59-year-old female presents with new daily persistent headaches

Jignesh Modi, MD

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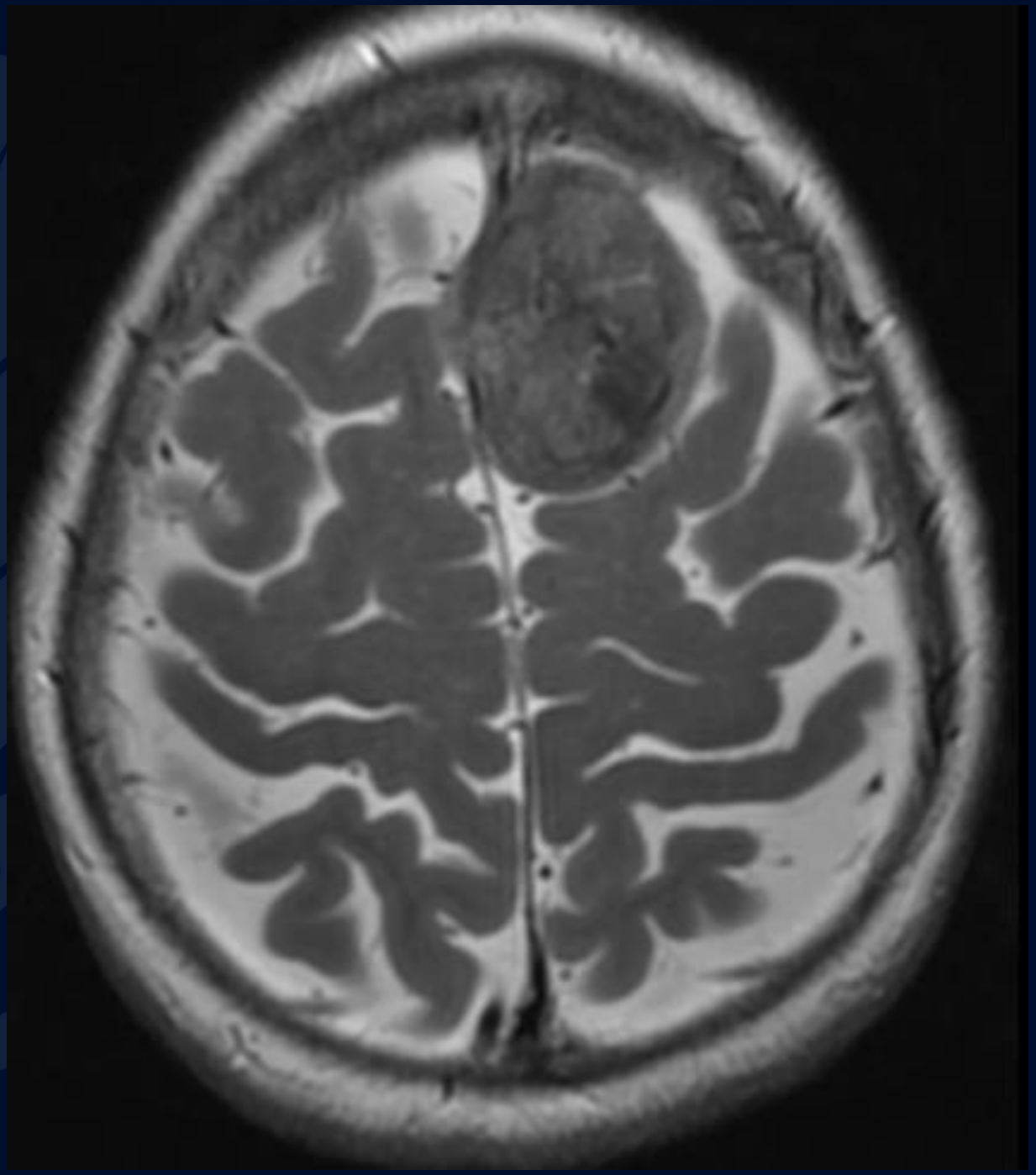

