SENRS 50TH ANNUAL MEETING

Spilling the TP53: Radiology-Pathology of a Rare HPAP

Circumscribed Glioma Mimicry & Surveillance in Li-Fraumeni Syndrome

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CLINICAL PRESENTATION

Acute Neurologic Deficits Triggering Motor Vehicle Collision

Acute Event & History

- **Patient Profile:** 26-year-old female presenting after a motor vehicle collision.
- **Preceding Aura:** Acute right visual aura and right arm weakness while driving.
- **Syncopal Seizure:** Sudden loss of consciousness resulted in vehicular collision.

Initial Neuro Exam

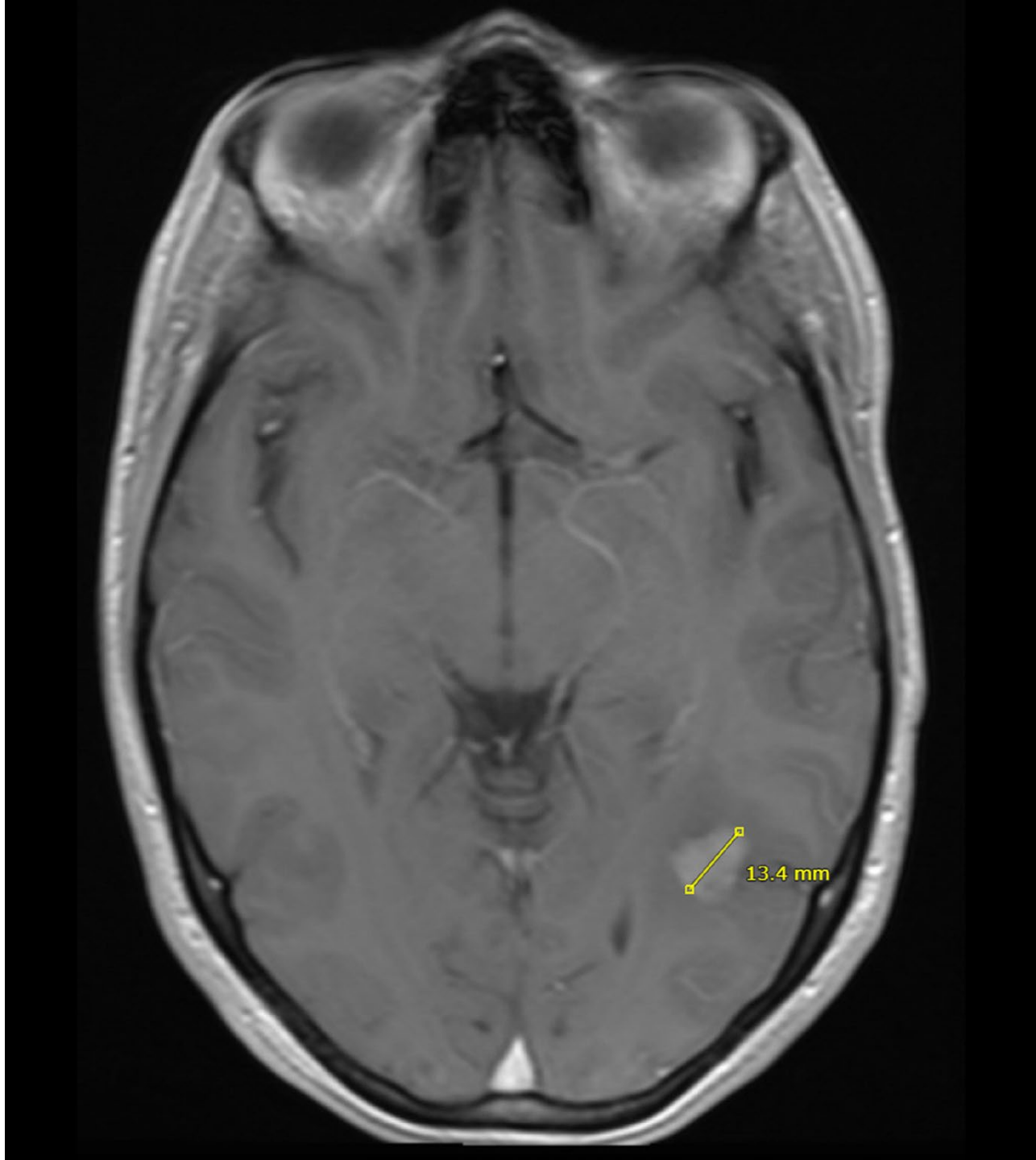
- **Motor Deficits:** Right hemiparesis (4/5) with arm spasticity.
- **Sensory Deficits:** Focal right-sided facial hypoesthesia across forehead and cheek.
- **Diagnostic Triage:** Suspicion of unprovoked seizure prompted emergent brain MRI.

