AMSER Case of the Month
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25 y/o F presenting with worsening headaches

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Patient Presentation

- HPI: Patient is a 25-year-old female with history of Kawasaki's disease with sudden cardiac arrest, POTS, Hashimoto's thyroiditis, migraines and history of syncope of unknown origin who presented to her neurologist with complaint of worsening headaches.
- Meds: Levothyroxine 88 mcg, Nurtec 75 mg, Midodrine 2.5 mg TID
- Allergies: Benadryl, Topiramate, Promethazine
- Pshx: None
- PE: HR 79 bpm, BP 126/80, no focal neuro deficits. No visual field defects. Significant tenderness over right occipital notches

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 7: **Headache with one or more of the following "red flags": increasing frequency or severity, fever or neurologic deficit, history of cancer or immunocompromise, older age (>50 years) of onset, or posttraumatic onset. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
MRI head without and with IV contrast	Usually Appropriate	O
MRI head without IV contrast	Usually Appropriate	O
CT head without IV contrast	Usually Appropriate	☢☢☢
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
MRA head with IV contrast	Usually Not Appropriate	O
MRA head without and with IV contrast	Usually Not Appropriate	O
MRA head without IV contrast	Usually Not Appropriate	O
MRI head with IV contrast	Usually Not Appropriate	O
MRV head with IV contrast	Usually Not Appropriate	O
MRV head without and with IV contrast	Usually Not Appropriate	O
MRV head without IV contrast	Usually Not Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CTA head with IV contrast	Usually Not Appropriate	☢☢☢
CTV head with IV contrast	Usually Not Appropriate	☢☢☢

Due to the increase in severity of her headaches, this is the imaging modality was ordered by the neurologist