Axial T2

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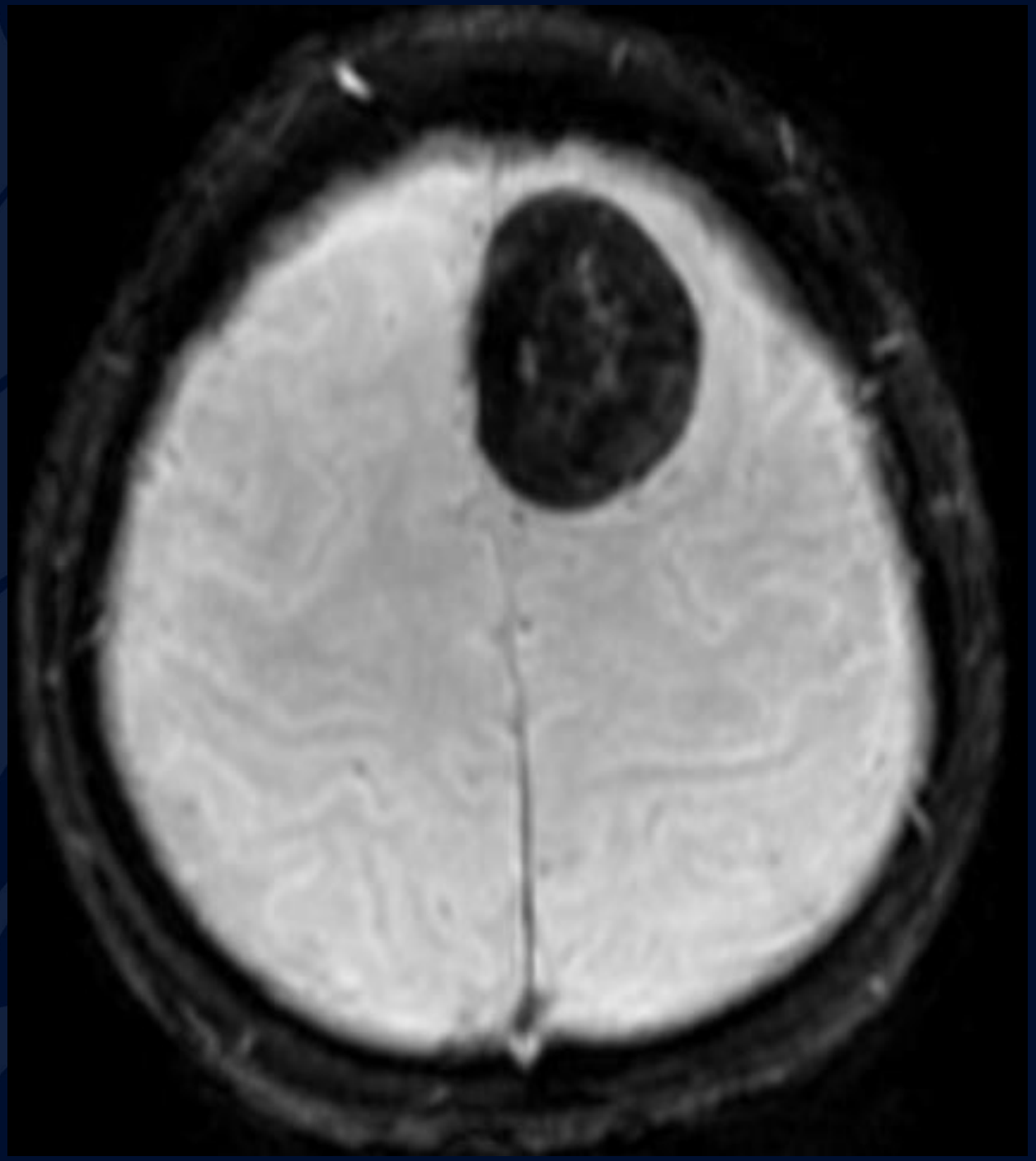

