

Septic Embolic Encephalitis: A Review of Imaging Modalities and Key Findings in a Case

Dallin Judd, Jake Oldham, James Lish, MD
UNTHSC Texas College of Osteopathic
Medicine.



Clinical Presentation

- The patient is a 48-year-old male with a significant history of ascending aortic aneurysm repair and bioprosthetic aortic valve replacement that was performed five years ago. He presented with generalized weakness, low-grade fevers, altered mentation, diarrhea, chills, and malaise.
- On physical examination, he was febrile with a temperature of 38.5°C and tachycardic with a heart rate of 112 beats per minute. He was disoriented but did not have any focal neurological deficits.
- Laboratory results revealed leukocytosis with a white blood cell count of 15,000/ μ L, an elevated C-reactive protein (CRP) level of 140 mg/L, and a presepsin level of 700 pg/mL, indicative of sepsis. Blood cultures grew *Enterococcus faecalis*, which was penicillin-resistant.



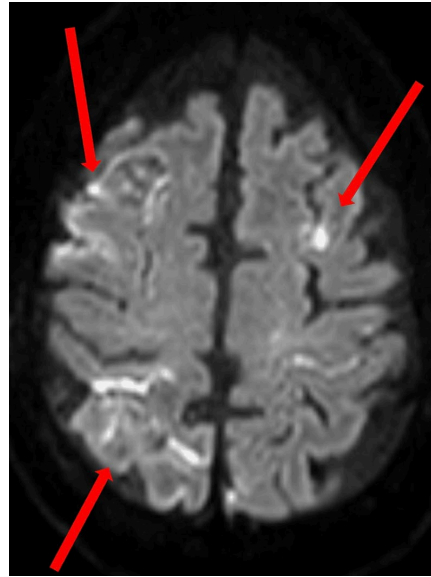
Initial Imaging Findings

- The initial **CT Brain without Contrast** revealed subarachnoid hemorrhage (SAH) in the left parietal region and parenchymal bleeding in the right temporal lobe, suggestive of embolic events. Transesophageal echocardiography identified mobile vegetation on the aortic valve, indicating a high risk of embolism.
- **Figure 1:** Non-contrast CT shows SAH in the left parietal region and parenchymal bleeding in the right temporal lobe (arrows).

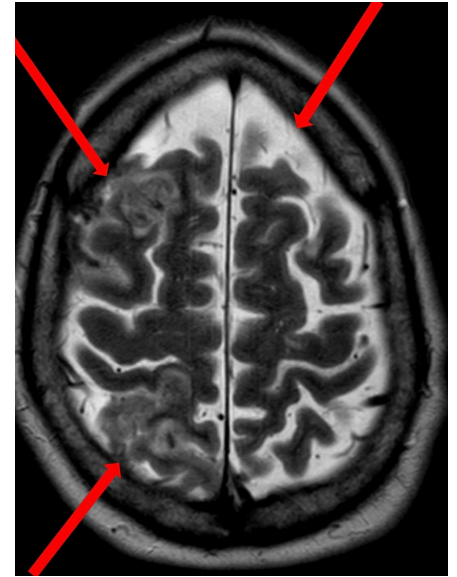


MRI - Day 1 Findings

- On Day 1, a **DWI MRI** demonstrated increased signal areas indicating acute subarachnoid blood and small cortical infarcts. This was confirmed by a **T2-weighted MRI**, which also showed acute subarachnoid blood and cortical infarcts.



- Figure 1:** DWI MRI shows increased signal indicating acute subarachnoid blood and small cortical infarcts (arrows).

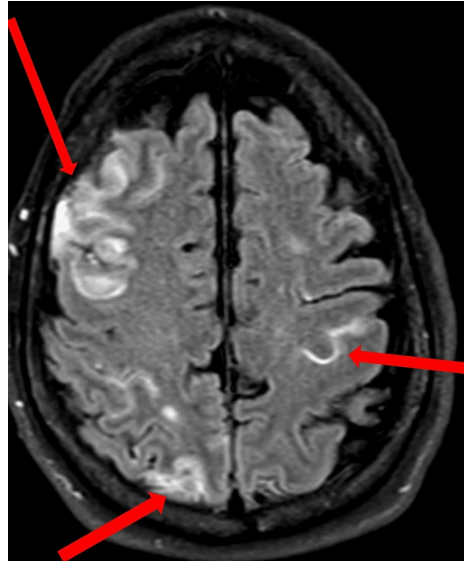


- Figure 2:** T2-weighted MRI shows increased signal consistent with acute subarachnoid blood and cortical infarcts (arrows).

