

A Case of Seizure Secondary to Ciprofloxacin for UTI

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Case Description:

- 21 year old male with no significant past medical history who is hospitalized after being found down unresponsive, found to have rhabdomyolysis and lower extremity compartment syndromes requiring multiple surgeries
- Following prolonged vegetative state, he was eventually diagnosed with acute disseminated encephalomyelitis (ADEM) based on MRI findings and after testing positive for Streptococcus pyogenes
- During hospitalization he suffered complications of respiratory failure requiring tracheostomy, renal failure requiring CRRT, and PEG tube placement
- He was admitted to the traumatic brain injury rehabilitation unit on day 39 of hospitalization
- During his rehabilitation stay he developed Enterobacter UTI resistant to multiple antibiotics prompting treatment with Ciprofloxacin
- On his final day of antibiotic treatment (day 7), which was his 77th day of hospitalization, he suffered a witnessed seizure
- His seizure resolved spontaneously and he was subsequently given 1,000mg Levetiracetam IV.

Physical Exam:

- T: 99.8 HR: 127 BP: 152/64 SpO2: 99%
- General: Appears in distress, no tonic or clonic activity in extremities
- CV: Tachycardic, regular rhythm, pulses 2+ in all extremities with no cyanosis
- Pulmonary: Clear to auscultation bilaterally, no respiratory distress noted
- GI: Nontender to palpation throughout abdomen, no significant bowel sounds noted
- Neuro: Nonverbal, left gaze deviation, unable to cross midline, not following commands; exam did improve over following 15 minutes to return to baseline of AOx2, following commands in all 4 extremities

Management:

