

AMSER Case of the Month

May 2023

A 35-year-old male with a one-week history of nausea, vomiting, generalized malaise, and worsening level of consciousness.

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Patient Presentation

- **HPI:** A 35-year-old male without a significant past medical history, presenting to the ED with a one-week history of nausea, vomiting, generalized malaise, and worsening level of consciousness. Emesis is non-bloody and non-bilious in nature. Denies abdominal pain, diarrhea, fever, URI symptoms, rashes, or weight loss.
- **Social History:** non-smoker, monogamous with one male partner
- **Physical Exam:** Vital signs are normal. Well-developed with a sickly and lethargic appearance, lying on his side curled up. Tacky mucous membranes, bilateral sluggish pupils. GCS of 11. Abdomen is soft, non-tender, and non-distended.

Pertinent Labs

- **CBC and CMP:** within normal limits
- **HIV:** positive
- **Absolute CD4+:** 62 cells/uL
- **Toxoplasma gondii PCR:** Detected

What Imaging Should We Order?

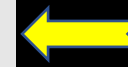
ACR Appropriateness Criteria: Acute Mental Status Change

Variant 1:

Acute mental status change. Increased risk for intracranial bleeding (ie, anticoagulant use, coagulopathy), hypertensive emergency, or clinical suspicion for intracranial infection, mass, or elevated intracranial pressure. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CT head without IV contrast	Usually Appropriate	☼ ☼ ☼
MRI head without IV contrast	Usually Appropriate	○
MRI head without and with IV contrast	May Be Appropriate	○
CT head without and with IV contrast	May Be Appropriate	☼ ☼ ☼
CT head with IV contrast	Usually Not Appropriate	☼ ☼ ☼

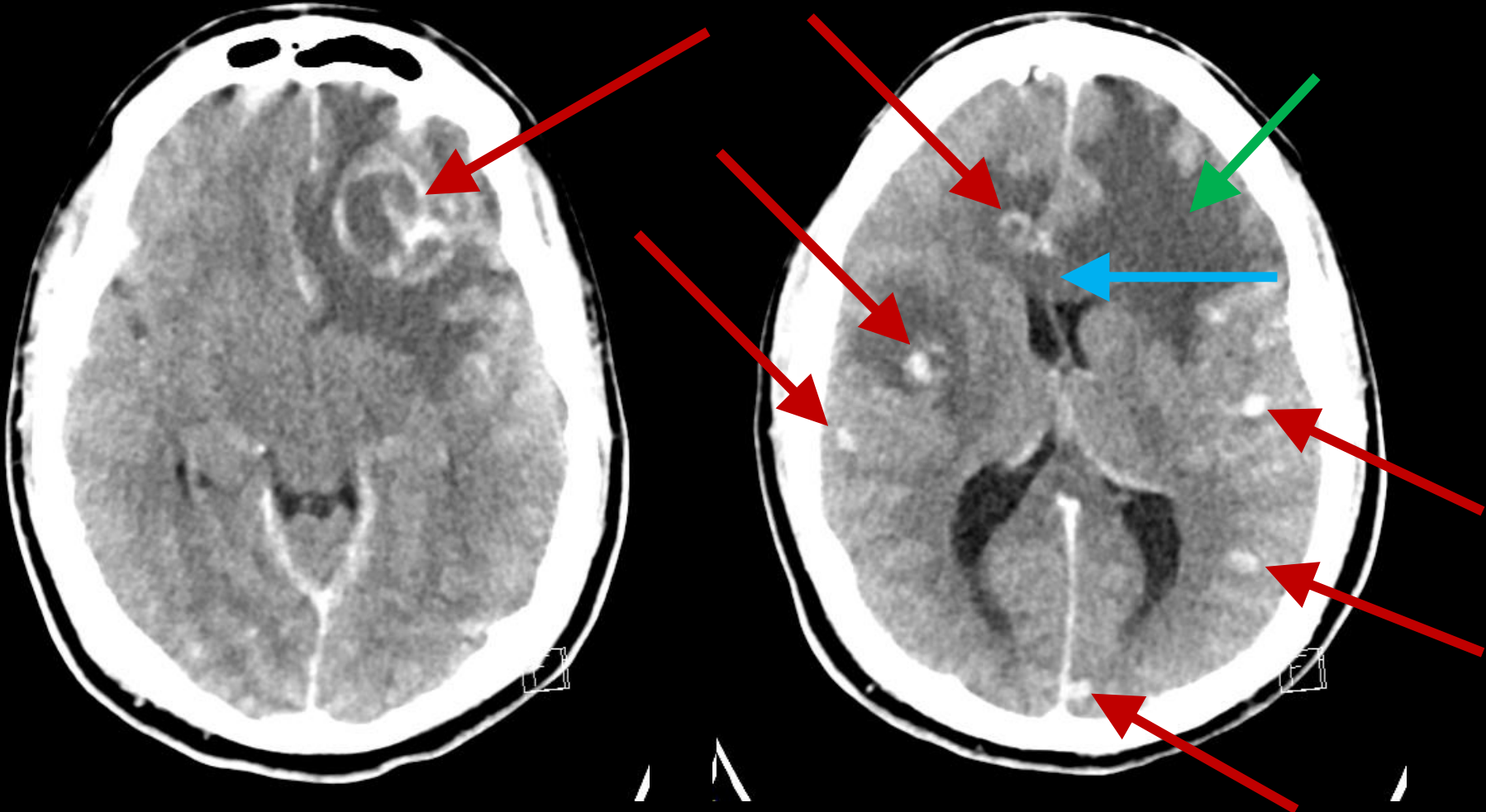
This imaging modality was ordered by the ER physician



