

AMSER Case of the Month

July 2021

25-year-old female with galactorrhea, amenorrhea, fatigue, and “squeezing” pressure in head

George Avetian, MS3

Drexel University College of Medicine

Neiladri Khan, DO

Albert Sohn, MD

Jody Leonardo, MD

Matthew Hartman, MD

Allegheny Health Network



Patient Presentation

- **HPI:** 25-year-old G0P0 female presents with 10 months of galactorrhea and amenorrhea after stopping use of OCPs. She also endorses general fatigue and “squeezing” pressure on the left side of her head associated with eye strain for the past 2 weeks.
- **ROS:** Denies headaches, vision changes, weight changes, change in libido, increased thirst, abdominal striae, or enlargement of her hands or feet
- **PMHx:** Hypothyroidism, depression
- **PSHx:** Adenoidectomy, tonsillectomy, oophorectomy
- **Medications:** Levothyroxine 175mcg

Pertinent Physical Exam and Lab Findings

- **Physical Exam**

- Neurologic: A&Ox3, full strength and sensation in all 4 extremities, CN II-XII intact, DTRs intact
- Ophthalmic: visual acuity 20/20 bilaterally with full visual fields

- **CBC/BMP: Within normal limits**

- **Hormone Workup**

- Prolactin: 51.9ng/mL (normal adult female = 4.8-23.3ng/mL)
- TSH, free T4, FSH, LH, estradiol, IGF1, cortisol (am), ACTH, and alpha subunit all within normal limits
- Negative urine pregnancy test

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1:

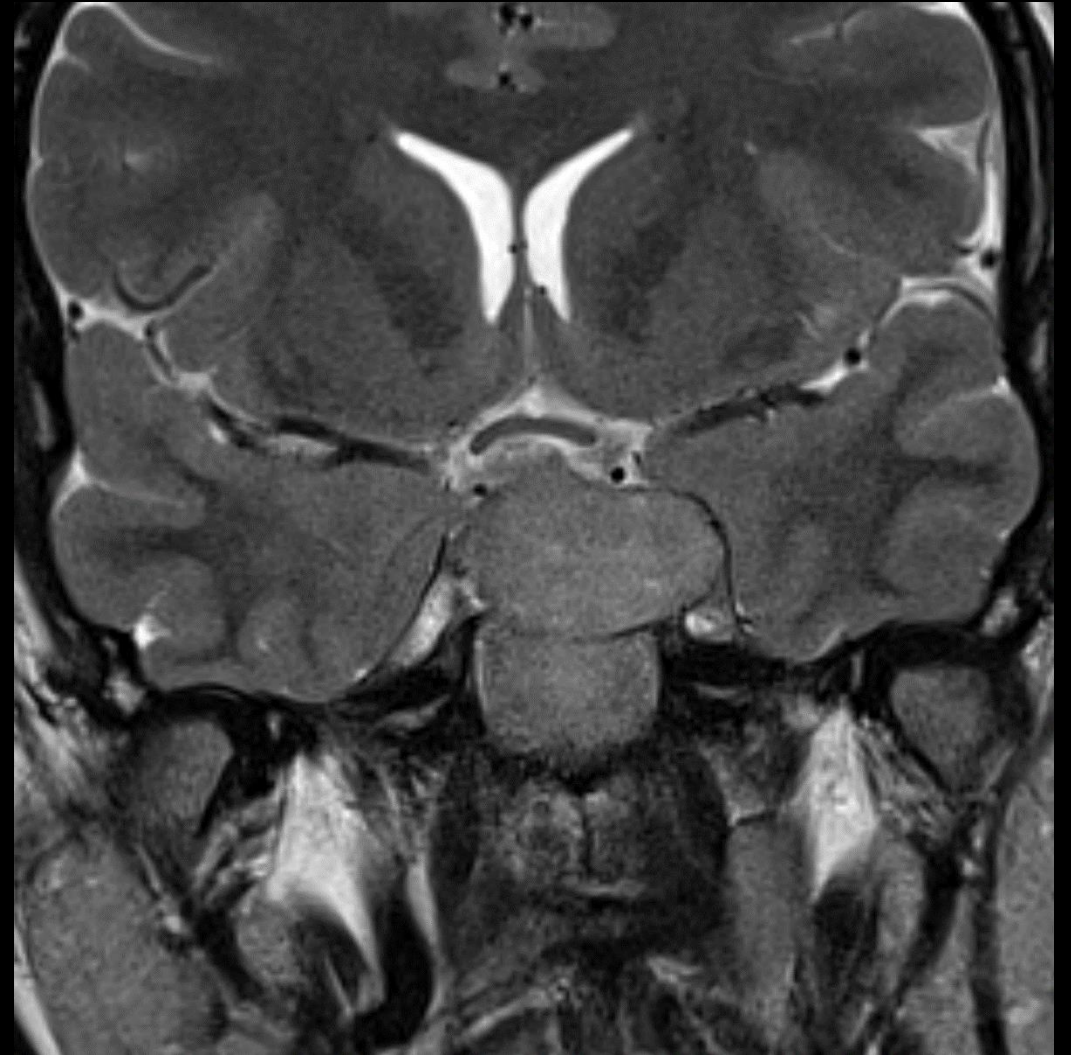
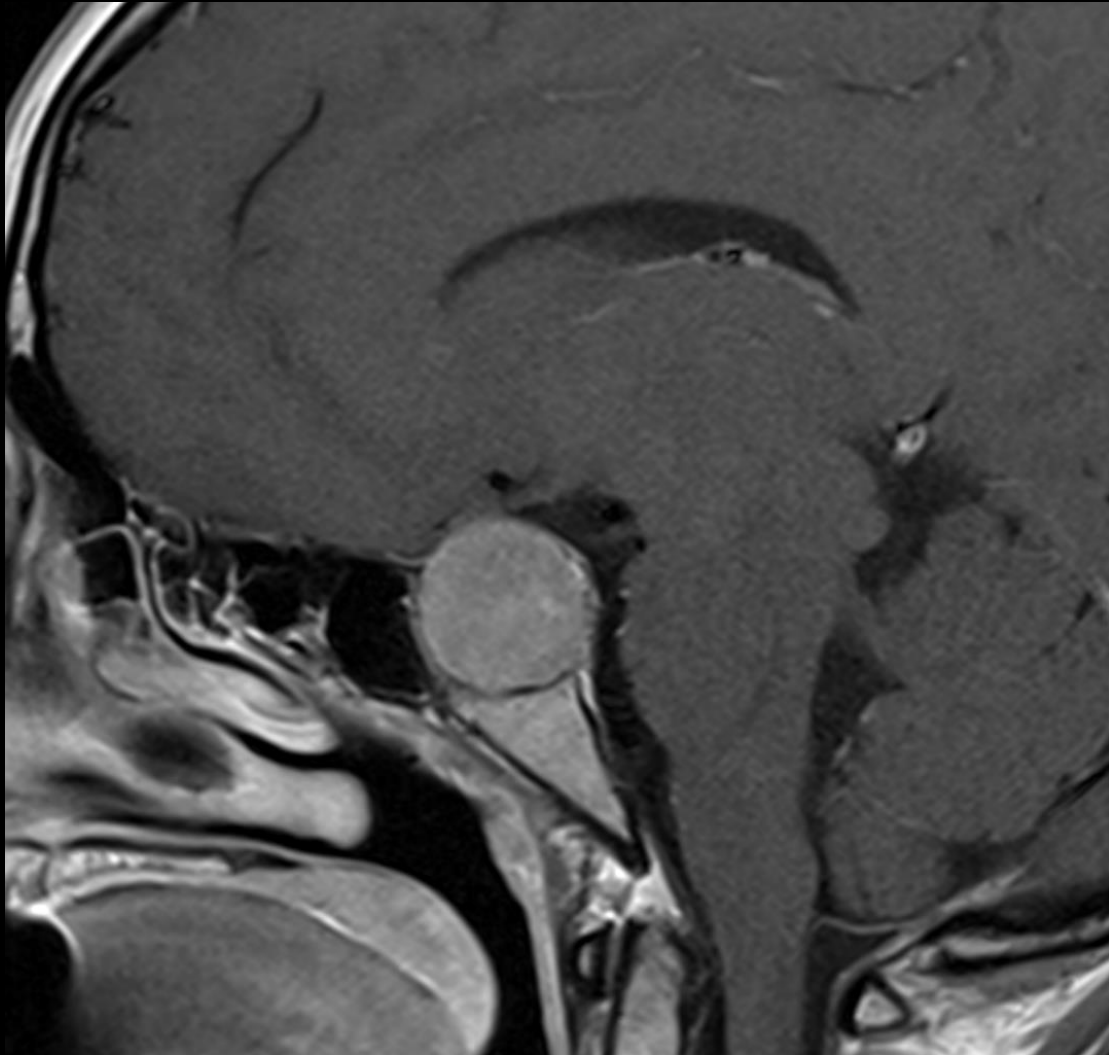
Adult. Suspected or known hypofunctioning pituitary gland (hypopituitarism, growth hormone deficiency, growth deceleration, panhypopituitarism, hypogonadotropic hypogonadism). Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
MRI sella without and with IV contrast	Usually Appropriate	○
MRI sella without IV contrast	Usually Appropriate	○
CT sella with IV contrast	May Be Appropriate	⊕⊕⊕
MRI sella with IV contrast	May Be Appropriate	○
CT sella without IV contrast	Usually Not Appropriate	⊕⊕⊕
CTA head with IV contrast	Usually Not Appropriate	⊕⊕⊕
MRA head without IV contrast	Usually Not Appropriate	○
MRA head with IV contrast	Usually Not Appropriate	○
MRA head without and with IV contrast	Usually Not Appropriate	○
CT sella without and with IV contrast	Usually Not Appropriate	⊕⊕⊕
Radiography sella	Usually Not Appropriate	⊕
Venous sampling petrosal sinus	Usually Not Appropriate	Varies

