

# Metastatic Infiltration of the Paranasal Sinuses by Breast Cancer

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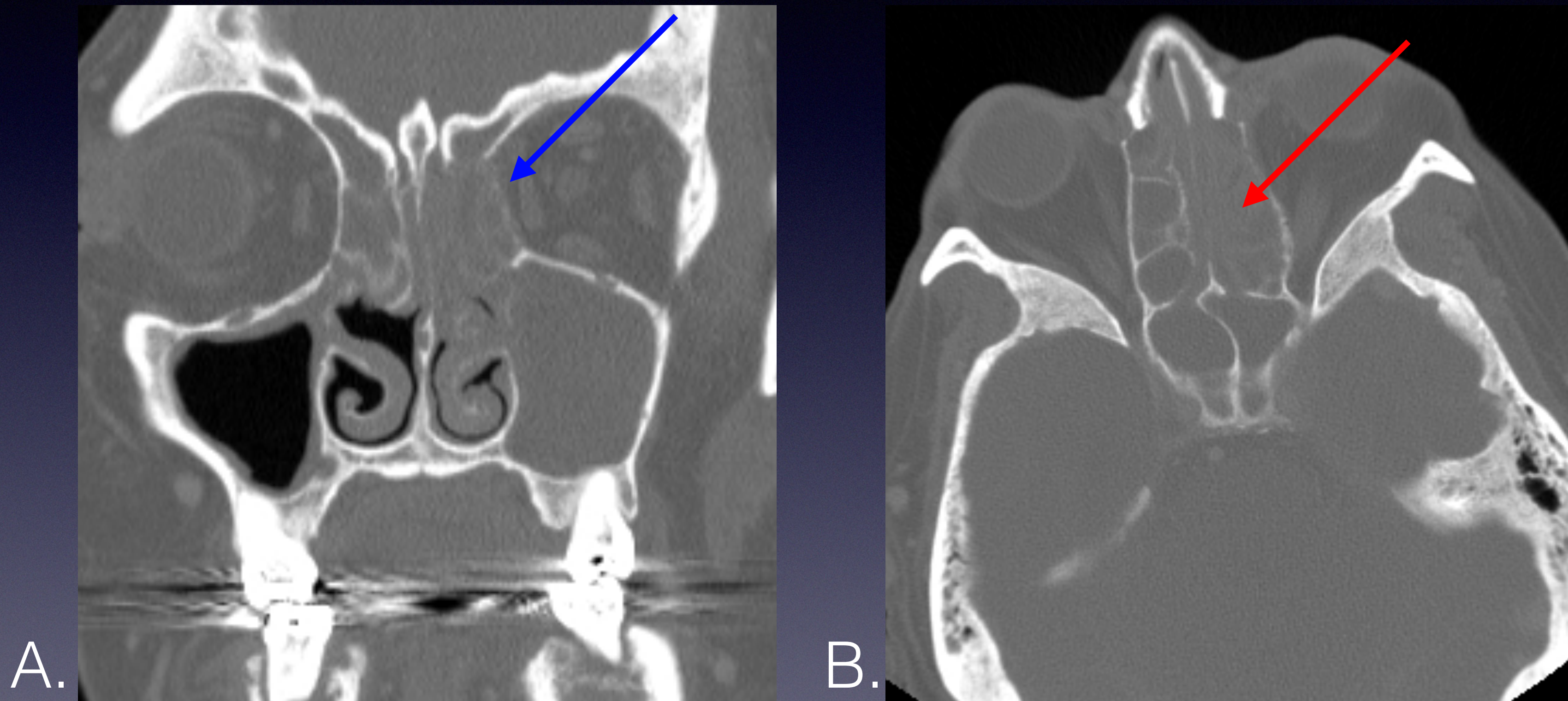


# Clinical Presentation

- 51 year old female patient presented to the emergency department complaining of left facial pain, headache, and decreased visual acuity for 1 week.
- Relevant past medical history includes recently diagnosed clear cell carcinoma status-post right partial nephrectomy.
- Physical exam demonstrated left-sided proptosis and ptosis. Ophthalmologic evaluation showed painful ophthalmoplegia with binocular diplopia and left CN 6 palsy. Fundoscopic evaluation showed bilateral papilledema with peripapillary hemorrhage.
- Admitted for work up of increased intracranial pressure and intravenous antibiotics for suspected pan-sinusitis.



