

6-month-old male with progressive right eyelid swelling

Carly Malesky MS3

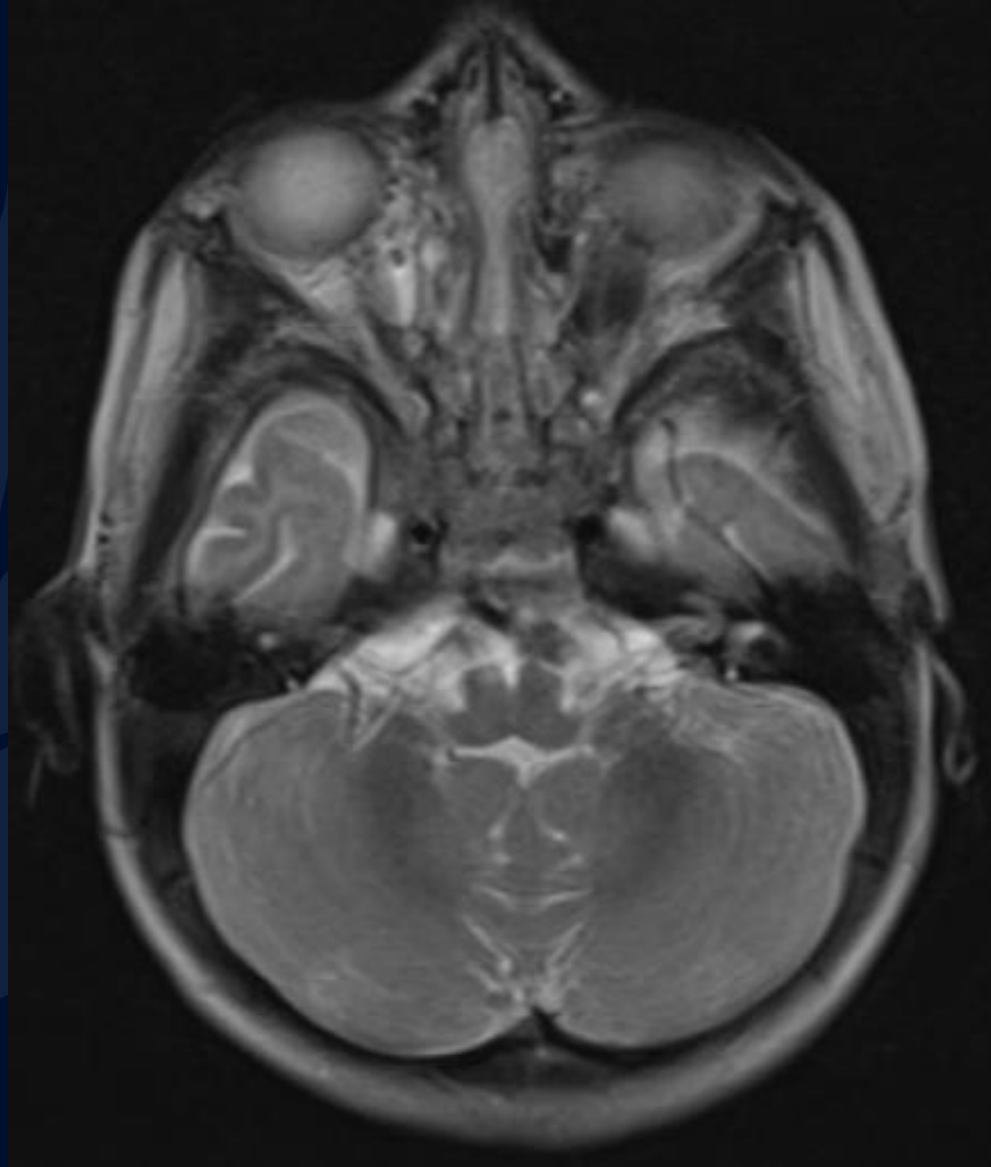
CT with IV contrast



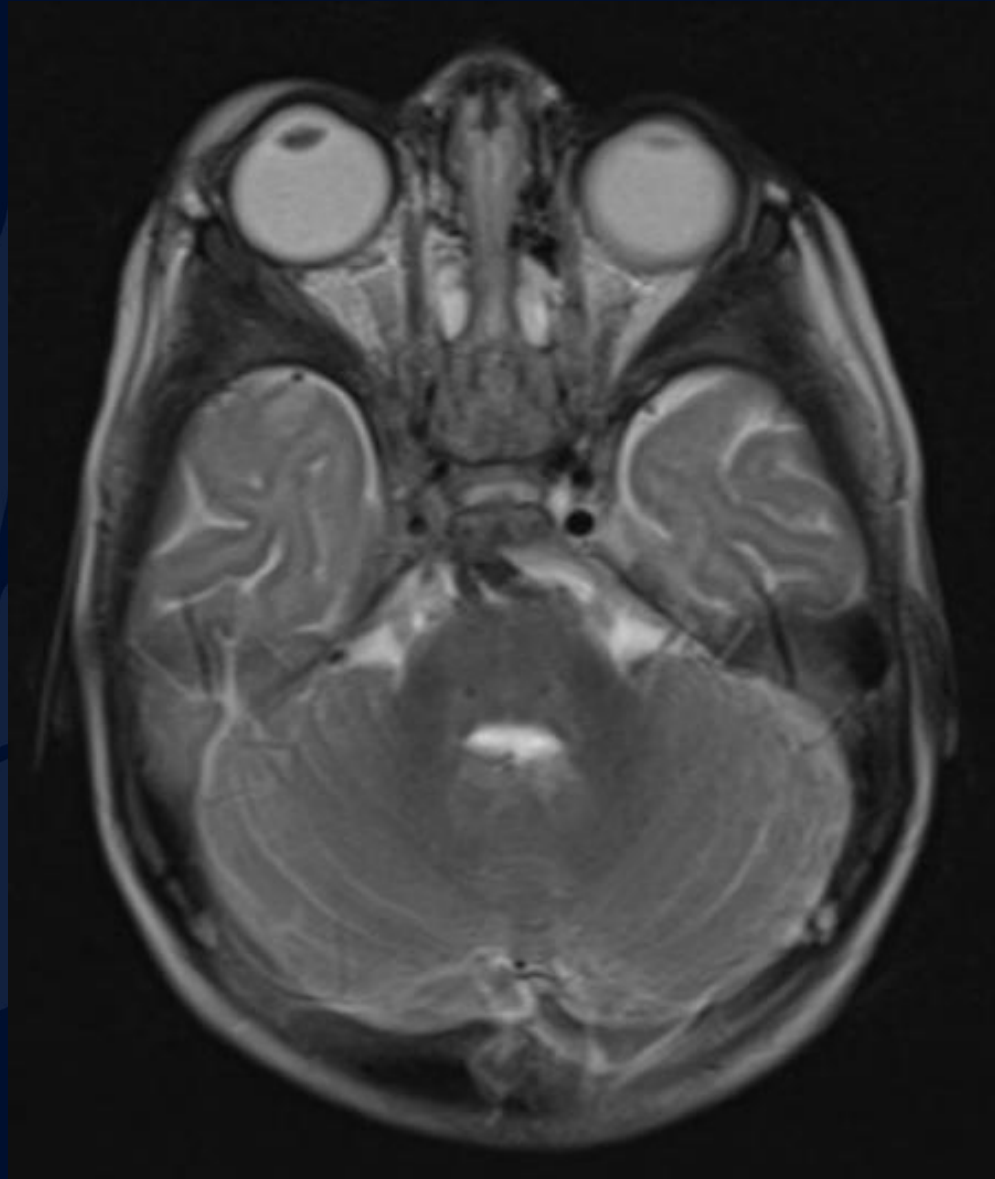