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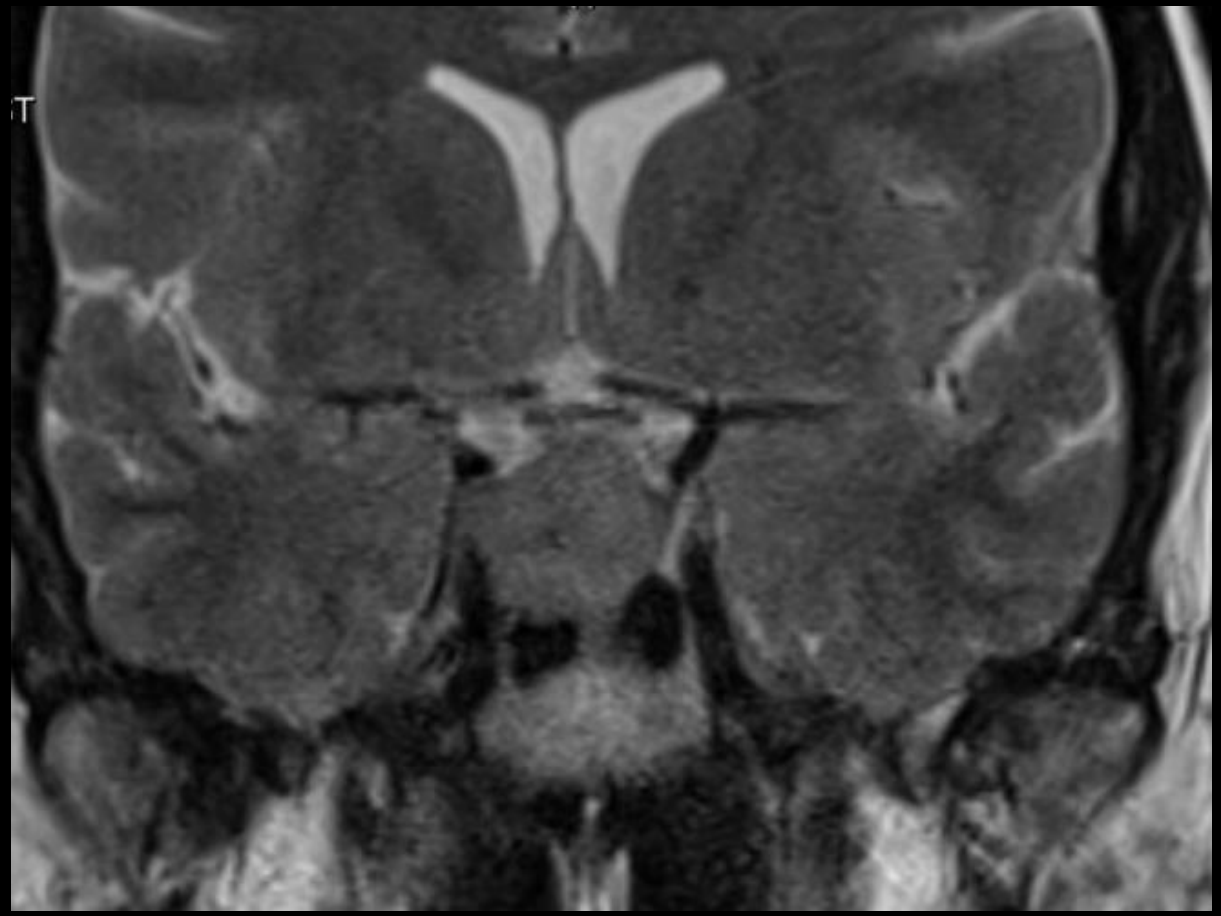