Findings: CT Head with Contrast (unlabeled)

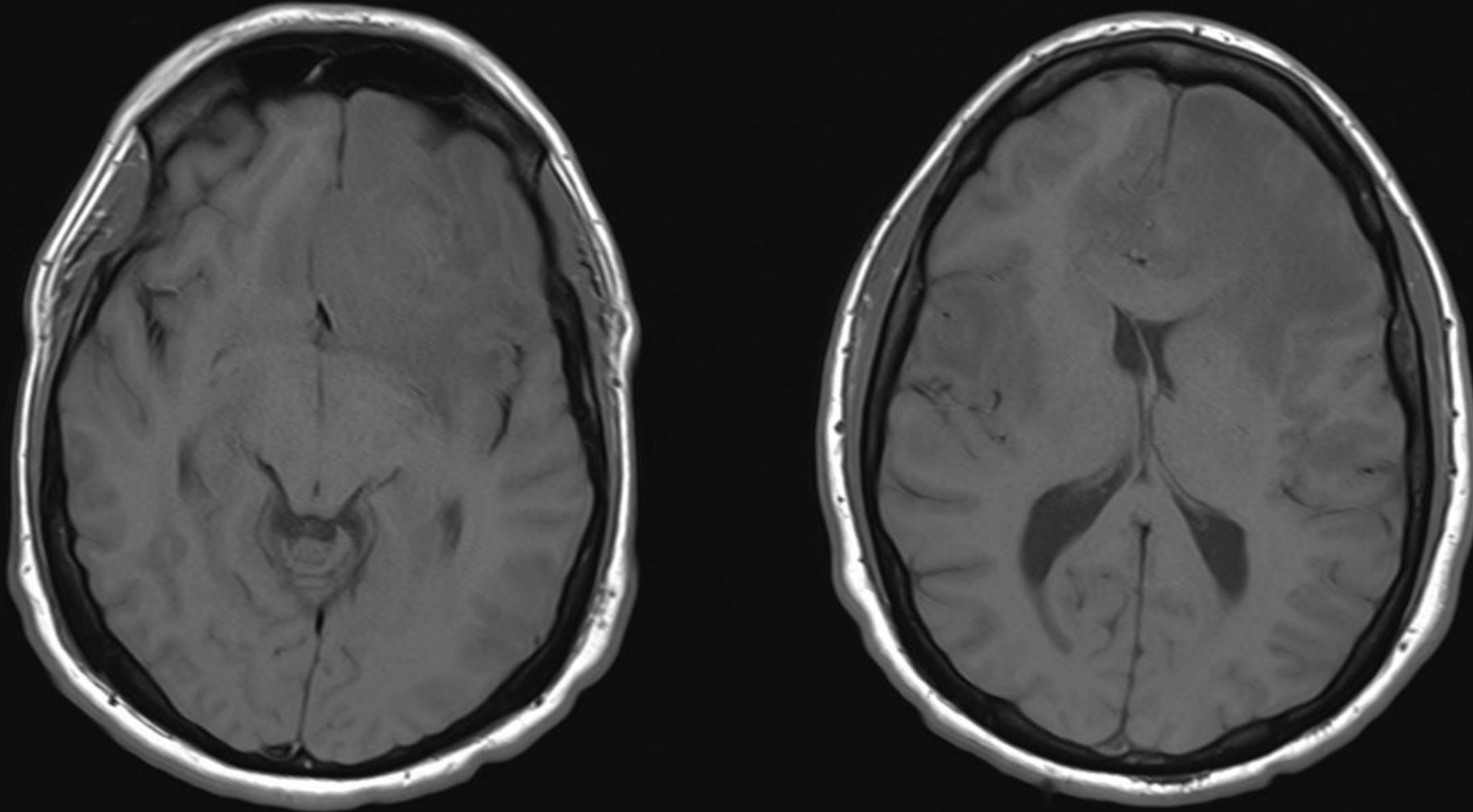


Findings: CT Head with Contrast (labeled)

