Rad-Path:

MAGICAL DR

and beyond

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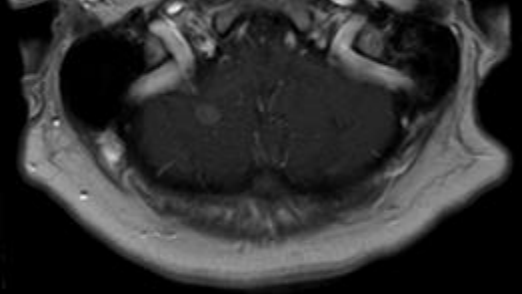
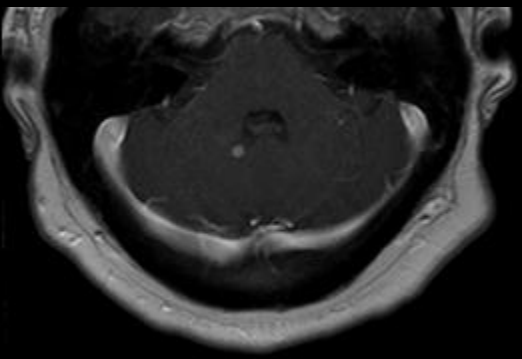
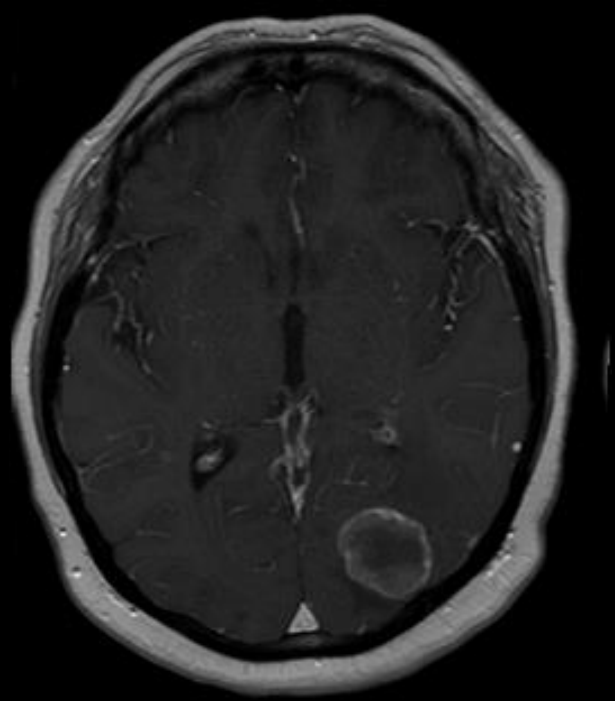
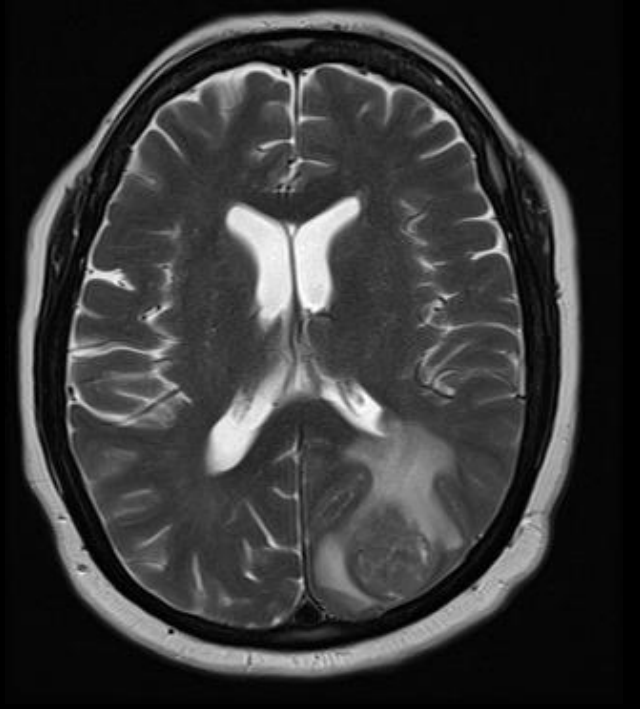
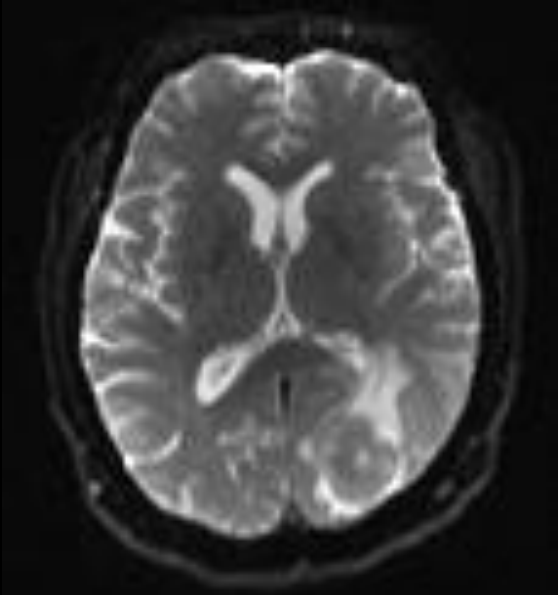
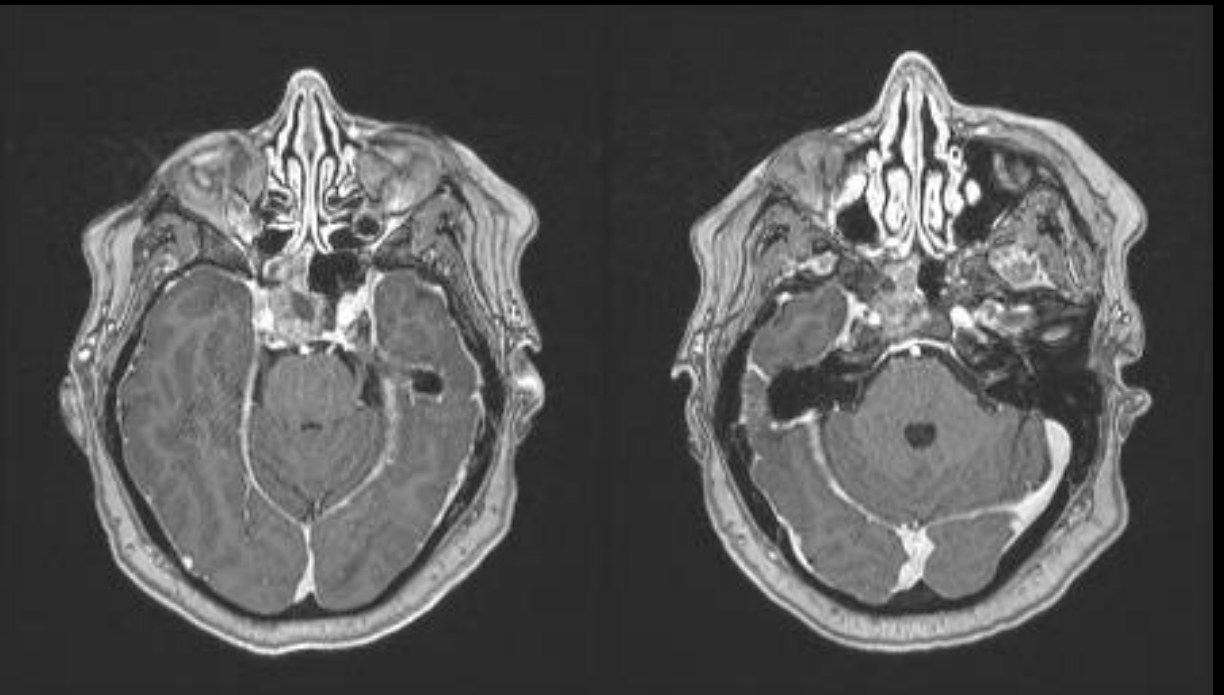
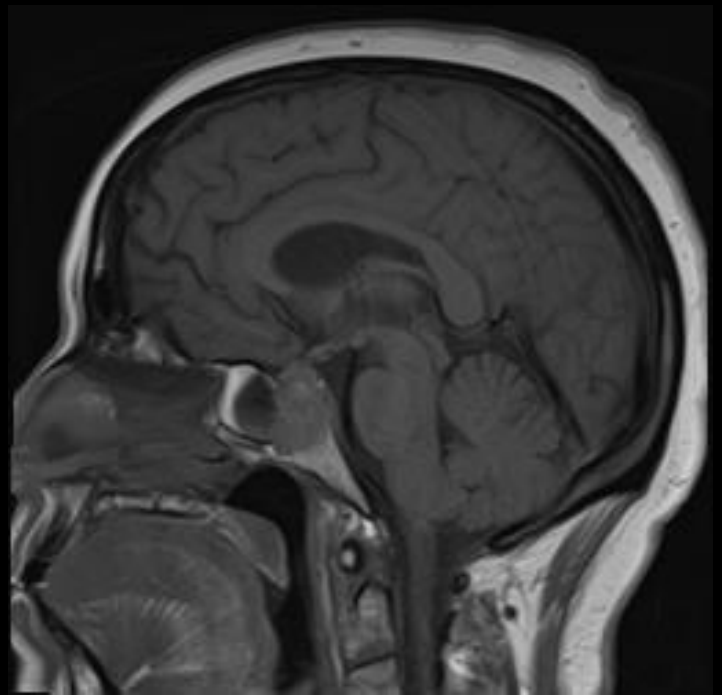
Cerebral ring-enhancing lesion

Metastasis
Abscess
Glioblastoma
Infarct
Contusion
AIDS
Lymphoma
Demyelinating disease
Radiation necrosis / Resolving hematoma

Case 1

58-year-old woman presents with 4 months of progressive headaches, sinus pressure, right facial pain, and intermittent double vision.

Past medical history withheld.

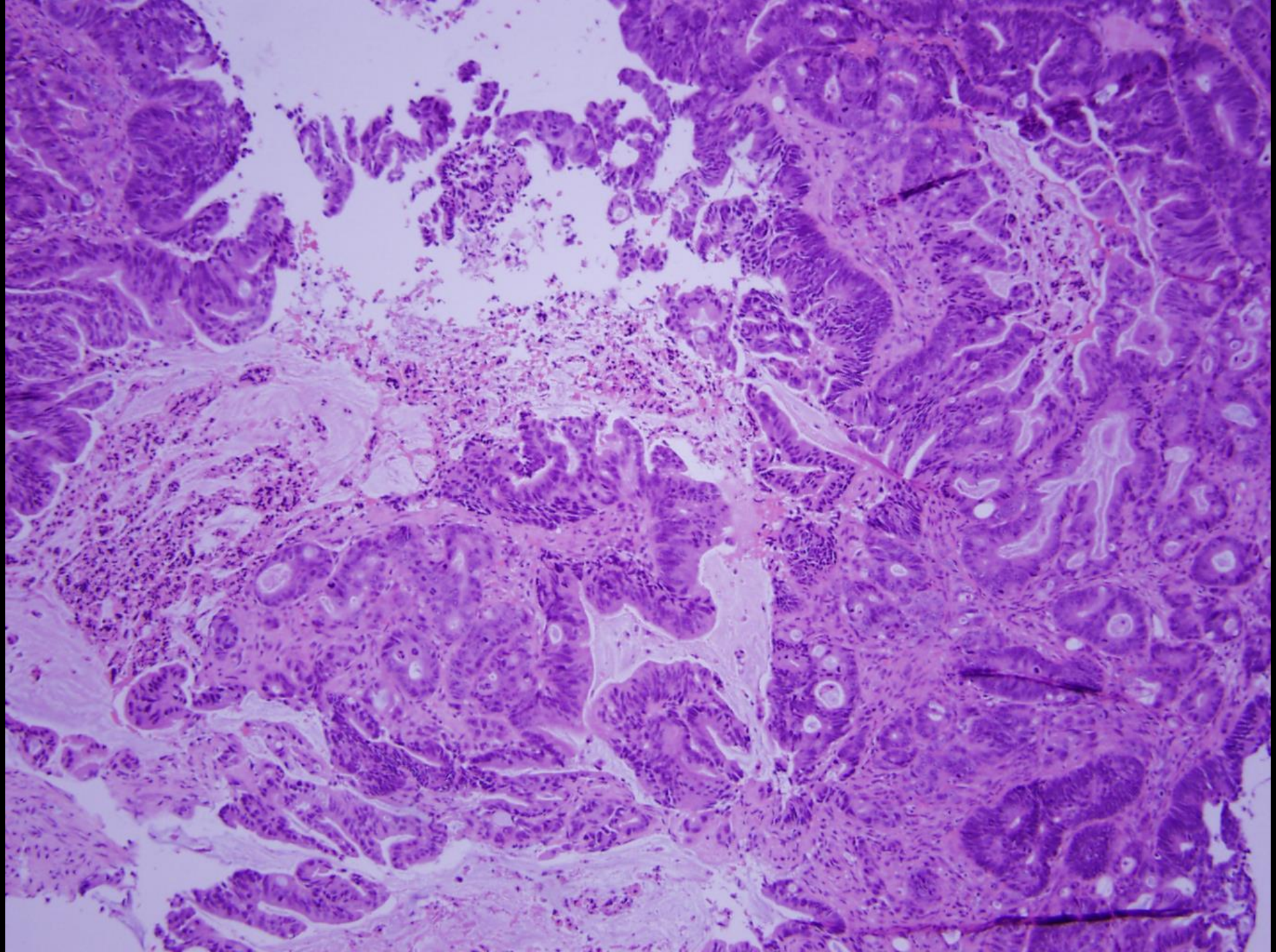









History

Sigmoid colon and rectal cancer status post resection and adjuvant chemotherapy in 2015, with subsequent lung and pleural metastases in November 2016.