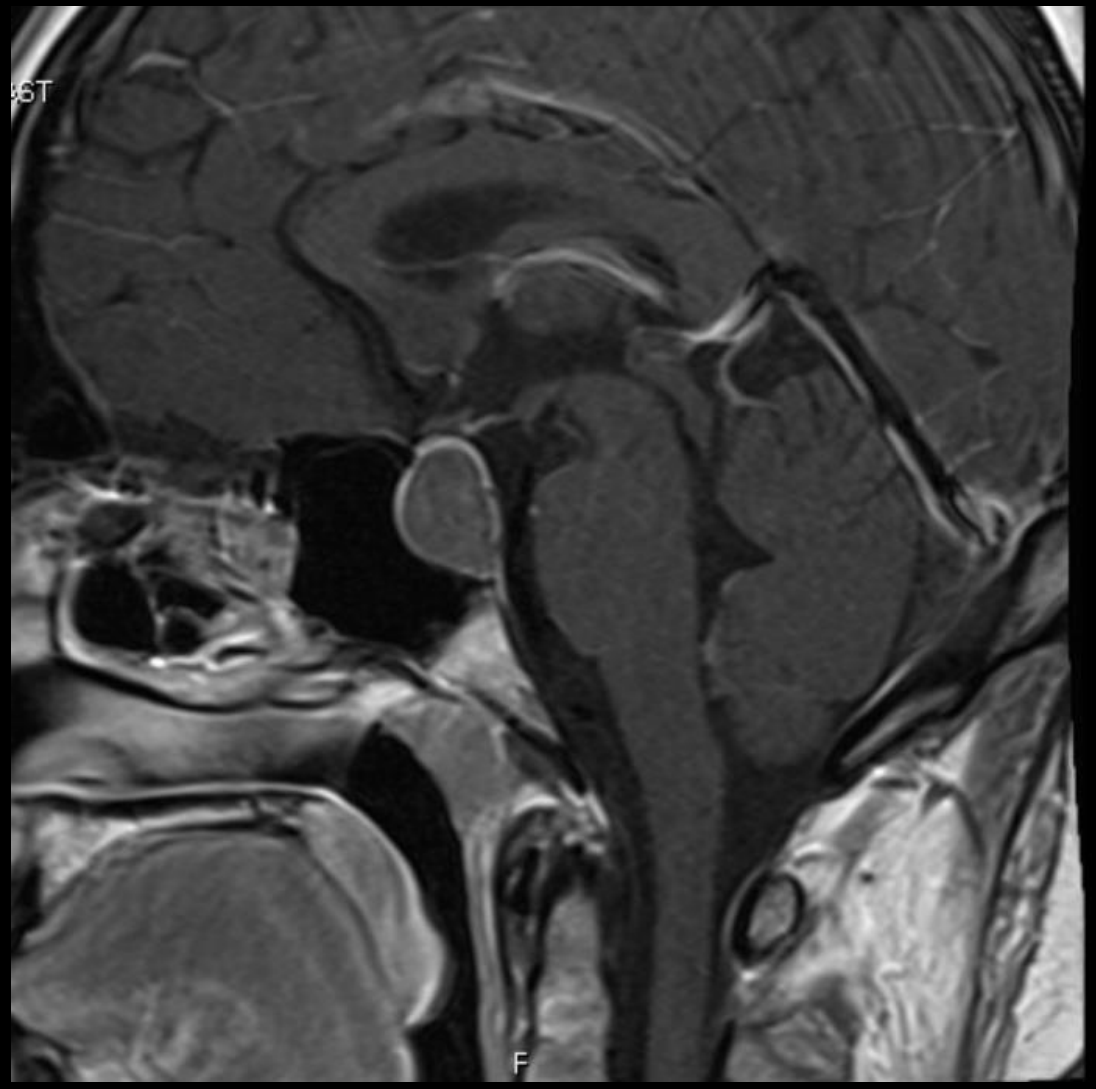
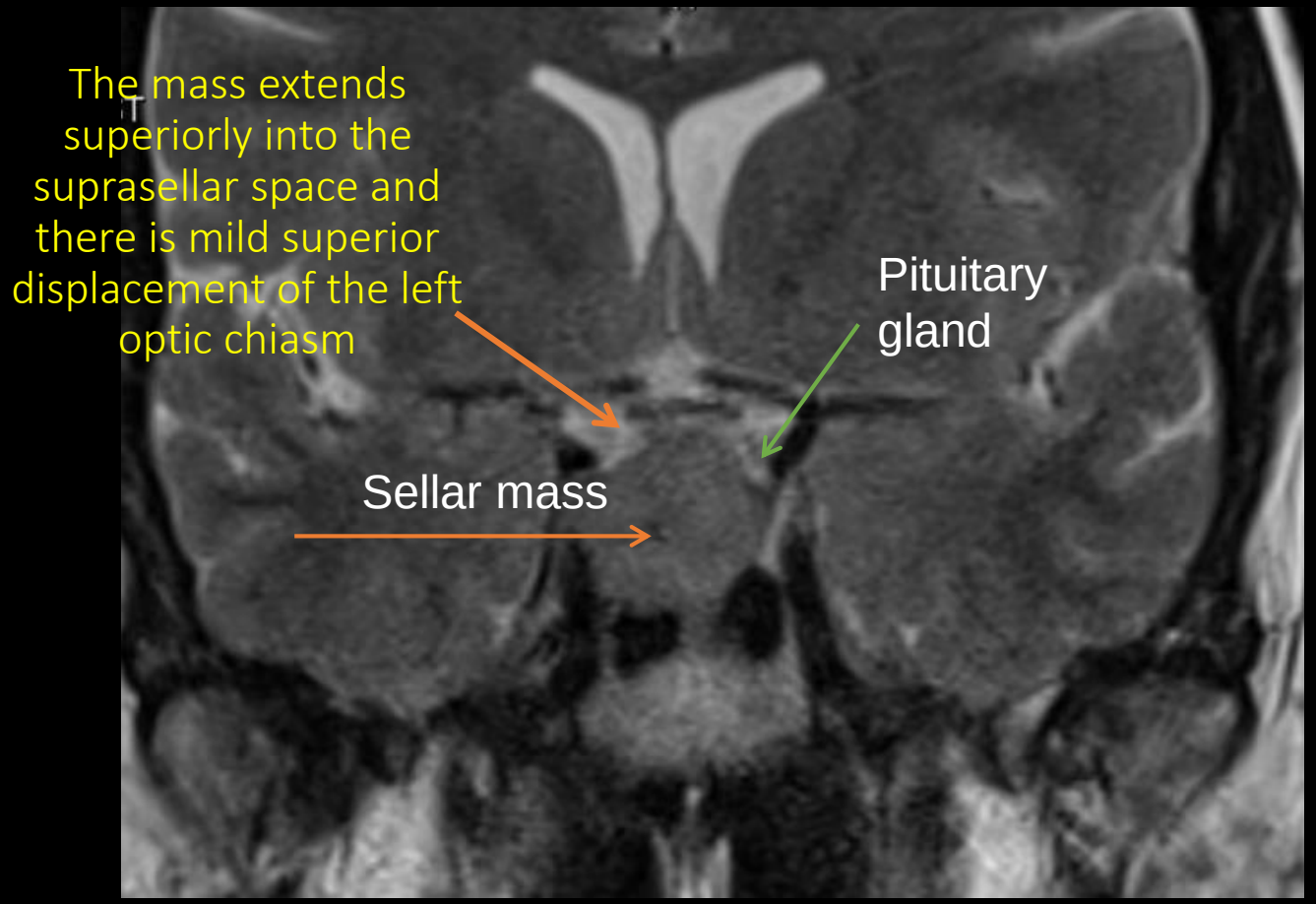
Findings (unlabeled)

