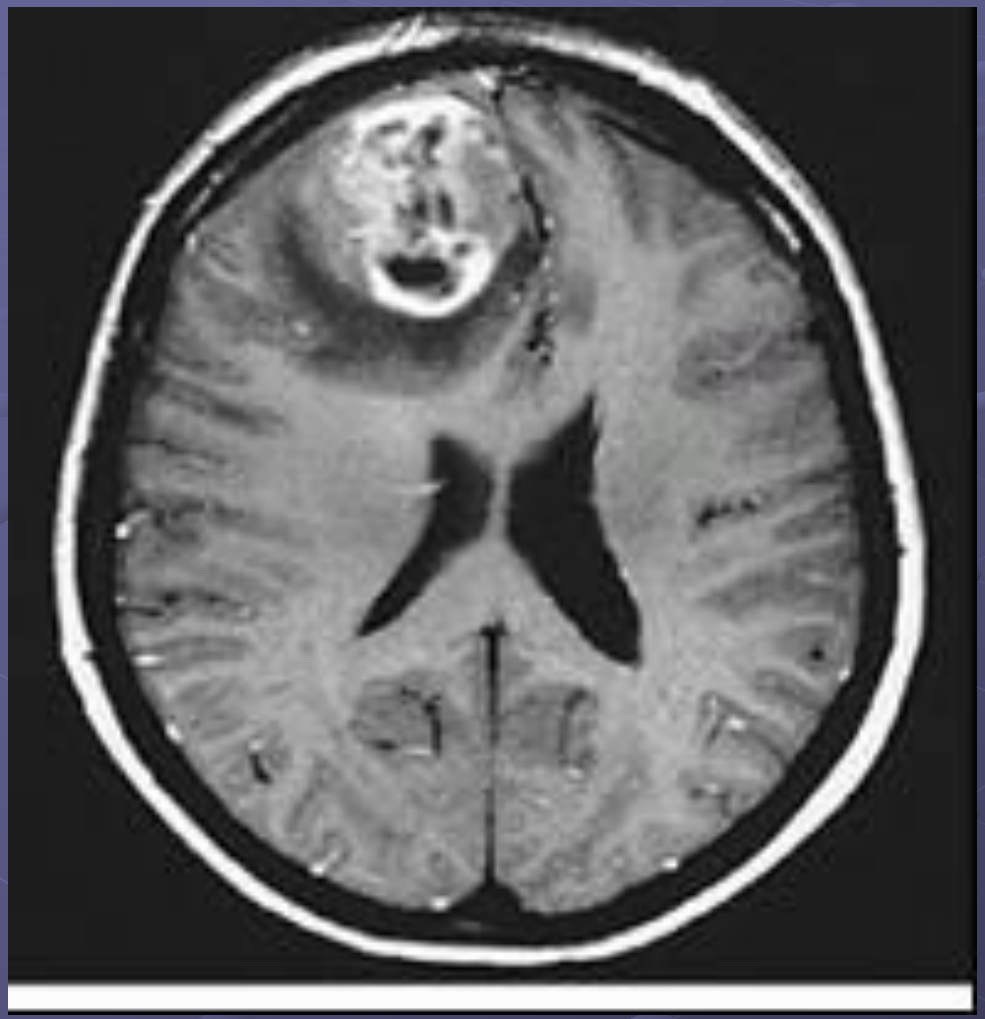
- Hemorrhage not uncommon
- Ca++ rare
- Variable diffusion restriction in solid portions of tumor