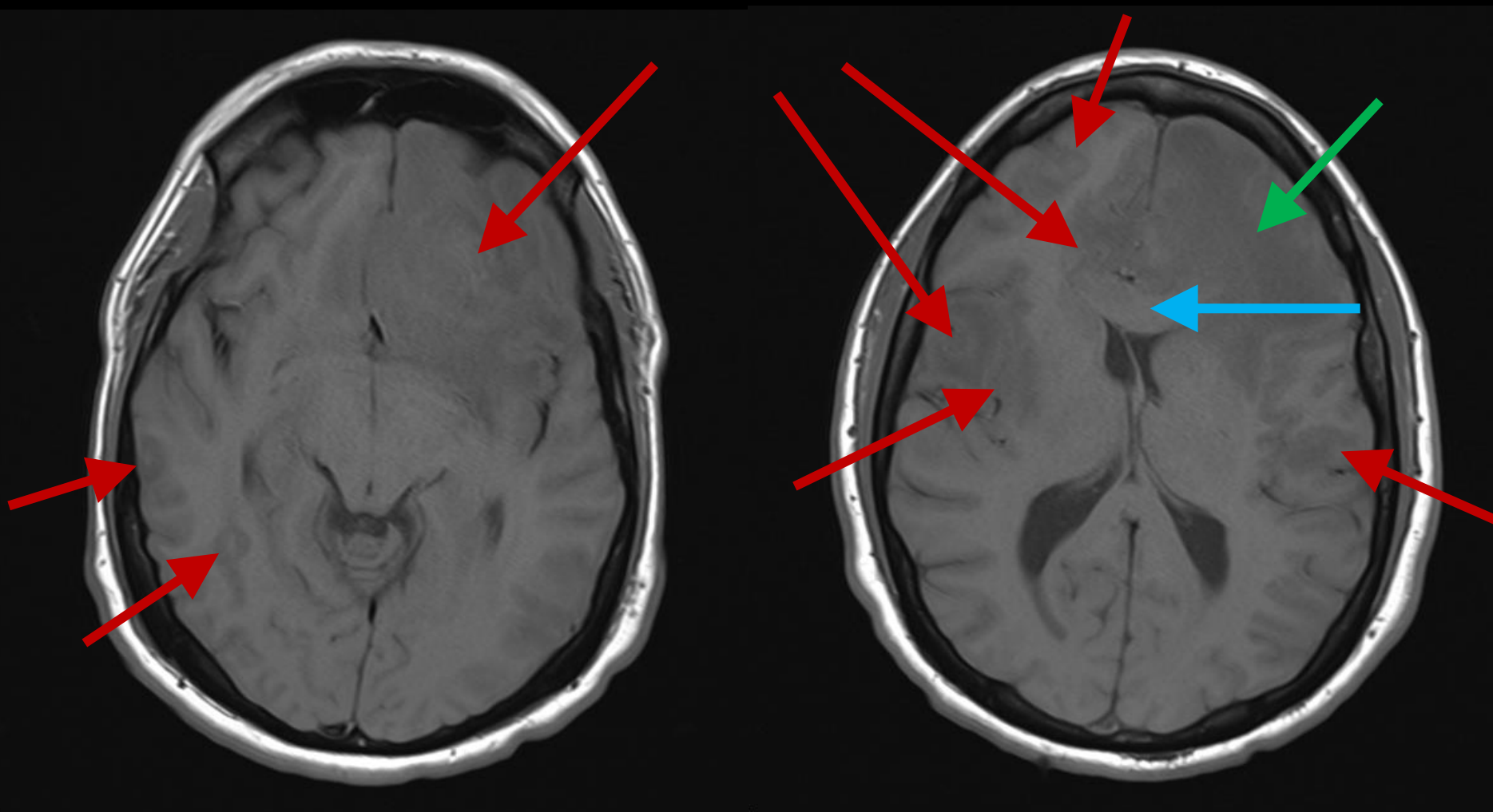


- Multiple ring-enhancing lesions (↑)
- Cerebral Edema (↑)
- Midline shift (↑)