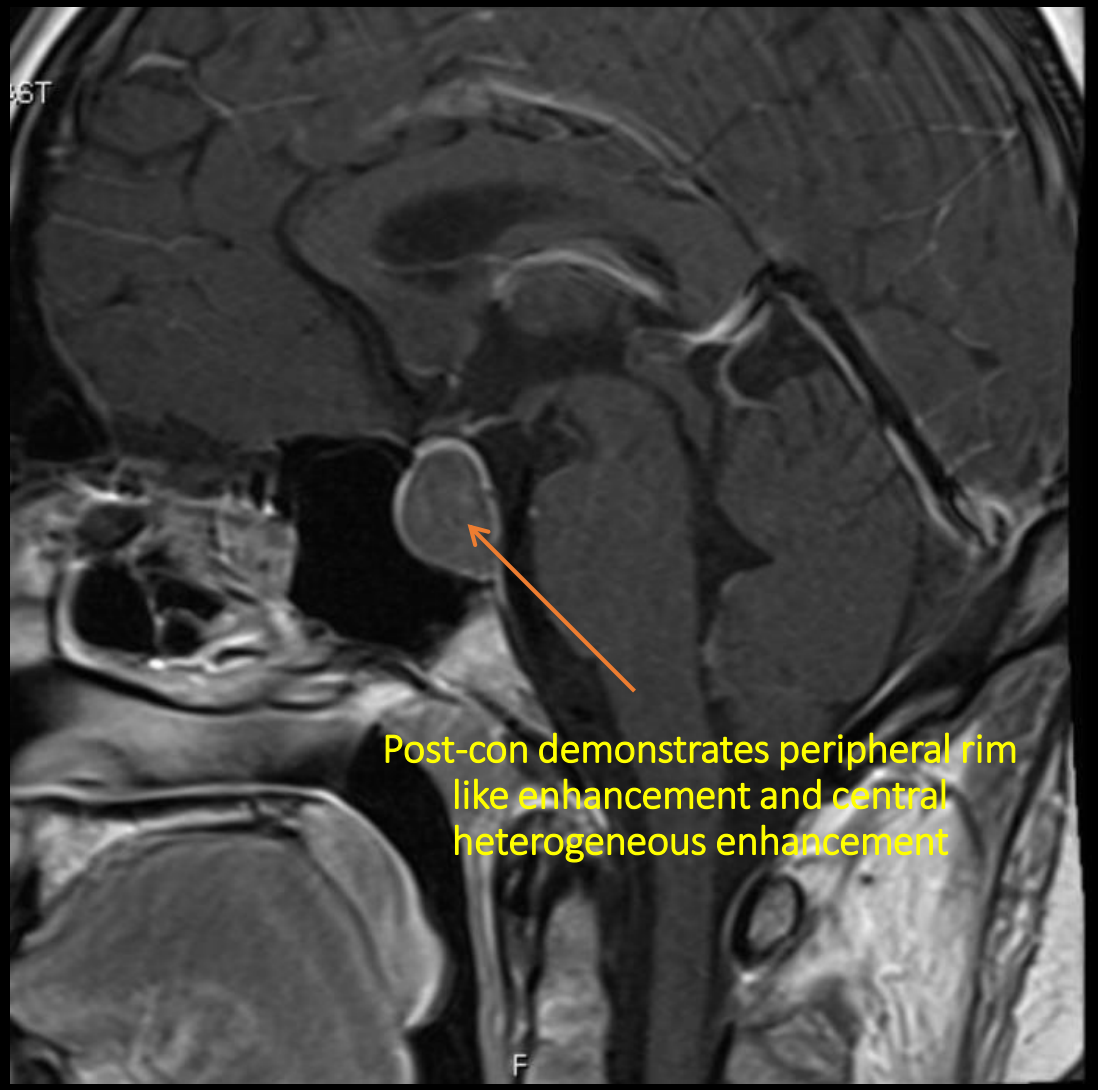




Findings (labelled): Sellar mass that is T2 and T1 hypointense and measures 14 mm x 20 mm x 19 mm in the AP x TV x CC dimensions