CT with IV contrast



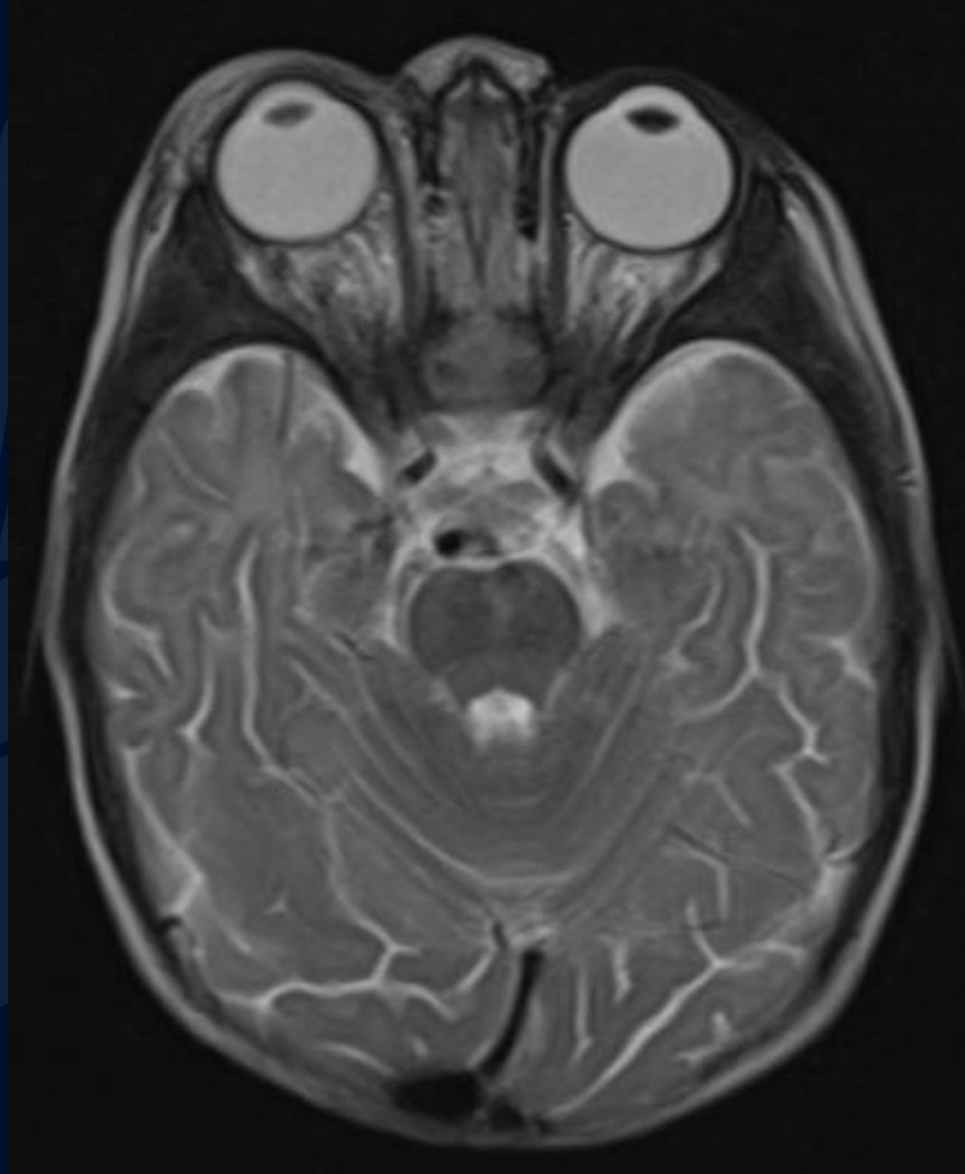
T2 MRI without contrast