Findings: MRI Brain T1 w/o Contrast (unlabeled)

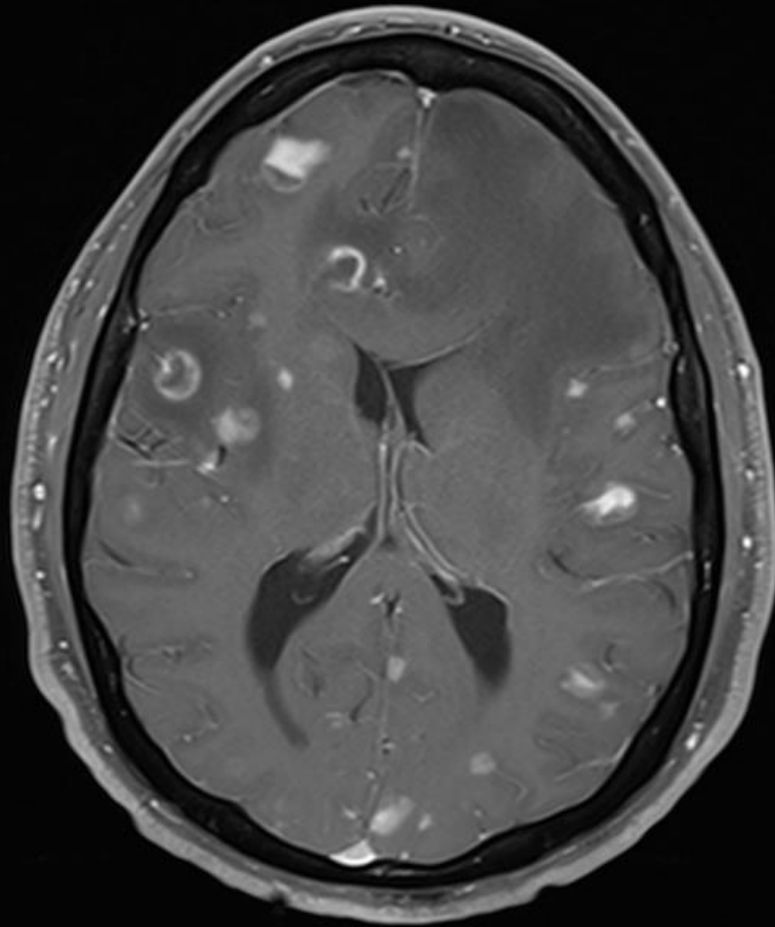
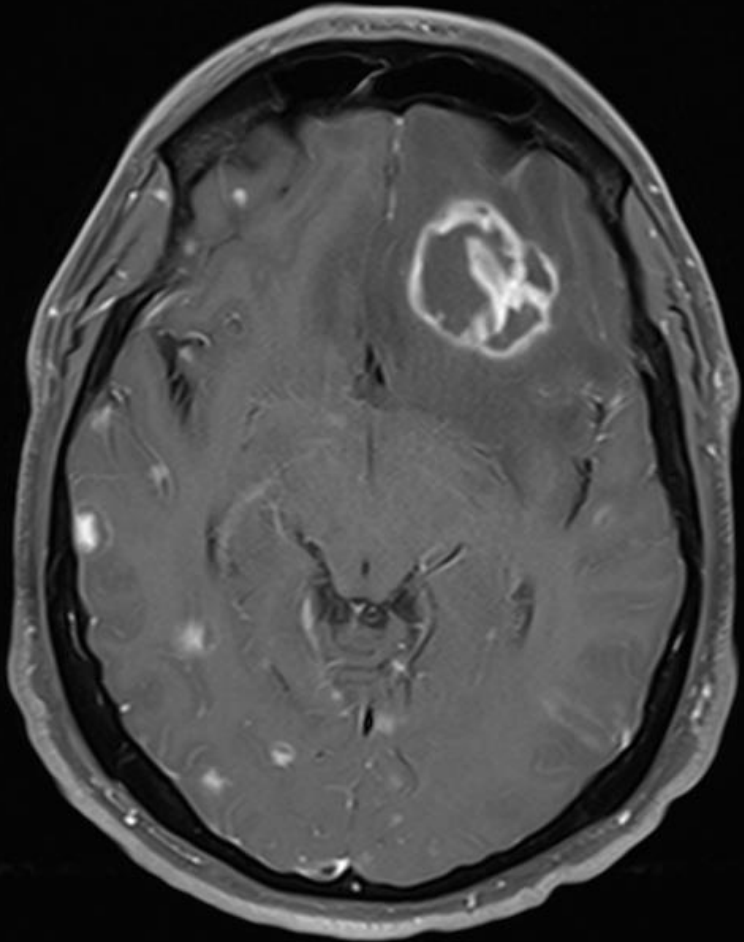