Coronal T2



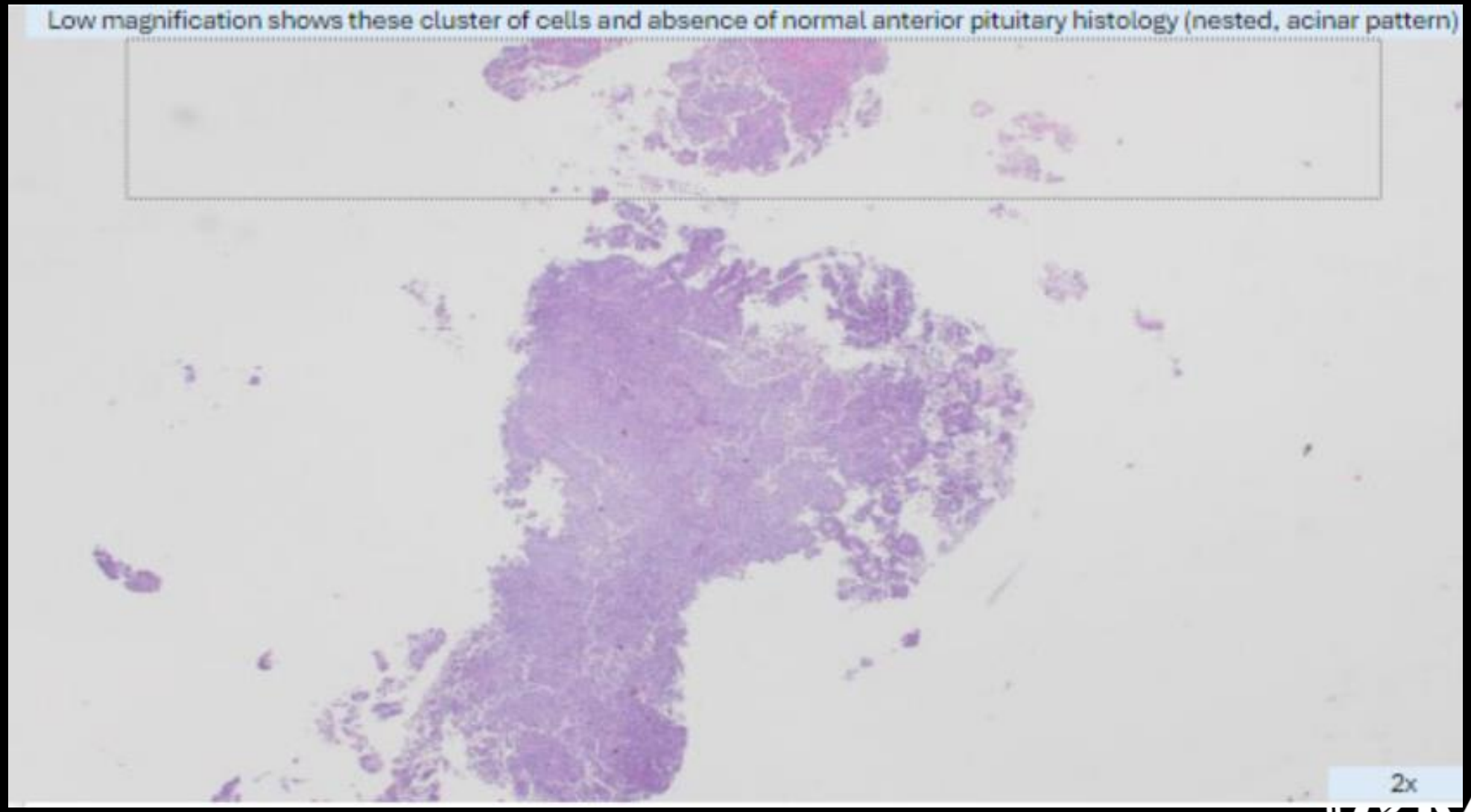
Labs obtained after imaging

Labs:	Reference range:
AM cortisol 10.4 UG/DL	4.8-19.5 UG/DL
Estradiol 69 PG/ML	Within range
FSH 2.8 MIU/ML	Within range
LH 4.5 MIU/ML	Within range
Prolactin 55.4 NG/ML	4.8-23.3 NG/ML
ACTH Pending	