Endoscopic transsphenoidal transclival resection

- Tumor in right sphenoid ostium
- Partially hemorrhagic tumor
- Carotid localized using Doppler



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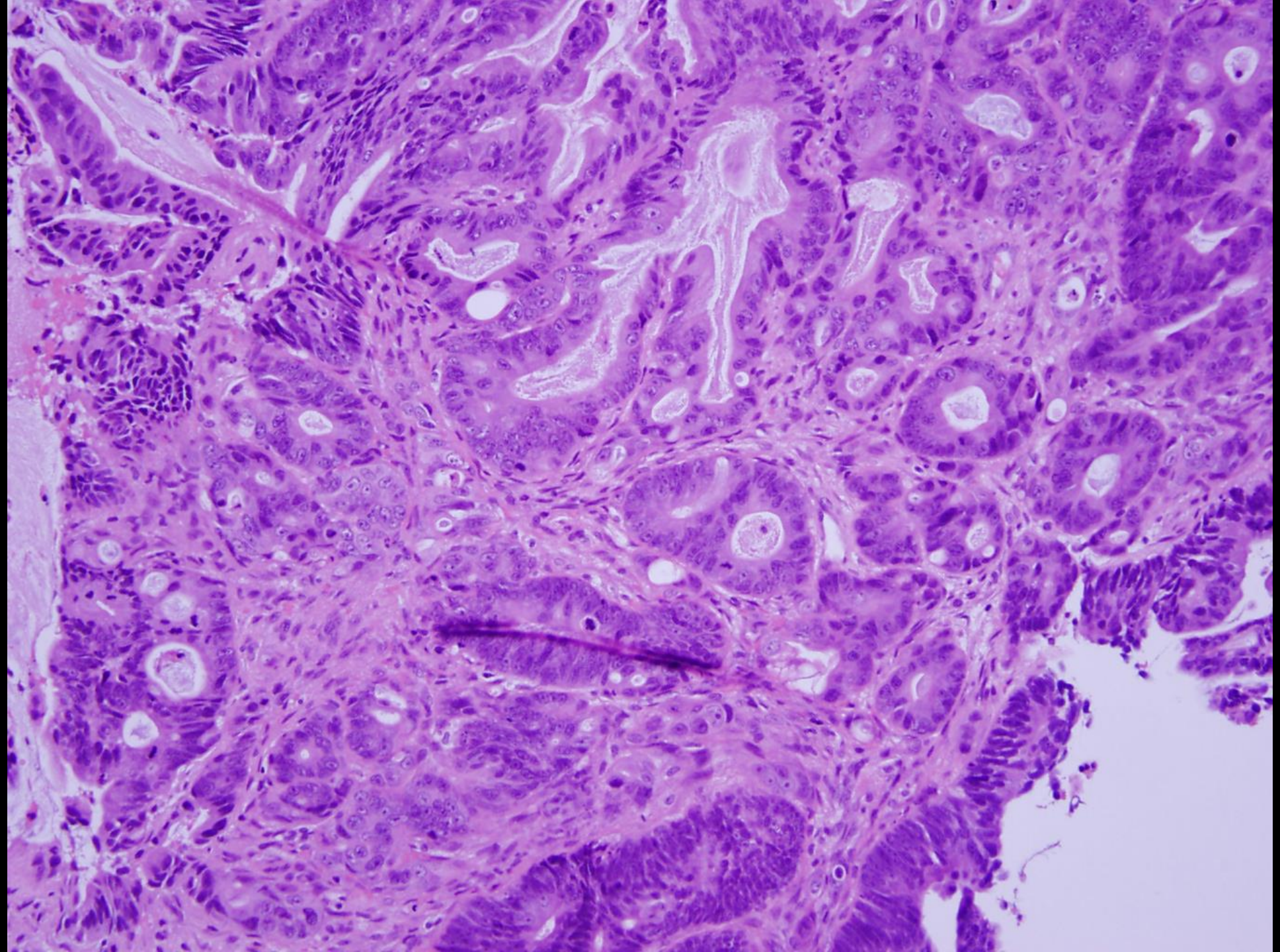

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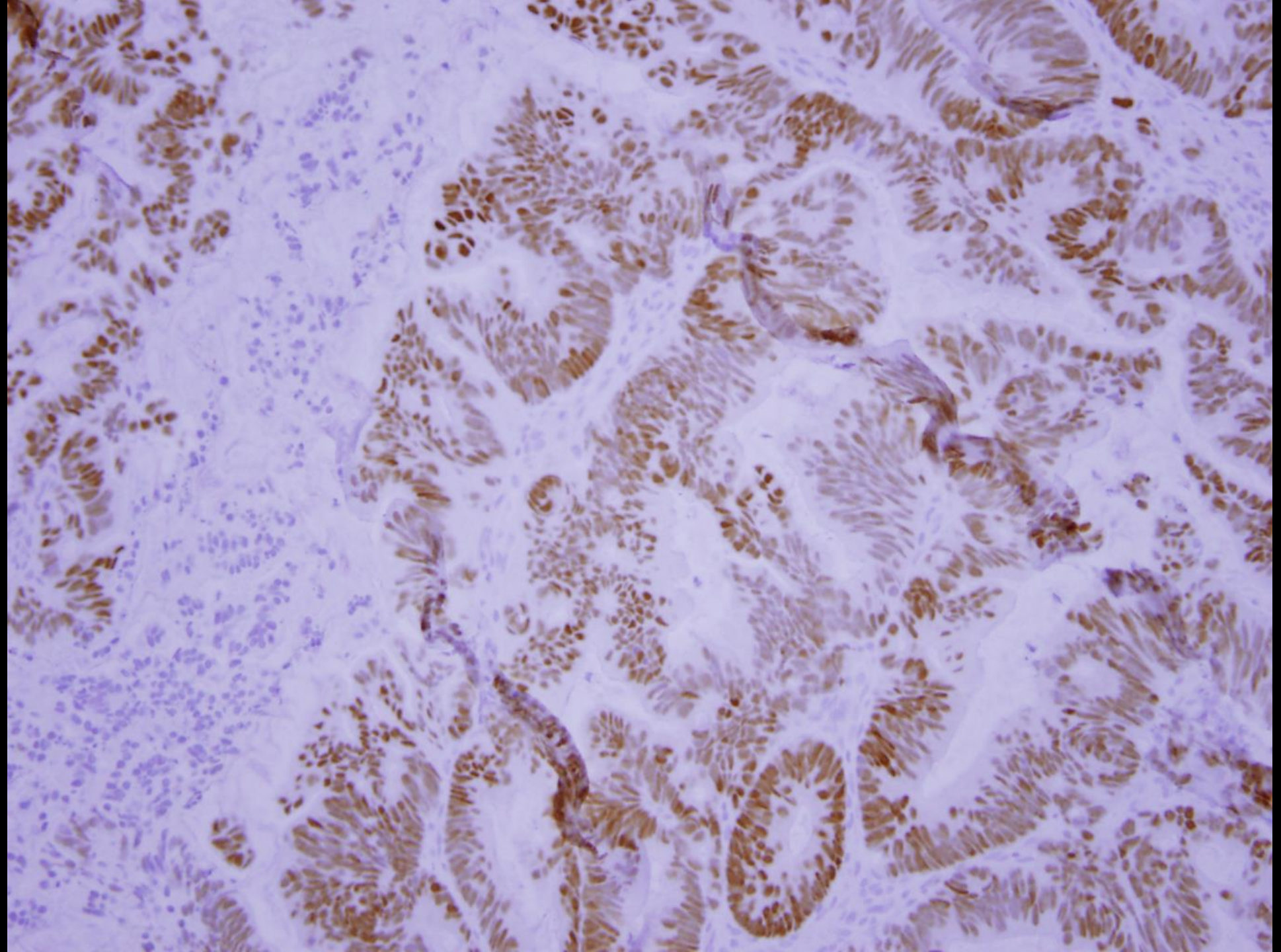


BS-18-12671
CDX2

BS-18-12671

METASTATIC ADENOCARCINOMA, consistent with spread from the patient’s known colorectal primary.

Immunohistochemistry performed at BWH demonstrates the following staining profile in lesional cells:

Positive – CDX2

The immunohistochemical profile supports the above diagnosis.

Among brain metastases, which is the most common source?

- Breast
- Colorectal
- GU
- Lung
- Melanoma

Among brain metastases, which is the most common source?

1. **Lung: ~50%**
2. Breast: ~15%
3. Melanoma: 5-10%
4. GU (mainly renal cell carcinoma)
5. Colorectal

Brain metastases. Handbook of Clinical Neurology. 2014 Jan 1;121:1143–57.

Brain parenchymal metastases

- Over 50% of brain tumors
- 50% solitary, 20% two lesions
- Ring-enhancing lesion @ gray-white junction
- No diffusion restriction unless very dense

Pertinent differentials

- Glioblastoma
  - Infiltrating, deeper
- Abscess
  - Diffusion restriction
- Infarction
  - Multiple emboli
  - Ring enhancement uncommon
  - Restricted diffusion when acute
- Tumefactive multiple sclerosis
  - Incomplete ring enhancement

Skull base osseous metastases

- ~4 % of cancer patients
- Meta-analysis of 279 cases:
  1. Prostate: 38%
  2. Breast: 20%
  3. Lymphoma: 8%
  4. Lung: 6%
  5. Others: 27%

Laigle-Donadey F, Taillibert S, Martin-Duverneuil N, Hildebrand J, Delattre J-Y. Skull-base metastases. J Neurooncol. 2005 Oct 1;75(1):63–9.

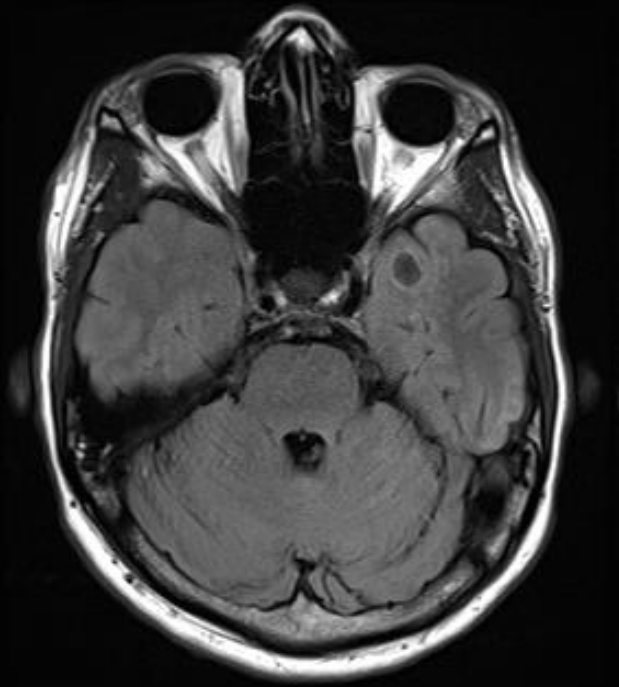
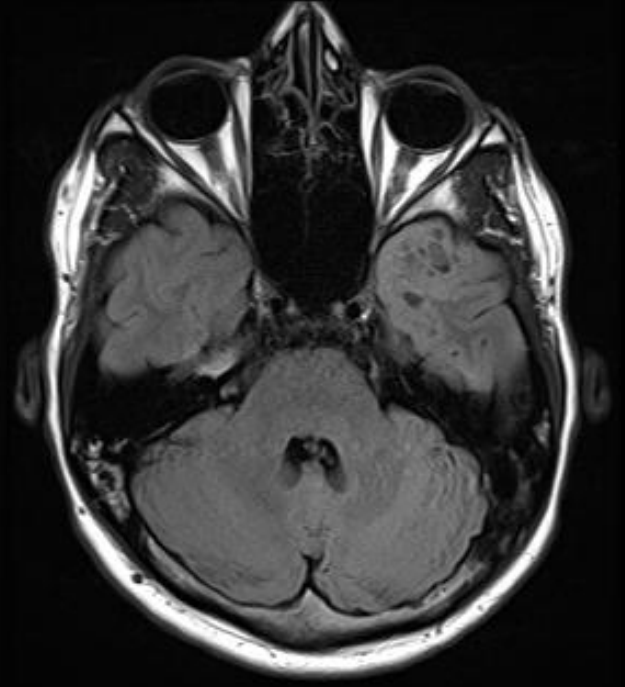
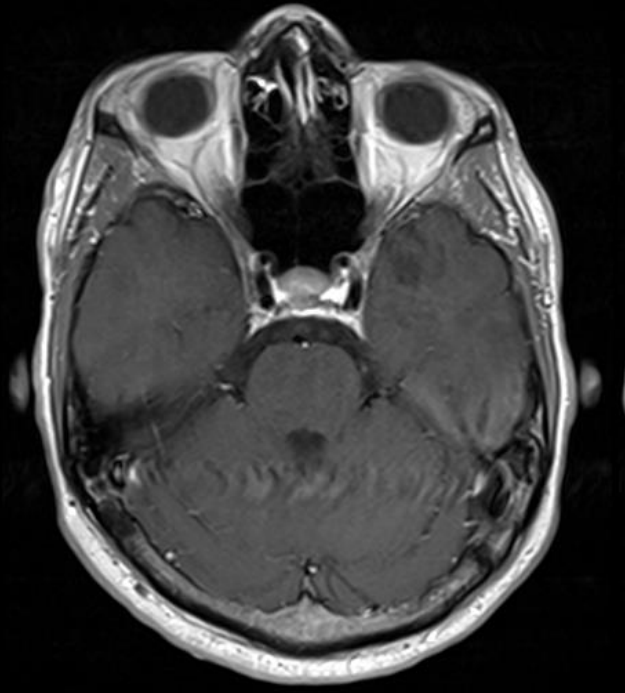
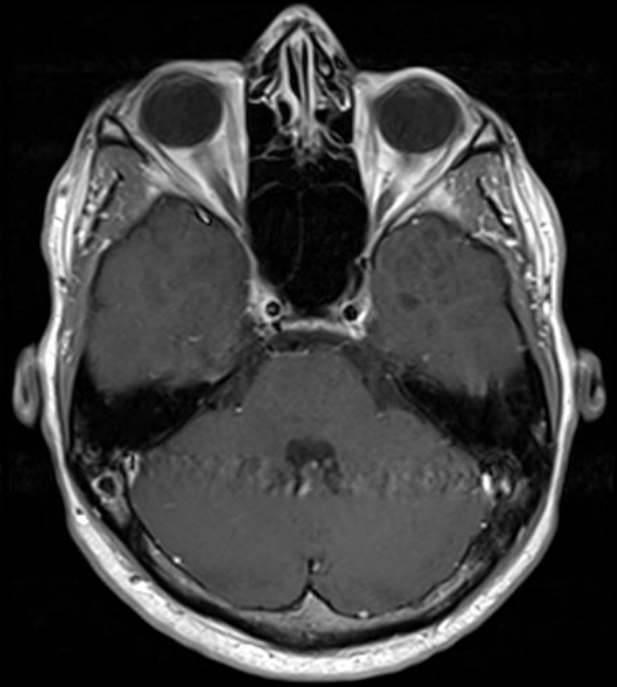
Course