Axial Gradient Echo

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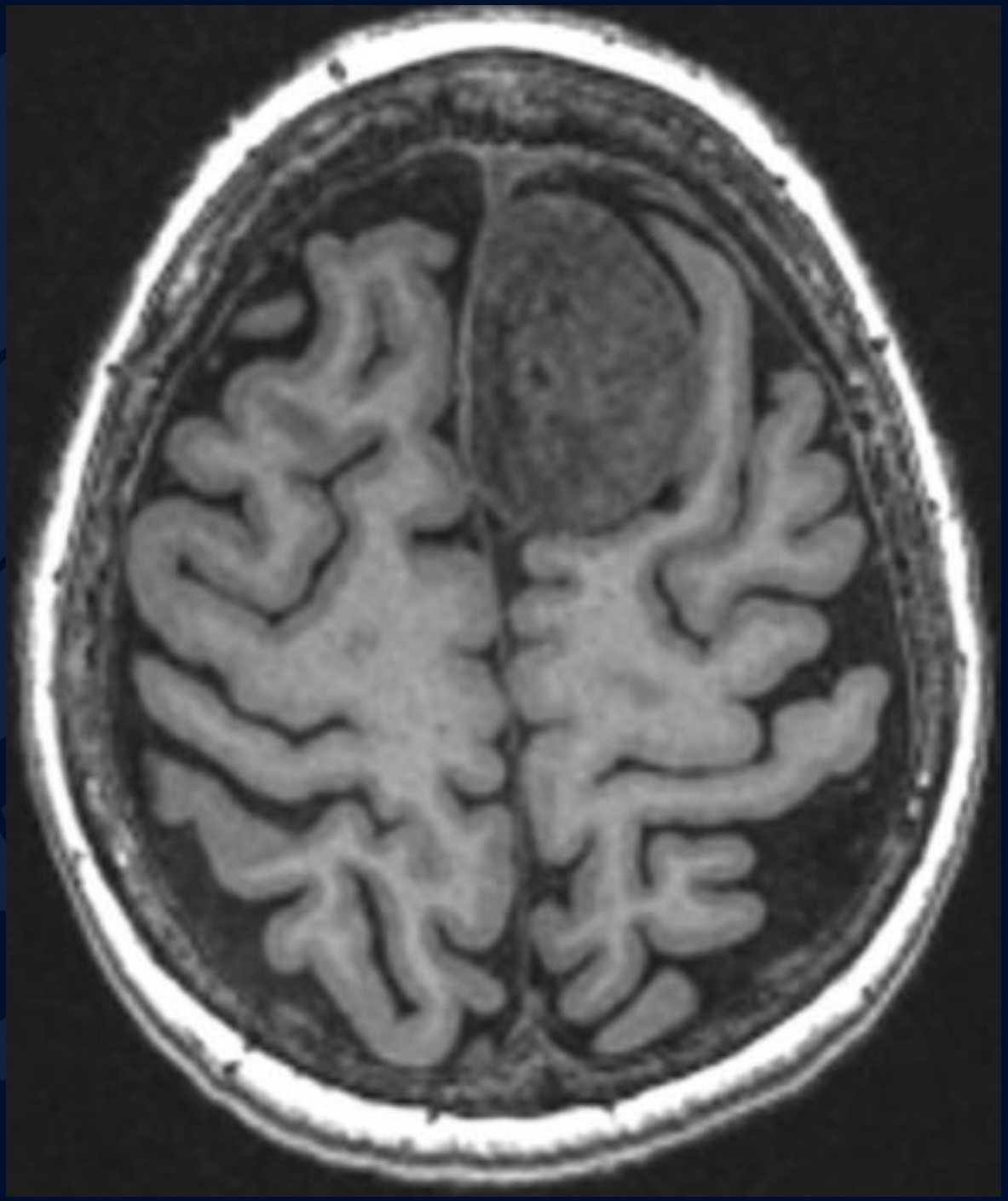