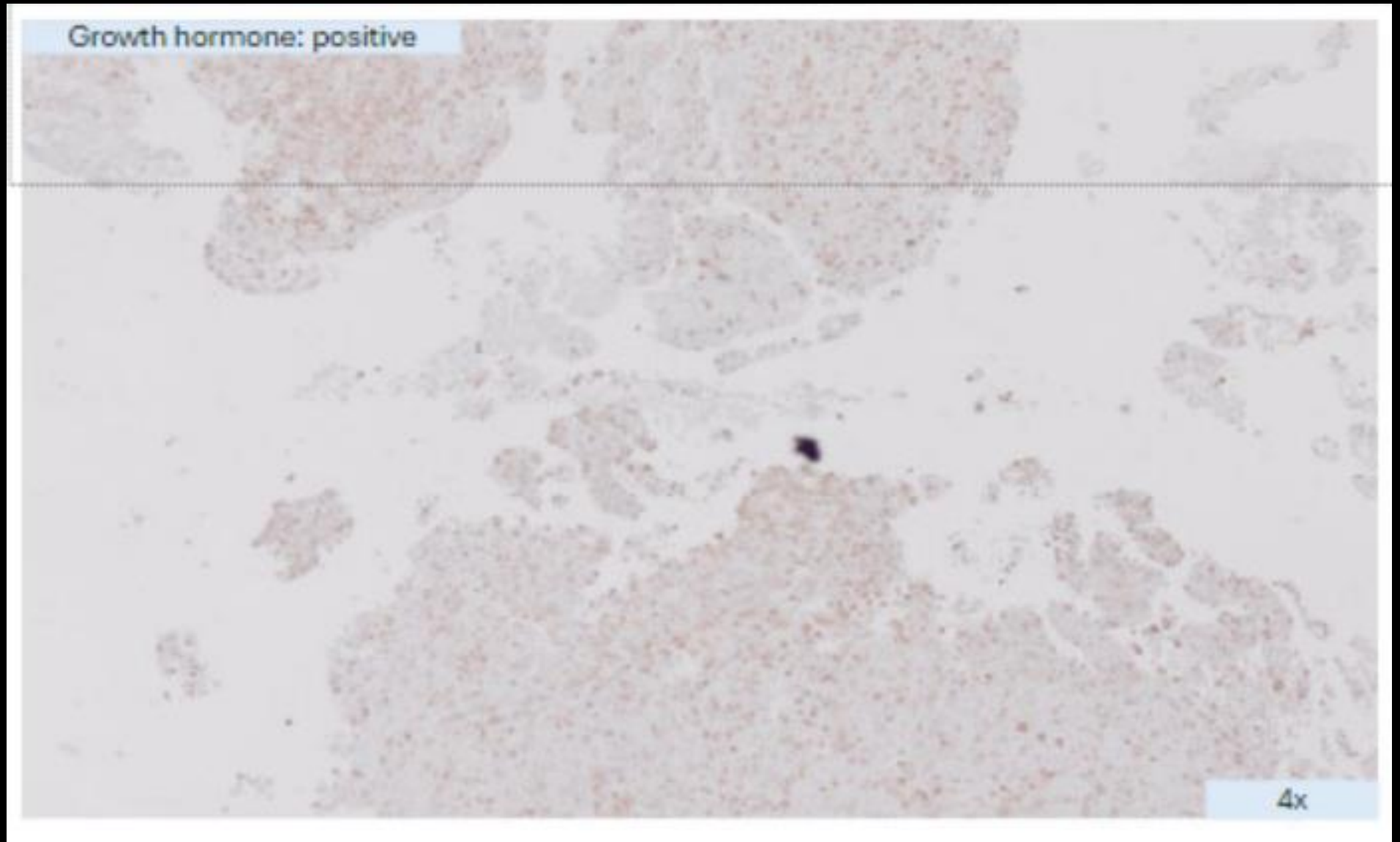
Differential Diagnosis

- Pituitary metastasis- typically seen in the setting of known metastatic disease, likely to lead to bony destruction
- Craniopharyngioma- tumor arising from remnants of Rathke's pouch, most often seen in children. More likely to have T1 intrinsic hyperintensity. May have cystic and calcified areas.
- Lymphocytic Hypophysitis- non-neoplastic inflammatory condition which leads to lymphocytic infiltration and enlargement of the pituitary gland. Typically occurs in the peri-partum period or with the use of immune checkpoint inhibitors.
- Meningioma- benign tumor of the meninges. Separate pituitary gland is visible. More enhancement on MRI, dural tail may be present.
- Pituitary adenoma- benign tumor of the anterior pituitary

Pathology


Low magnification shows these cluster of cells and absence of normal anterior pituitary histology (nested, acinar pattern)
2x

Pathology cont.



Pathology cont.