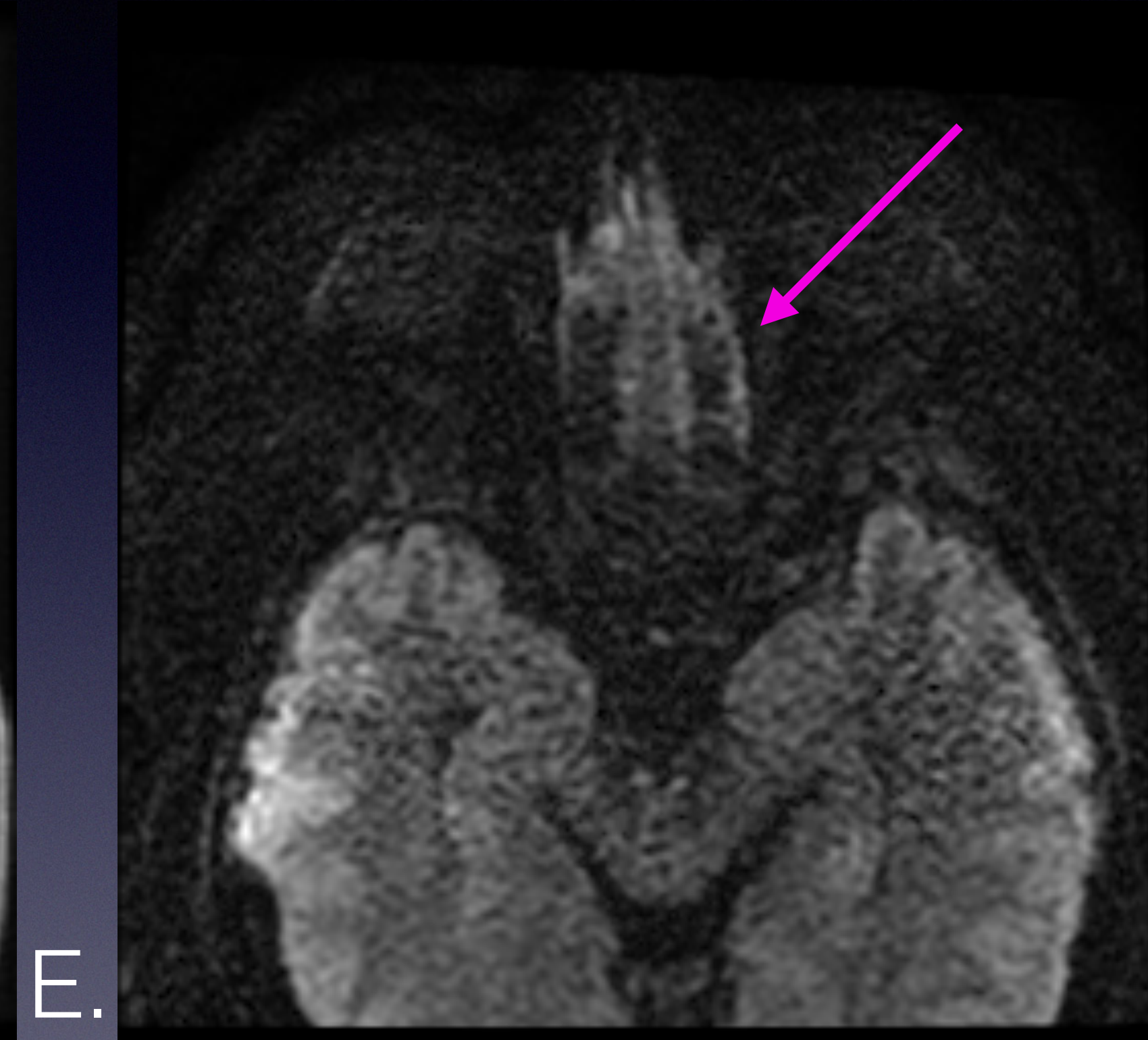