Axial T1 Pre-contrast

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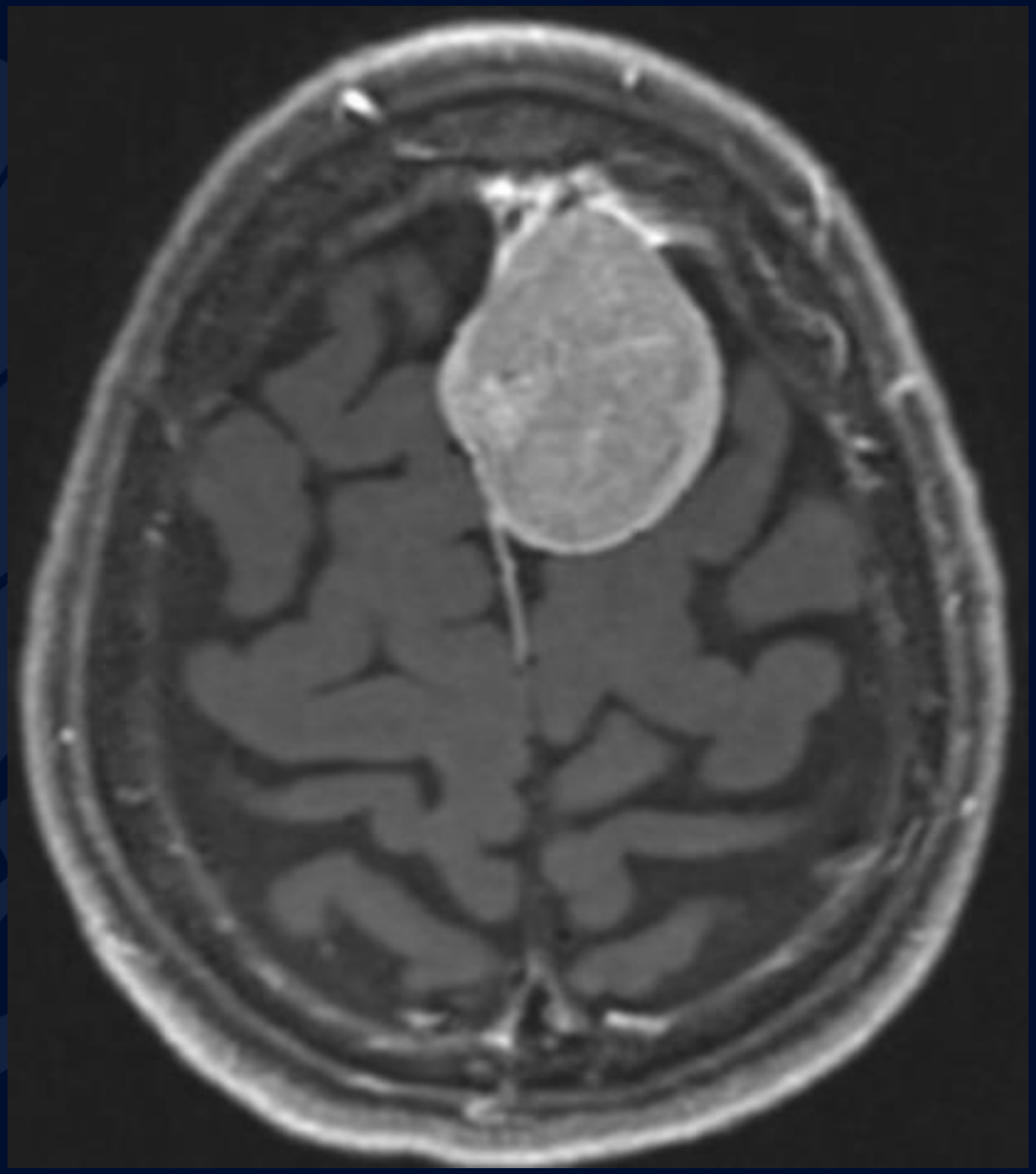