Findings: MRI Brain T1 w/o Contrast (labeled)

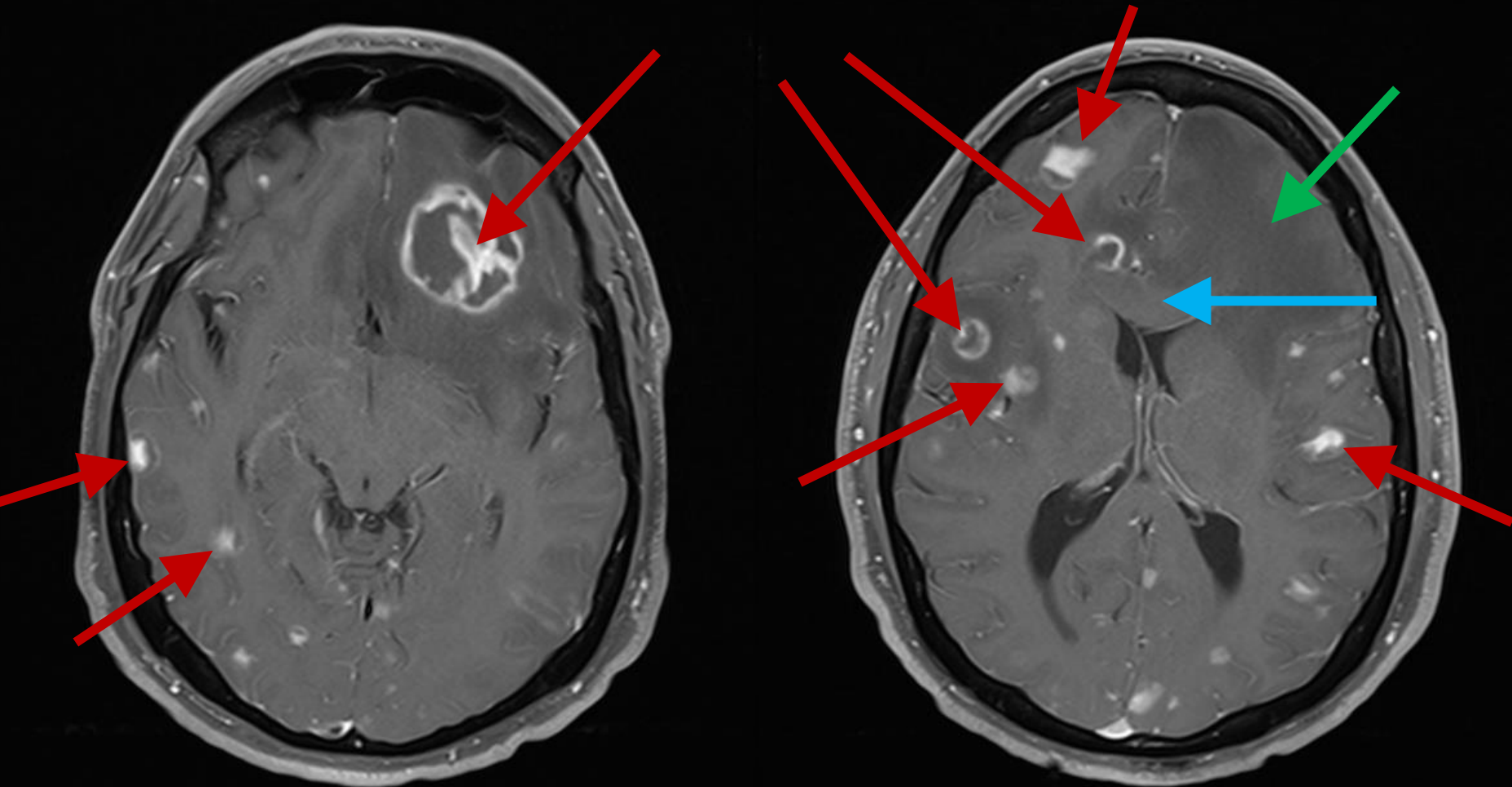


- Numerous iso/hypointense lesions (↑)
- Cerebral Edema (↑)
- Midline shift (↑)

Findings: MRI Brain T1 with Contrast (unlabeled)