Glioblastoma multiforme





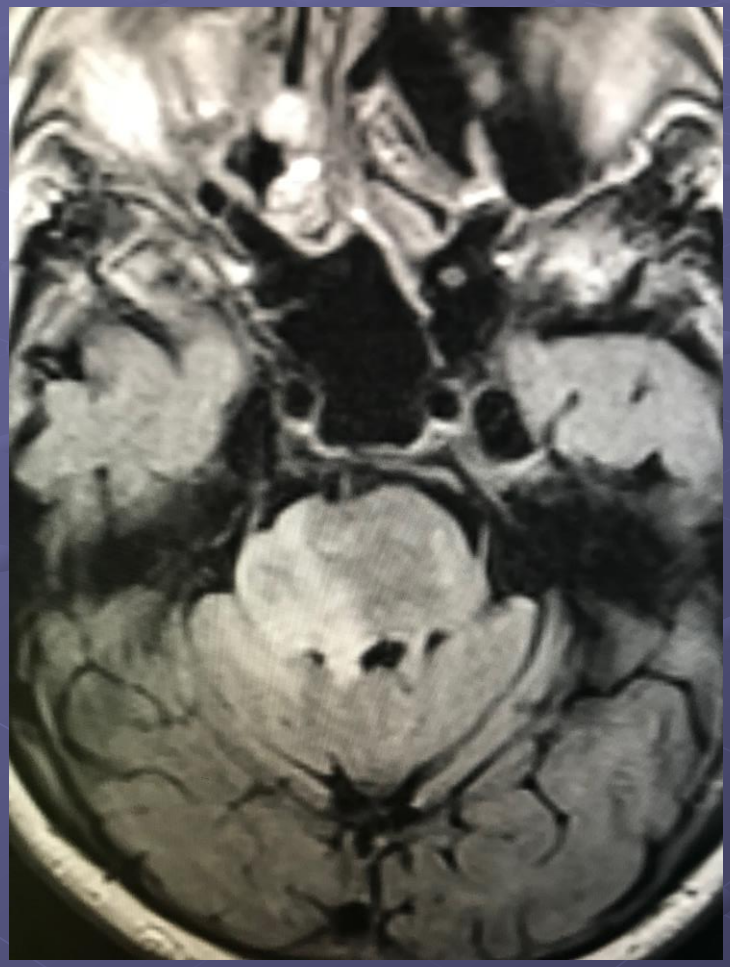
Glioblastoma multiforme

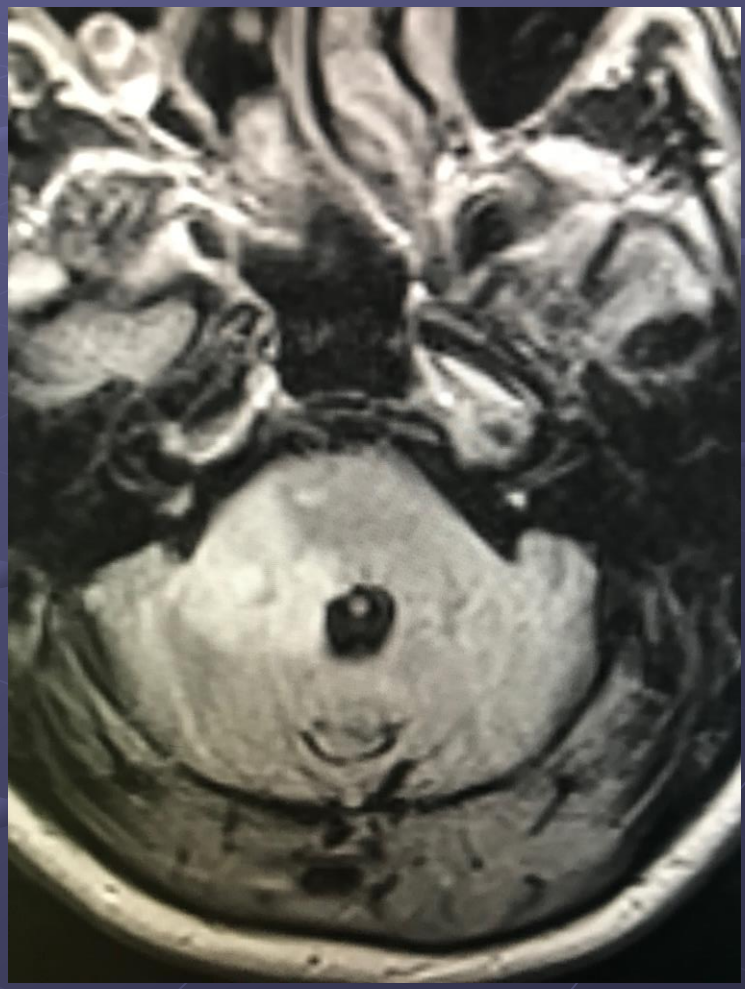


DDX: Ring enhancing lesion

1. **Single Metastasis**
2. **Gliobalstoma multiform**
3. **Abscess (toxoplasmosis,fungal ,cystercericosis, baceria)**
4. **Dymylinating disease.**
5. **Lymphoma.**
6. **Radiation Necrosis.**