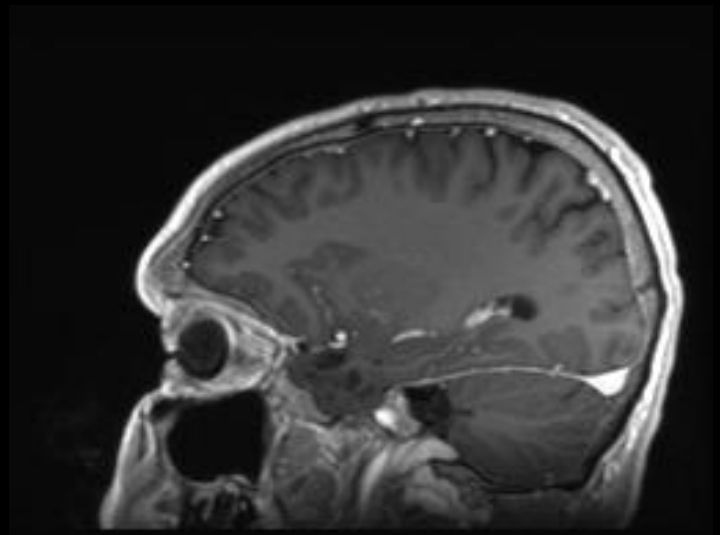
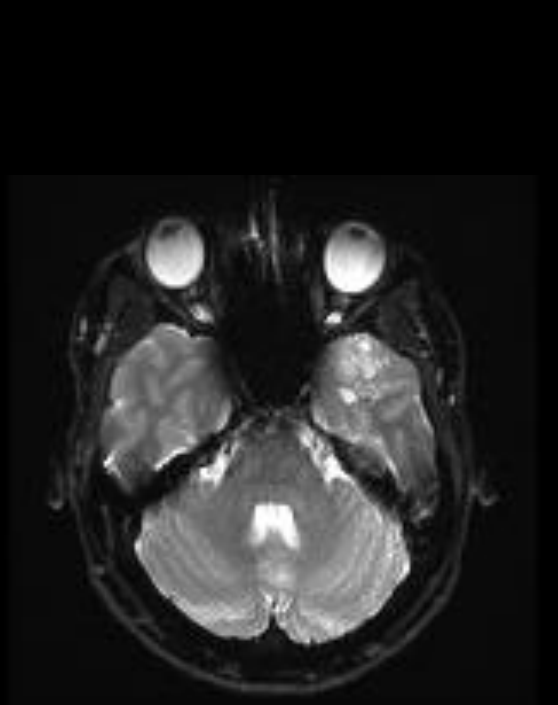
- Discharged on postoperative day 1
- Left occipital tumor resection 2 months later

Case 2

24-year-old man presents after an episode of left hand tingling, anxiety, dizziness, and tunnel vision that lasted for 20-30 minutes.

Courtesy of Dr. Ray Huang


Differential diagnosis

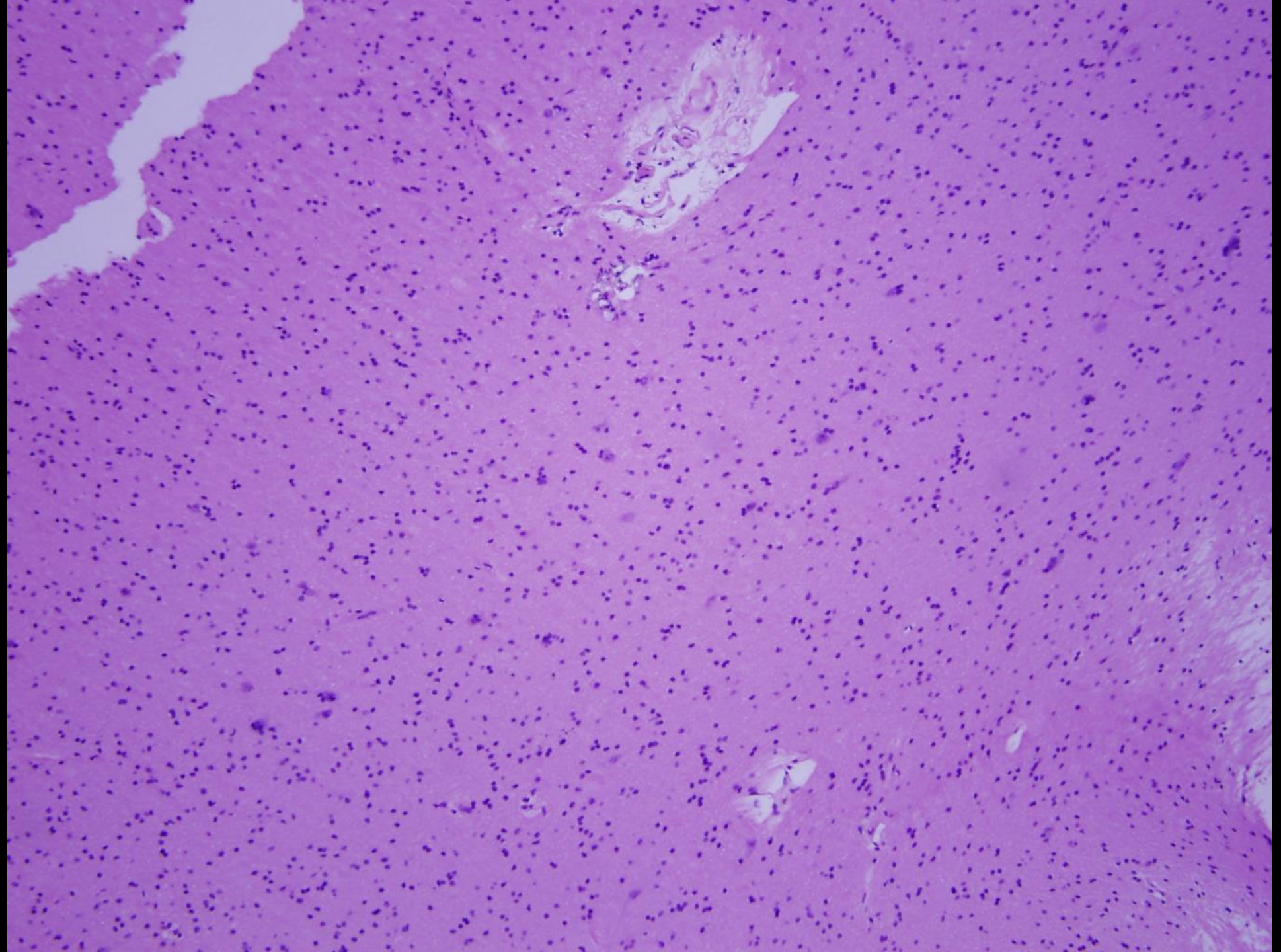
- Dysembryoplastic neuroepithelial tumor (DNET)
  - Temporal lobe cortical/subcortical “bubbly” mass
  - Enhancement uncommon
  - Classically, children and young adults with seizures
- Ganglioioglioma
  - Calcifications common
  - Cystic and enhancing solid components
  - Most common neoplasm to cause temporal lobe epilepsy
- Low-grade glioma
- Enlarged perivascular (Virchow-Robin) spaces

Preoperative course

- Outpatient EEG: left temporal lobe epilepsy
- No further symptoms
- Admitted for surgery 4 months after event

Left frontotemporal craniotomy and tumor resection

- “we opened the cortex and saw a gray tissue deep to the cortex. This to me looked very abnormal”
- “There were several pockets of this grayish tissue”



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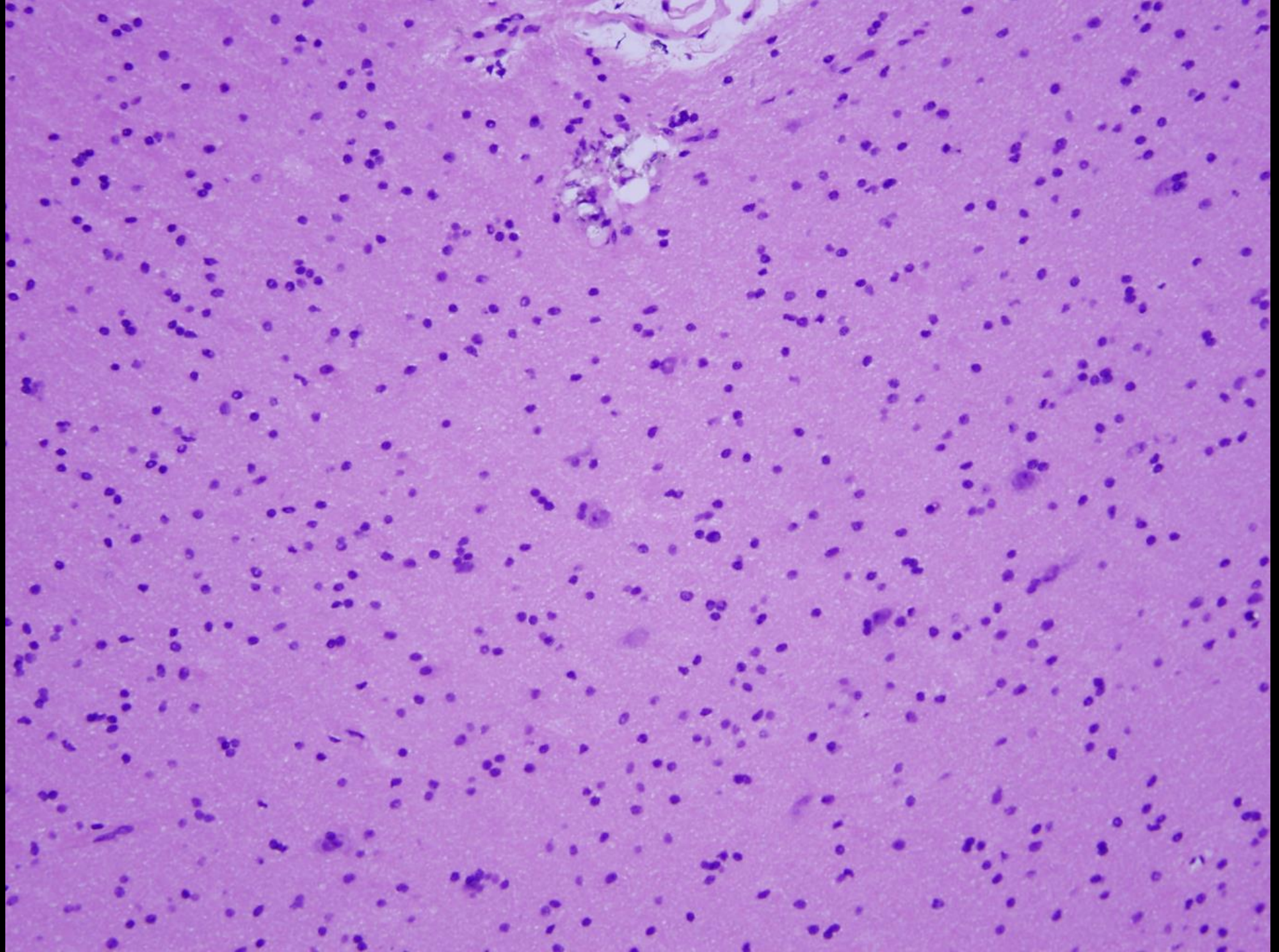