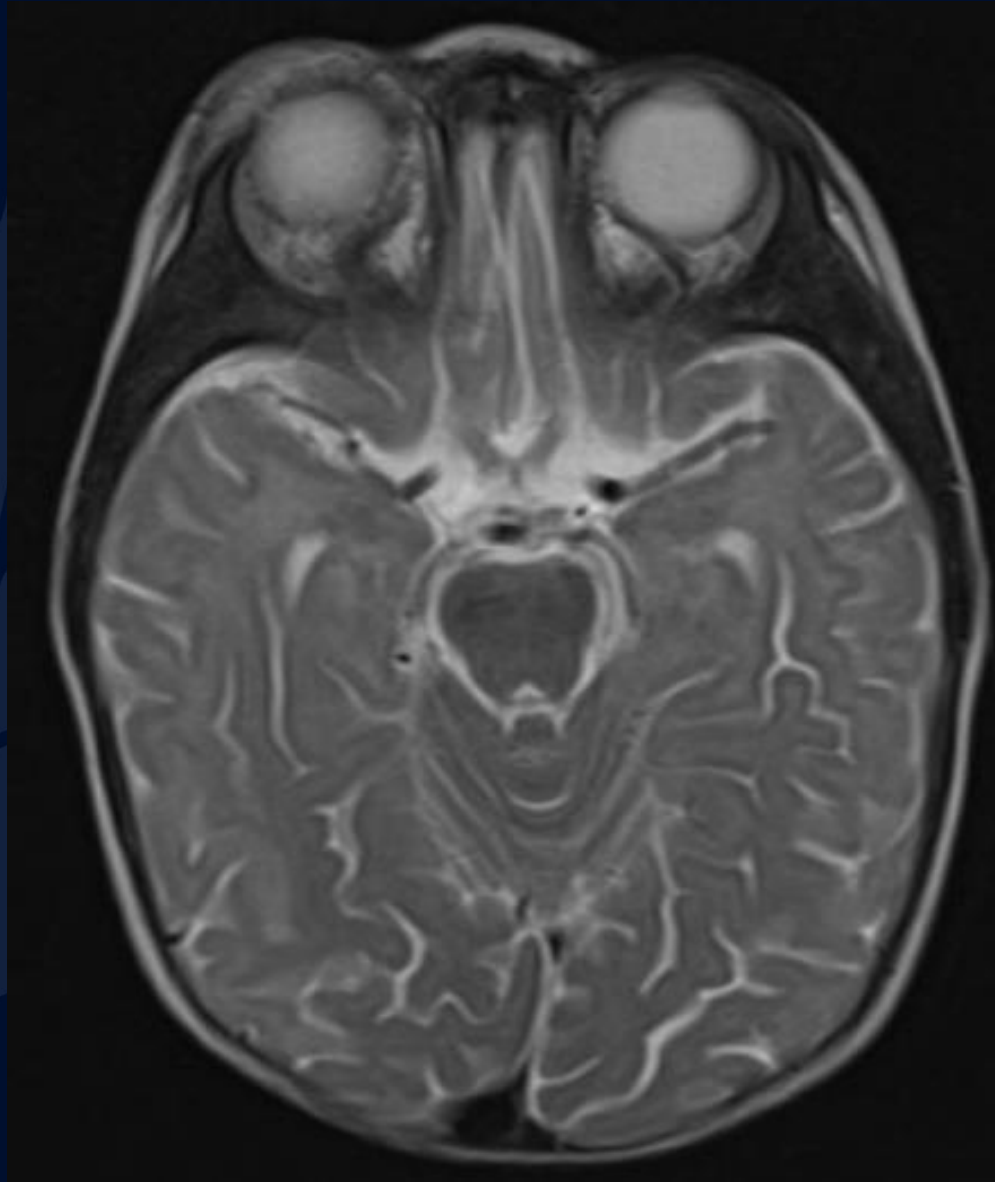
T2 MRI without contrast