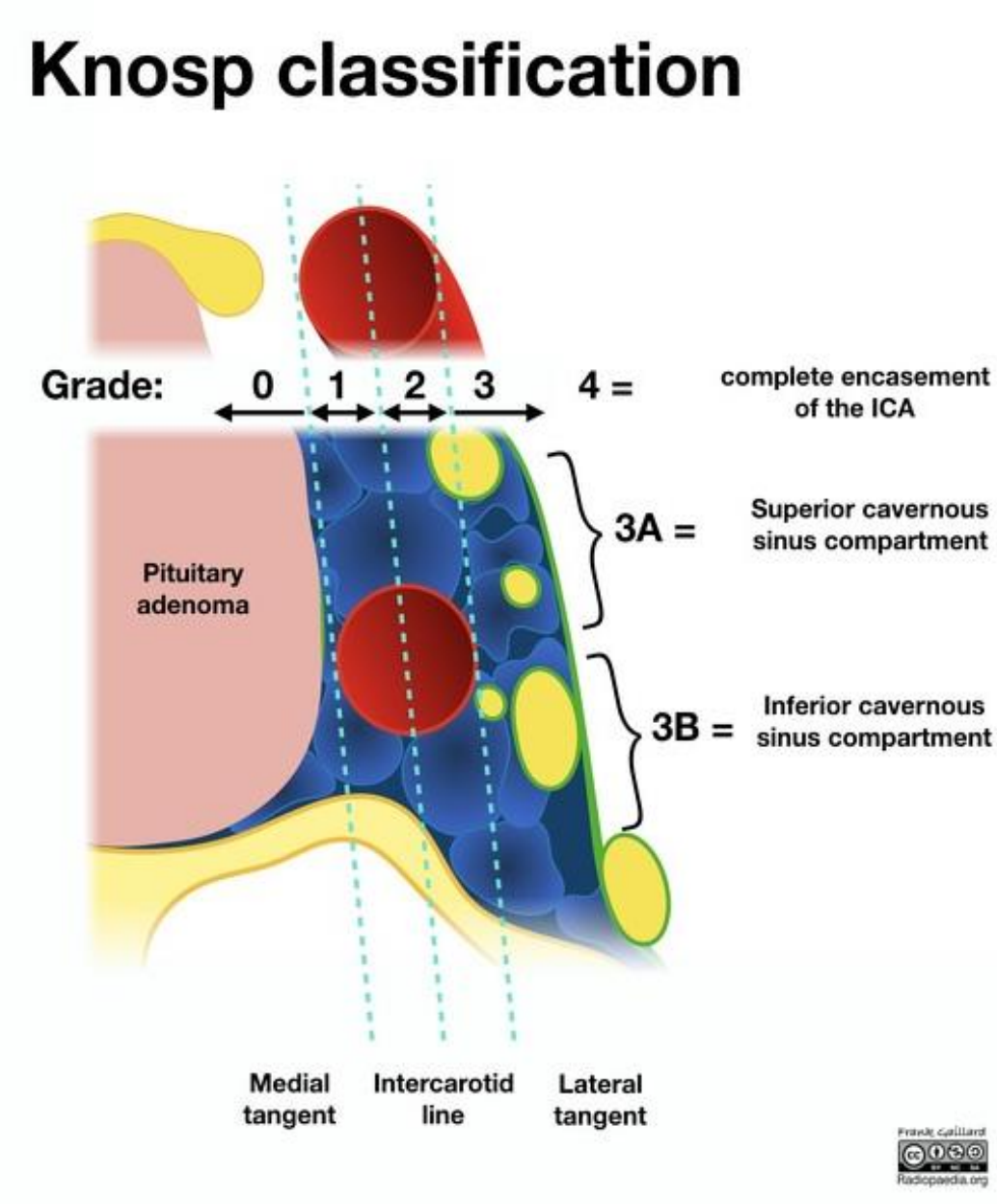
Final Dx:

Pituitary Adenoma

Pituitary Adenomas

- Pituitary adenomas account for 10% of all intracranial neoplasms
- Lesions smaller than 1 cm are classified as microadenomas, and lesions larger than 1 cm are classified as macroadenomas.
- Adenomas can arise from any type of cell of the anterior pituitary as they arise from clonal expansion of somatic cell mutations. They may result in increased secretion of the hormone(s) produced by that cell and/or decreased secretion of other hormones due to compression of other cell types
  - Lactotrophs-prolactin
  - Somatotrophs- growth hormone
  - Corticotrophs- ACTH
  - Non-functioning- no hormonal secretion

What do we worry about?



Tumor invasion is the biggest concern. Suprasellar expansion can cause compression of the optic chiasm and visual defects.

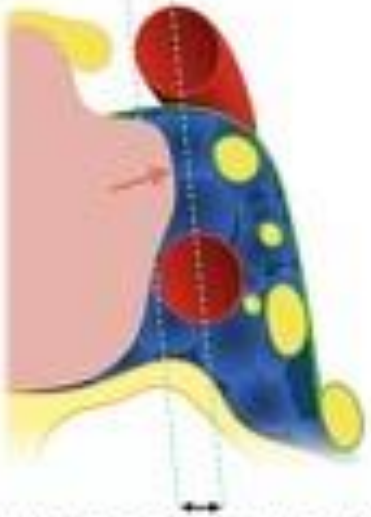
Knosp classification is used to describe the likelihood of cavernous sinus invasion by pituitary adenoma. This helps with operative planning and predicts tumor residual after resection.

A lower Knosp grade is associated with significantly greater remission after resection

Knosp classification

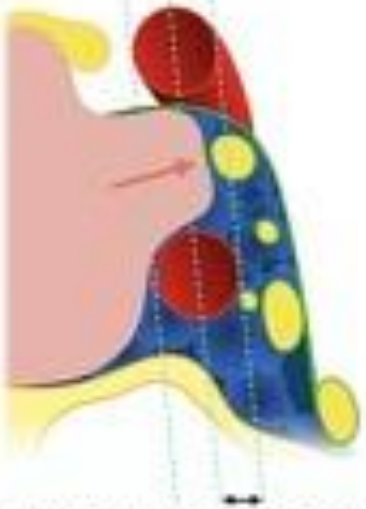
Grade 0 = tumour is medial to the medial tangent