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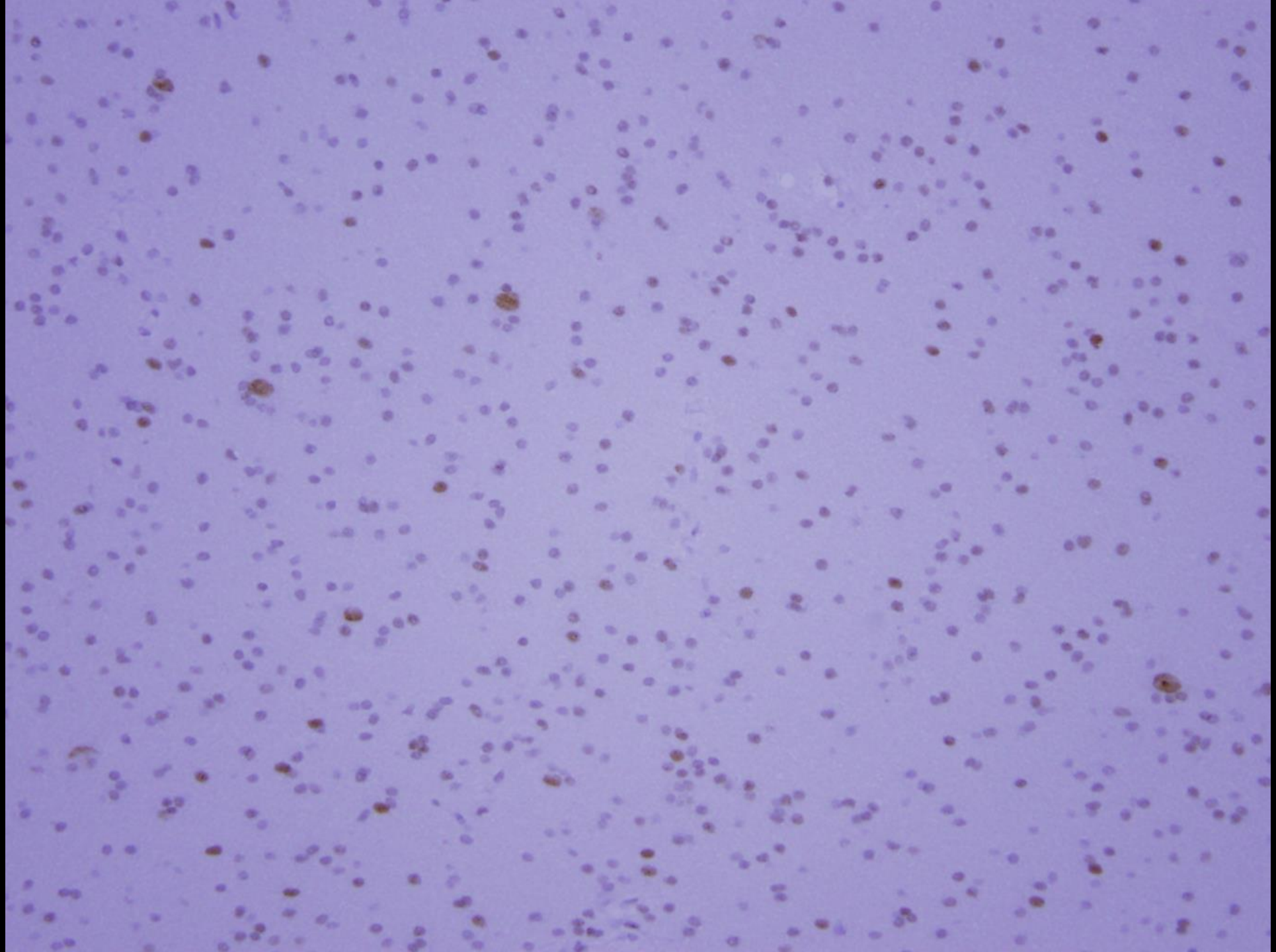

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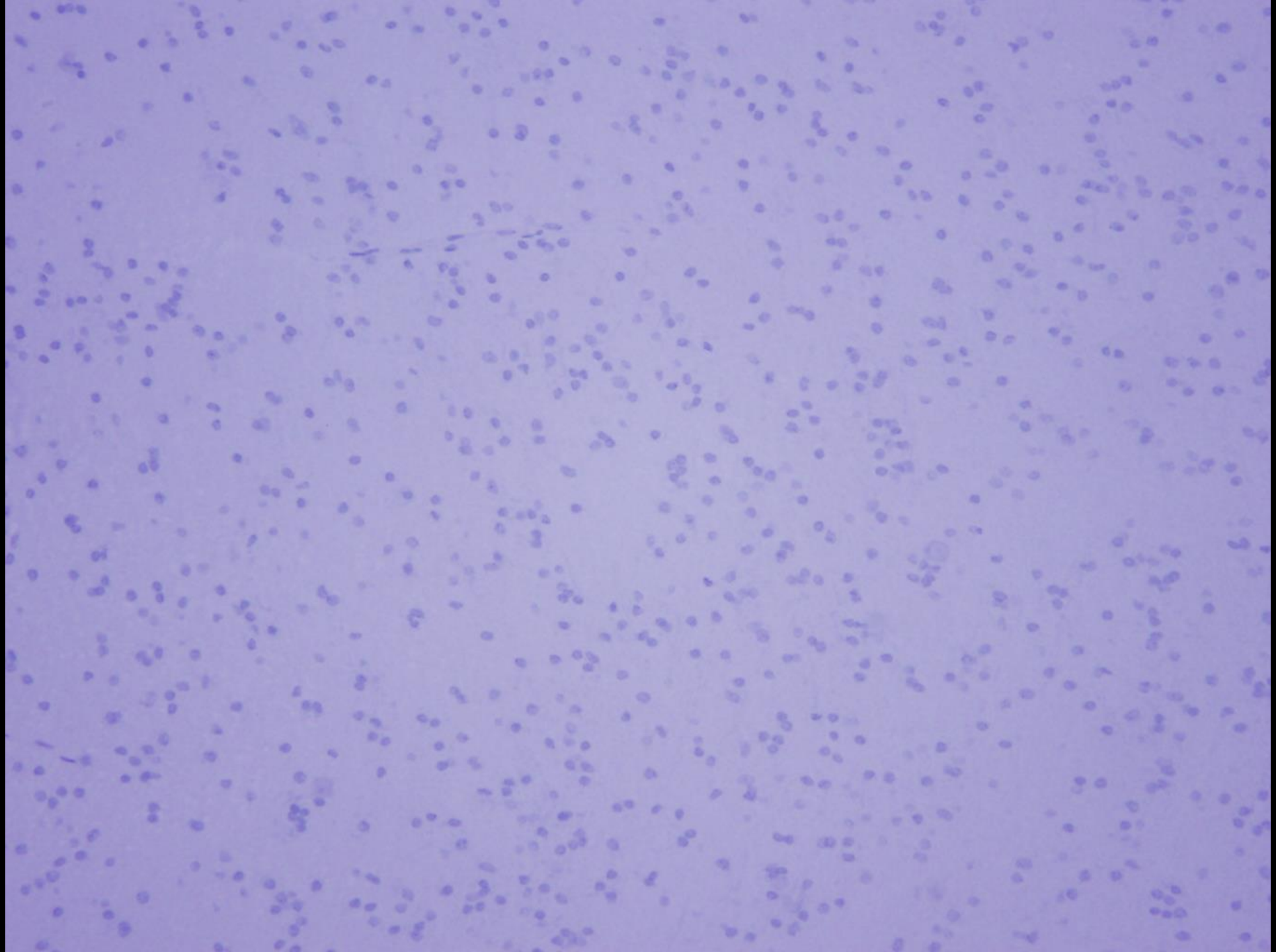
ATRX



BS-17-58507
NeuN

BS-17-58507

LOW GRADE GLIAL/GLIONEURONAL TUMOR, See NOTE.

NOTE: There are features of this low grade primary brain tumor that suggest dysembryoplastic neuroepithelial tumor (DNT), though the lesion is not entirely characteristic of that entity; furthermore, the tumor is not well circumscribed.

The overall size of the resection is small. Tumor infiltrates brain parenchyma. The tumor is newly diagnosed.

W.H.O. Histologic Grading Criteria:

Cellularity:	mild
Atypia:	mild
Mitoses:	not detected
Vascular Proliferation:	not present
Necrosis:	not present

Immunohistochemistry performed at BWH demonstrates the following staining profile in lesional cells (block B1):

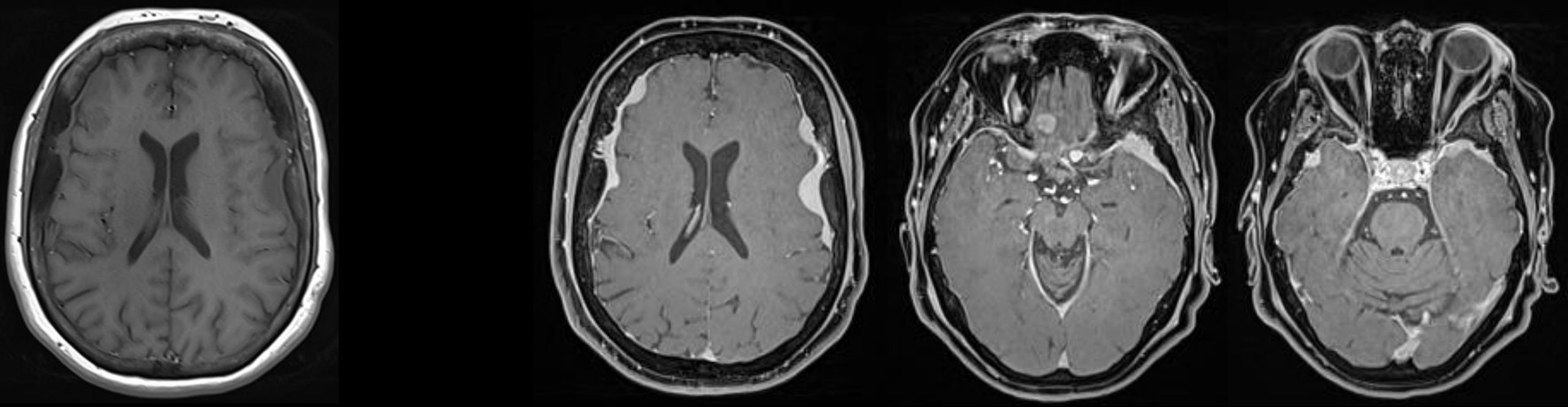
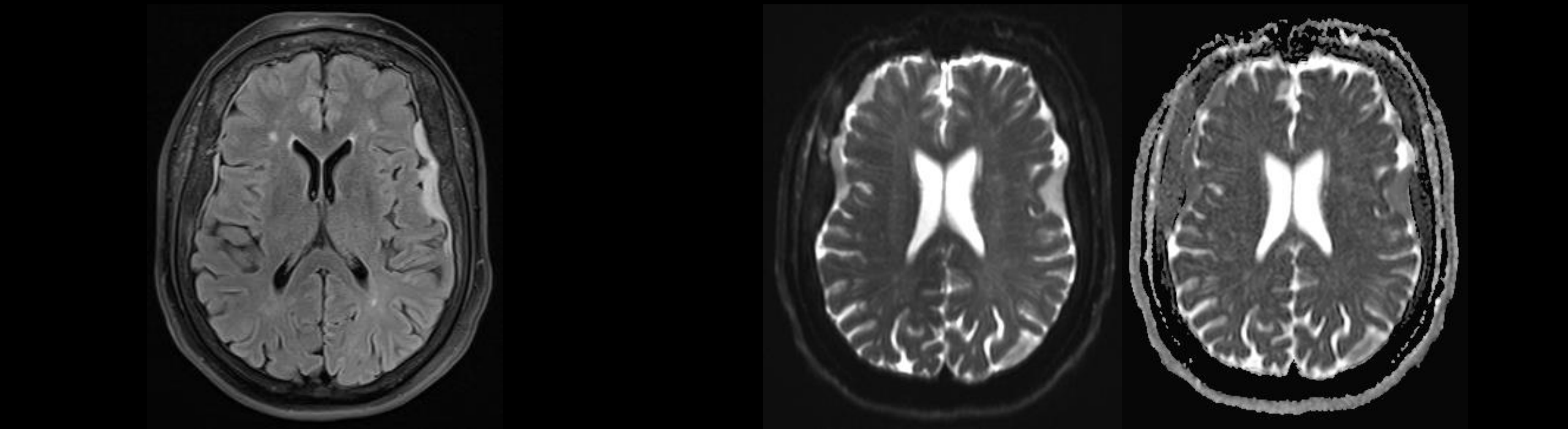
Positive: ATRX (retained)
Negative: BRAFV600E, P53, IDH1-R132H

Postoperative course

- Discharged on postoperative day 2
- Doing well on 2-week follow-up
- Oncopanel pending
- Generalized tonic-clonic seizure 6 months later. Maintained on levetiracetam (Keppra)

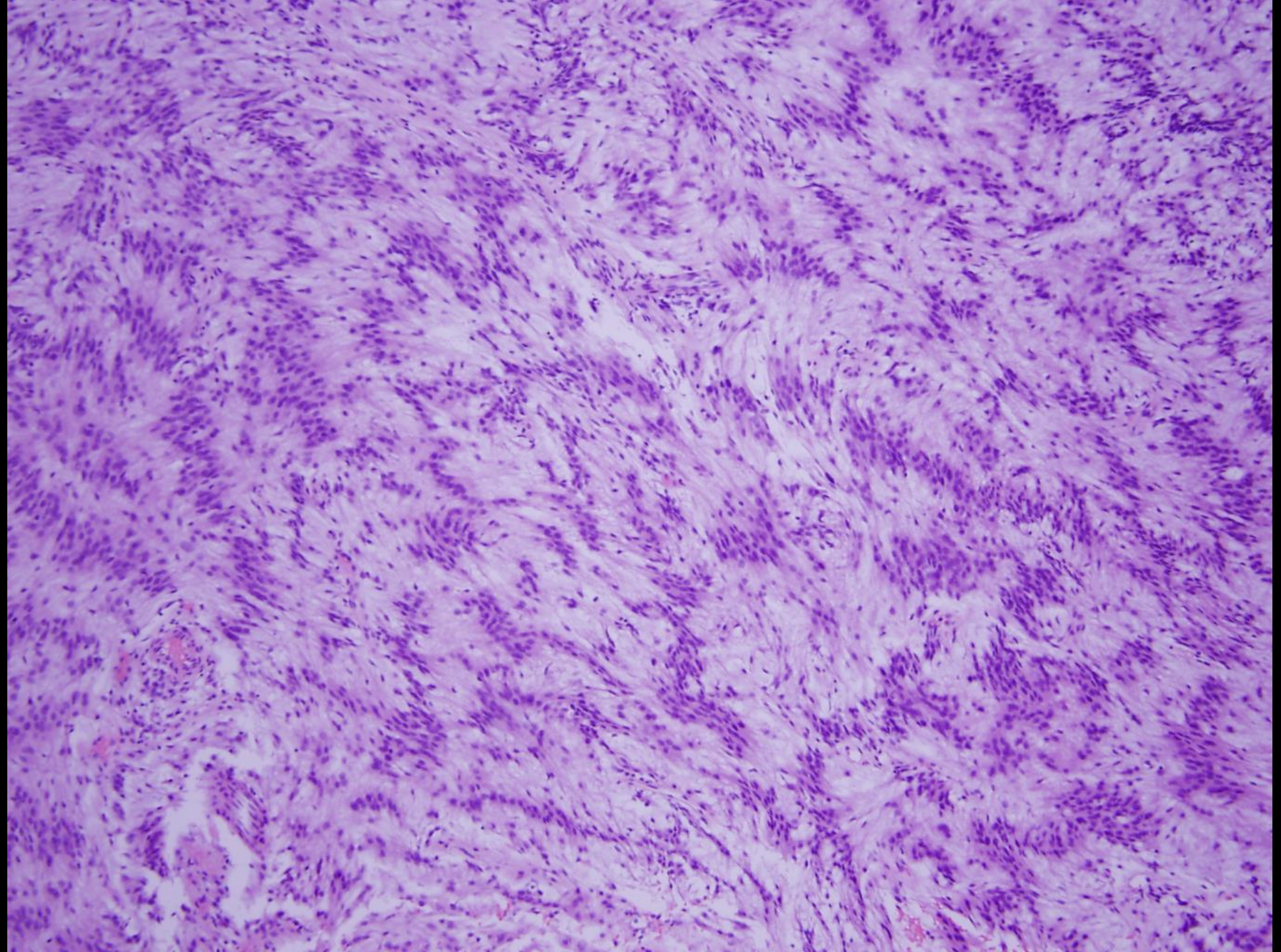
Case 3

68-year-old woman with metastatic uterine cancer (2015) in remission on megestrol acetate (Megace), presents with 5 months of left-sided ptosis and gait instability.