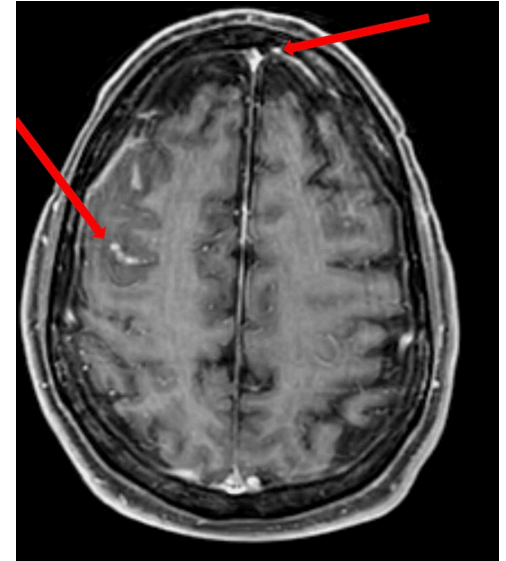
Post-Contrast MRI Findings

- A **Post-Contrast FLAIR MRI** indicated cerebritis and subarachnoid hemorrhage with cortical and leptomeningeal enhancement. A **Post-Contrast T1 MRI** revealed pachymeningeal and leptomeningeal enhancement, along with cortical edema.

- **Figure 3:** Post-contrast FLAIR MRI shows subarachnoid hemorrhage with cortical and leptomeningeal enhancement (arrows).

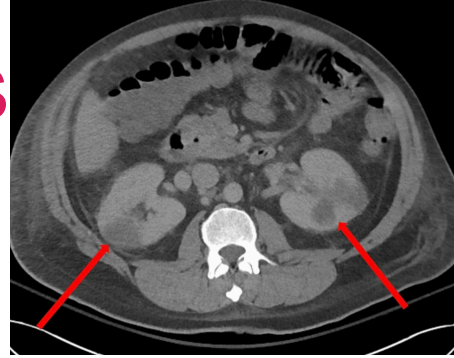


- **Figure 4:** T1 post-contrast MRI demonstrates pachymeningeal and leptomeningeal enhancement with cortical edema (arrows).

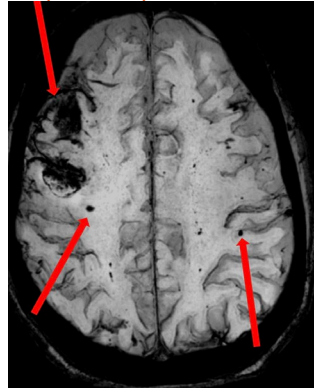


Follow-Up Findings

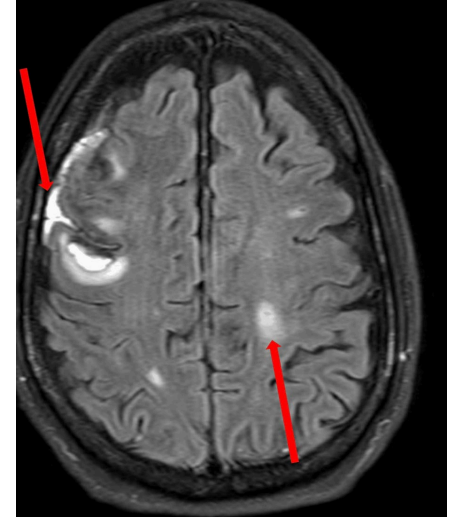
- A follow-up **non-contrast CT of the Abdomen** showed bilateral renal cortical infarcts and splenic infarcts, correlating with the patient's altered coagulation status.
- Fifteen days later, a follow-up **MRI of the Brain** revealed evolving tiny parenchymal bleeds and extra-axial hemorrhage. **FLAIR imaging** displayed evolving extra-axial and parenchymal hemorrhages with areas of cerebritis.



- **Figure 5:** Non-contrast CT of the abdomen shows bilateral renal cortical infarcts (arrows).



- **Figure 6:** Follow-up MRI shows tiny parenchymal bleeds and extra-axial hemorrhages (arrows).



- **Figure 7:** FLAIR imaging shows evolving extra-axial and parenchymal hemorrhages with areas of cerebritis (arrows).

Management

- **Empirical Antibiotics:**
- Started on broad-spectrum antibiotics (vancomycin + ceftriaxone), adjusted to high-dose ampicillin and gentamicin based on culture results. Duration: 6 weeks.
- **Management of Encephalitis:**
- Corticosteroids (dexamethasone) to reduce cerebral inflammation. Avoided anticoagulants due to risk of hemorrhage.
- **Supportive Care:**
- Seizure prophylaxis with levetiracetam (Keppra) and referral to rehabilitation for cognitive recovery.



Outcome

- The patient's neurological status gradually improved with ongoing treatment, although he had residual mild cognitive impairment at the time of discharge. Follow-up imaging showed stable findings, with no evidence of new infarcts or hemorrhages. The discharge plan included continuation of intravenous antibiotics via a PICC line, close follow-up with infectious disease and neurology specialists, and participation in physical therapy to address mobility concerns. His long-term prognosis includes a high risk of future embolic events due to his history of prosthetic valve replacement, necessitating regular echocardiogram follow-ups and cognitive assessments.



Take Home Points

- Septic Embolic Encephalitis is a serious complication that can occur following prosthetic valve endocarditis, requiring prompt recognition and intervention. Early initiation of targeted antibiotics is essential for treating resistant organisms and improving patient outcomes. MRI plays a critical role in the diagnosis and ongoing monitoring of both embolic and infectious complications in these patients.