Case 2





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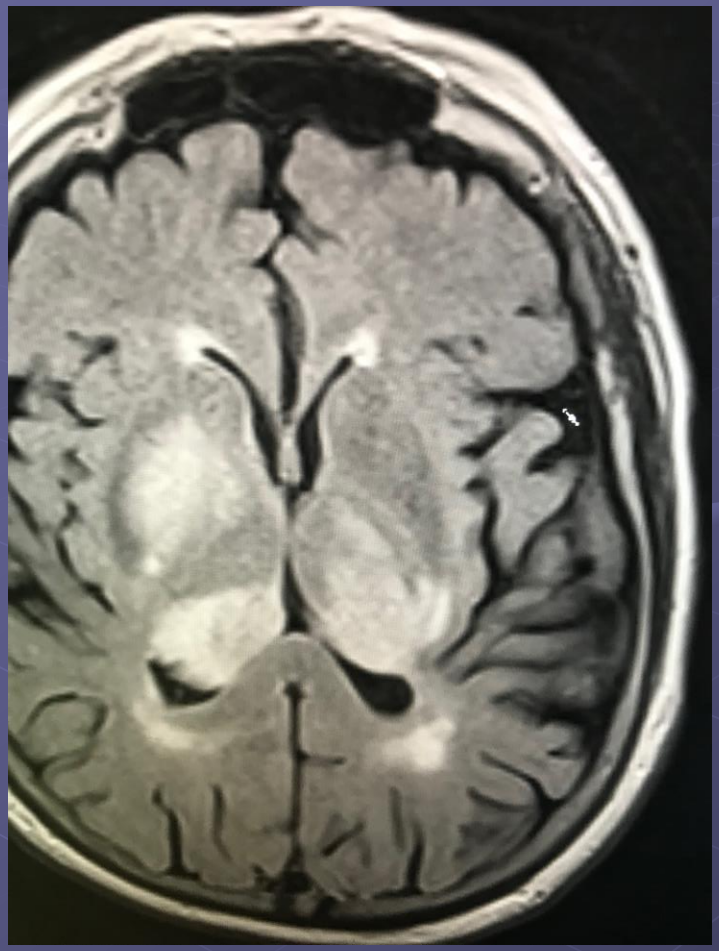