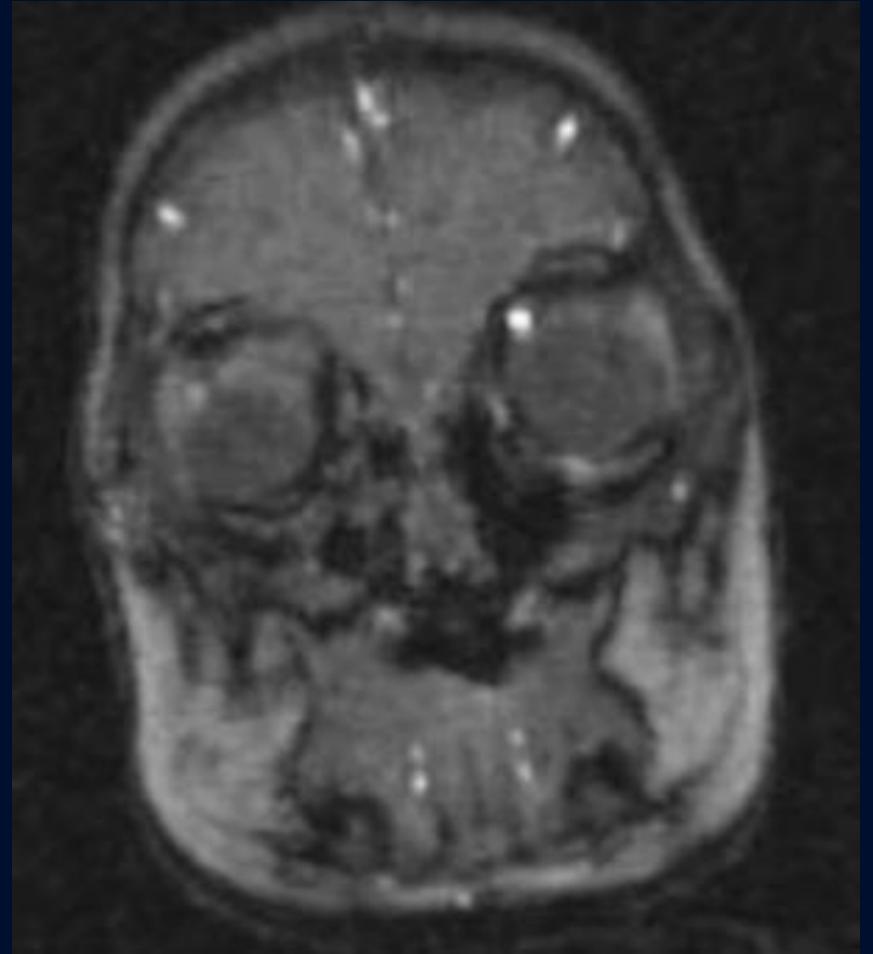
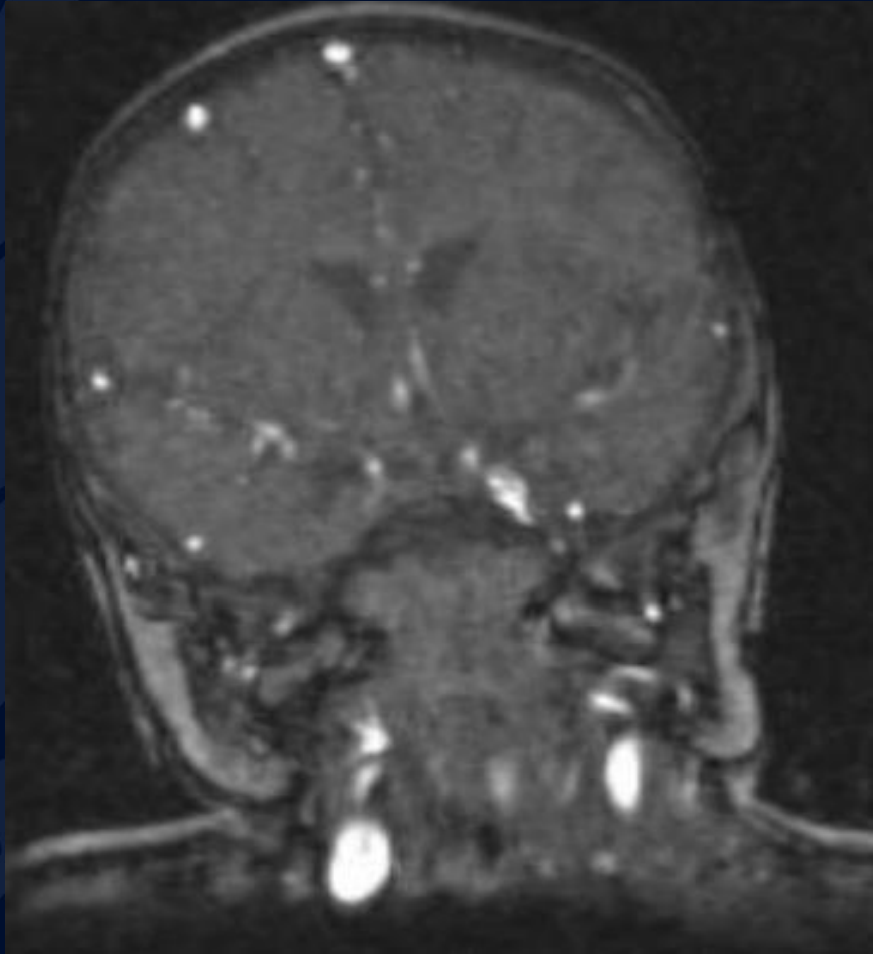
T2 MRI without contrast