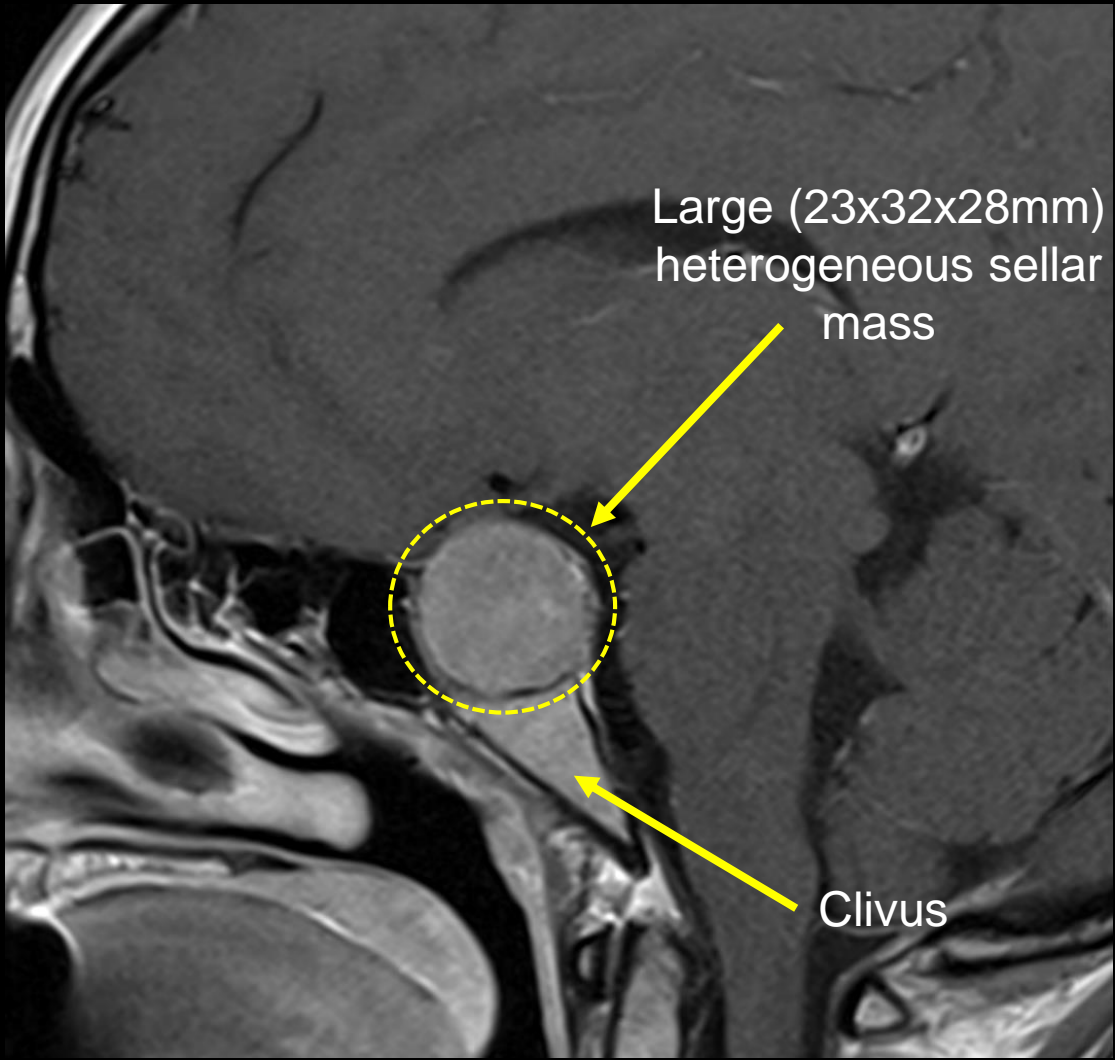
This imaging modality was initially ordered by the physician



