

# AMSER Case of the Month

## July 2026

16-year-old female presents with primary amenorrhea

Prateek Asthana, M1  
Northeast Ohio Medical University

Dr. Pauravi Vasavada, M.D.  
Department of Radiology, University Hospitals Cleveland Medical Center

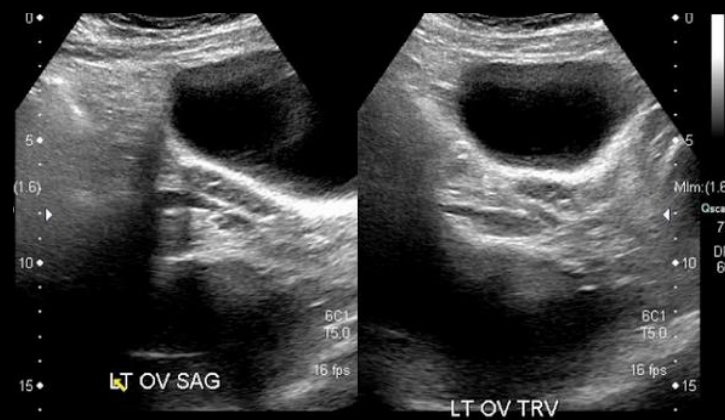
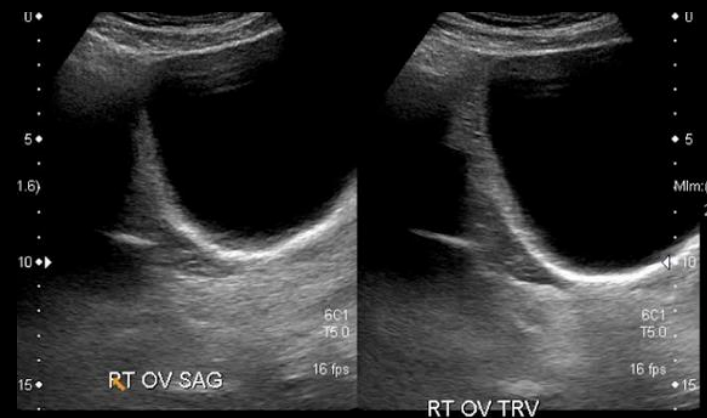
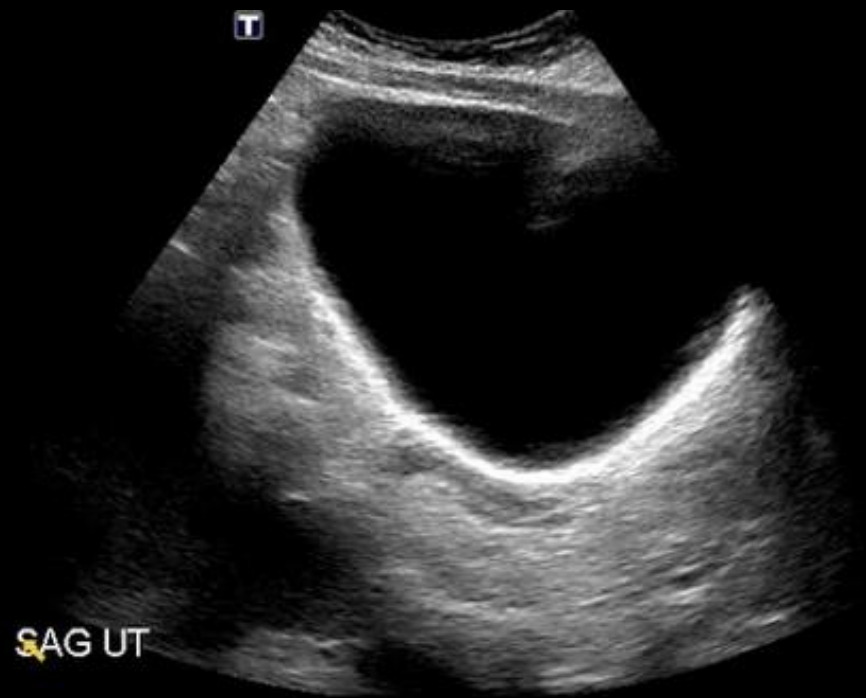
Dr. Michael Wien, M.D.  
Department of Radiology, University Hospitals Cleveland Medical Center