Knosp classification

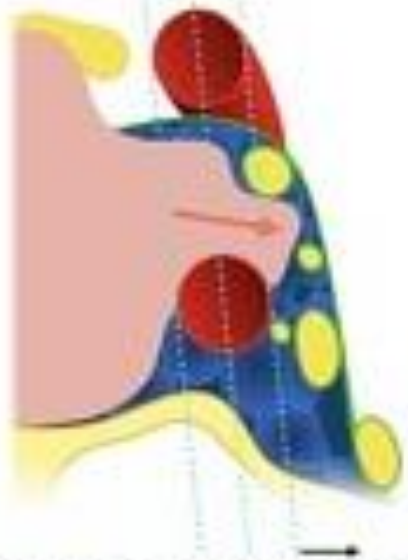


Grade 1 = tumour is between the medial tangent and intercarotid line

Knosp classification

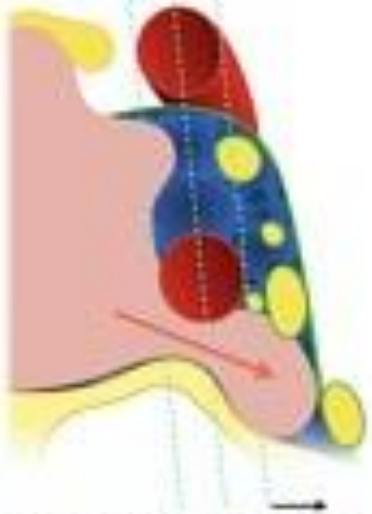


Grade 2 = tumour is between the inter carotid line and the lateral tangent



Grade 3A = tumour beyond the lateral tangent into the superior cavernous sinus compartment

Knosp classification



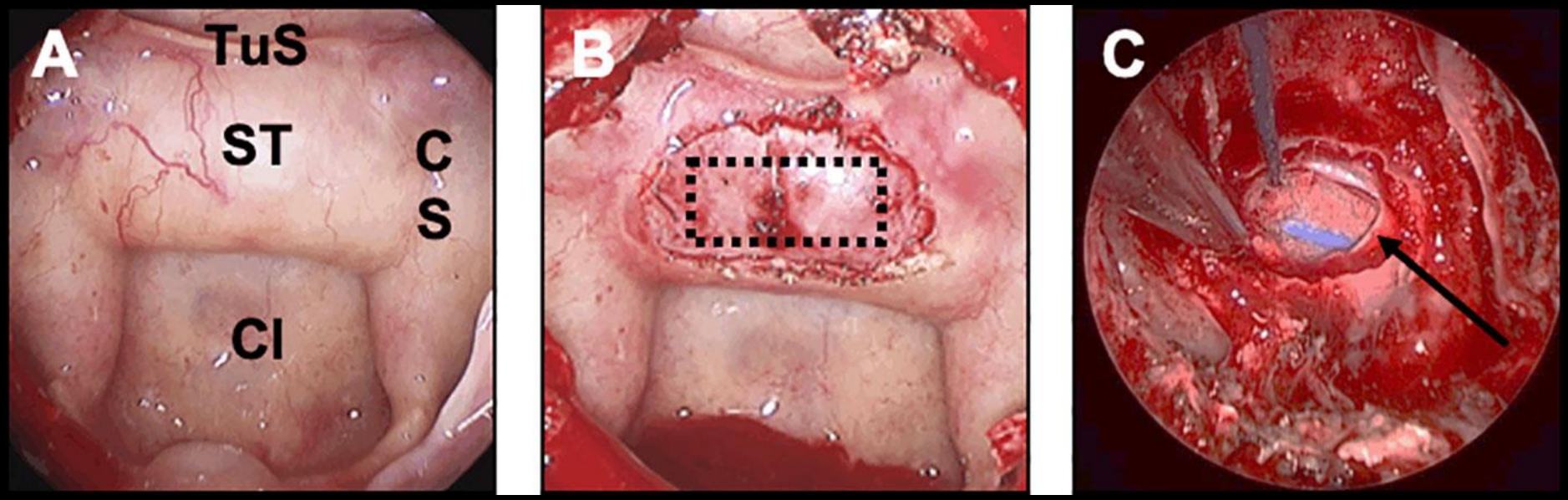
Grade 3B = tumour beyond the lateral tangent into the inferior cavernous sinus compartment

Knosp classification

Grade 4 = tumour completely encases the

Treatment options

- While medical treatment can be used based off tumor type (ie dopamine agonist for primary prolactinoma) Transphenoidal Hypophysectomy is a common treatment for adenomas and the treatment of choice for our patient.



ST= Sella Turcica, CL= Clivus, CS= Cavernous Sinus, Tus= Tuberculum Sellae

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