Right frontal craniotomy and biopsy

- “The dura was notably vascular”
- “encountered a fleshy vascular lesion”



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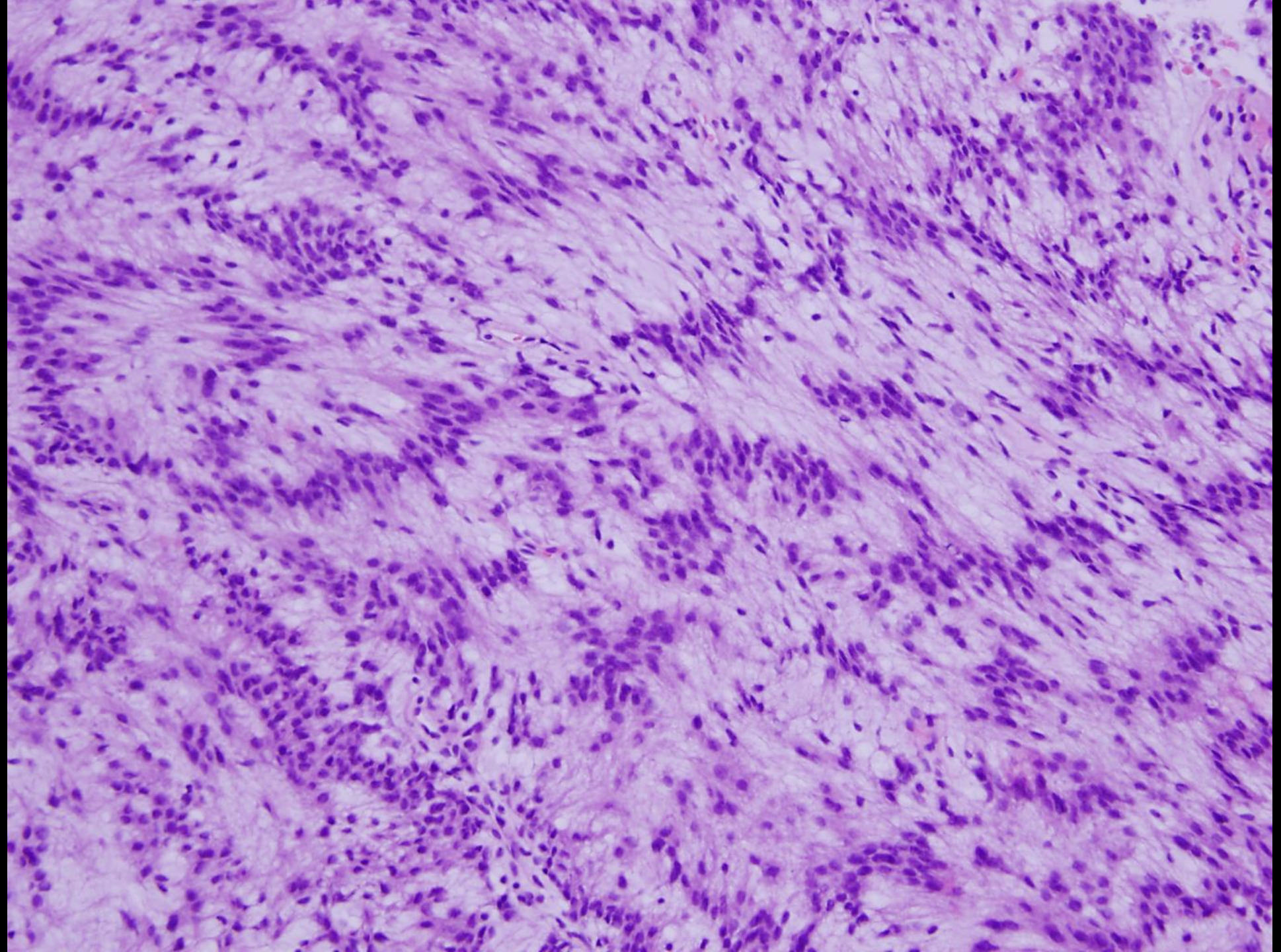

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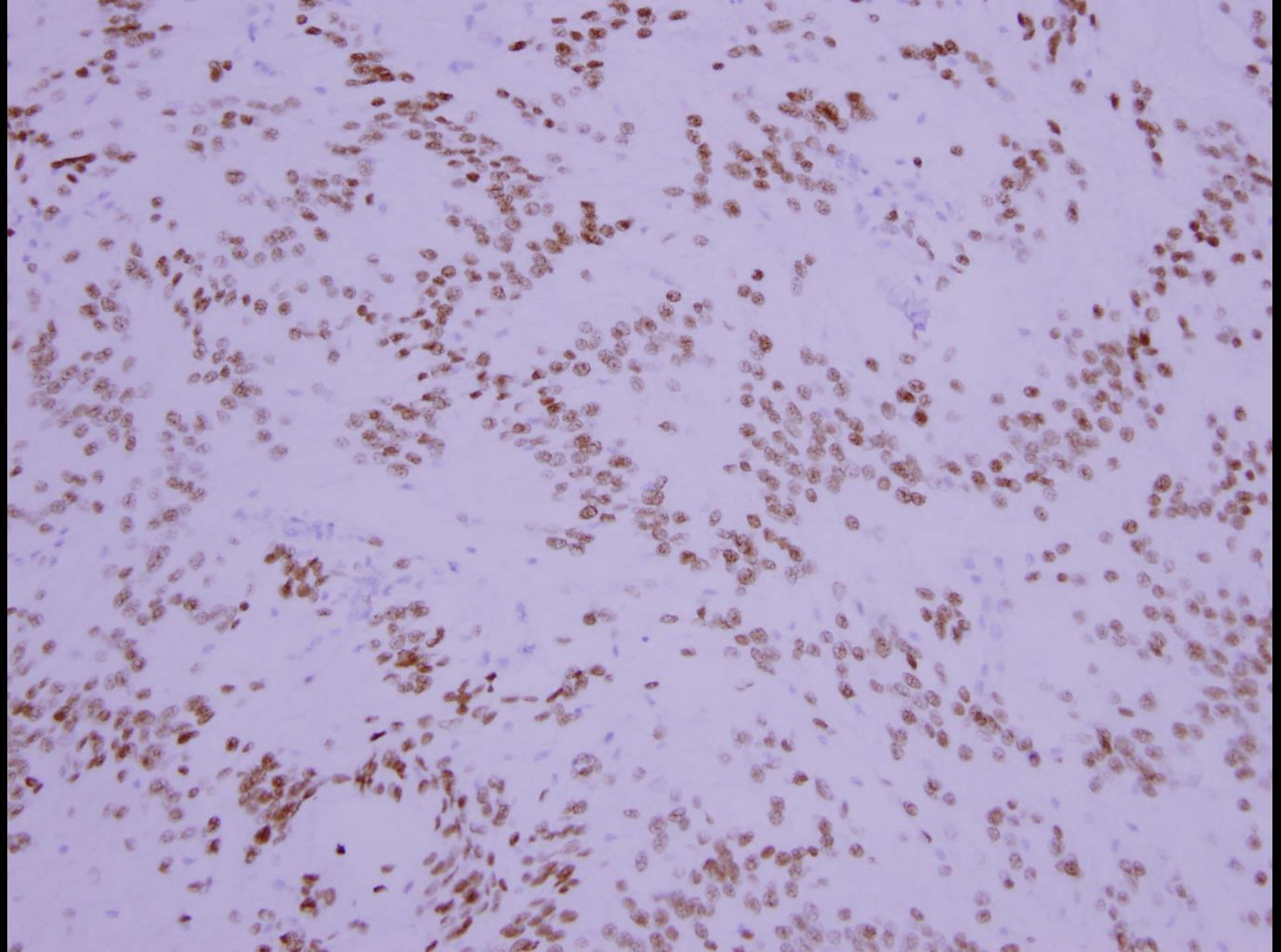

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PR

BS-17-47983

MENINGIOMA, W.H.O. Grade I (ICD-0 9530/0), WITH ELEVATED MIB-1 PROLIFERATIVE INDEX AND UNUSUAL MORPHOLOGY, see NOTE.

NOTE:
The tumor only satisfies strict WHO criteria for Grade I meningioma. Nevertheless, the mildly elevated MIB-1 proliferative index of 4.71%, the most unusual nuclear palisading architecture with a myxoid background and the clinical/radiologic findings, are all noteworthy.

Molecular studies are in progress and may guide understanding of the potential clinical behavior of this neoplasm.

The overall size of the resection is large with an estimated tumor size of 1.4 cm (in greatest dimension).

Multiple meningiomas on Megace

1. Gruber T, Dare AO, Balos LL, Lele S, Fenstermaker RA. Multiple meningiomas arising during long-term therapy with the progesterone agonist megesterol acetate: Case report. Journal of Neurosurgery. 2004 Feb;100(2):328–31.
2. Vadivelu S, Sharer L, Schulder M. Regression of multiple intracranial meningiomas after cessation of long-term progesterone agonist therapy: Case report. Journal of Neurosurgery. 2010 May;112(5):920–4.
3. Shahar T, Ram Z. Hormonal effect on meningioma growth. World Neurosurg. 2011 Nov;76(5):412–4.

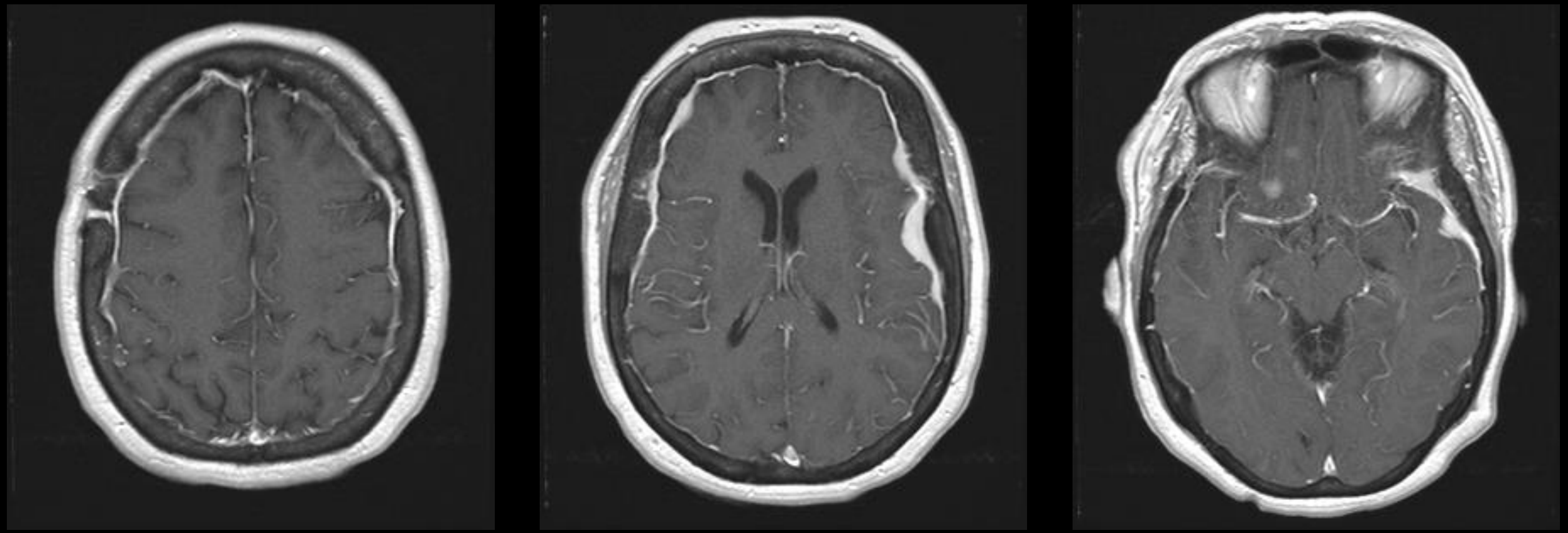
Biology

- Megestrol acetate: PR agonist; antiestrogenic in endometrium
- Meningioma cells have ER and PR
- Insufficient evidence for progesterone inhibitor therapy

Cossu G, Levivier M, Daniel RT, Messerer M. The Role of Mifepristone in Meningiomas Management: A Systematic Review of the Literature. Biomed Res Int. 2015;2015:267831.