Axial T1 Post-contrast

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Meningioma

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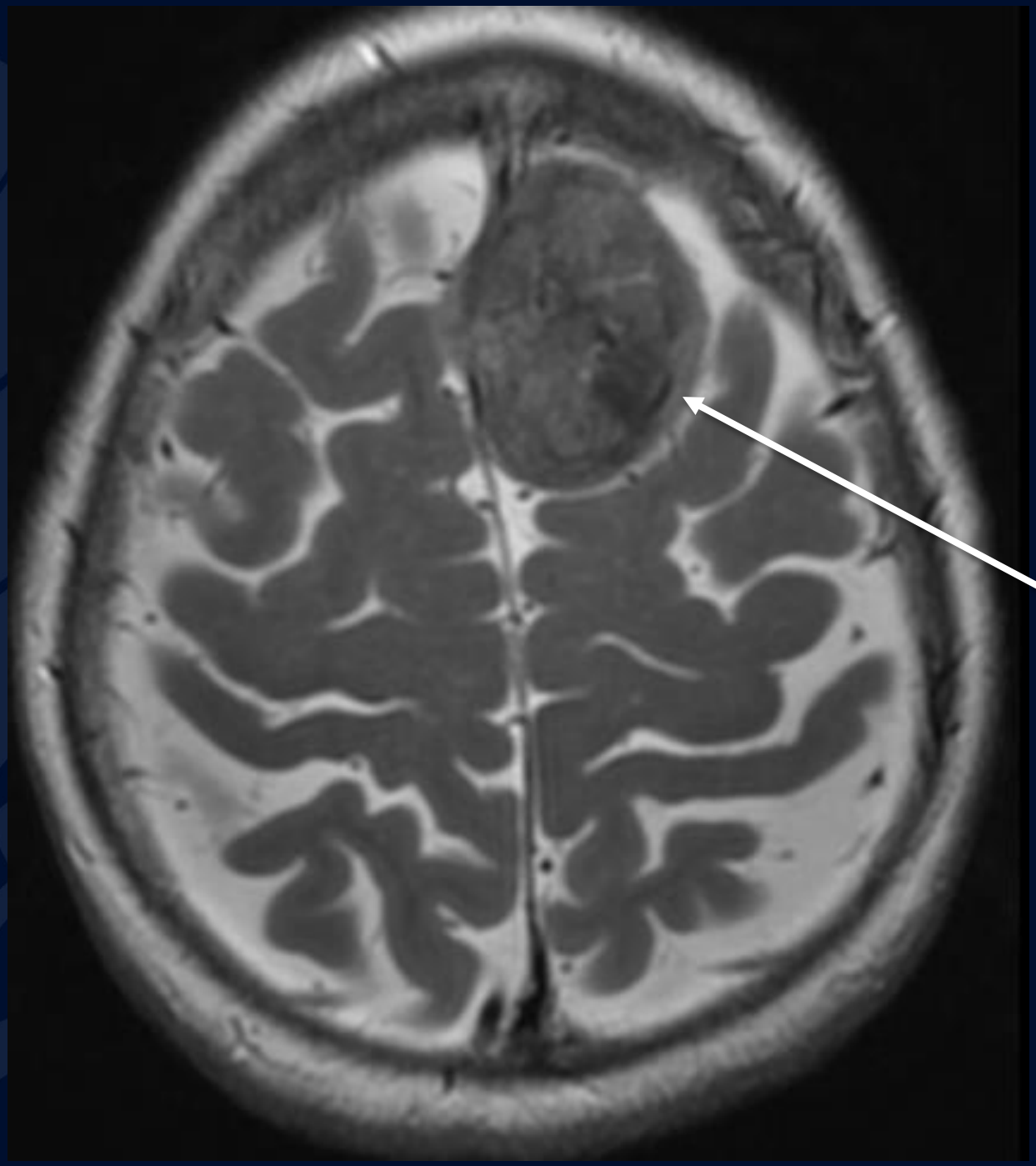