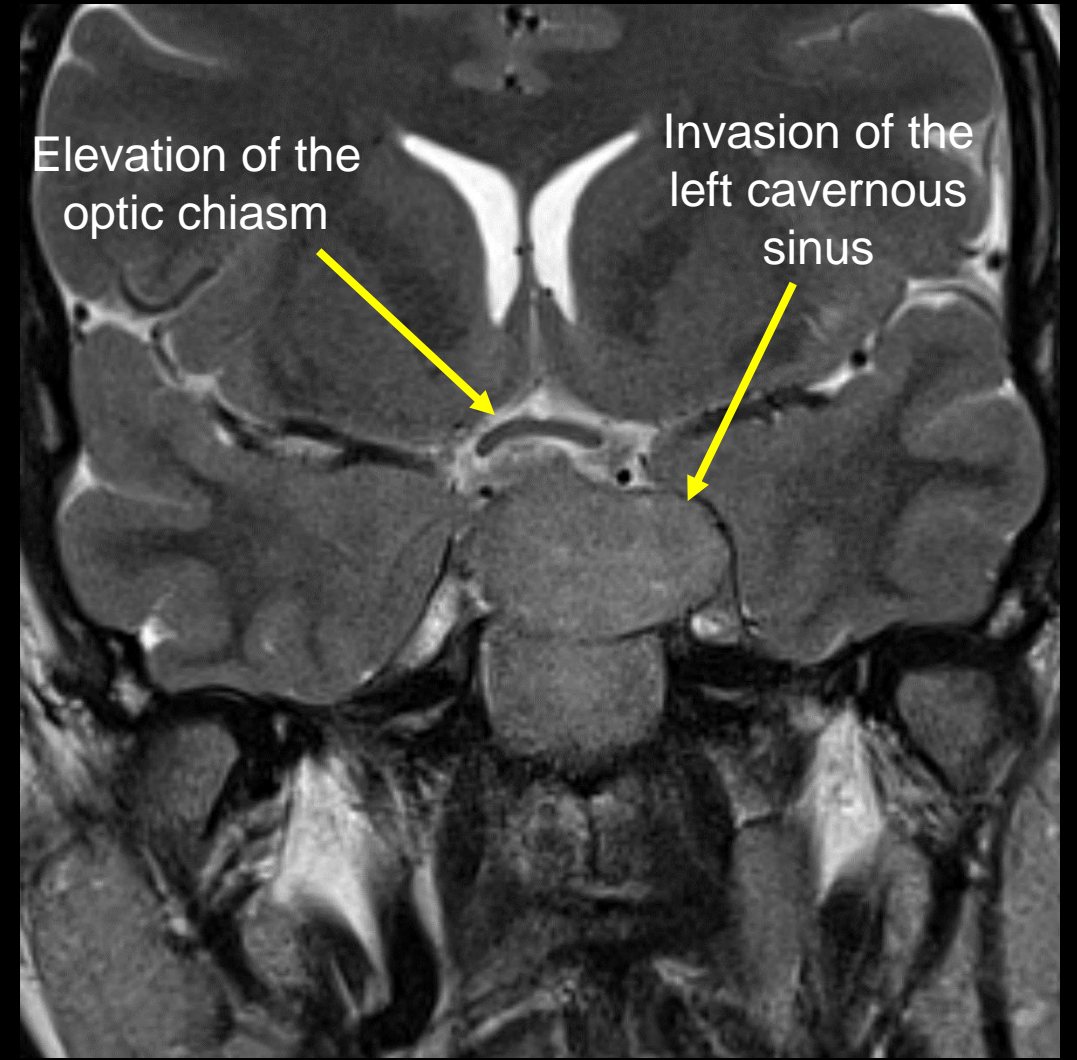
MRI with Pituitary Protocol (unlabeled)



MRI with Pituitary Protocol (labeled)