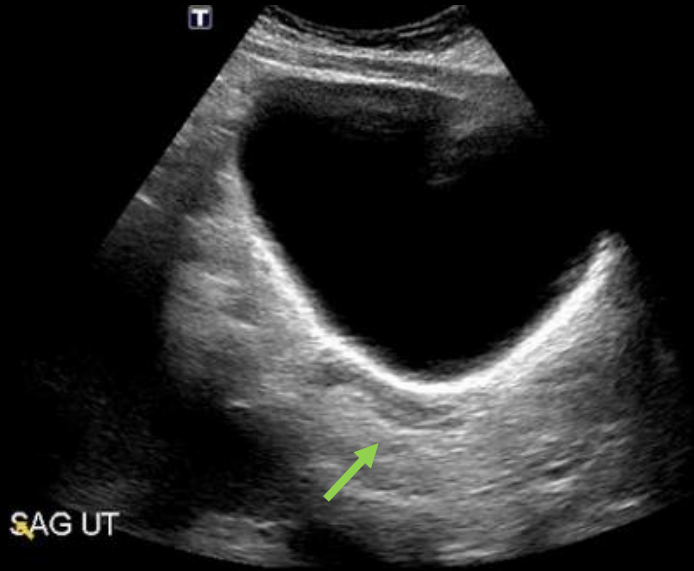
# Patient Presentation

- **HPI:** 16 y.o. female G0 presents to OB GYN with primary amenorrhea (absence of first period). Initial Evaluation demonstrates:
- **Review of Systems:** Positive for fatigue, anxiety.
- **Physical Exam** (pertinent findings):
  - Breasts: Tanner stage 3. No masses, no nipple discharge
  - Genitourinary: Tanner stage 4; external genitalia, vagina, urethra are normal.
- **Family History:** Hypothyroidism, colon cancer
- **Initial laboratory values demonstrate:**
  - Prepubertal levels of gonadotropin LH and FSH
  - TSH, Testosterone and 17OHP wnl
- Subsequently, a transabdominal pelvic ultrasound was performed.

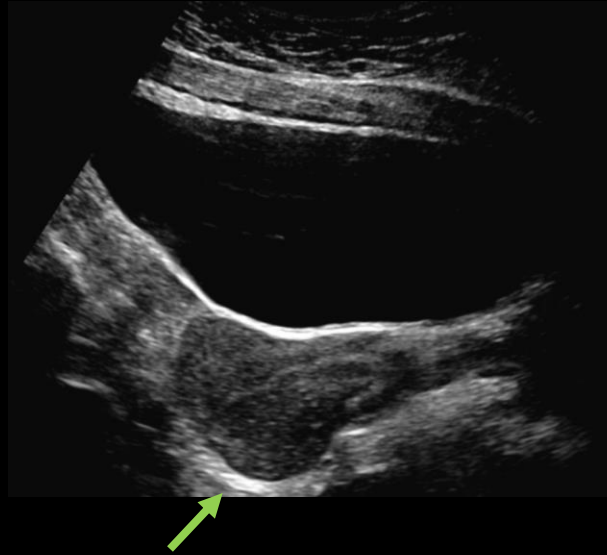
# Pelvic US (Unlabeled)