Course

- Discharged on postoperative day 3
- Megace discontinued 2 weeks after surgery
- Observation, with plan for radiation therapy if progression

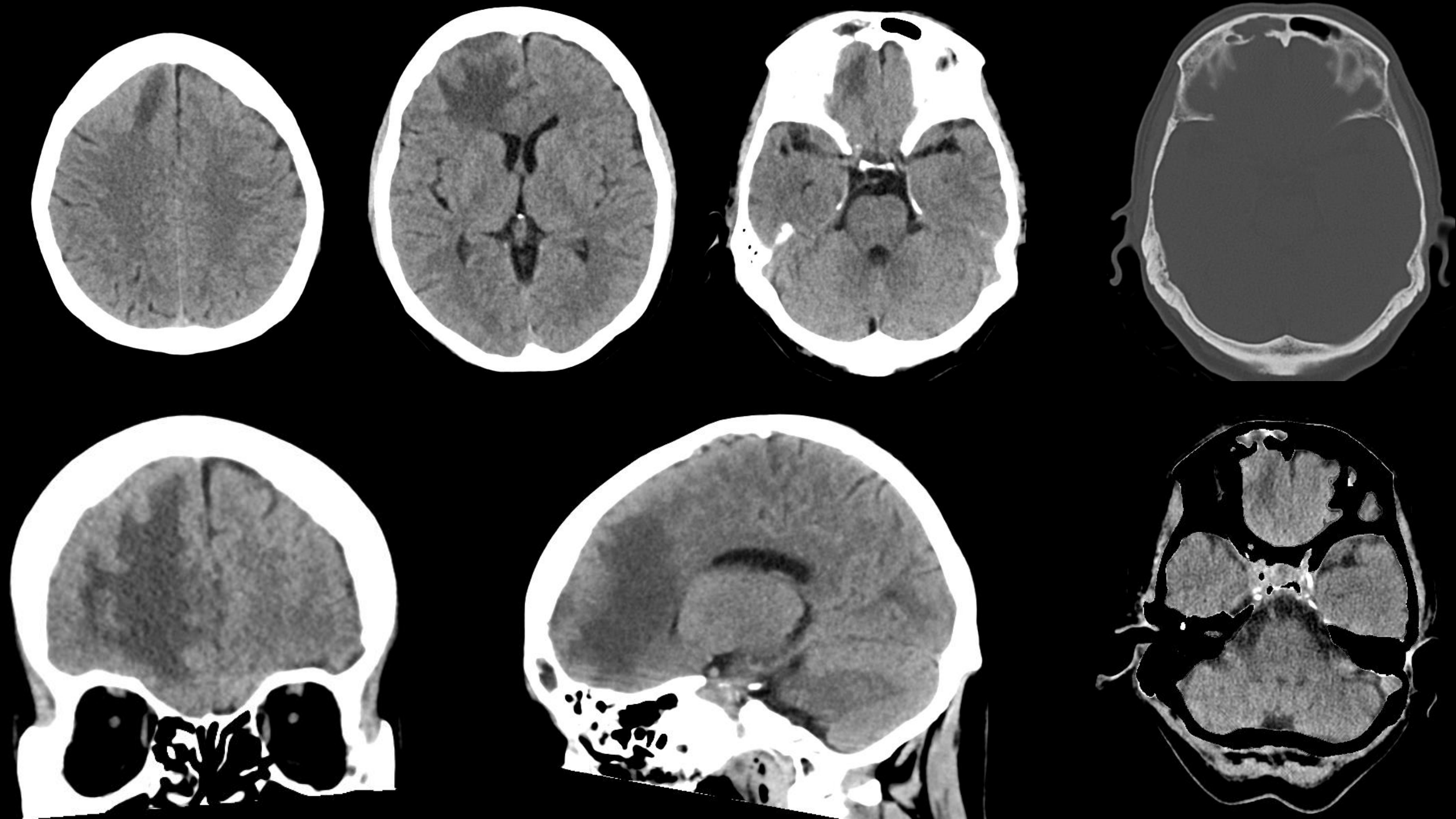


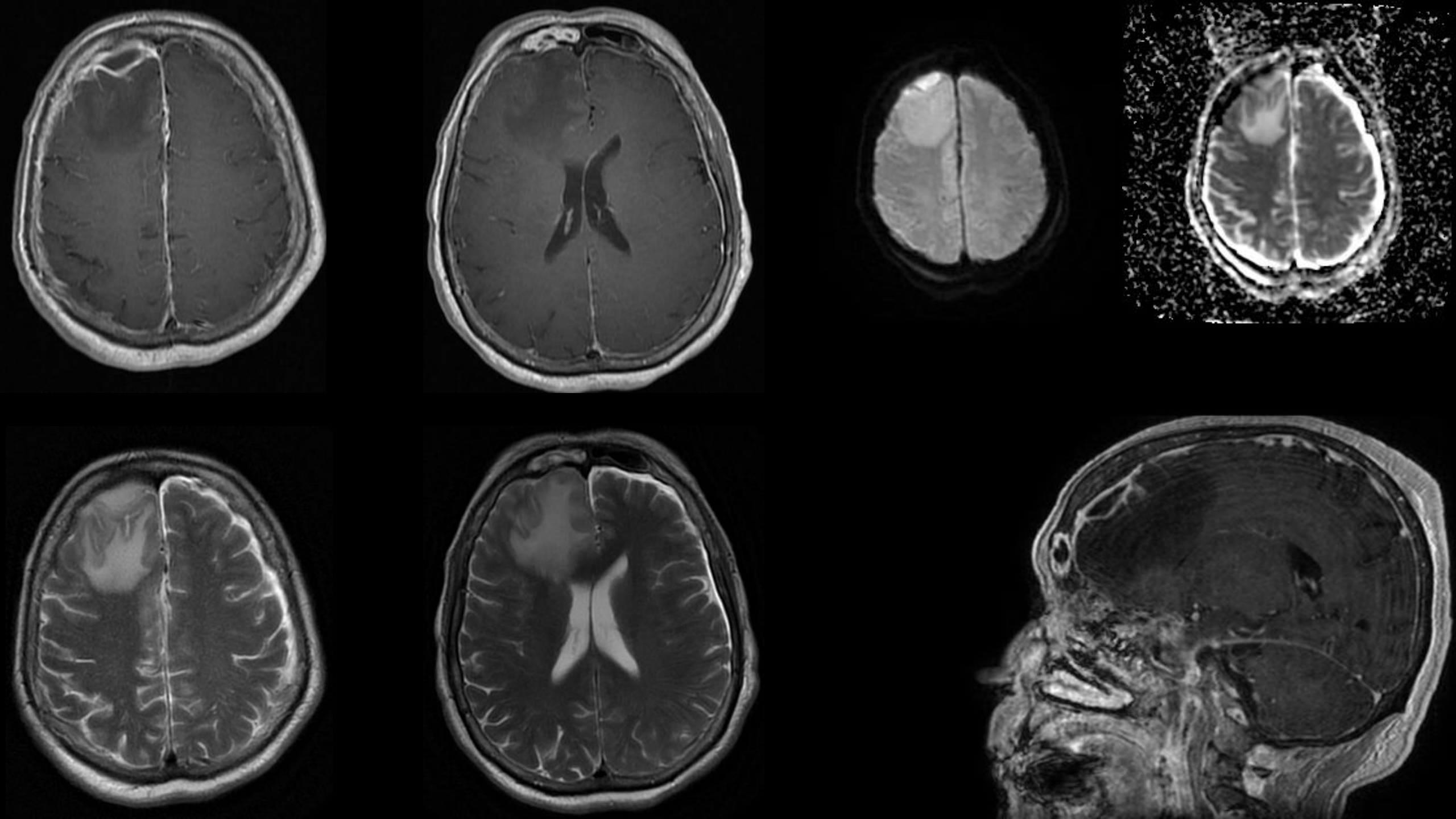
MRI after 6 months

Case 4

70-year-old woman with rheumatoid arthritis on methotrexate and bronchitis since 1 week prior, presents with 2 days of left arm weakness and involuntary shaking, as well as altered taste and numbness on left side of tongue.

Courtesy of Dr. Christine Kim

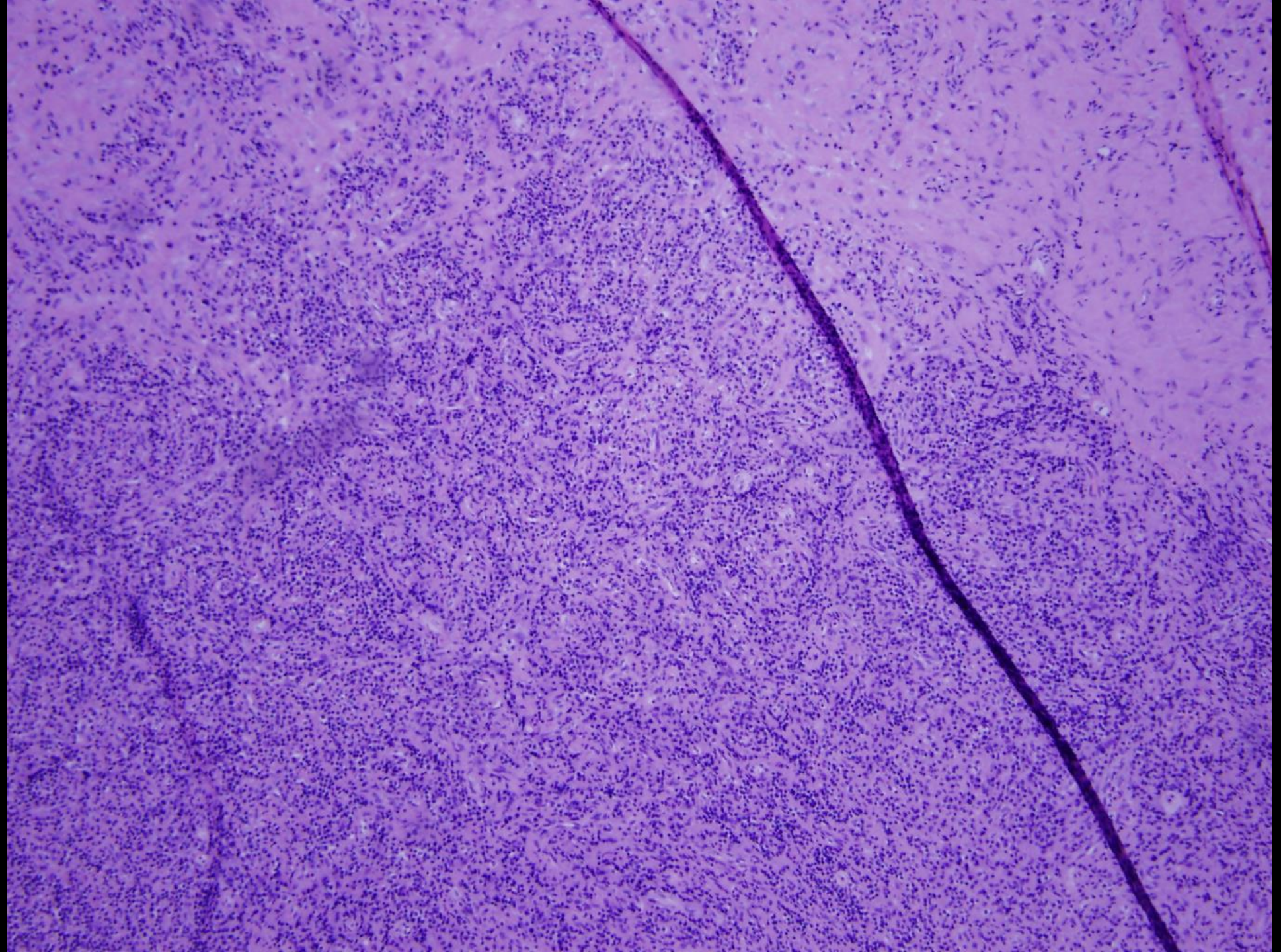





IT'S NAHT A TOOMAH

Right frontal craniotomy

- No epidural empyema
- Subdural empyema extending into right frontal lobe intracerebral abscess



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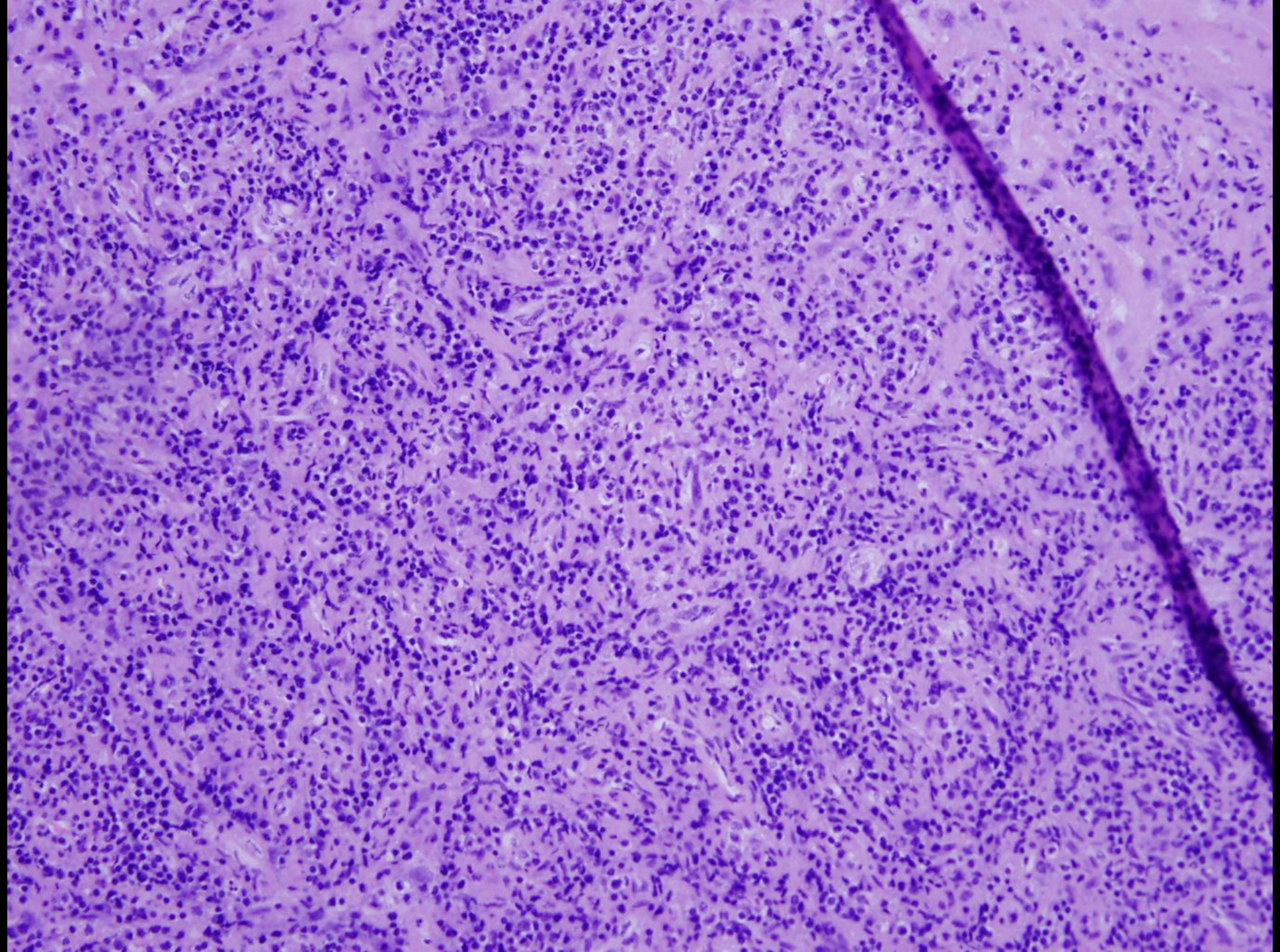