Axial T2

Extra axial mass with decreased signal intensity

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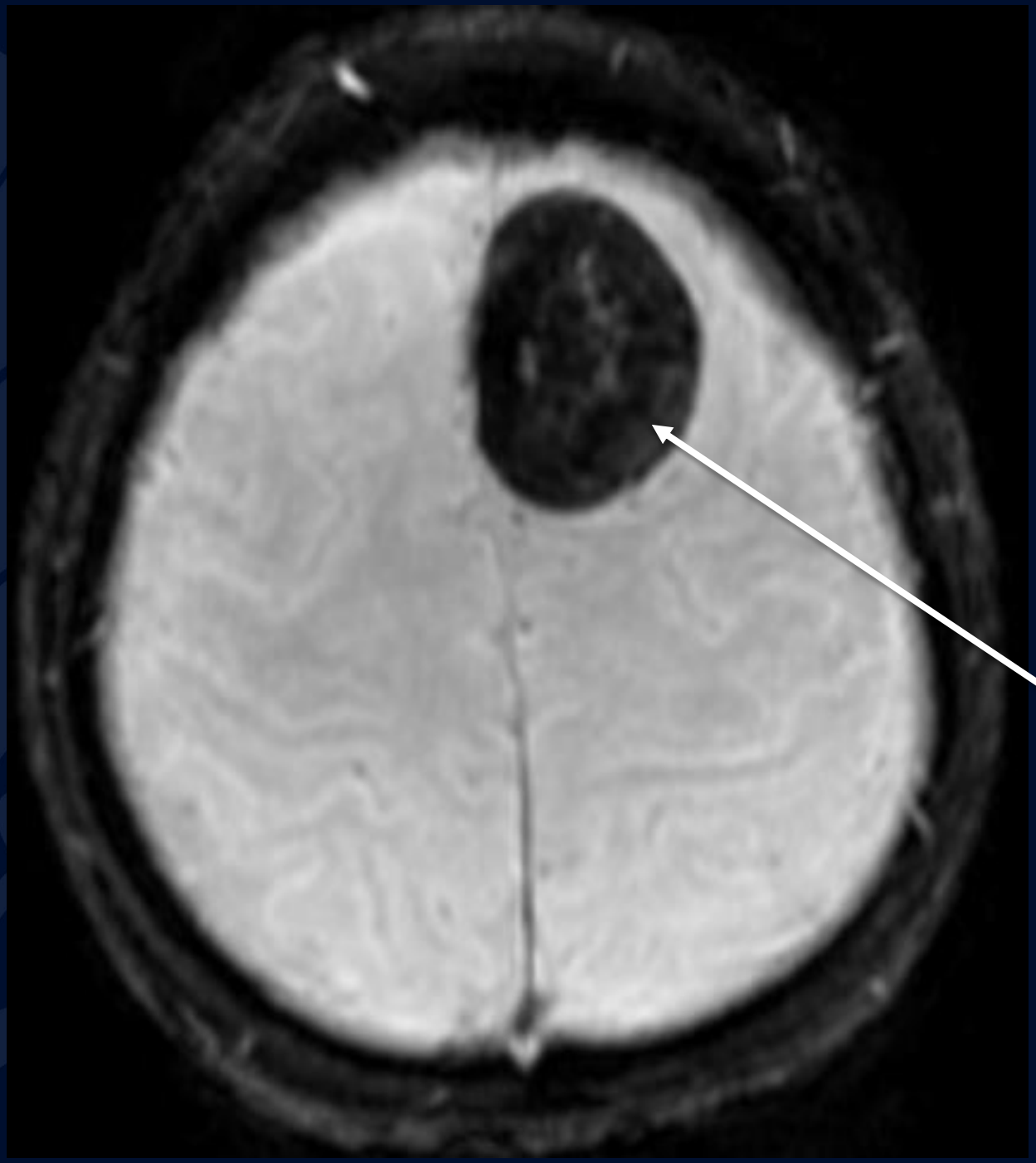