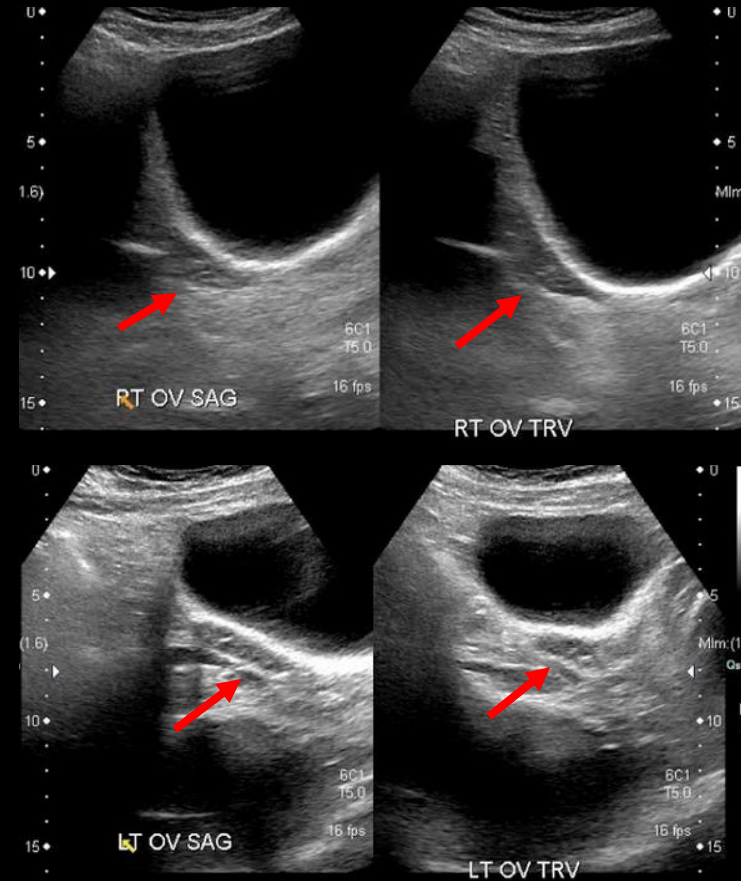
# Pelvic US (labeled)



Pre-pubertal size (2.7 x 1.4 x 2.2 cm) and morphology of uterus (fundus is cigar shaped)



Post-pubertal uterus in a different patient (pear-shaped fundus) for comparison



Ovaries are normal in morphology; prepubertal in size.  
Rt. Ovary: 2.7 x 1.4 x 2.2 cm=4.3ml volume  
Lt. Ovary 2.2 x 3.7 x 1.0 cm=4.3ml volume  
Mean ovarian volume in menstruating females: 9.8ml

# Patient referred to endocrinology

- **Review of Systems:** Pt denies headaches and visual disturbances.
- **Vitals:** BP 95/63, HR 77, RR 16, Ht 61 in, Wt 126 lb, BMI 23.81
- **Physical Exam**
  - Neck: Abnormal. Rubbery gland; 20 grams; no nodules.
  - Breasts: Tanner stage 4-5. Milky discharge bilaterally on palpation.
  - Examination of visual fields: Normal
  - Cranial Nerve Exam: Normal
- **Additional lab ordered:**
  - Prolactin >1000 ug/L (normal 6.0-20.0ug/L)

What Imaging Should We Order?