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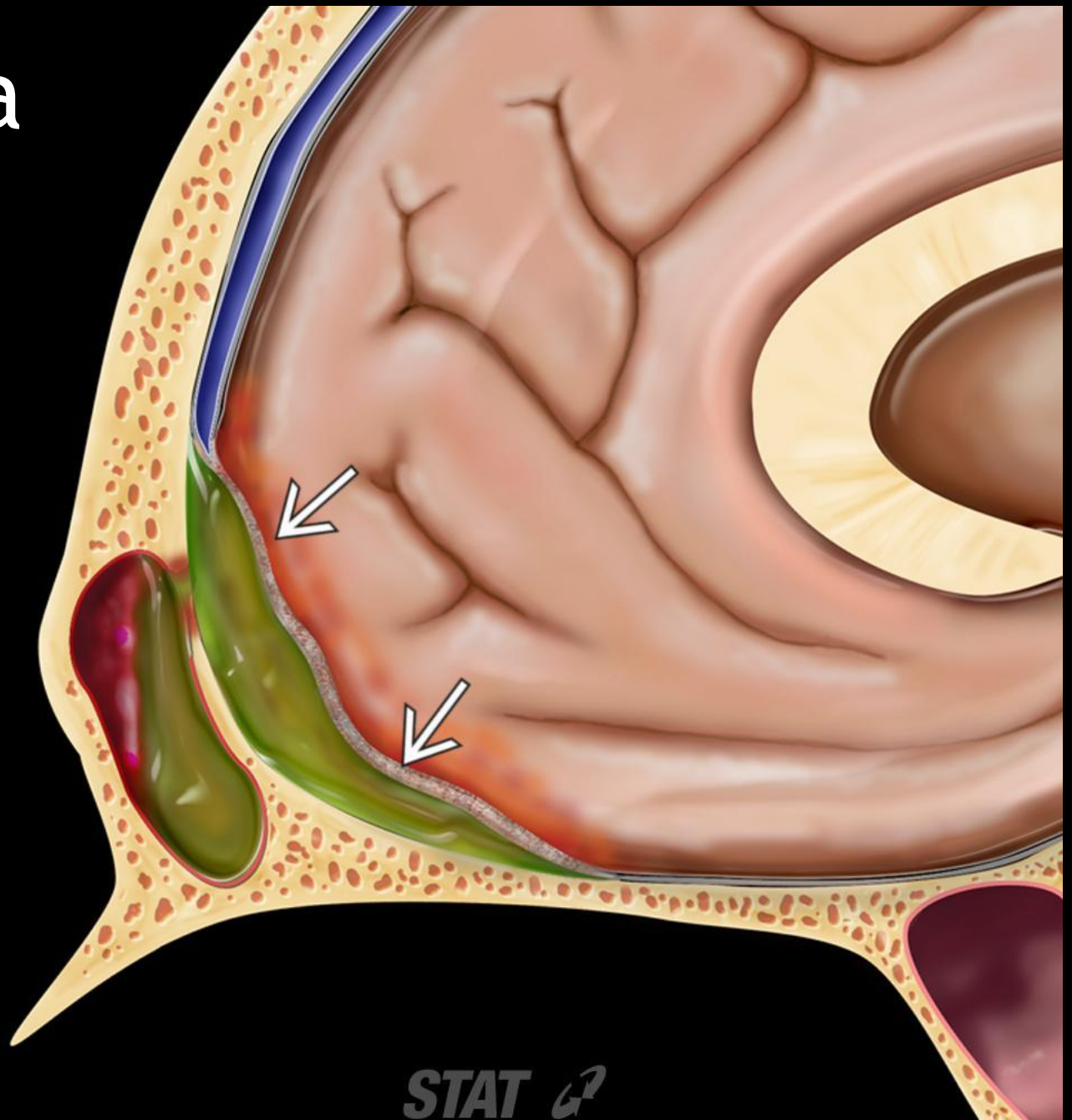
BS-18-09578

Intracranial chronic abscess with organization.

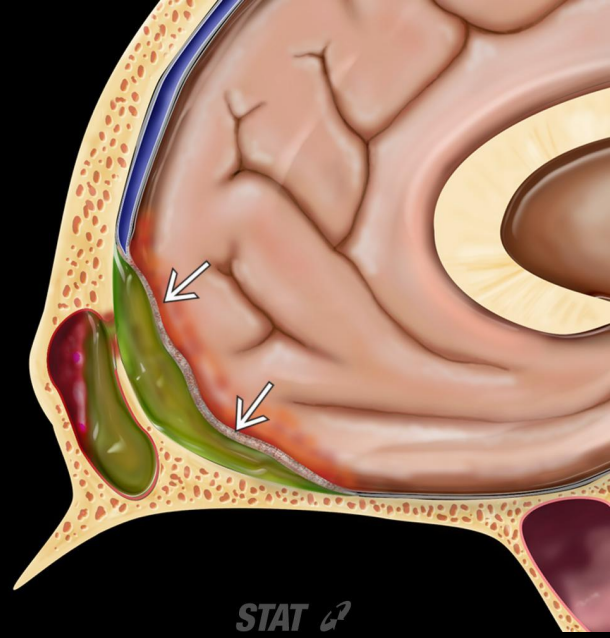
Gram, MSS, and AFB stains are negative for stainable organisms.

Concurrent wound cultures are said to be growing *Pseudomonas aeruginosa* and *Staphylococcus aureus* per Microbiology Laboratory.

Empyema



Empyema



- Extra-axial pus collection
- Subdural >> epidural
- Complication of sinusitis (adults) or bacterial meningitis (children)
- CT: extra-axial, iso- to hyperdense to CSF
- MRI: margin enhancement, diffusion restriction
- Surgical drainage

Differential diagnosis

- Dural neoplasm
  - Often breast or prostate metastasis
  - Diffuse, nodular enhancement
- Chronic subdural hematoma
  - Blood products
  - Loculated
  - Edge enhancement
- Subdural hygroma
  - Nonenhancing CSF
  - May be from chronic subdural hematoma

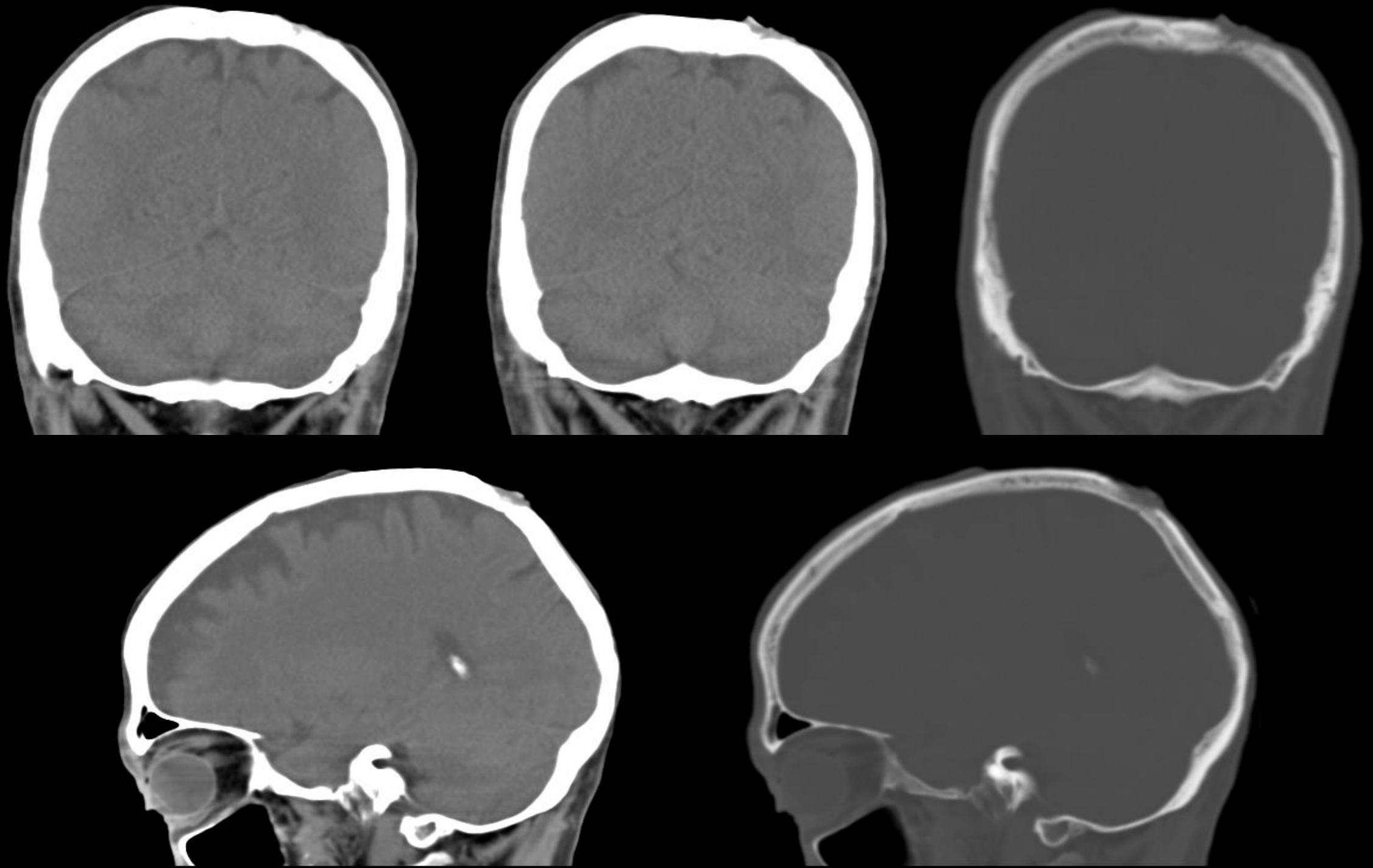
Course

- HD 1: frontal craniotomy and drainage
- HD 5: endoscopic frontal sinus drainage
- HD 7: discharged

No symptoms at 2-week follow-up

Case 5

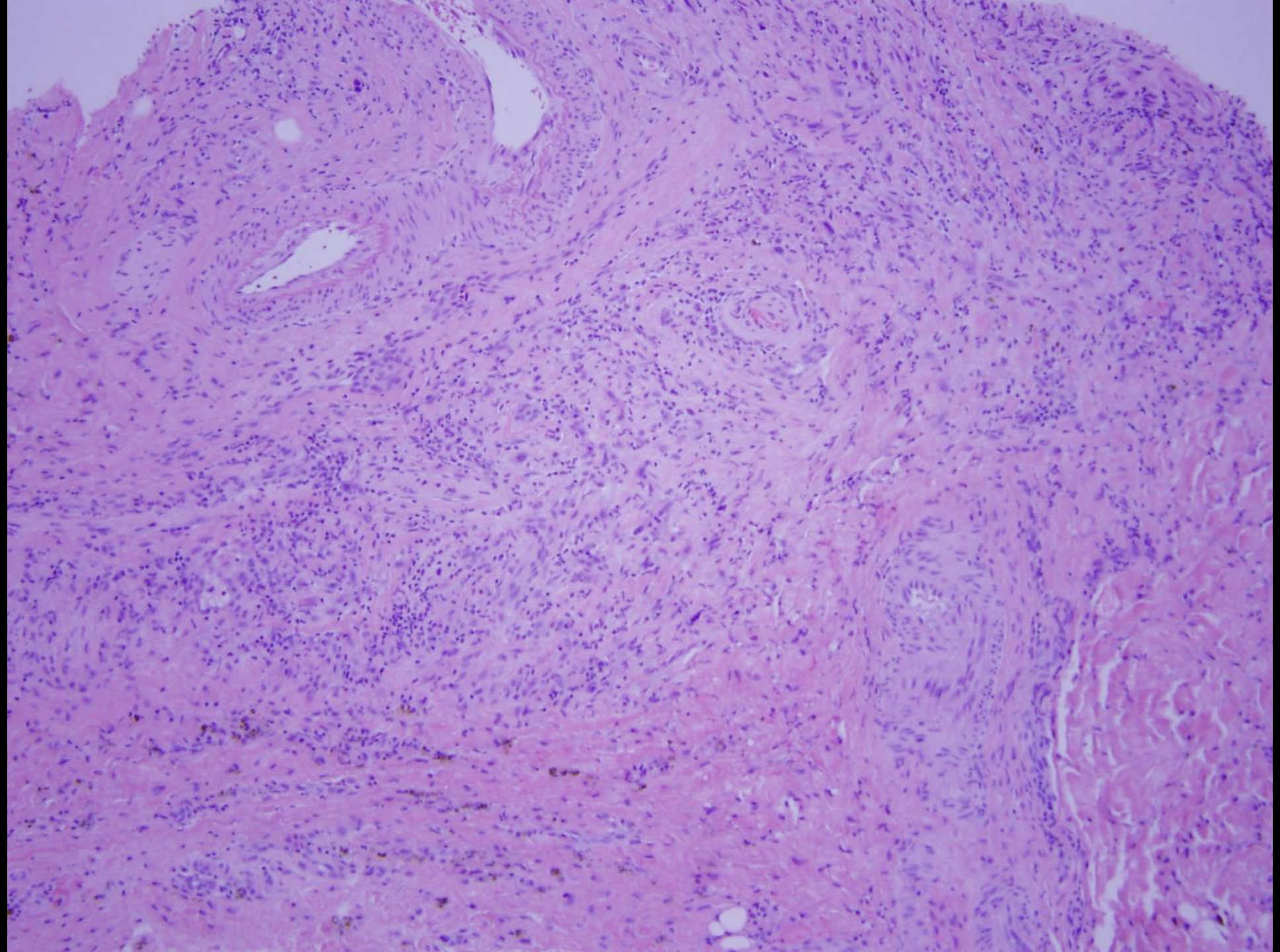
59-year-old man with history of bilateral lung transplant (3 years prior) and squamous cell carcinoma of the scalp status post three excisions (10, 6, and 2 months prior), presenting for follow up.