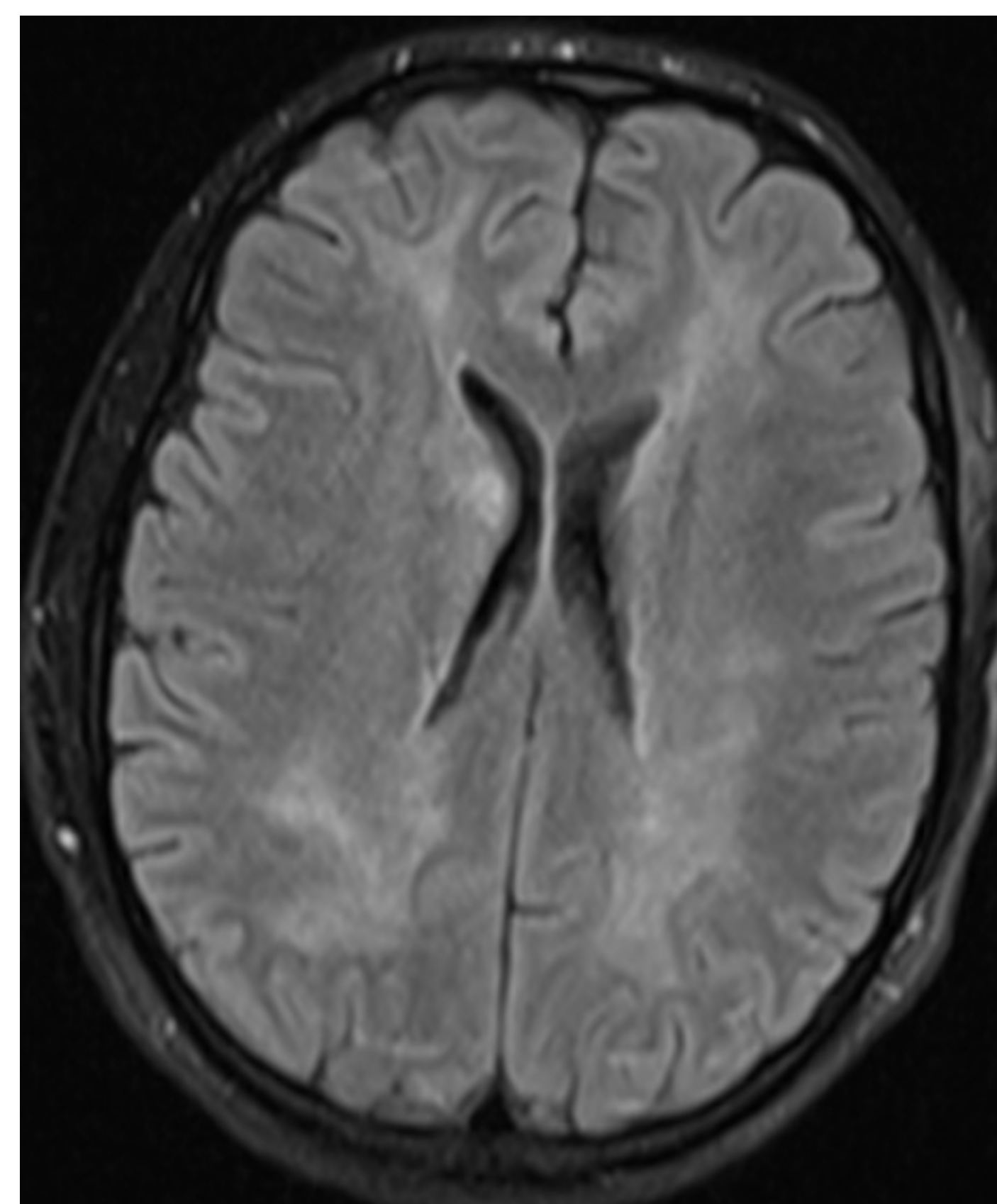
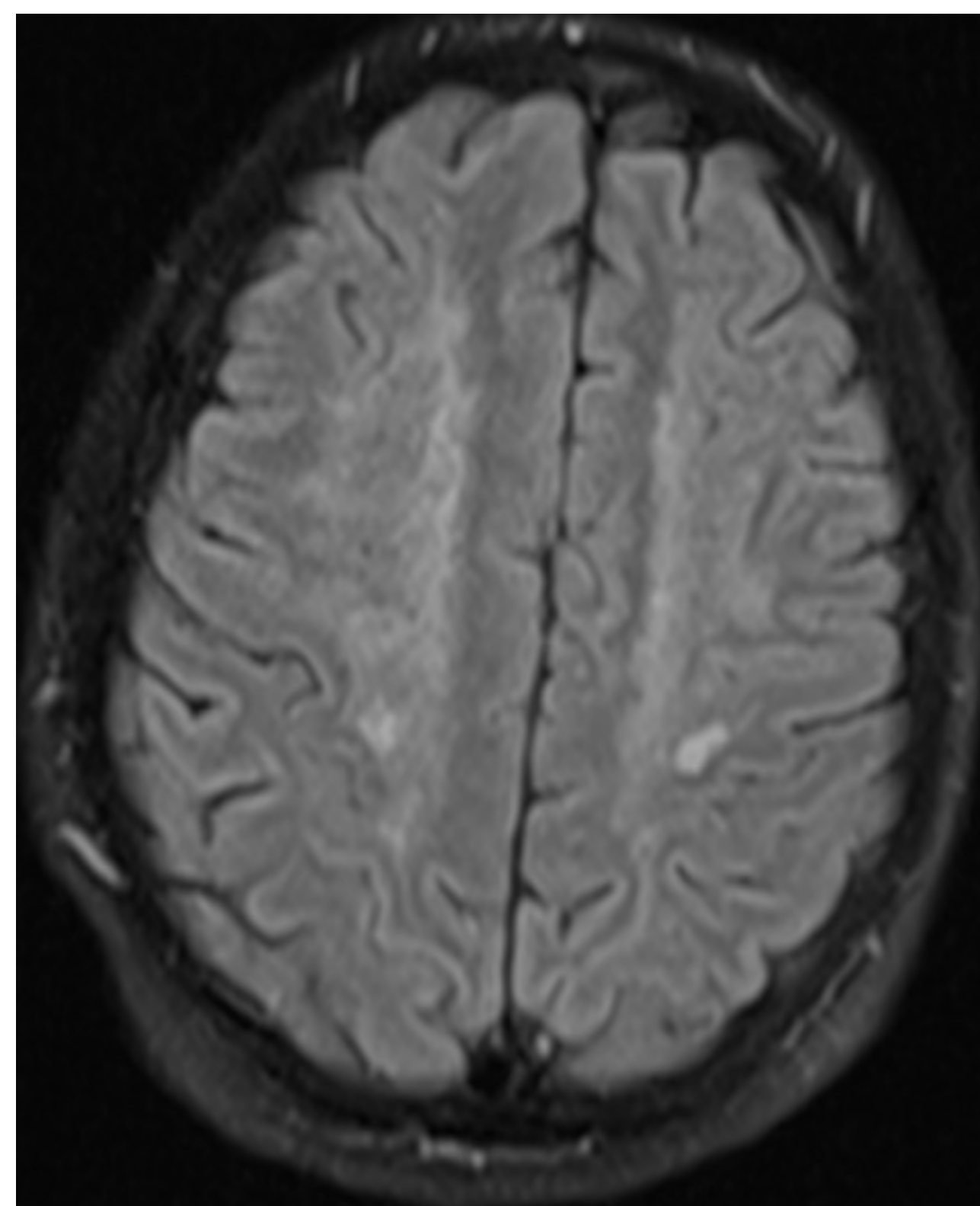
- Neurology consult: Levetiracetam 500mg BID, recommend EEG and follow up brain MRI with and without contrast
- EEG: slowing over left central temporal region, suppression over right central parietal region, no evidence of epileptiform discharges
- Unable to obtain MRI due to equipment limitations
- Urine toxicology screen negative
- Following discussion with pharmacy regarding patient medications that could affect seizure threshold, Ciprofloxacin was identified as the only medication that had changed within the past 17 days and has been recognized to contribute to seizure activity
- Ciprofloxacin was discontinued in favor of Bactrim although this only required one dose to complete 7 day course of antibiotics