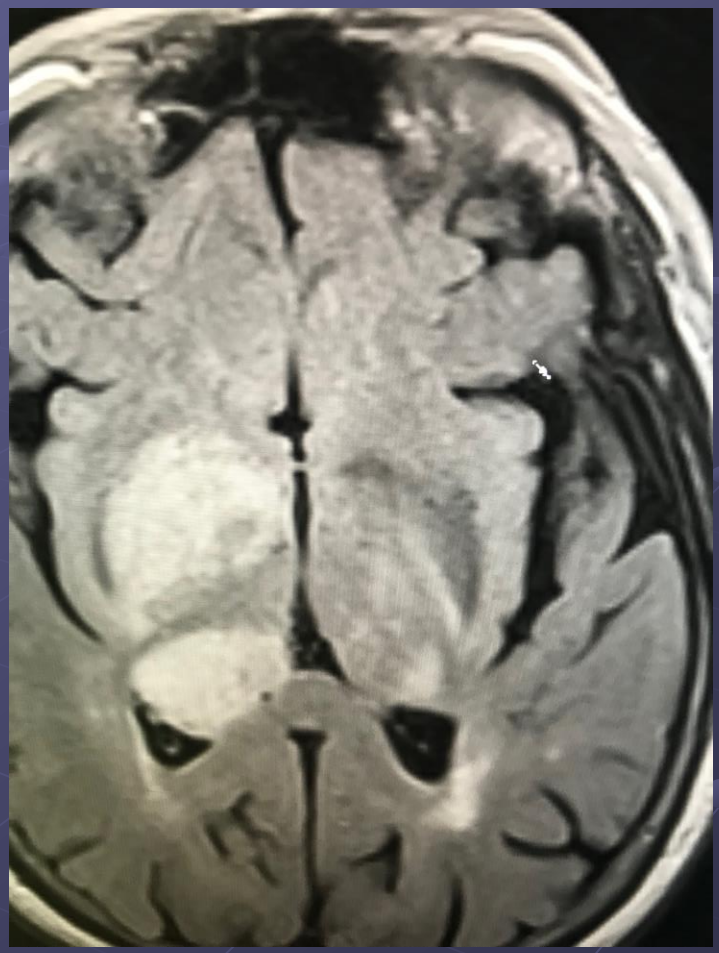

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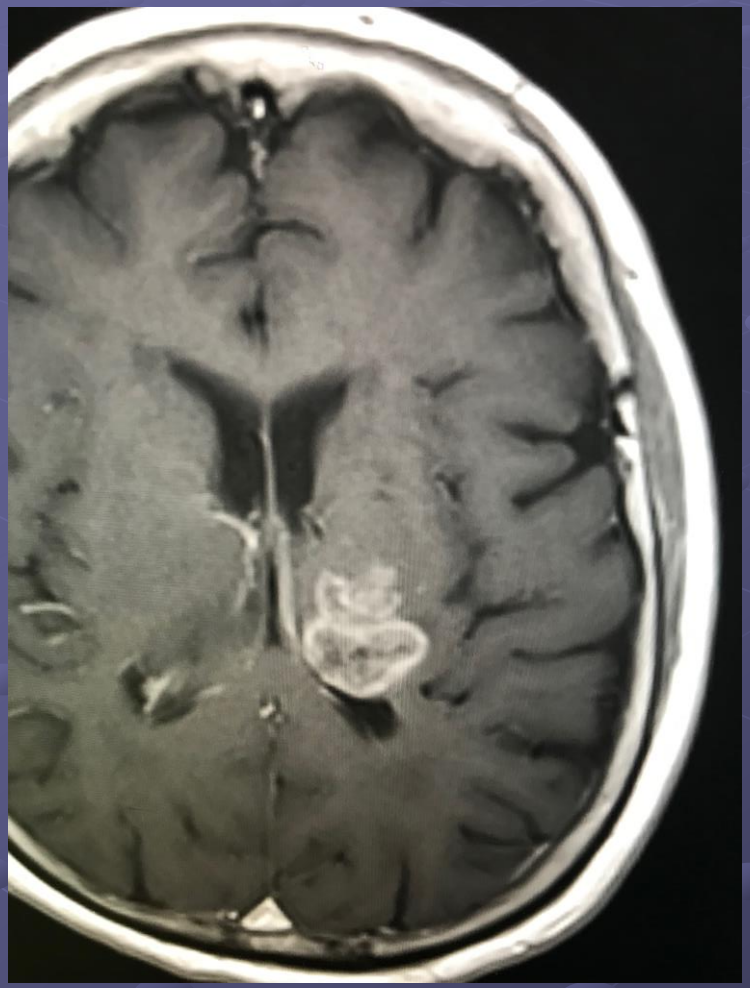