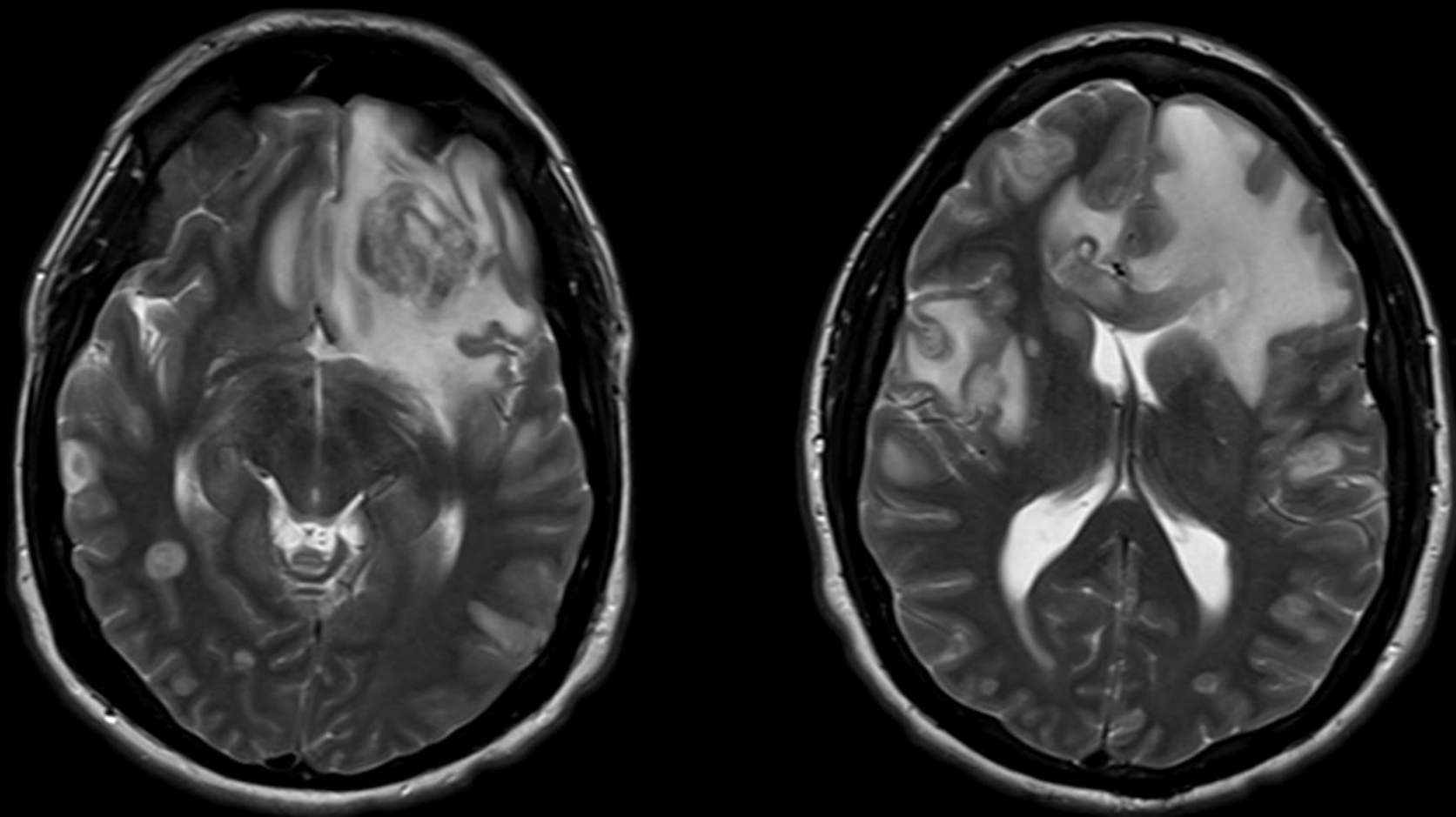


Findings: MRI Brain T1 with Contrast (labeled)