T2 MRI without contrast



MRV





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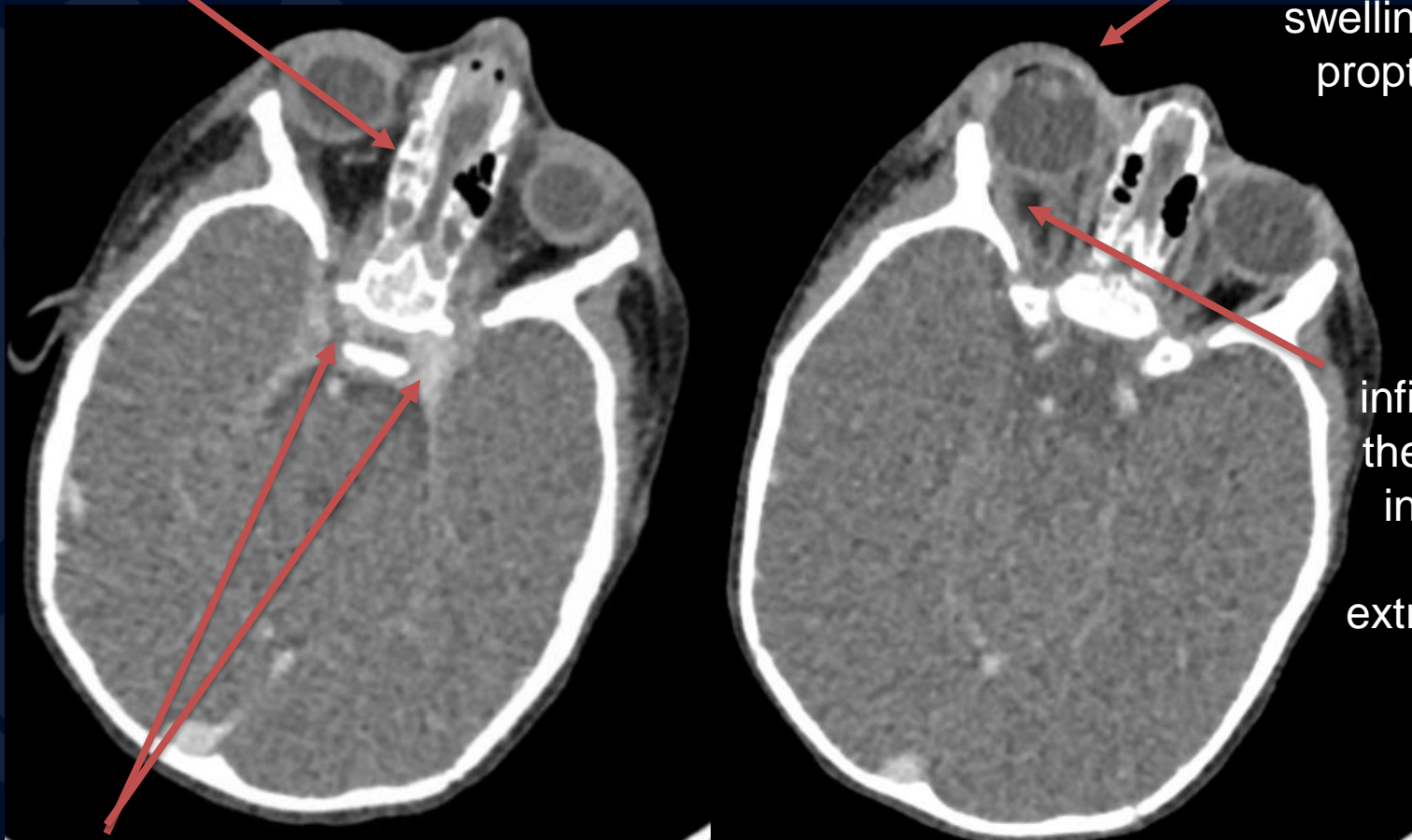
Right Cavernous Sinus and Ophthalmic Vein Thrombosis

Opacification of the right ethmoid sinus

CT with IV contrast

Pre-septal soft tissue swelling and proptosis

Mild infiltration of the superior intraconal and extraconal fat



Right cavernous sinus is asymmetrically hypodense compared to the contralateral left