# ACR Appropriateness Criteria

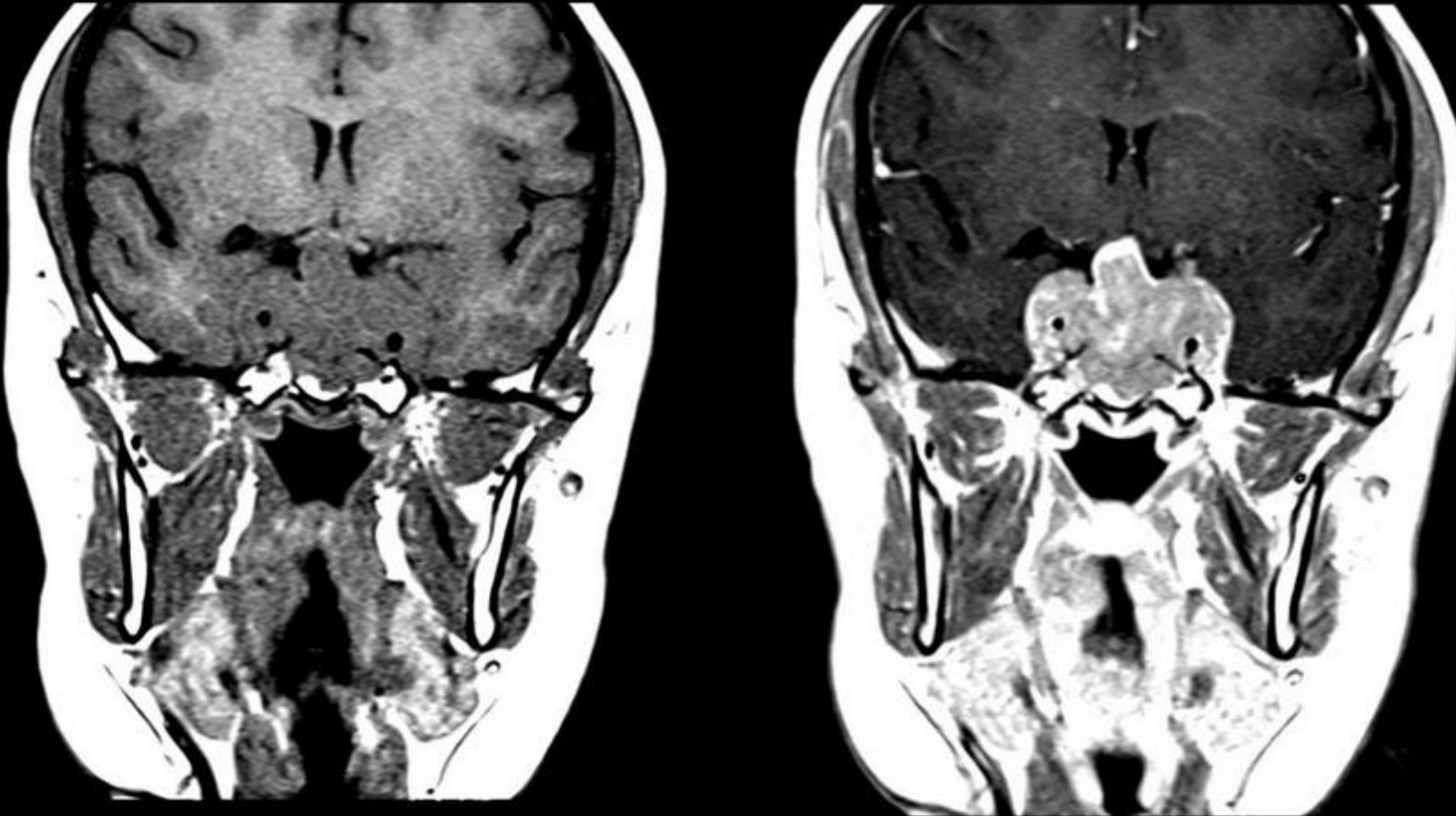
**Variant: 2 Adult. Suspected or known hyperfunctioning pituitary adenoma (hyperthyroidism [high thyroid-stimulating hormone], Cushing syndrome [high adrenal corticotrophic hormone], hyperprolactinemia, acromegaly, or gigantism). Initial imaging.**

| Procedure                              | Appropriateness Category | Relative Radiation Level |
|----------------------------------------|--------------------------|--------------------------|
| MRI sella without and with IV contrast | Usually Appropriate      | 0                        |
| MRI sella without IV contrast          | Usually Appropriate      | 0                        |
| MRI sella with IV contrast             | May Be Appropriate       | 0                        |
| CT sella with IV contrast              | May Be Appropriate       | ☢☢☢                      |
| CT sella without IV contrast           | May Be Appropriate       | ☢☢☢                      |
| Radiography sella                      | Usually Not Appropriate  | ☢                        |
| Venous sampling petrosal sinus         | Usually Not Appropriate  | Varies                   |
| MRA head with IV contrast              | Usually Not Appropriate  | 0                        |
| MRA head without and with IV contrast  | Usually Not Appropriate  | 0                        |
| MRA head without IV contrast           | Usually Not Appropriate  | 0                        |
| CT sella without and with IV contrast  | Usually Not Appropriate  | ☢☢☢                      |
| CTA head with IV contrast              | Usually Not Appropriate  | ☢☢☢                      |