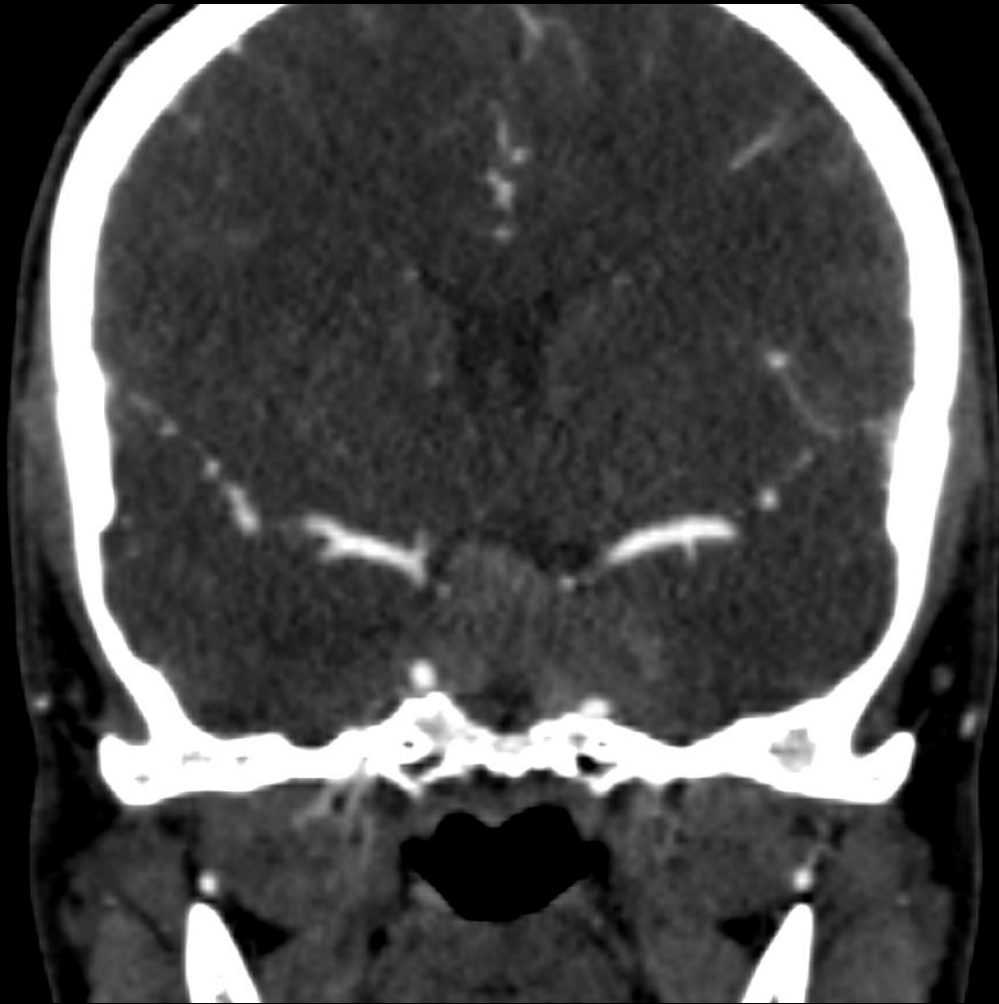


Sagittal T1 post contrast



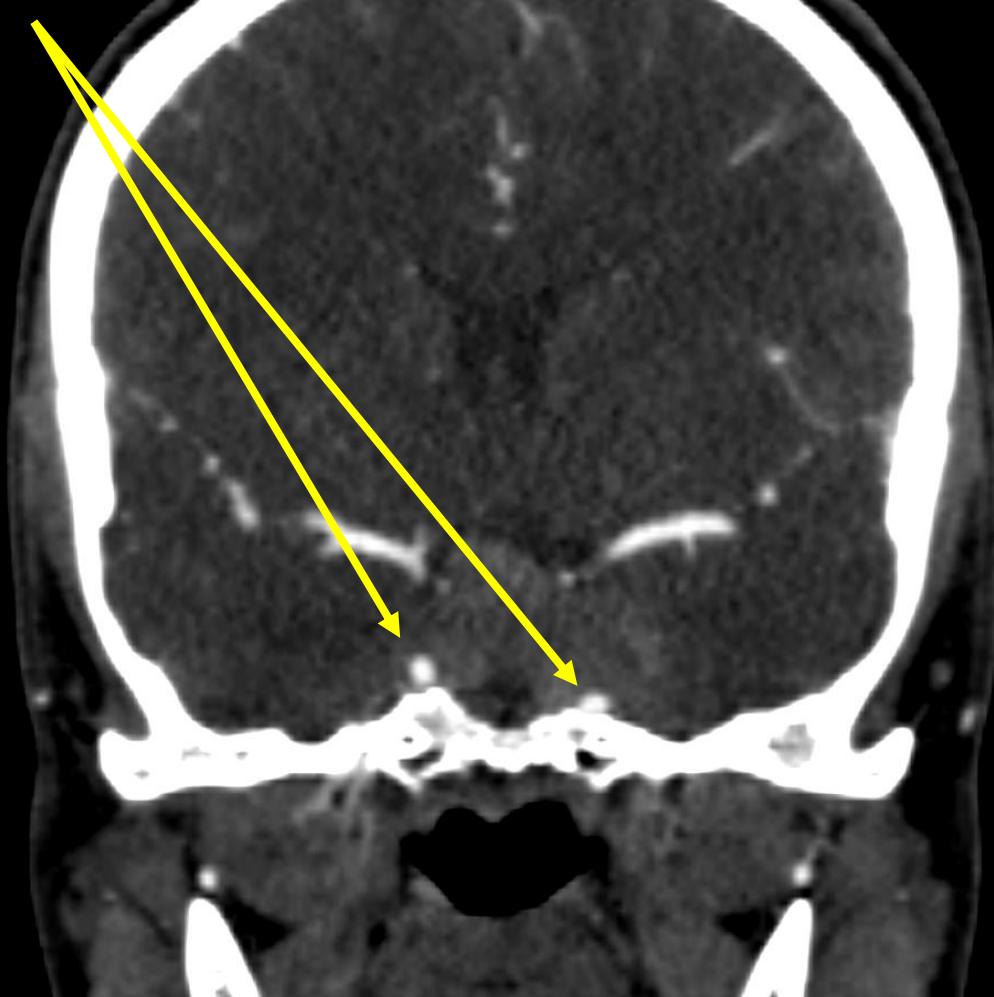
Coronal T2

CT Angiography (unlabeled)