IMAGING DISCUSSION: INDEX LESION

Solitary Occipital Enhancing Nidus

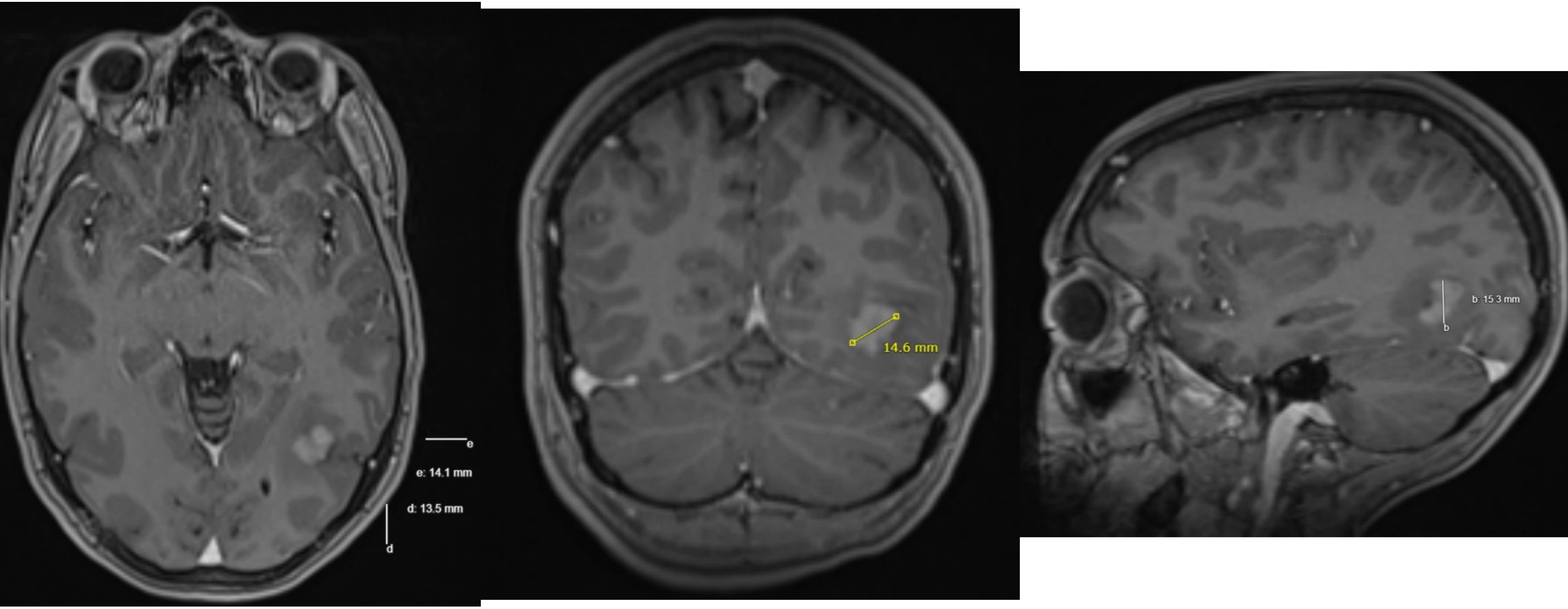
Axial T1 Contrast Features

- **Anatomic Center:** Solitary mass along periphery of left occipital cortex.
- **Discrete Size:** Measures 1.4 x 1.3 cm in maximal transverse dimension.
- **Solid Uptake:** Avid, relatively uniform solid contrast enhancement.
- **Cortical Abutment:** Well-demarcated margin with adjacent leptomeningeal contact.