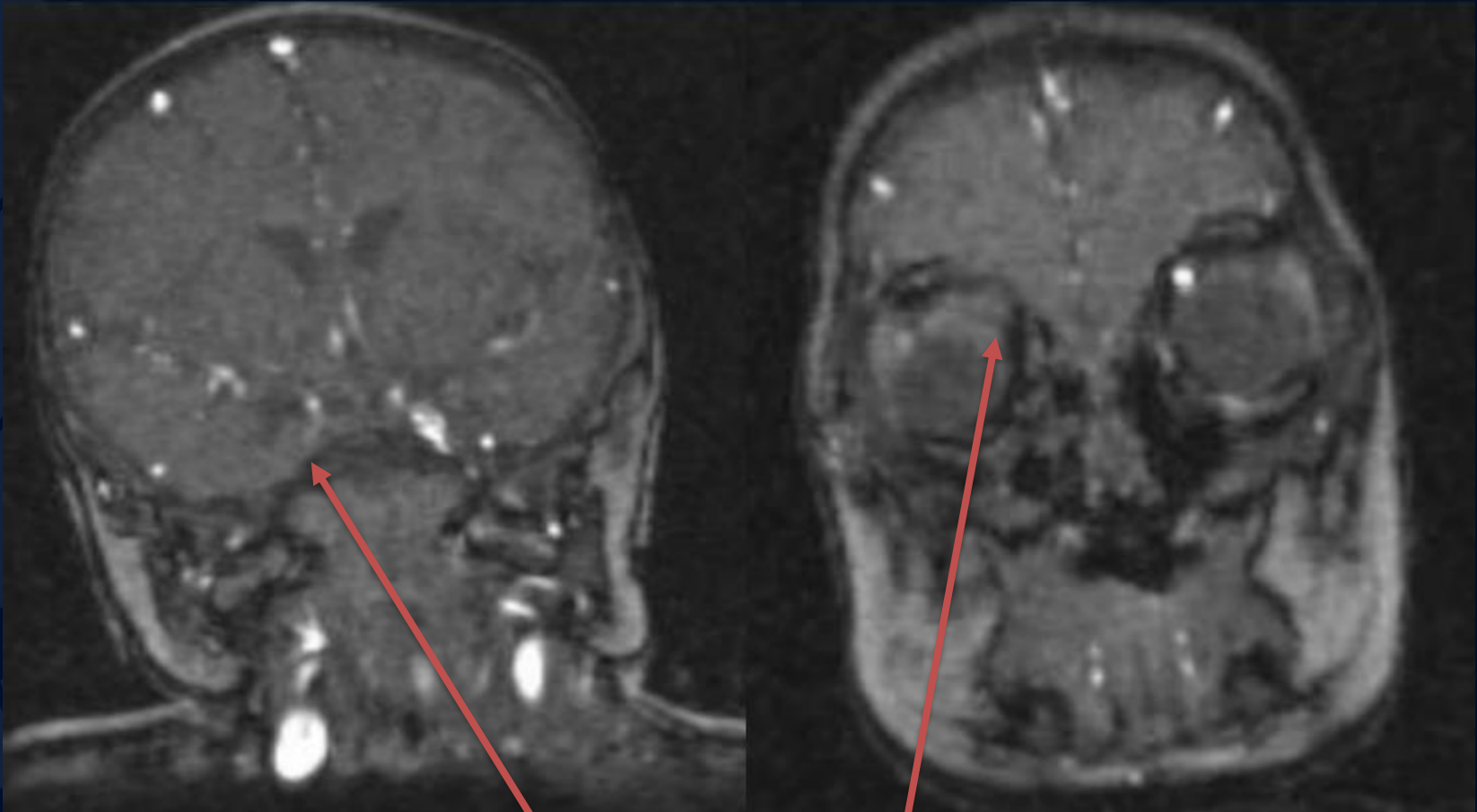
CT with IV contrast

Opacification of
the right maxillary
sinus



Hypodense fluid
collection in the
nasal septum

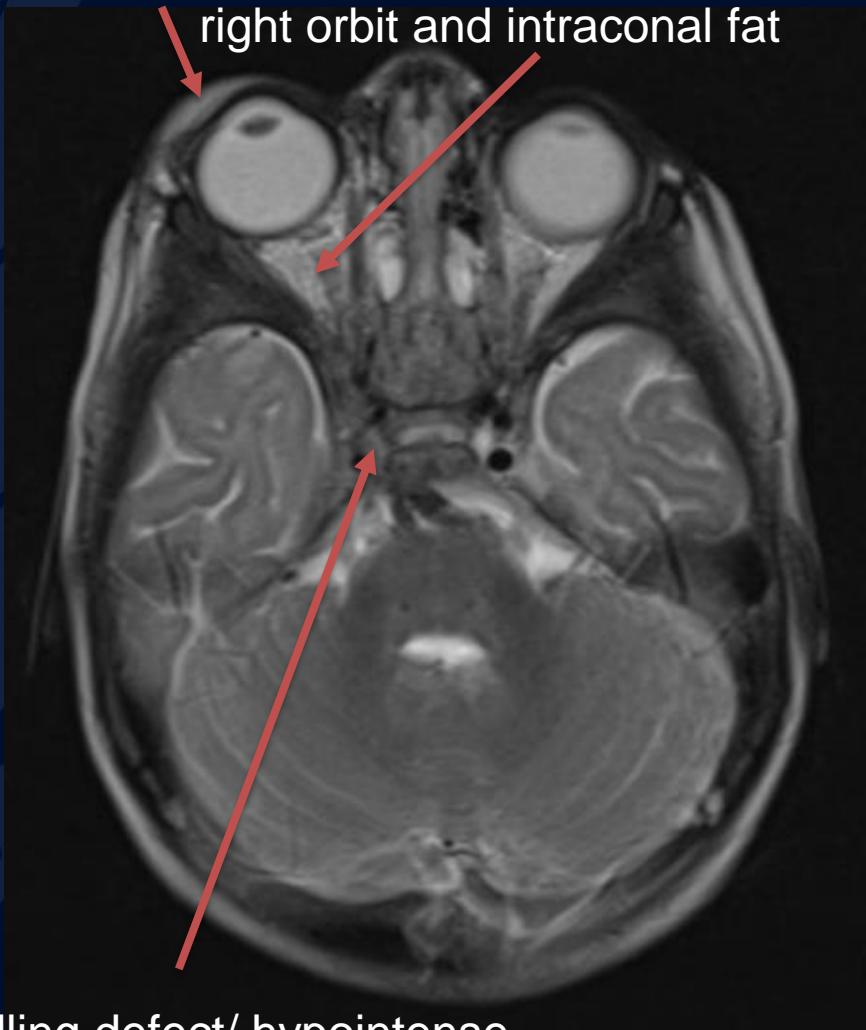
MRV



Lack of enhancement of the right cavernous sinus and superior ophthalmic vein

T2 MRI without contrast

Fat stranding and enhancement along the superior right orbit and intraconal fat



Engorgement of right superior ophthalmic vein



Filling defect/ hypointense area representing a thrombus within the right cavernous sinus

Cavernous Sinus Thrombosis

Pathophysiology

- The cavernous sinuses are located at the anterior skull base and are responsible for draining blood from the facial veins. The dural venous sinuses lack valves. Therefore, bidirectional blood flow from the facial veins expose the cavernous sinuses to both local and adjacent infections.

Epidemiology

- Incidence: 0.2-1.6 cases per 100,000 per year
- Accounts for 1-4% of cerebral venous and sinus thromboses
- More common in the pediatric population
- 2:1 Male predominance
- Mortality rate as high as 30%

Cavernous Sinus Thrombosis

Risk Factors: Facial infections, acute sinusitis, periorbital or orbital infections, tonsillitis, otitis media, mastoiditis, dental infections, hypercoaguable state, immunocompromised state

Clinical Presentation

- *General:* Fever, headache, ophthalmologic deficits (present in 90% of patients)