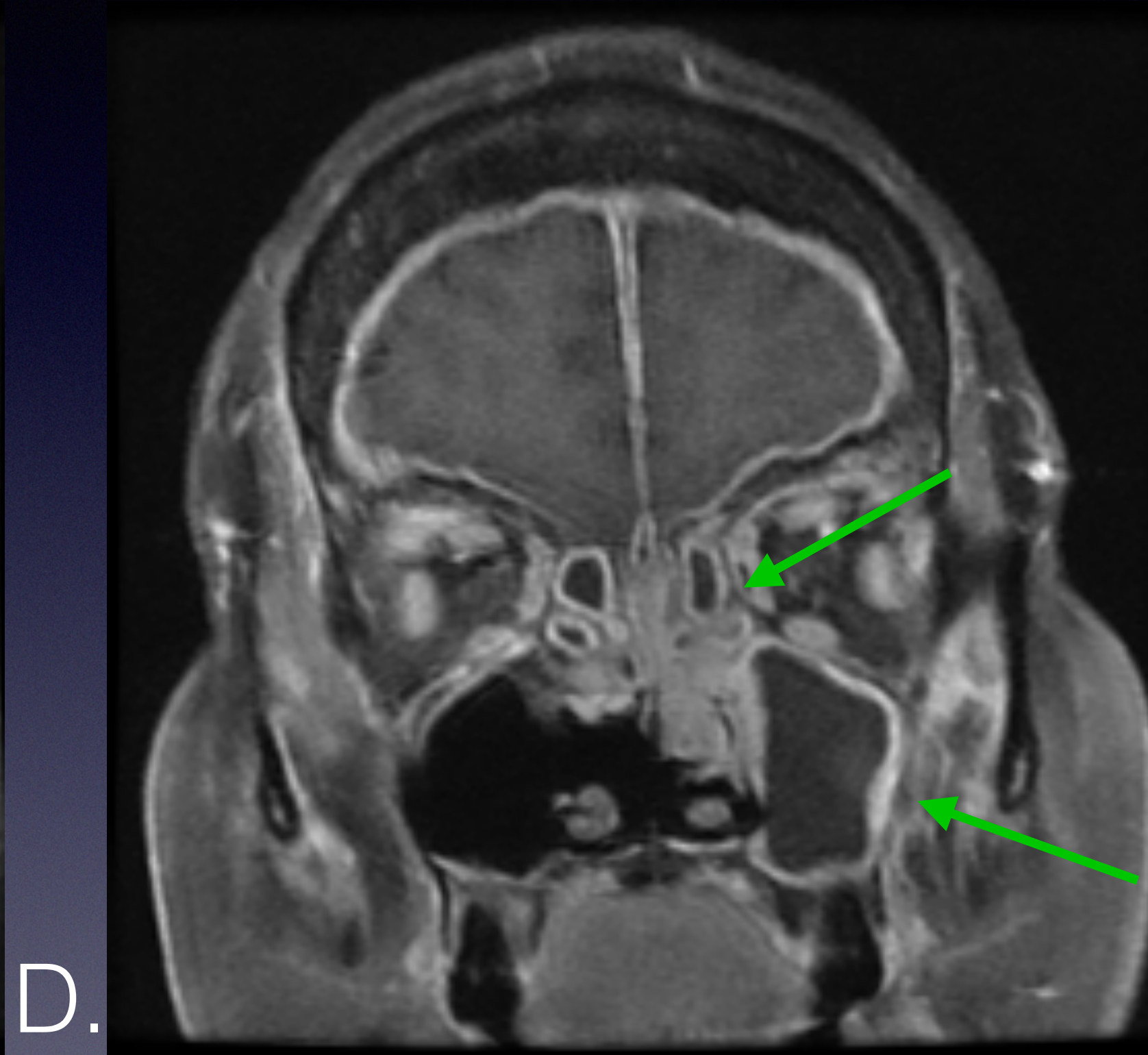