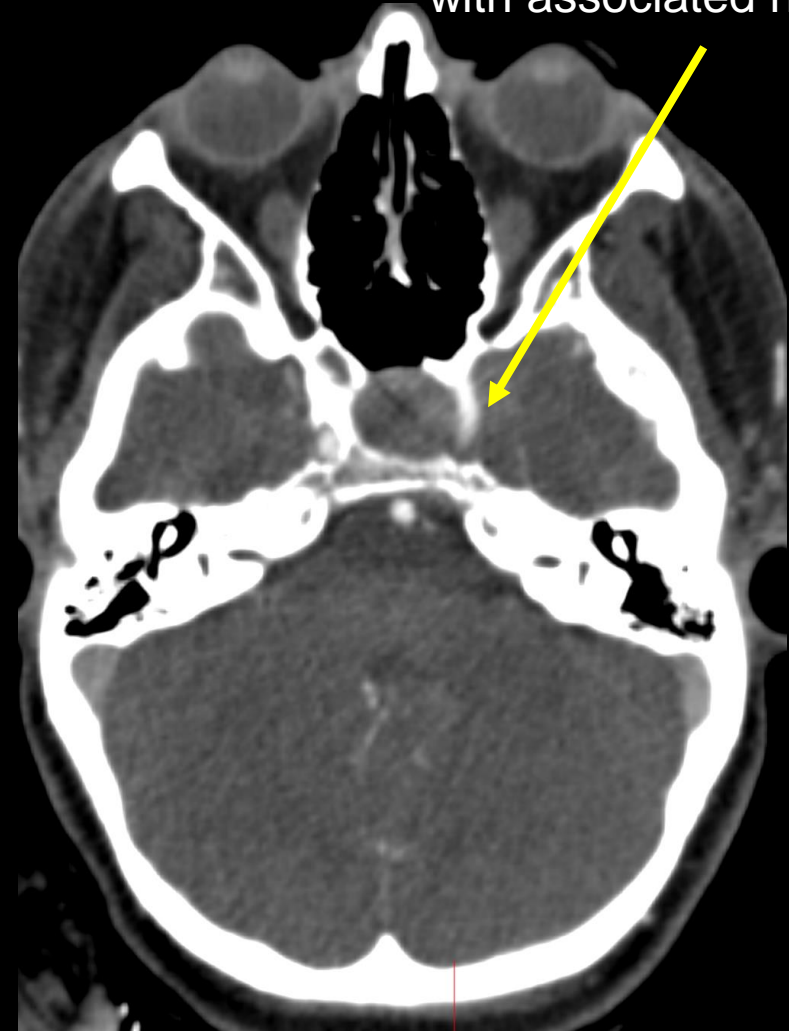


CT Angiography (labeled)

Bilateral encasement of the ICAs with greater invasion into the left cavernous sinus



Encasement of the left ICA with associated narrowing



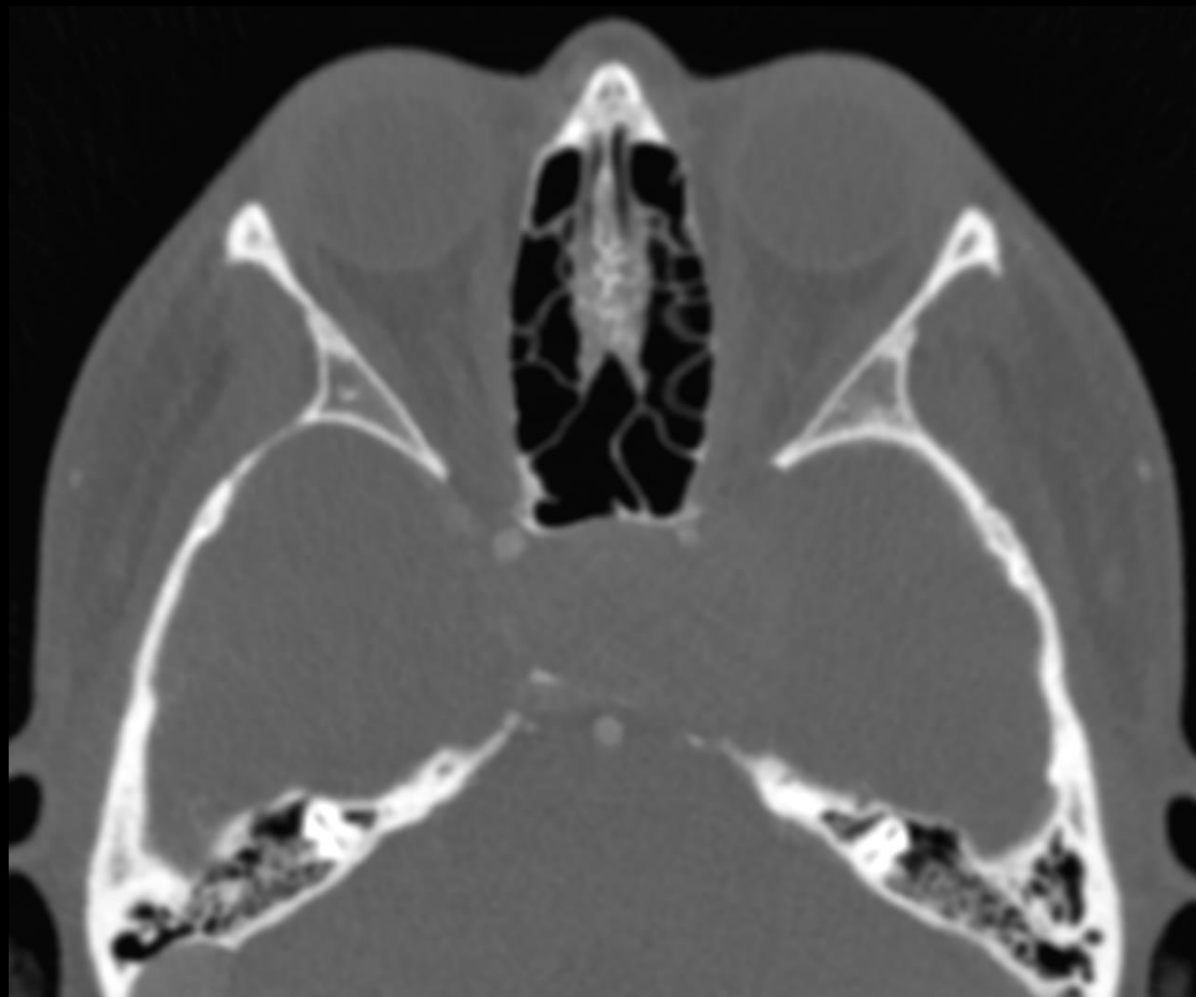
Differential Diagnoses for Suprasellar Masses