IMAGING DISCUSSION: INDEX LESION

Initial MPRAGE Axial, Coronal, Sagittal



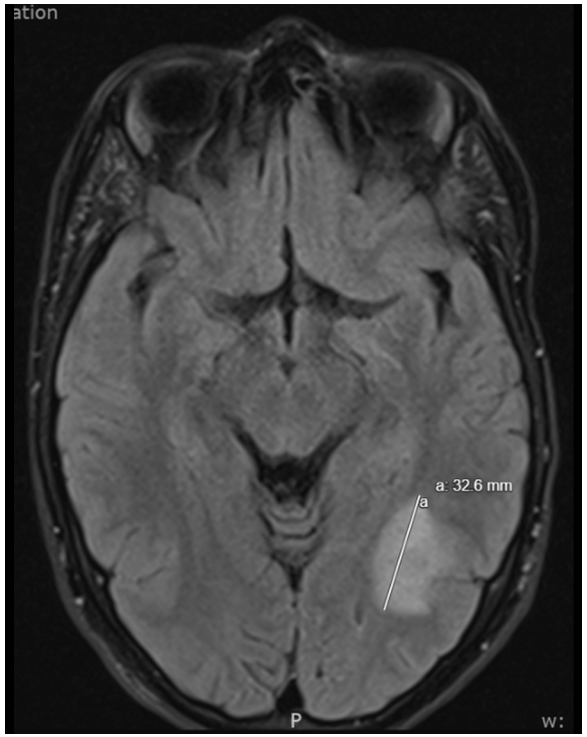
IMAGING DISCUSSION: ADVANCED SEQUENCES

Circumscription on FLAIR & Marked Diffusion Restriction

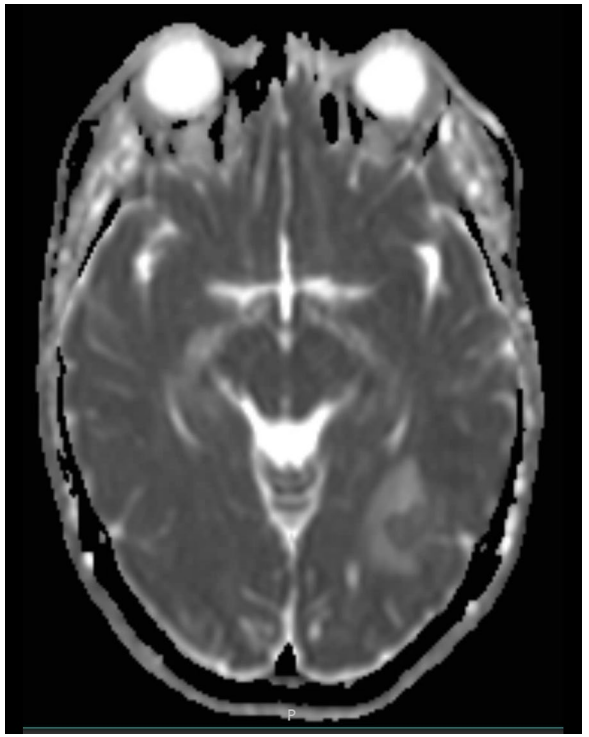
Sequence Analysis

- **T2 / FLAIR Signal:** Hyperintense nidus with ~3.3 cm localized vasogenic edema.
- **Circumscribed Edge:** Lack of infiltrative peritumoral signal distinguishes from GBM.
- **Diffusion Restriction:** Pronounced DWI hyperintensity with profound ADC hypointensity.
- **Dense Cellularity:** Low ADC tracks high cellular density typical of high-grade glioma.