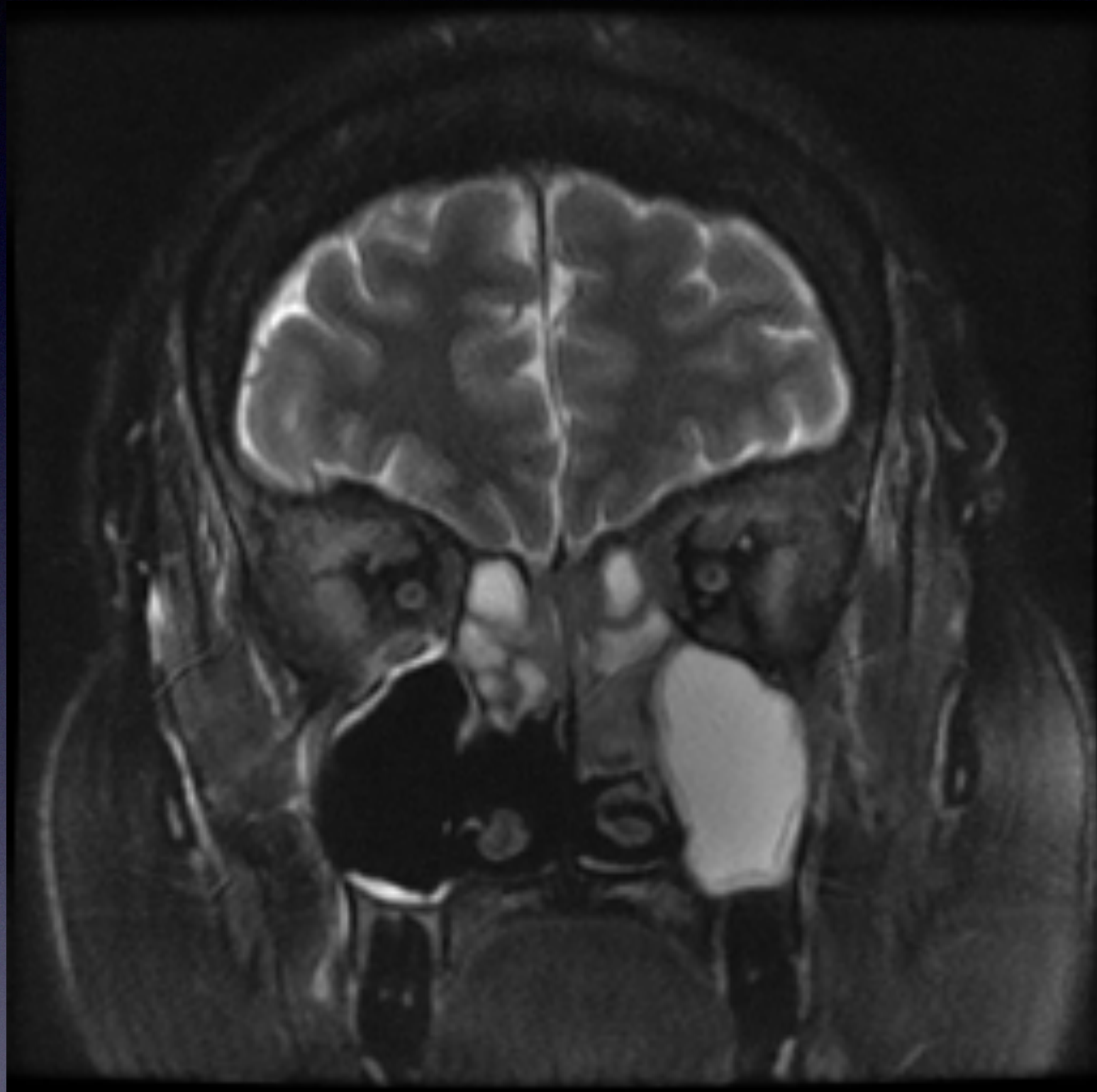
# Imaging: CT Sinus