This imaging modality was ordered by the OBGYN physician



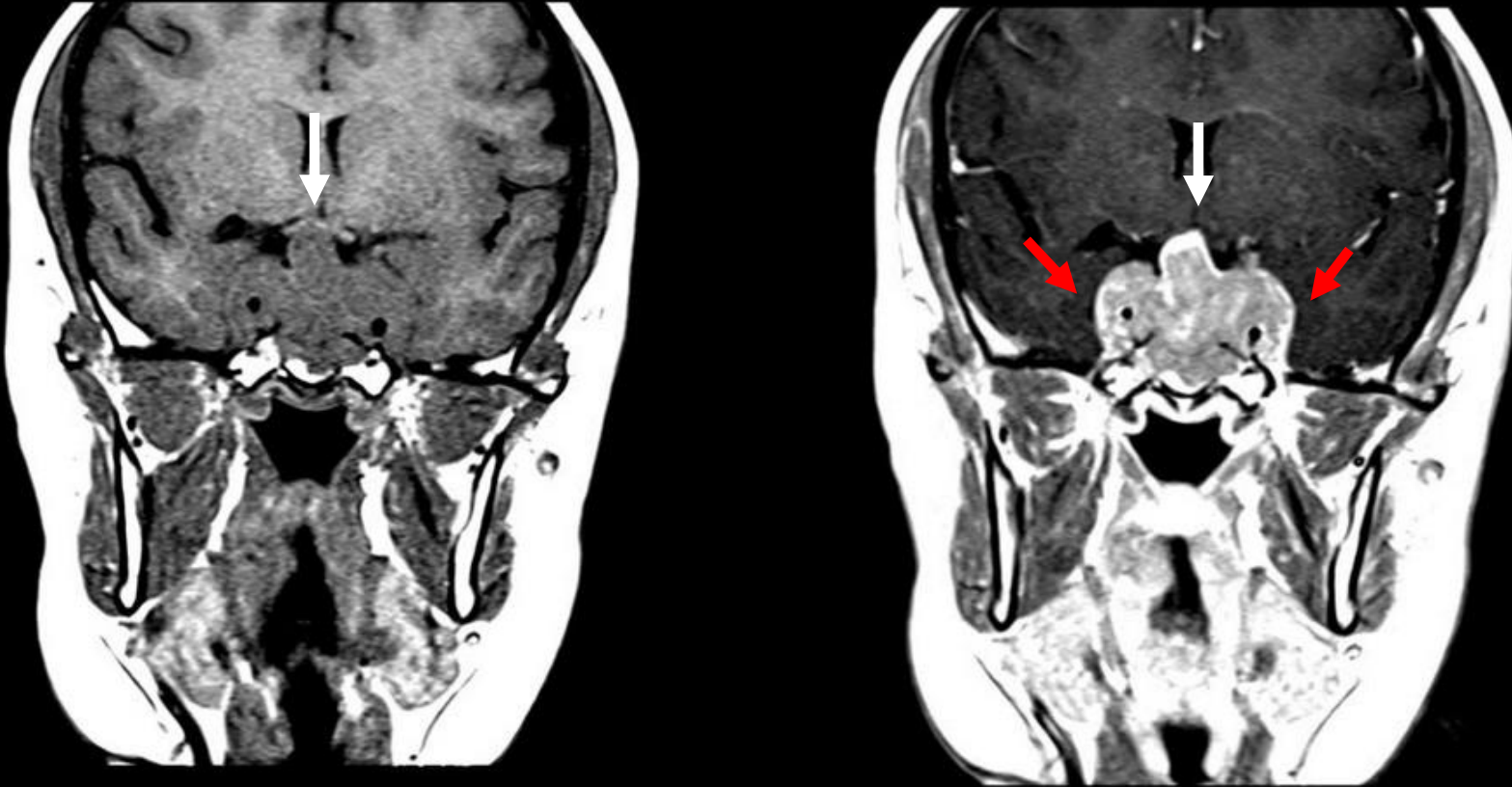
# MRI Findings (unlabeled)



Coronal T1-weighted non-contrast (left) and Coronal T1 post-contrast (right) MRI



# MRI Findings (labeled)



Coronal T1-weighted non-contrast (left) and post-contrast MRI (right) demonstrate a large lobulated mass centered at the suprasellar cistern. There is mild mass effect on adjacent structures including the optic chiasm superiorly and medial temporal lobes laterally. The mass also extends through the bilateral cavernous sinuses and surrounds the bilateral carotid flow voids.