Axial T2 / FLAIR



Axial Diffusion ADC



IMAGING DISCUSSION: DIFFERENTIAL DIAGNOSIS

Distinguishing Circumscribed Cortical Glioma Mimics

PXA Characteristics

- **Classic Pattern:** Peripheral cortical mass with cyst and mural nodule.
- **Histology Overlap:** Pleomorphic cells and eosinophilic granular bodies.
- **Genetics:** Driven by BRAF V600E and CDKN2A deletion.

Other Cortical Mimics

- **Ganglioglioma:** Cortical solid-cystic mass with mural calcification.
- **Astroblastoma:** Well-demarcated nodular mass with MN1 alteration.
- **PLNTY:** Discrete oligodendroglioma-like cortical lesions.

HPAP vs. Glioblastoma

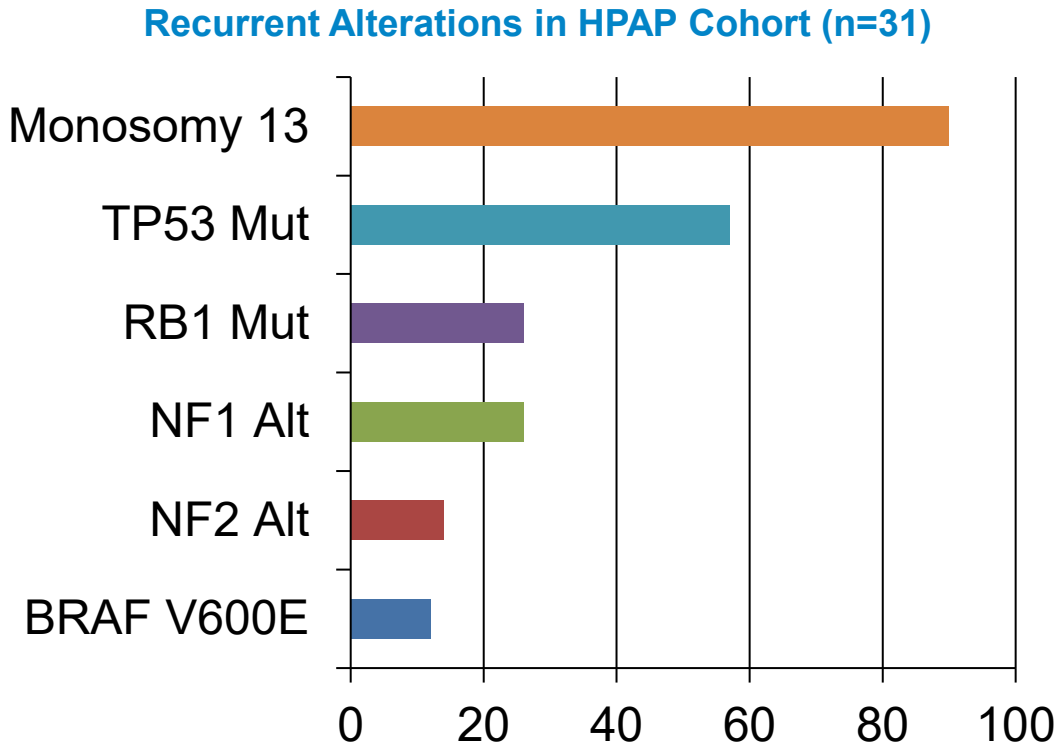
- **Circumscription:** HPAP presents as a discrete mass mimicking PXA.
- **GBM Features:** Infiltrative margins, thick ring enhancement, necrosis.
- **Diagnostic Need:** DNA methylation profiling is required to confirm.