Coronal (A.) and Axial (B.) CT images in bone window through the paranasal sinuses demonstrate erosions through the left lamina papyracea (blue arrow) and several ethmoid bony septations on the left (red arrow). There is opacification of the frontal, ethmoid, sphenoid and left maxillary sinuses.



# Imaging: MR Brain & Orbit



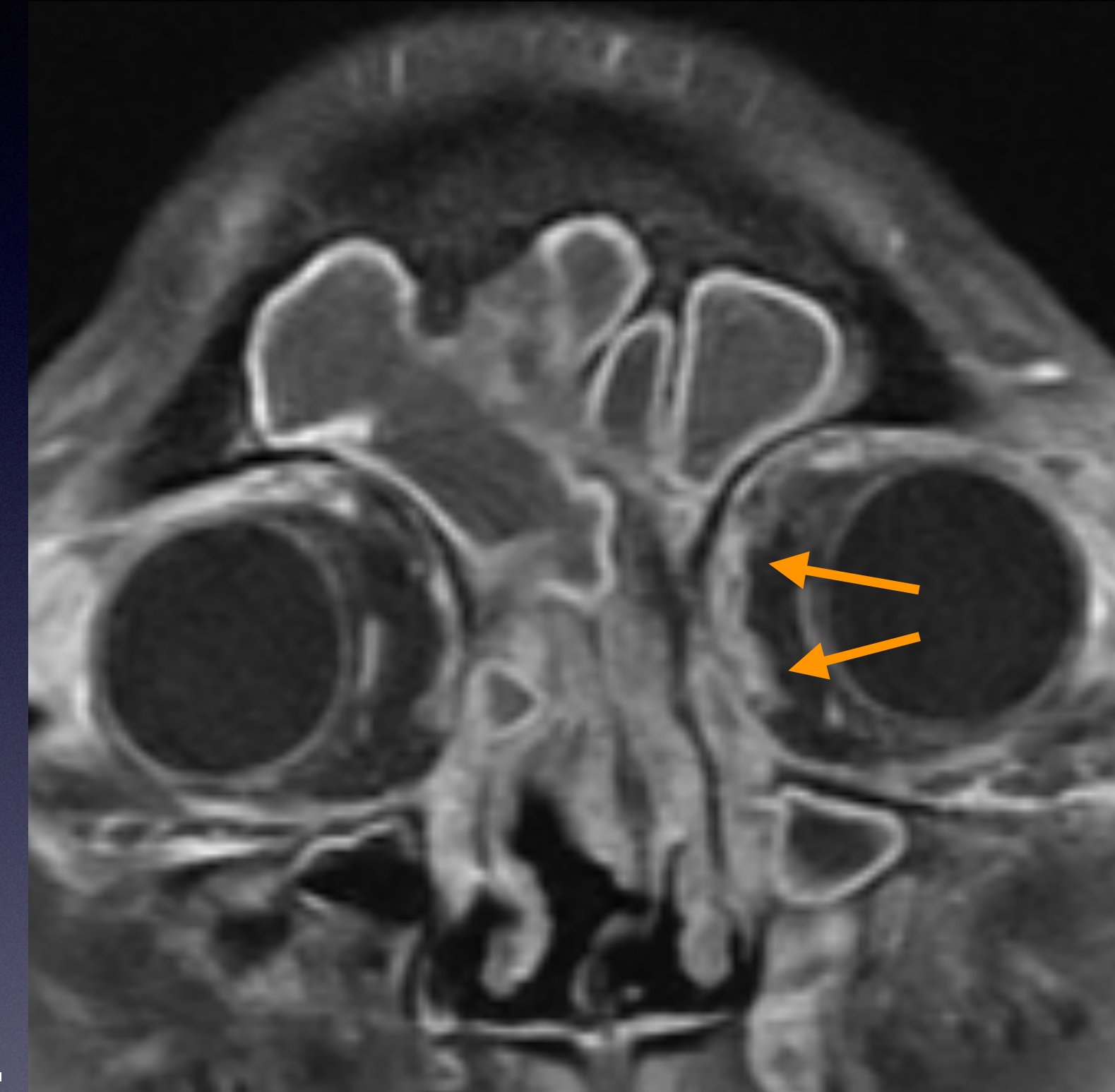
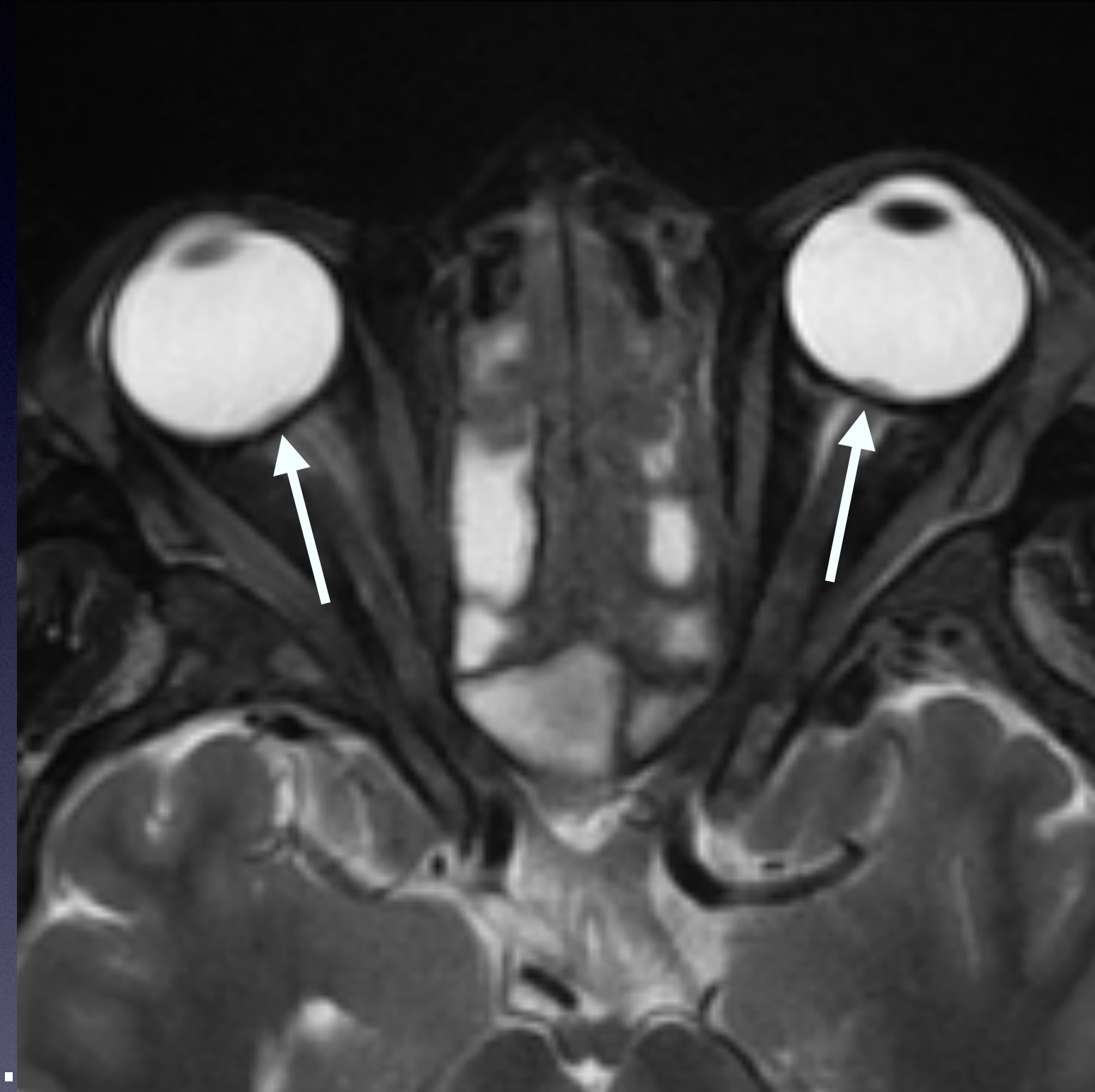