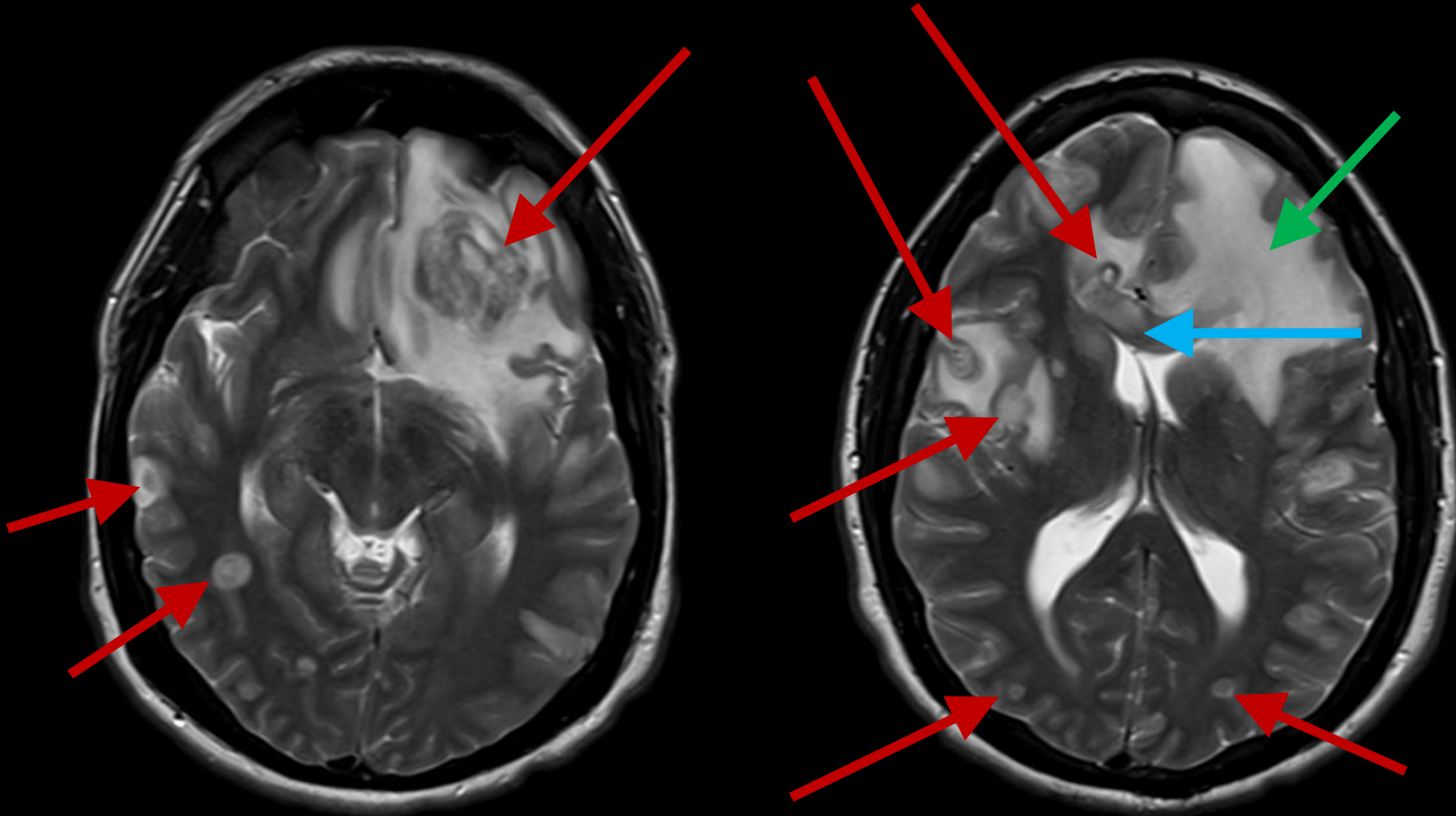


- Numerous ring-enhancing lesions (↑)
- Cerebral Edema (↑)
- Midline shift (↑)

Findings: MRI Brain T2 (unlabeled)



Findings: MRI Brain T2 (labeled)



- Numerous iso/hyperintense lesions (↑)
- Cerebral Edema (↑)
- Midline shift (↑)

Final Dx:

Toxoplasmosis

Case Discussion

Pathology

- Toxoplasmosis is a disease caused by the protozoan parasite *Toxoplasma gondii*
- Can infect any nucleated cell
- IFN- γ is the main cytokine for acute and chronic infection control

Epidemiology

- Spread through ingestion of undercooked meat containing *Toxoplasma gondii* organisms or exposure to cat feces
- Infects approximately 1/3 of the world's population

Case Discussion

Clinical Presentation

- Immunocompetent
 - Most cases are asymptomatic or have isolated cervical lymphadenopathy
- Immunocompromised
 - Reactivation of latent infection leads to toxoplasmic encephalitis
 - CD4+ counts <100 cells/uL
 - Mental status changes, seizures, focal motor deficits (hemiparesis, speech abnormalities), movement disorders, neuropsychiatric changes, etc.
 - Chorioretinitis
 - Pneumonitis

Case Discussion

Radiologic Findings

- Has a predilection for the basal ganglia, thalami, and corticomedullary junctions of the brain