# MRI Findings (unlabeled)



Sagittal T1-weighted non-contrast (left) and post-contrast (right) MRI

# MRI Findings (labeled)



Sagittal T1-weighted non-contrast (left) and post-contrast MRI (right) demonstrate mass extension inferiorly through the sella tursica into the sphenoid sinus.

Final Dx:

Pituitary Macroadenoma with Extrasellar Extension

# Case Discussion

- **Definition<sup>1,3</sup>**

- Pituitary adenomas are usually benign, slow-growing tumors. They can be divided into functional and non-functional adenomas. Secreting or functional adenomas include those that cause acromegaly and Cushing's disease, prolactinomas, and thyrotroph adenomas. Tumors larger than 10mm in diameter are classified as pituitary macroadenomas.

- **Epidemiology<sup>2,4</sup>**

- Prolactinomas account for 50% of all pituitary adenomas in both men and women. Prior to menopause they predominantly affect females at a ratio of 5:1 to 10:1. Microprolactinomas (less than 10mm) are the most frequent type while macroprolactinomas have a different clinical prognosis and require closer follow-up

# Case Discussion

- **Pathophysiology<sup>5</sup>**

- Normal prolactin secretion is under tonic inhibitory control by hypothalamic dopamine. A prolactinoma involves lactotroph hyperplasia resulting in the profound hypersecretion seen in this patient ( $>1000$  ng/mL). Prolactin inhibits the release of GnRH, leading to a reduction in the secretion of LH and FSH manifesting clinically as hypogonadism and amenorrhea.

- **Imaging Appearance<sup>2,3</sup>**

- Macroadenomas generally present as slightly hypointense or isointense on T1-weighted sequences and exhibit variable enhancement post-contrast. Vertical expansion through the rigid diaphragm sellae often yields a characteristic "snowman" or "figure-of-eight" morphology.
- Extrasellar extension into the suprasellar cistern, cavernous sinus, and sphenoidal sinus as seen in this case is less common.