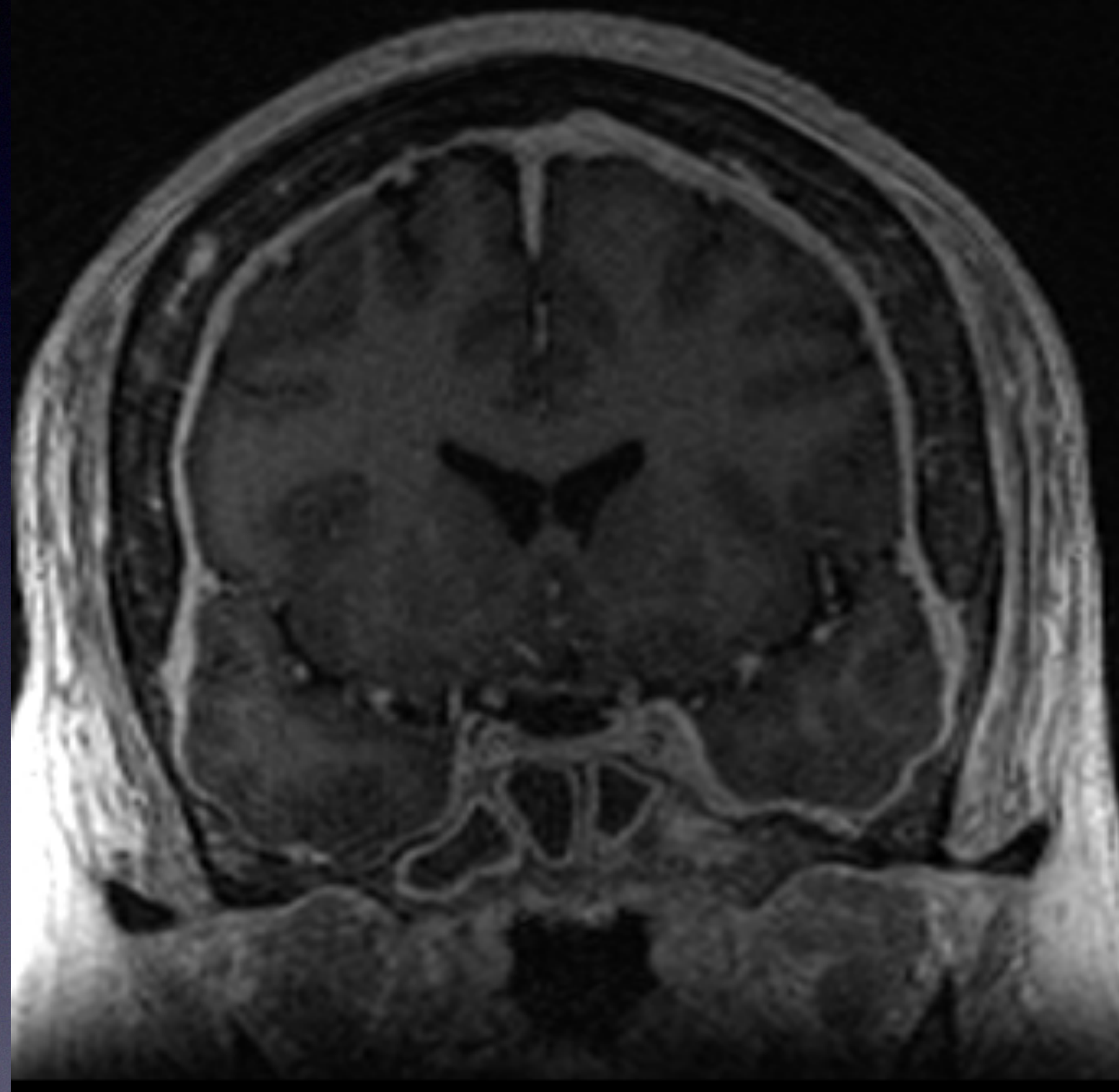
C. Coronal T2 fat-sat image through the paranasal sinuses shows fluid signal within the paranasal sinuses in a similar distribution to the opacification seen on CT.