- CT
 - Variably sized hypodense regions with ring enhancement +/- mass effect
 - Treated: Calcified lesions
- MRI
 - T1: isointense or hypointense
 - T2: isointense or hyperintense

Treatment

- 6 weeks of Sulfadiazine, Pyrimethamine, and Leucovorin
- This patient also underwent left frontal craniotomy and cranioplasty

References:

1. Montoya, J. G., & Liesenfeld, O. (2004). Toxoplasmosis. *The Lancet*, 363(9425), 1965–1976. [https://doi.org/10.1016/s0140-6736\(04\)16412-x](https://doi.org/10.1016/s0140-6736(04)16412-x)
2. Garcia, H. H., Tanowitz, H. B., & Del Brutto, O. H. (2013). Chapter 8 - Toxoplasmosis. In *Neuroparasitology and tropical neurology* (Vol. 114, pp. 125–145). essay, Elsevier.
3. Jha P, Yap J, Chieng R, et al. Neurotoxoplasmosis. Reference article, Radiopaedia.org (Accessed on 28 Mar 2023) <https://doi.org/10.53347/rID-8614>
4. Luft, B. J., Hafner, R., Korzun, A. H., Leport, C., Antoniskis, D., Bosler, E. M., Bourland, D. D., Uttamchandani, R., Fuhrer, J., Jacobson, J., Morlat, P., Vilde, J.-L., & Remington, J. S. (1993). Toxoplasmic encephalitis in patients with the acquired immunodeficiency syndrome. *New England Journal of Medicine*, 329(14), 995–1000. <https://doi.org/10.1056/nejm199309303291403>