 - CN3- miosis, EOM deficits, diplopia
 - CN4- diplopia
 - CN6- diplopia
 - Proptosis
 - Periorbital swelling
- *Numbness/parasthesias*
 - V1, including impaired corneal reflex
 - V2

Commonly Involved Organisms

- *Bacteria:* Staphylococcus Aureus (65%), Streptococcus (20%), Pneumococcus (5%), Gram negatives and Anaerobes less common
- *Fungi:* Aspergillosis, Zygomycosis
- *Others:* Parasites (toxoplasmosis, malaria) and viruses (HSV, CMV, HIV)

Cavernous Sinus Thrombosis

Diagnosis

- T2 MRI in combination with MR venography is the most sensitive imaging method
 - T1 or T2 MRI
 - <5 days: thrombus appears isointense (T1), hypointense (T2)
 - >5 days: thrombus appears hyperintense
 - >30 days: variable presentation

Overall, the appearance of a thrombus is variable on all imaging modalities depending on the acuity of presentation

Cavernous Sinus Thrombosis

Complications

- Meningitis
- Abscesses
- Pulmonary manifestations via jugular veins -> septic emboli or abscess, pneumonia, empyema
- Cortical vein thrombosis-> carotid artery narrowing, vasculitis, hemorrhagic infarction
- Hypopituitarism
- Blindness

Management

- Infection: targeted antibiotic coverage to organism for at least 4 weeks
- Thrombus: unfractionated or low molecular weight heparin for at least 6 months

References

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