D. Coronal T1 fat-sat post-contrast image at the same level shows extensive irregular thickening and enhancement of the mucosal layer within the paranasal sinuses (green arrows).

E. Trace Axial DWI shows increased signal involving the abnormally enhancing paranasal mucosa (violet arrow). There is no abnormal DWI signal emanating from the fluid within the sinuses.



# Imaging: MR Brain & Orbit



F. Coronal FSPGR image at the level of the cavernous sinuses shows diffuse pachymeningeal thickening and enhancement that includes the meningeal surfaces of the cavernous sinuses.

G. Axial T2 fat-sat image through the globes shows bulging of the optic discs bilaterally (white arrows) and mild left proptosis.

H. Coronal T1 fat-sat post-contrast image through the orbits shows only a small amount abnormal enhancing tissue along the orbital surface of the left lamina papyracea (orange arrows).



# Management

- Paranasal Sinus disease was treated with empiric antibiotics and sinus surgery for concern of sinusitis in setting of drainage pathway obstruction. Pathology showed metastatic tissue of breast origin.
- Diffuse pachymeningeal enhancement was concerning for meningeal carcinomatosis, however no malignant cells were noted on CSF cytology. Despite this, skull base radiation was administered.
- Papilledema and increased ICP (49 cm H<sub>2</sub>O) were treated medically with dexamethasone and acetazolamide.



# Management

- Diffuse osseous metastases were also found and biopsied, showing metastatic tissue of breast origin. One dose of zoledronic acid was administered.
- Widely metastatic breast cancer (ER+ PR+ HER2-) was addressed with hormonal therapies only, as patient was not a candidate for systemic chemotherapy. The primary lesion was never found.



# Outcome

- Following discharge, the patient was transferred to nursing home where overall status continued to deteriorate. Current treatment regimen is palliative in nature as per wishes of the patient and family.



# Take-Home Points

- Classically, breast cancer metastasizes to axillary lymph nodes, orbit, bone, lung and pleura. Less common sites include the liver, brain and pancreas.
- Breast cancer metastases to the paranasal sinuses are exceedingly rare.
- Paranasal metastatic involvement should be considered in patients with metastatic breast cancer who present with any signs/symptoms of sinus disease.



# Take-Home Points

- On imaging, paranasal metastases typically appear as irregular/nodular thickening and enhancement of the mucosal lining.
- DWI signal abnormality involving the paranasal mucosa can help differentiate metastatic paranasal infiltration from inflammatory/infectious etiologies. MR also better demonstrates the true extent of disease.
- Associated bony erosions are suggestive of metastatic infiltration.
- Concomitant sinusitis is possible and should be excluded as a cause of mucosal thickening and enhancement.
- Spread of disease from the paranasal sinuses into adjacent tissues and compartments is possible, including the orbits (as seen in our case) and intracranially.



# Take-Home Points

- Prognosis of metastatic breast cancer to the paranasal sinuses is exceedingly poor. One study reports a median survival rate of 6 months following initial presentation with sinus symptoms.
- Treatment options are limited, and consist mostly of palliative radiation.



# References/Sources

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