Remainder of Rehabilitation Course:

- Following a therapy hold for the day after seizure, he returned to full schedule of 3 hours a day of therapy without any issue. He remained on Levetiracetam 500mg BID at his discharge from the rehabilitation unit 25 days after his seizure.

Acute Disseminated Encephalomyelitis:

- Acute disseminated encephalomyelitis is characterized by brief, diffuse inflammation within the brain and spinal cord. It often follows bacterial or viral infection. Symptom onset is rapid with prominent encephalitis symptoms such as fever, fatigue, headache, nausea and vomiting¹.
- The most common presentation involves motor deficits².
- Over 75% of patients have an elevated WBC count in their CSF upon presentation².
- MRI T2/FLAIR appears to be best for identifying the supratentorial white matter lesions that are predominant in this disease².



Ciprofloxacin and Seizure:

- Ciprofloxacin, like all fluoroquinolones, is recognized to increase seizure risk although current literature is limited to case reports³.
- Recognized seizure risks in the setting of Ciprofloxacin use include: renal dysfunction, CNS disorders, and concurrent Theophylline use³.
- Literature review found 11 cases of seizure attributed to Ciprofloxacin use with two cases occurring without risk factors.
- It is suspected that fluoroquinolones contribute to seizure risk by competitively inhibiting GABA-benzodiazepine receptor binding, interfering with inhibitory neurotransmission protective against seizures⁴.

Follow Up:

- At 3 month follow up, he was still taking Levetiracetam 500mg BID as prescribed at discharge, was tolerating it well without any adverse effects, and had no recurrence of seizure.

Discussion/Conclusion:

- Incidence of late seizures ranges from 5% in ischemic strokes to 50% in penetrating TBI^{5,6}.
- Guidelines for seizure prophylaxis vary from no prophylaxis for ischemic stroke to 7 days prophylaxis for TBI barring any seizure activity after the first 24 hours⁶.
- Anti-epileptic drugs are not without their own risks, being associated with worsening neurobehavioral impairments⁷.
- Seizures are associated with a lower level of function at rehabilitation discharge and worse health-related quality of life scores⁸.

References:

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