- Mnemonic = **SATCHMO**
 - **S:** Sarcoid, Suprasellar extension of a pituitary adenoma
 - **A:** Aneurysm
 - **T:** Teratoma, Tolosa-Hunt Syndrome
 - **C:** Craniopharyngioma, Clerk Cyst (Rathke)
 - **H:** Hypothalamic Glioma (adults), Hypothalamic Hamartoma (children)
 - **M:** Meningioma, Metastasis
 - **O:** Optic Nerve Glioma

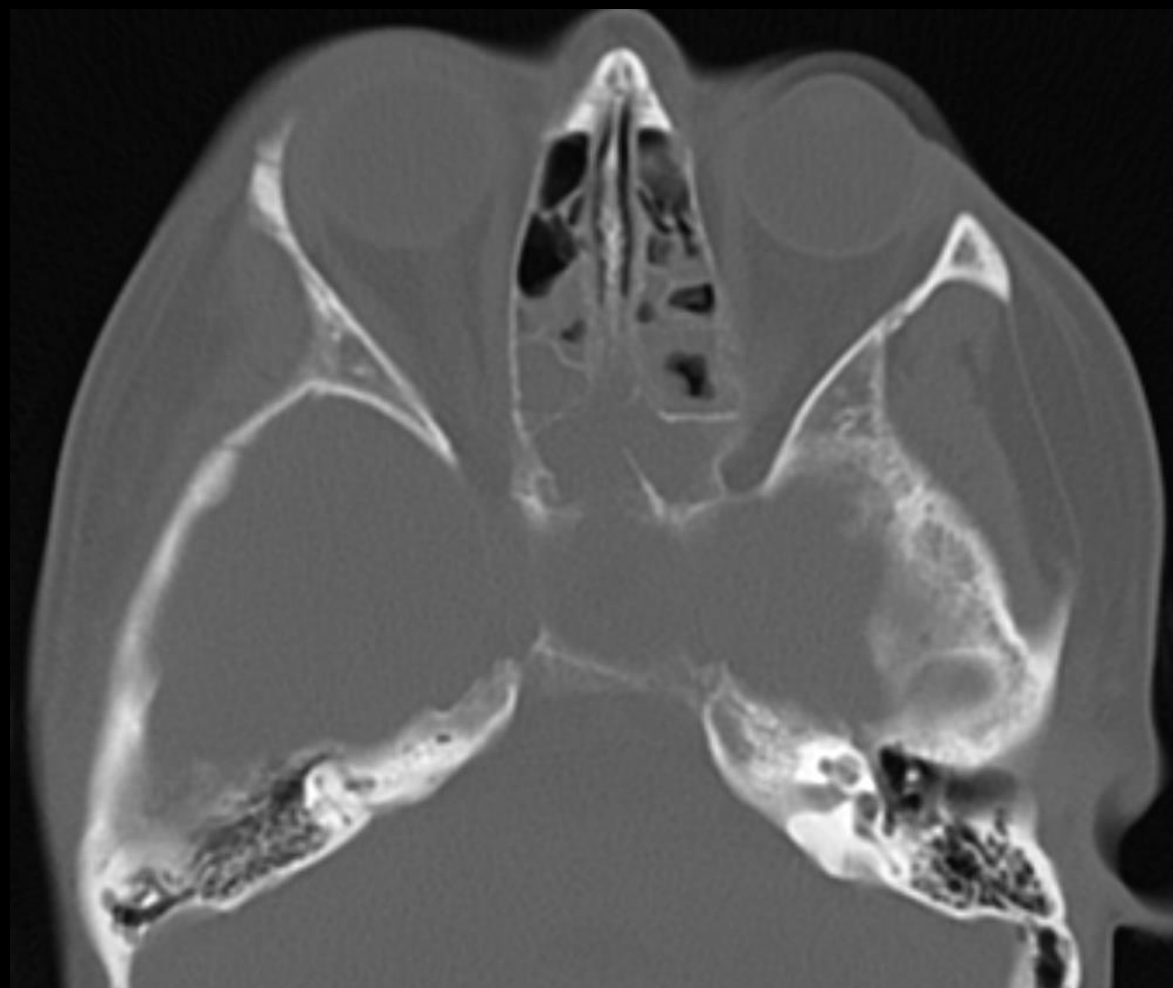
Final Dx:

Pituitary Macroadenoma

Pre-Op vs. Post-Op Imaging (unlabeled)