MANAGEMENT: PATHOLOGY & MOLECULAR INTEGRATION

Histologic PXA Mimicry Resolved by Methylation Profiling

Diagnostic Evolution

- **Frozen Section:** Hypercellular glial neoplasm with pleomorphic cells.
- **Initial Impression:** Ki-67 ~5%; morphology and EGBs favored PXA.
- **NGS Mutational Panel:** Identified TP53 p.R158H and truncating NF1 p.R440*.
- **CMA Cytogenetics:** Confirmed monosomy 13 (-13); lacked BRAF V600E.
- **Integrated Diagnosis:** DNA methylation confirmed high-grade glioma (HPAP).



MANAGEMENT: INTEGRATED TREATMENT PARADIGM

Genetics, Surgical Excision & Radiation Avoidance

Germline Li-Fraumeni

- **Genetic Testing:** Ambry panel confirmed heterozygous germline TP53 c.473G>A.
- **Syndrome Diagnosis:** Established Li-Fraumeni syndrome (LFS); first HPAP association.
- **Cancer Pedigree:** Maternal choriocarcinoma, grandfather prostate, and radiation sarcoma.

Surgical Resection

- **Gross Total Excision:** Left craniotomy achieved macroscopic resection of enhancing nidus.
- **Clear Cavity:** Minimal surrounding fluid without acute hemorrhage or infarct.
- **Functional Recovery:** Patient recovered baseline ambulatory function postoperatively.

Radiation Sparing

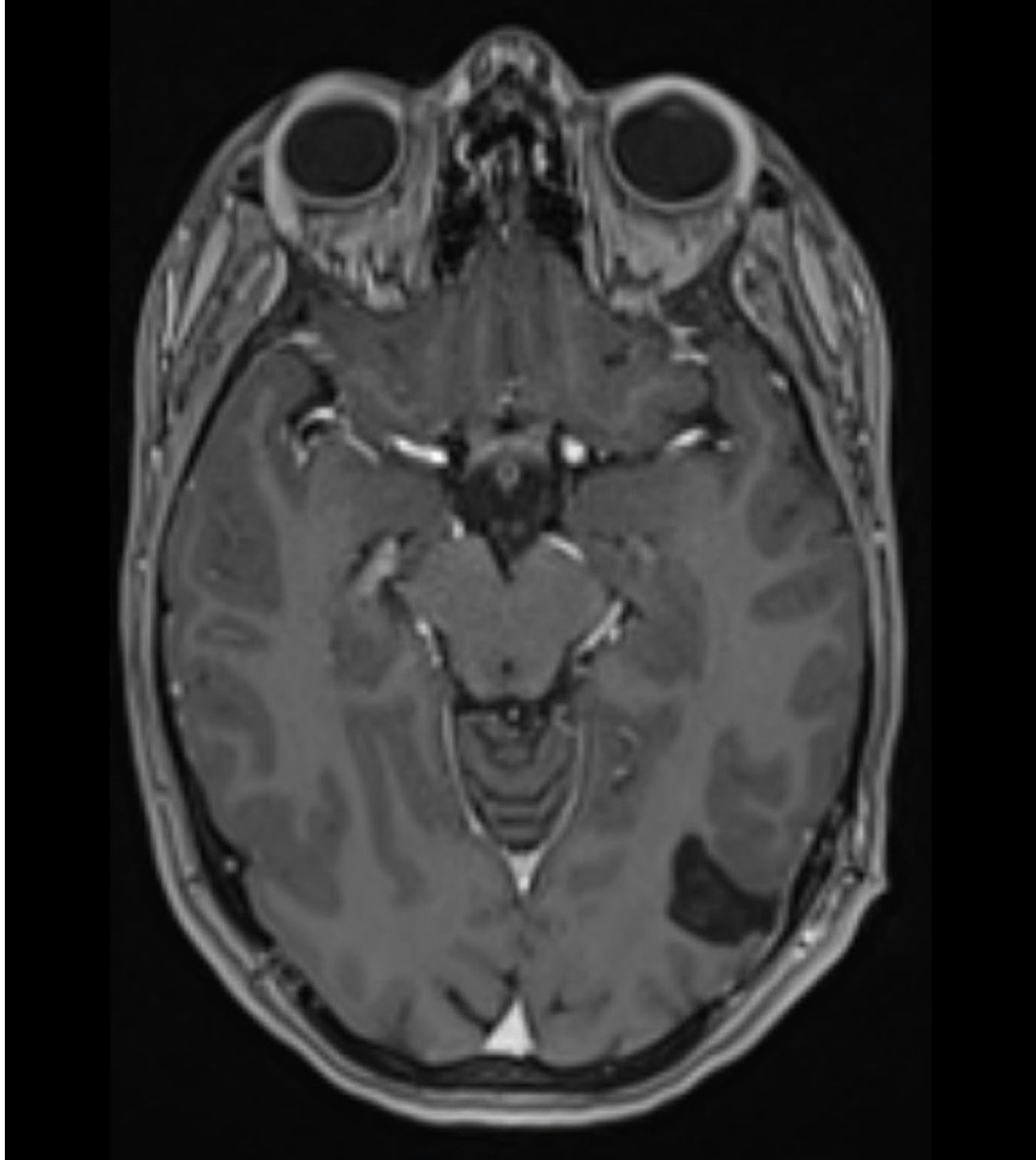
- **Strict Radiation Omission:** Radiotherapy avoided due to secondary sarcoma risk in LFS.
- **Chemo Deferred:** Temozolomide deferred after tumor board discussion.
- **Surveillance Strategy:** Fertility preservation completed; active 3-month MRI follow-up.