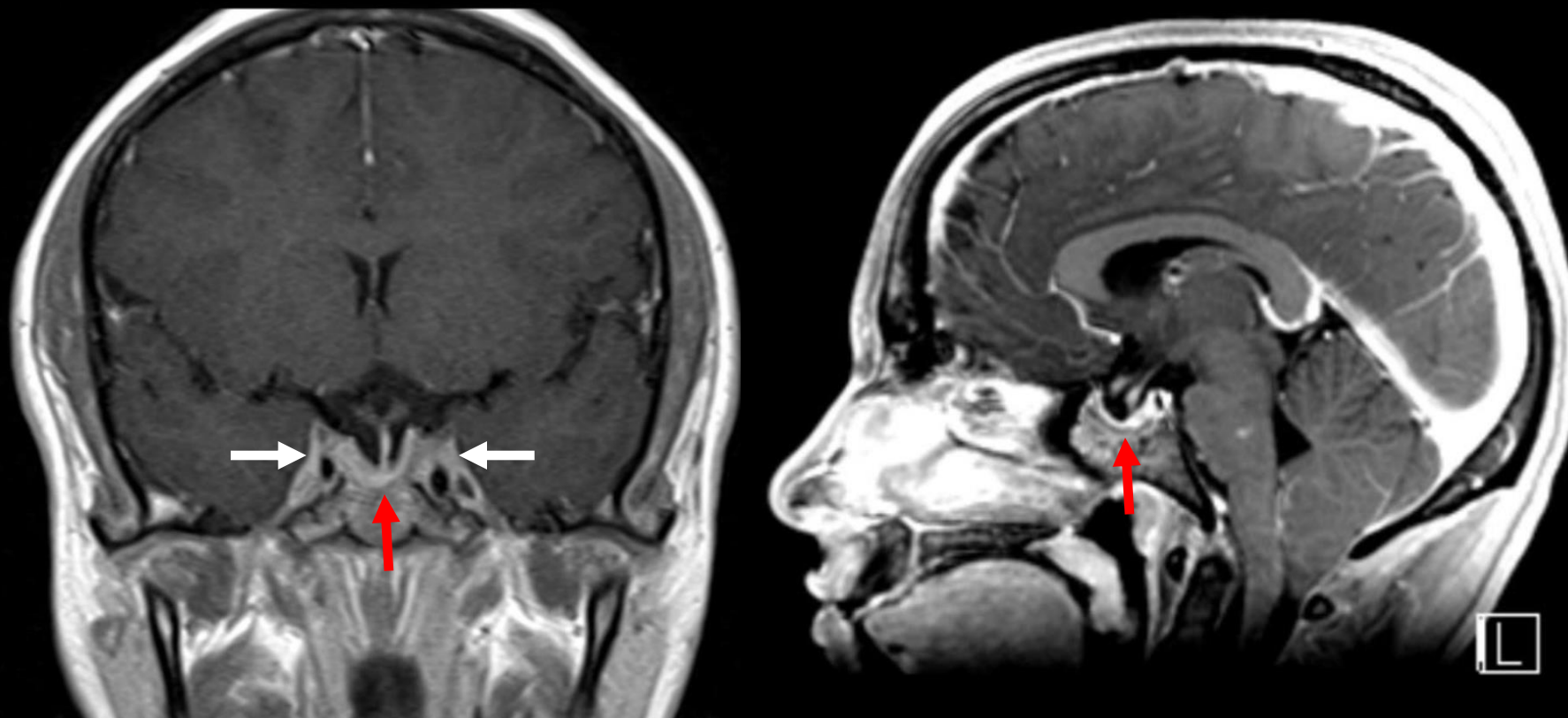
# Case Discussion

- **Management and Outcome** <sup>4,5</sup>

- Medical Treatment: Dopamine agonists such as cabergoline and bromocriptine serve as the definitive first-line therapy for prolactinomas. Cabergoline is preferred due to its higher efficacy in normalizing prolactin levels and achieving tumor shrinkage in the majority of patients
- Surgical Intervention: Endoscopic transsphenoidal surgery is reserved for tumors resistant to dopamine agonists. Prophylactic surgery is considered in women with large prolactinomas that threaten vision during pregnancy.
- The patient in this case was managed medically with 0.25 mg of cabergoline daily with repeat labs as well as follow-up MRI examinations after initiation of treatment.



# Post treatment MRI (1.5 yrs after cabergoline initiated)



Coronal post-contrast T1 (left) and Sagittal post-contrast T1 MRI (right) demonstrate marked decrease in size/amount of abnormal enhancing **seller** and **extrasellar** tissue compared to original scan.

# References:

1. Brue T, Castinetti F. The risks of overlooking the diagnosis of secreting pituitary adenomas. *Orphanet J Rare Dis*. 2016;11(1):135. Published 2016 Oct 6. doi:10.1186/s13023-016-0516-x
2. Petersenn, S., Fleseriu, M., Casanueva, F.F. et al. Diagnosis and management of prolactin-secreting pituitary adenomas: a Pituitary Society international Consensus Statement. *Nat Rev Endocrinol* 19, 722–740 (2023). <https://doi.org/10.1038/s41574-023-00886-5>
3. Pereira FV, Yoshida NY, Soares DF, et al. Pituitary macroadenoma: less common neuroimaging features in a common lesion. *Radiol Bras*. 2025;58:e20250065. Published 2025 Dec 15. doi:10.1590/0100-3984.2025.0065
4. Drummond JB, Molitch ME, Korbonits M. Prolactinoma Management. [Updated 2025 Apr 9]. In: Feingold KR, Adler RA, Ahmed SF, et al., editors. *Endotext* [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK279174/>
5. Kaur J, Bhusal K. Hyperprolactinemia. [Updated 2025 Nov 30]. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK537331/>