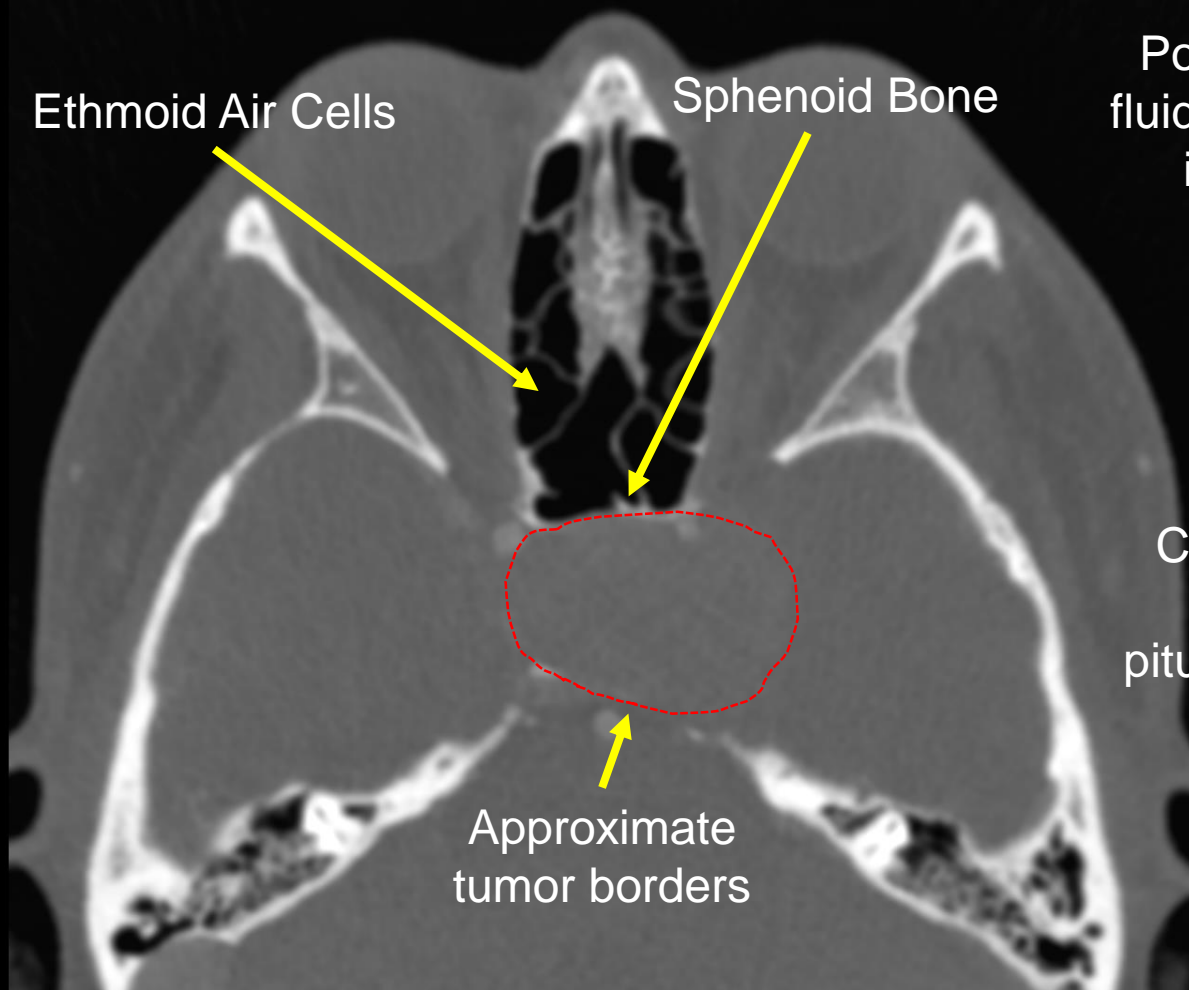


Pre-Op Scan



Post-Op Scan

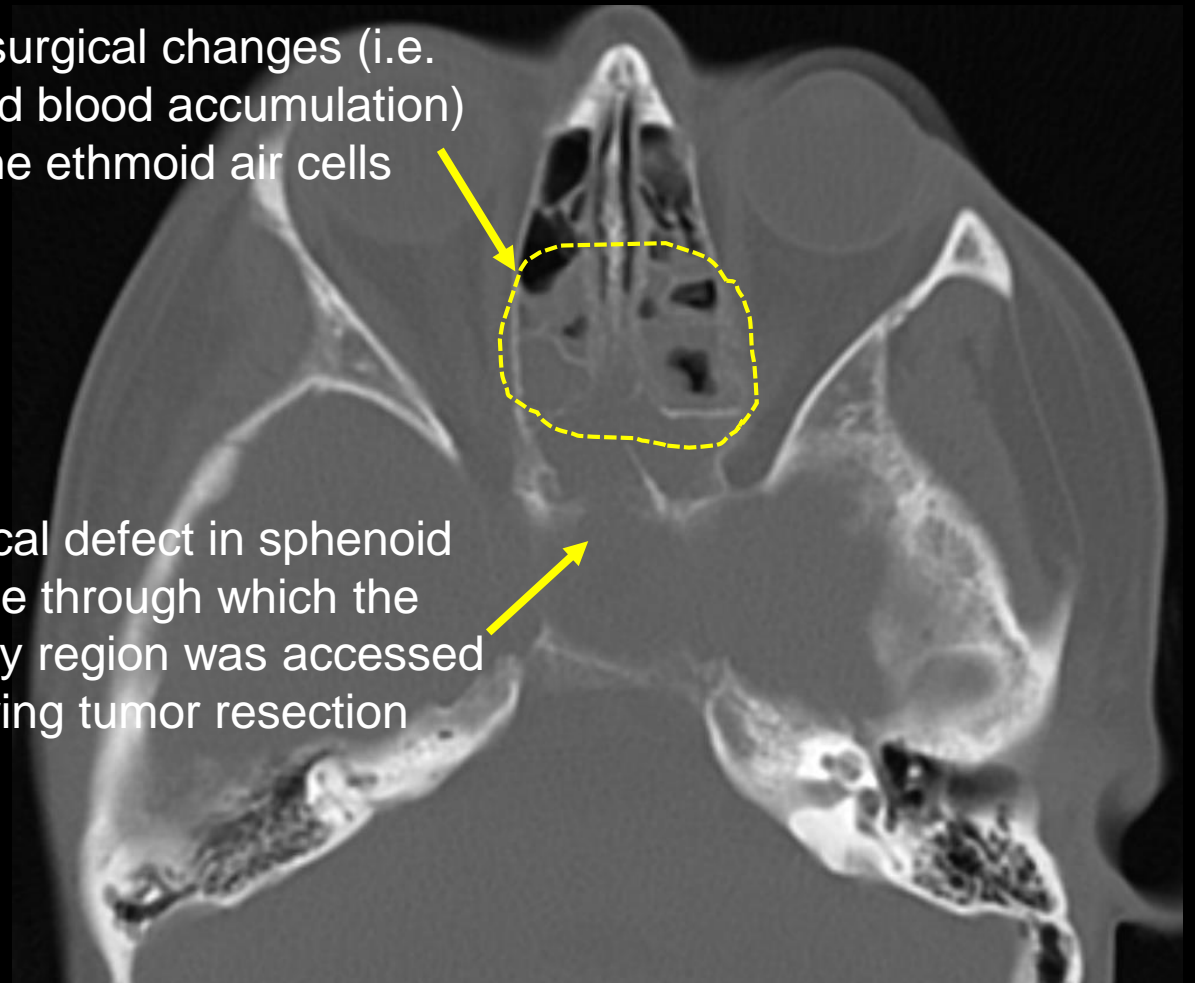
Pre-Op vs. Post-Op Imaging (labeled)