Physical exam

- Left temporal scalp with 1.1 cm skin-colored fixed subcutaneous nodule
- Mid-frontal scalp with 1 cm hyperkeratotic plaque
- Right parietal scalp with 2 cm eroded plaque

Biopsies taken



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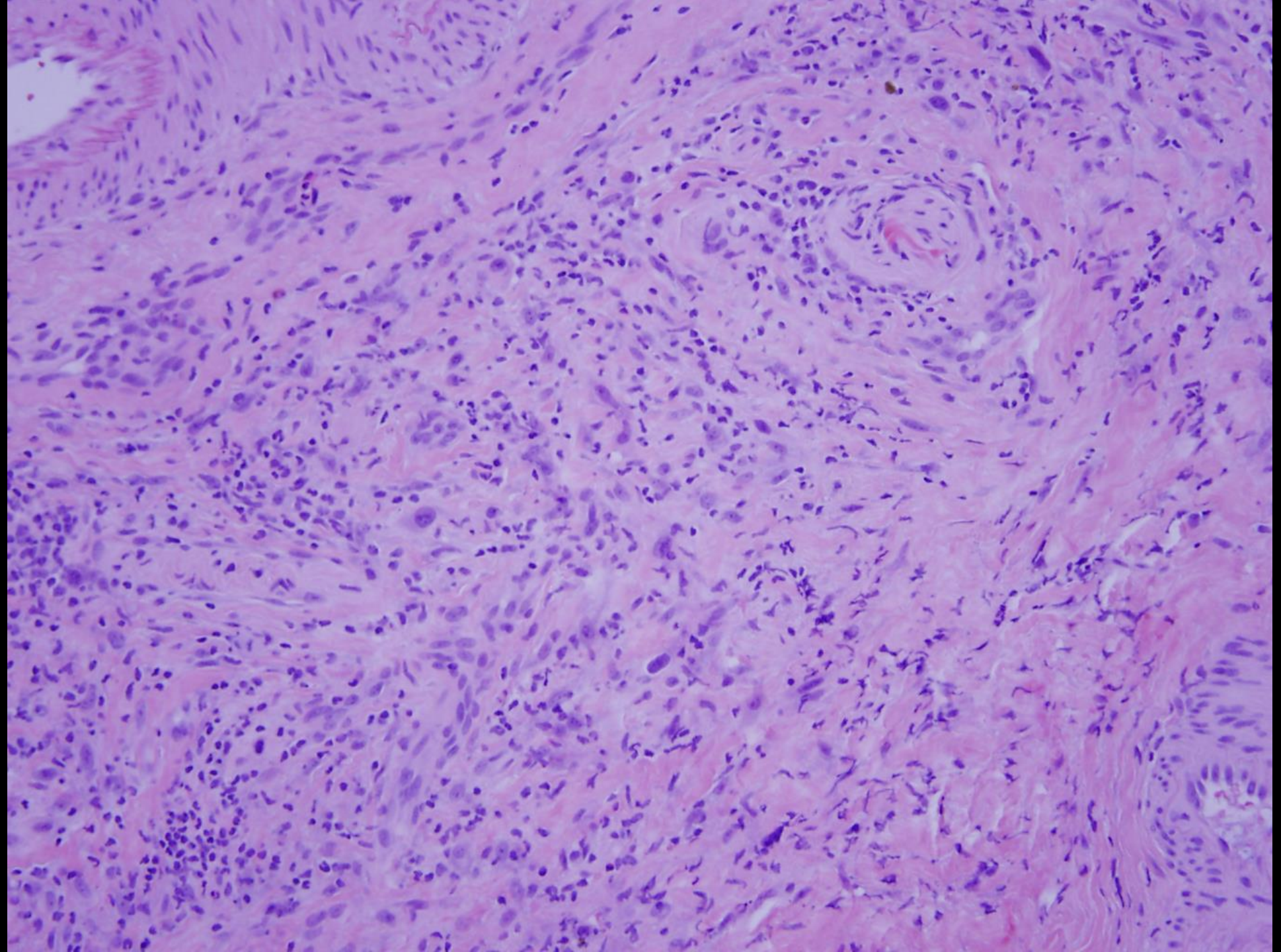

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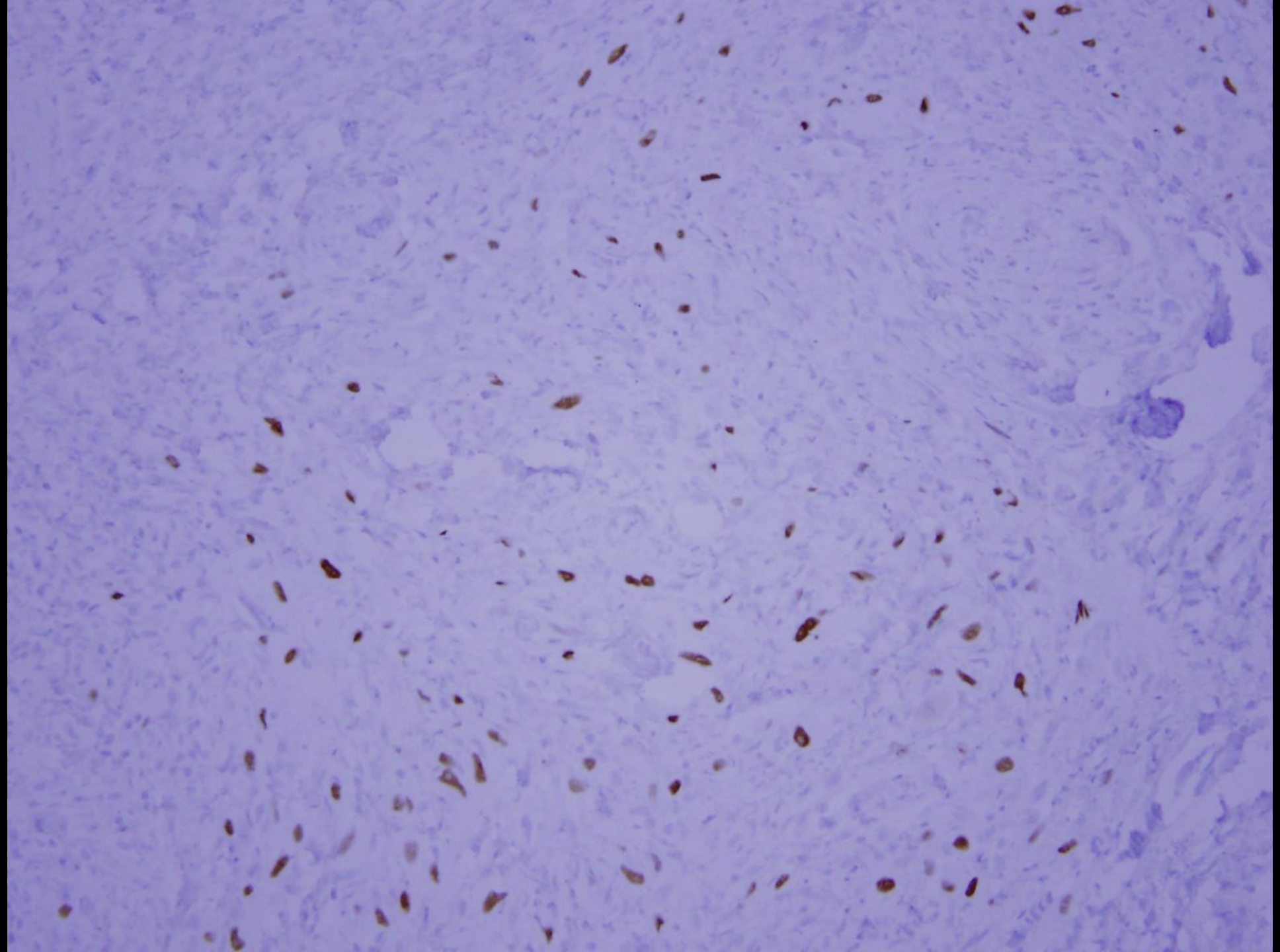

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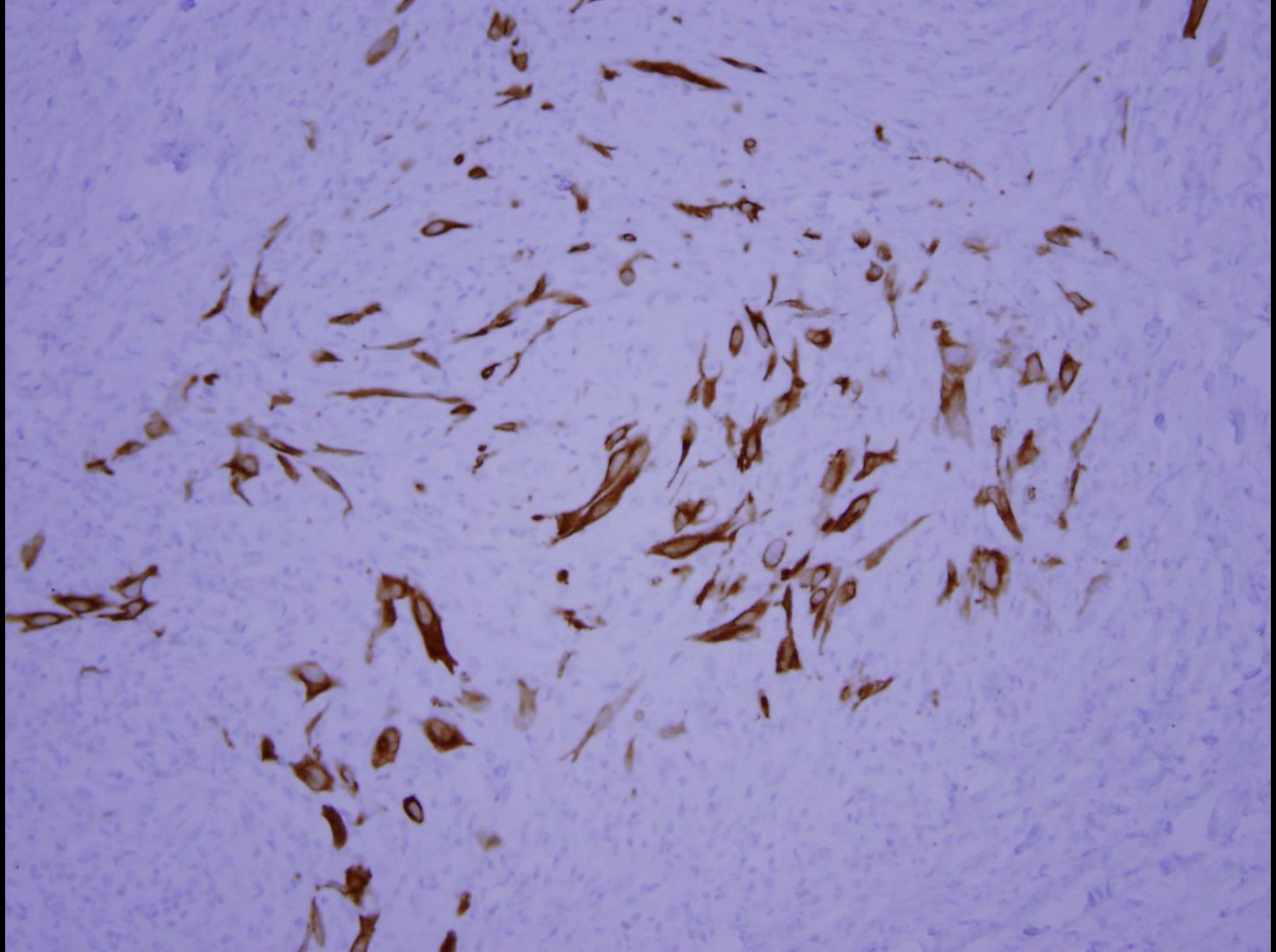
p40



BS-18-10633
CK5

BS-18-10633

Deep dermal/subcutaneous poorly-differentiated carcinoma, consistent with recurrence/metastasis of patient's known SARCOMATOID SQUAMOUS CELL CARCINOMA; present at margin.

Immunohistochemistry performed at BWH demonstrates the following staining profile in lesional cells:

Positive - p63, CK5, p40

Course

- Excision 2 months later: “there clearly was tumor involving the bone”
- Integra mesh (collagen and glycosaminoglycan) placed
- Poor wound healing 1 month later; split-thickness skin graft placed

Acknowledgments

- Angela Giardino, MD
- Raymond Huang, MD, PhD
- Christine Kim, MD