OUTCOME: LONGITUDINAL NEUROIMAGING

Fourteen-Month Remission & Calvarial Finding

Longitudinal Findings

- **Tumor Bed:** Stable encephalomalacia without recurrent nodule.
- **NED Remission:** No Evidence of Disease confirmed at 14 months.
- **Calvarial Finding:** Incidental 7-mm frontal lesion (probable hemangioma).
- **CT Avoidance:** Occult on CT; followed by MRI to spare radiation.
- **Neuraxis Precaution:** Spinal metastasis risk supports craniospinal MRI.



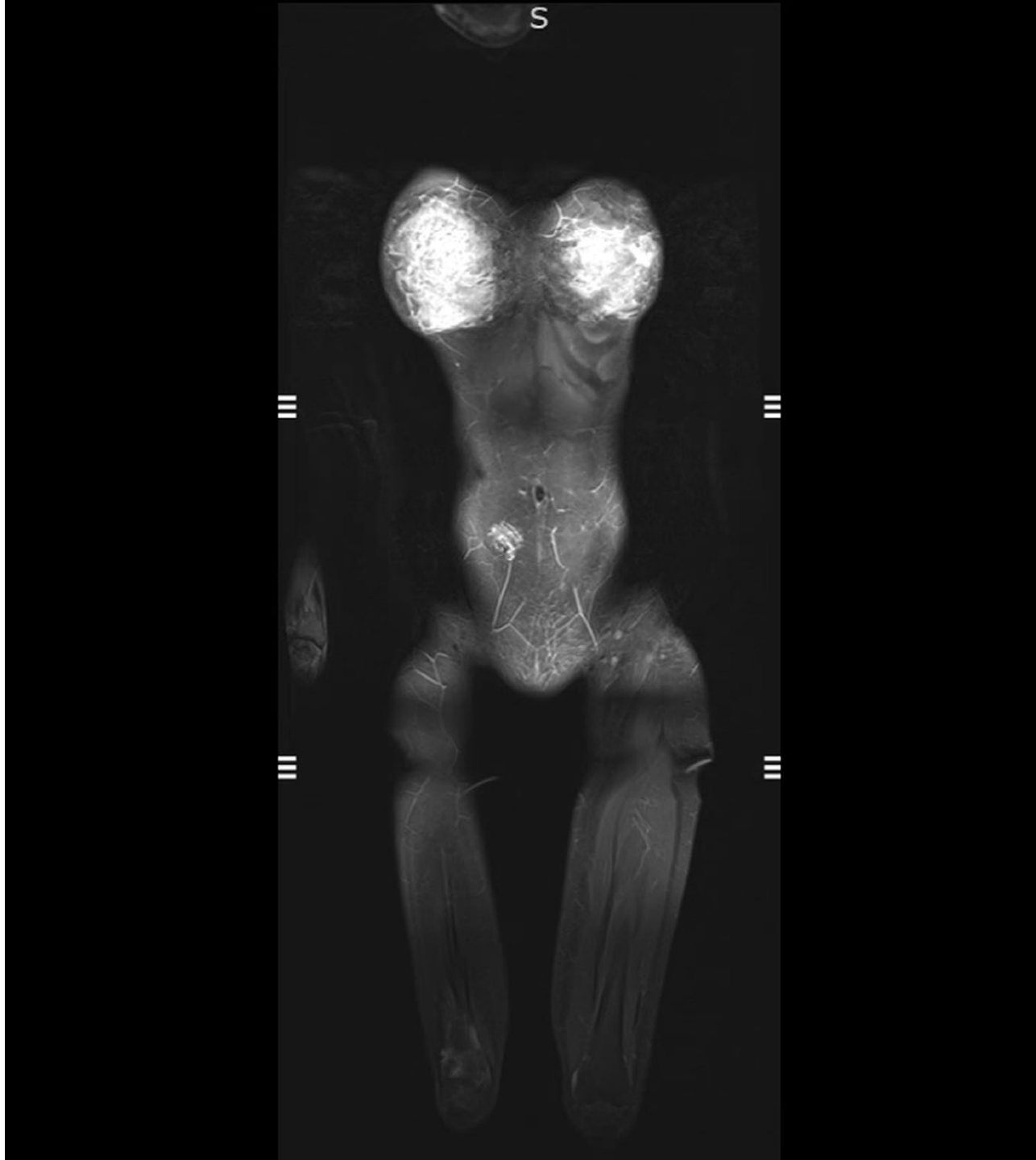
SENRS 50th Annual Meeting | Axial 3D MPRAGE Surveillance (14 Months Post-Op)

OUTCOME: WHOLE-BODY MRI & INCIDENTALOMAS

Whole-Body MRI & The Incidentaloma Burden

Surveillance & Incidentalomas

- **LFS Protocol:** Annual whole-body, dedicated brain, and breast MRI.
- **Cancer-Free:** Confirmed absence of internal malignancy (high NPV).
- **Abdominal Edema:** 2.5 cm subcutaneous edema from fertility injections.
- **Benign Findings:** Remnant thymus and stable TI-RADS 3 thyroid nodule.
- **Clinical Pearl:** Anticipate benign incidentalomas; avoid biopsy.



TAKE HOME POINTS: PRACTICE PEARLS

Key Clinical, Radiological, and Surveillance Lessons

Diagnostic Pearls

- **Circumscribed Mimic:** Consider HPAP in young adult cortical brain tumors.
- **MRI Clues:** Low ADC and lack of infiltrative FLAIR edema.
- **Molecular Anchor:** DNA methylation profiling is required to confirm.

Genetics & Safety

- **Reflex Testing:** Tumor TP53 alterations demand germline testing.
- **LFS Identification:** Diagnosis pivots follow-up to lifelong surveillance.
- **Radiation Sparing:** Omit radiation therapy and minimize CT scans.

Surveillance Discipline

- **Whole-Body Protocol:** Annual whole-body and dedicated brain MRI.
- **Incidentaloma Burden:** Expect benign false alarms; avoid invasive biopsy.
- **Spine Precaution:** Metastasis risk supports craniospinal monitoring.

REFERENCES

Key Literature & Clinical Practice References

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