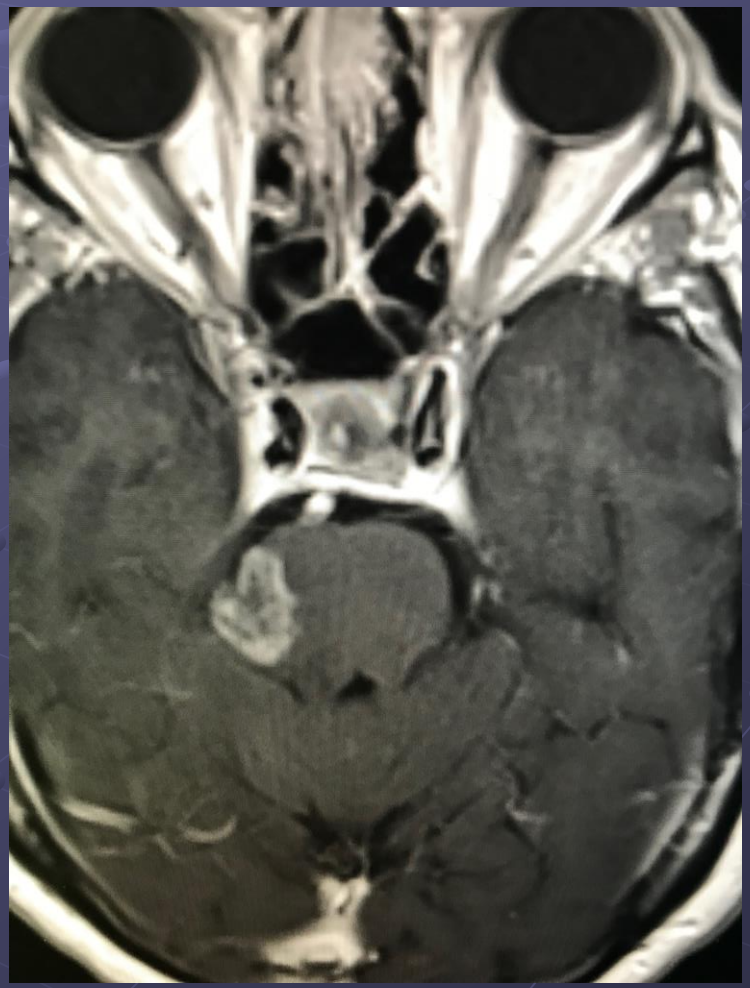

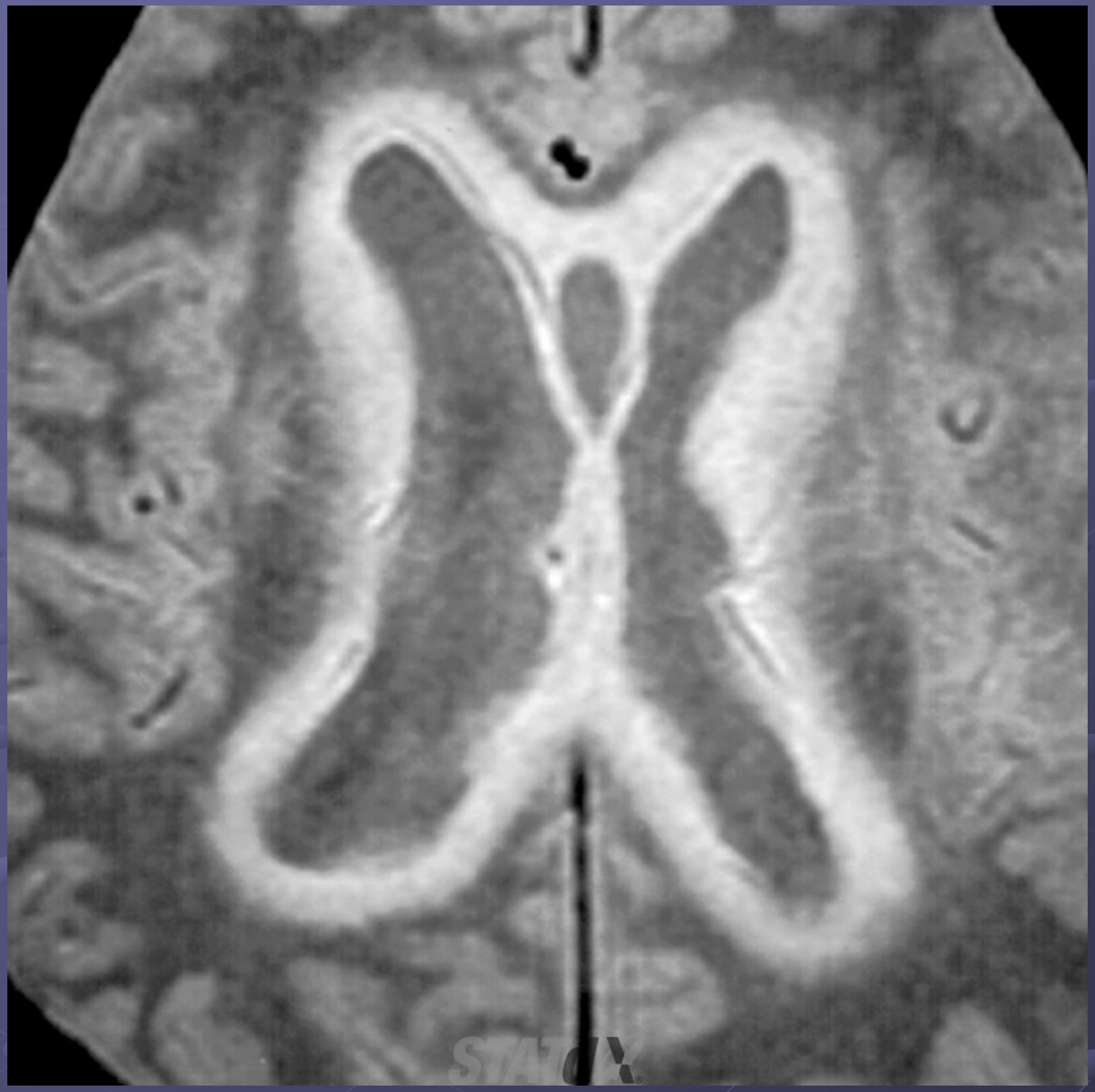

Axial PD/intermediate MR in another case shows hyperintense periventricular signal, representing diffuse ependymal spread of GBM. (Courtesy I. Tarwal, MD.)