Axial Gradient Echo

Blooming artifact

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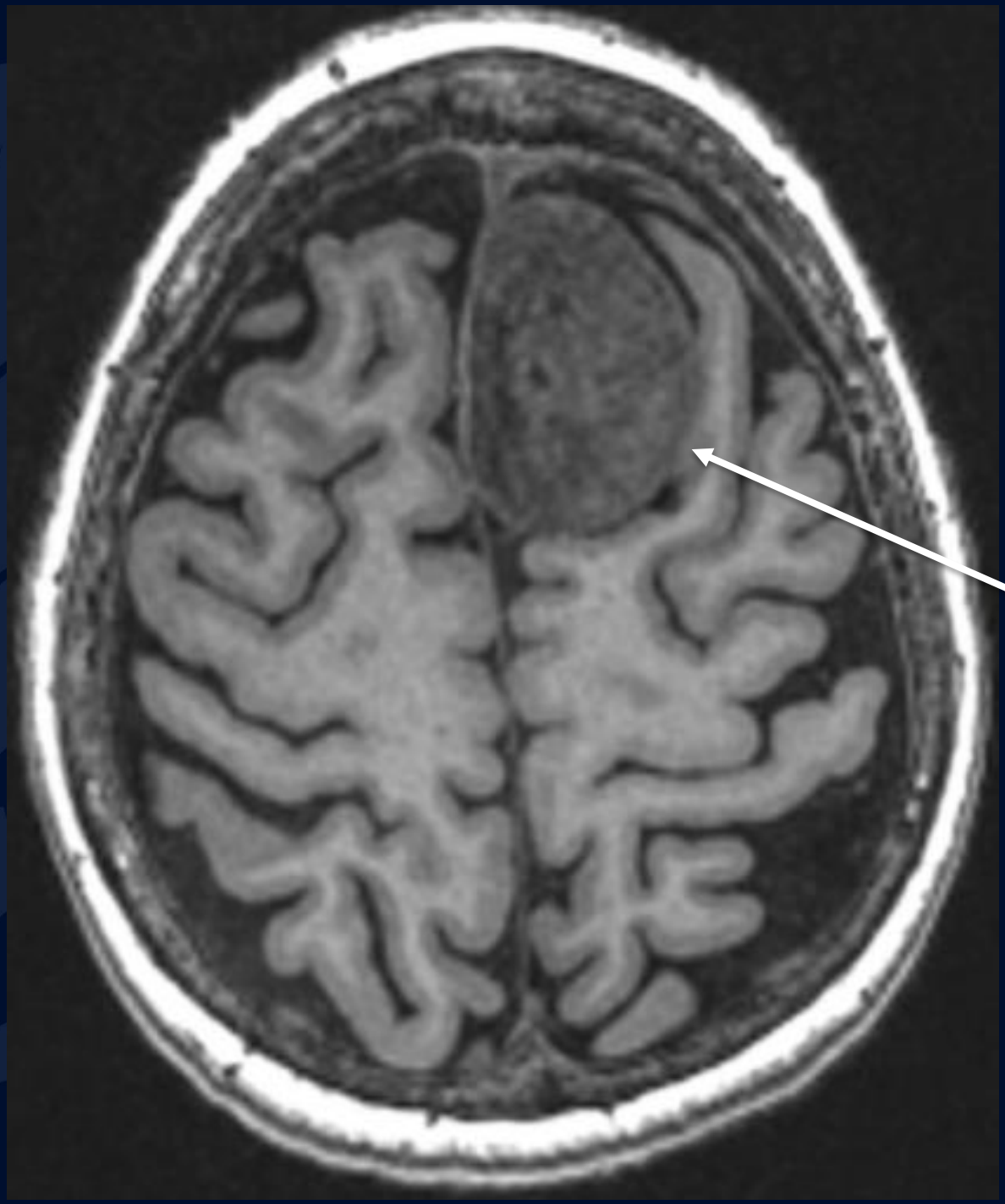

Axial T1 Pre-contrast

Isointense extra axial mass

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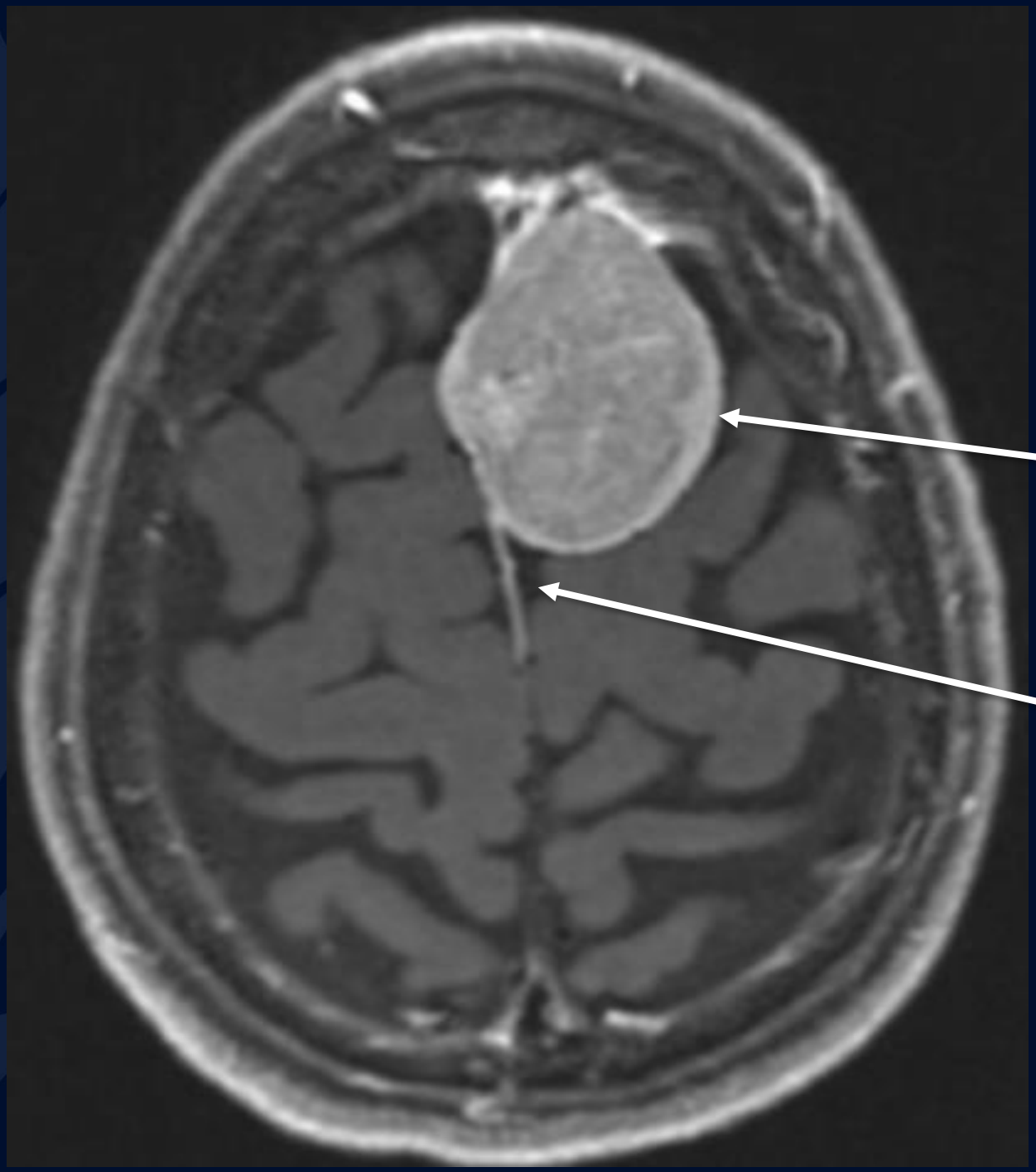