Pre-Op Scan

Post-surgical changes (i.e. fluid and blood accumulation) in the ethmoid air cells

Cortical defect in sphenoid bone through which the pituitary region was accessed during tumor resection



Post-Op Scan

Pituitary Adenomas

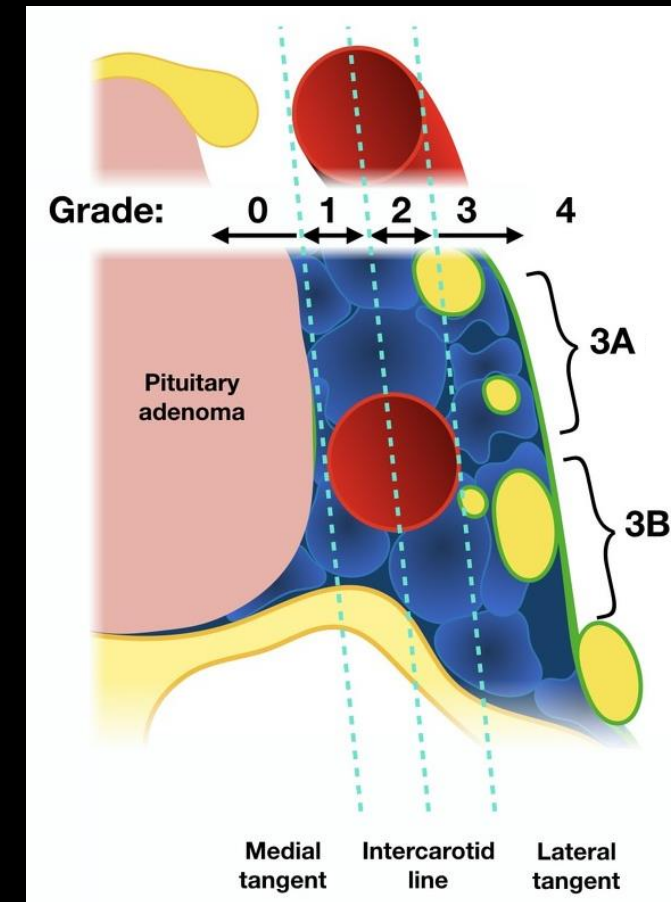
- Most common cause of sellar masses from the third decade on and account for at least 10% of all intracranial neoplasms
 - Can either be functioning (secrete active hormones) or nonfunctioning (do not secrete active hormones)
- Clinical Presentation
 - Visual defects due to compression of the optic chiasm, most commonly bitemporal hemianopsia and decreased visual acuity
 - Headaches
 - CSF rhinorrhea if lesion extends inferiorly (rare)
 - Pituitary apoplexy (rare)
 - Associated symptoms for functioning adenomas (e.g. acromegaly for GH-secreting adenomas)

Pituitary Adenomas

- Management/Treatment
 - Hypothalamus-pituitary evaluation with the following hormones should be done in every patient with a sellar mass, as only pituitary adenomas cause hormonal hypersecretion:
 - Prolactin (Lactotroph Adenomas)
 - GH (Somatotroph Adenomas)
 - ACTH and 24-hour urinary free cortisol (Corticotroph Adenomas)
 - FSH and LH (Gonadotroph Adenomas)
 - TSH and free/total T4 (Thyrotroph Adenomas)
 - Surgical resection via transsphenoidal hypophysectomy is the mainstay of treatment in most patients with pituitary adenomas
 - Prolactinomas specifically can be treated with dopamine agonists

Pituitary Adenomas (Classification/Grading)

- By size
 - Microadenomas are $<1\text{cm}$, while macroadenomas are $>1\text{cm}$
- **Knosp Classification**: grading system that assesses the likelihood that the tumor has invaded the cavernous sinus
 - Grade 0-1: no risk of invasion with no spread past either the medial tangent (grade 0) or intercarotid line (grade 1)
 - Grade 2: possible risk of invasion with no spread past the lateral tangent
 - Grade 3: probable risk of invasion with spread into the superior (3A) or inferior (3B) cavernous sinus compartment
 - Grade 4: definite risk of invasion with complete encasement of internal carotid artery



(Image from Radiopaedia)

Stalk Effect

- Interruption of the transport of dopamine from the hypothalamus to the anterior pituitary gland causes decreased inhibition of prolactin release, which leads to minor elevation in prolactin even in non-prolactin secreting tumors
 - Can be either due to direct impingement of the portal circulation or elevated intrasellar pressure (e.g. due to a pituitary mass)
 - Begin suspecting prolactinomas when prolactin > 200ng/mL
- Going back to the patient, her prolactin level was only slightly elevated at 51.9ng/mL
 - Therefore, preoperative clinical suspicion for the mass being a prolactinoma was low, and the slight elevation is most likely due to stalk effect, which likely contributed to her galactorrhea and amenorrhea

References

- American College of Radiology. ACR Appropriateness Criteria. Available at <https://www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria>. Accessed March 19, 2021.
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