Axial T1 Post-contrast

Homogenously enhancing extra axial mass

Dural tail sign

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Meningioma

- When small, are often found incidentally in asymptomatic patients.
- Often, they cause concern as they are mistakenly deemed to be the cause of vague symptoms, most frequently headaches. Larger tumors or those with adjacent edema or abutting particularly sensitive structures can present with a variety of symptoms.
- Most common presentations: headache: 36%, paresis: 22%, change in mental status: 21%
- Meningiomas may also become clinically apparent due to mass effect depending on their location:
  - Supratentorial: 85-90%
  - Parasagittal, convexities (45%): seizures and hemiparesis
  - Sphenoid ridge (15-20%)
  - Olfactory groove/ planum sphenoidale (10%): anosmia, Foster Kennedy syndrome
  - Juxtasellar (5-10%): visual field defects, cranial nerve deficits
  - Infratentorial (5-10%): obstructive hydrocephalus, cranial nerve deficits
  - Miscellaneous intradural (<5%): intraventricular meningioma, optic nerve meningioma, Occasionally transosseous or intraosseous involvement with prominent hyperostosis may result in local mass effect.

Imaging Features

- Typical imaging features include a dural-based, extra-axial mass with a cerebrospinal fluid “cleft” at the brain-tumor interface. Most show intense enhancement with slow washout of contrast.
- On CT, most are iso- to hyperdense and may show calcification, hyperostosis of adjacent bone, and dilation of adjacent paranasal sinuses (pneumosinus dilatans).
- MRI signal can vary depending on tumor cellularity, presence of necrosis or calcification, or microcystic change. True brain invasion can be challenging to accurately predict by imaging. Features such as pial hypervascularity can predict a challenge of obtaining an easy surgical plane at the brain-tumor interface.

Imaging Signs

- CSF Cleft sign
- Dural tail
- White matter "Buckling" sign
- Sunburst or spoke wheel appearance of vessels
- Mother-in-law sign on angiogram: early arterial enhancement; delayed enhancement persist (comes early and stays late)

Treatment & Prognosis

- Treatment is usually with surgical excision. If only incomplete resection is possible (especially at the base of the skull), then external-beam radiation therapy (or even brachytherapy) can be used. Radiation has been shown to improve local control and prolongs overall survival.
- No widespread chemotherapeutic/systemic therapy has been proven to be efficacious although some mTOR inhibitor and antiangiogenic treatments show promise.
- The Simpson grade correlates the degree of surgical resection completeness with symptomatic recurrence rate, which also varies with grade and length of follow-up. Metastatic disease is rare but has been reported.

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