Enterococcal Meningitis in the setting of Non-Small Cell Lung Cancer with Metastasis to Brain

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Case Presentation: The patient was a 61-year-old man with a past medical history of seizure disorder and non-small cell lung cancer diagnosed and treated with radiation and chemotherapy in 2017, later with progression of disease to the brain necessitating radiation and checkpoint inhibitor therapy with chronic steroids. He presented to the emergency department with a one-day history of severe headache without neurologic changes, fevers, chills, or abdominal or urinary complaints. On initial evaluation, he was afebrile and hemodynamically stable with waxing and waning mental status and stuttering dysarthria without other neurologic deficits. CBC revealed neutrophil-predominant leukocytosis (WBC 16.4 10^3/uL, 94% neutrophils). CT and MRI of the brain were significant for bifrontal cystic hygromas and subtle increase in proteinaceous fluid in the left frontal and parietal sulci from prior imaging. Lumbar puncture with CSF examination revealed WBC count of 17,246 cells/uL (84% neutrophils), protein 328 mg/dL, and normal glucose. Meningitis/Encephalitis PCR panel was negative. CSF cultures grew few colonies of ampicillin-susceptible *Enterococcus faecalis* and CSF cytology was suggestive of carcinoma. Blood cultures demonstrated no growth. The patient was started on intravenous ampicillin, ceftriaxone, and gentamicin for Enterococcal meningitis and high-dose steroids for possible meningeal carcinomatosis. His mentation improved over 24-48 hours. CSF studies were repeated with a decrease in WBC to 22 cells/uL and protein to 140 mg/dL. Treatment was complicated by suspected gentamicin-induced nephrotoxicity leading to discontinuation of gentamicin on day 16. He was discharged to home upon completion of a 21-day course of ampicillin and ceftriaxone but returned to the ED a week after discharge with fever of 102.6°F and altered mental status. He was restarted on empiric ampicillin and ceftriaxone. Workup during the second hospital stay was negative for reinfection, with no growth on CSF or blood cultures. CT of head was significant for increase in size of left frontal lobe metastasis. Patient was discharged with home hospice.

Discussion: This case is an uncommon presentation of enterococcal meningitis, as it seemingly occurred as a spontaneous, community-acquired meningitis in an immunocompromised male with structural abnormalities due to underlying metastasis. Enterococcus species are resident flora of the gastrointestinal tract, and are better known to cause urinary tract infections, bacteremia, and endocarditis. Enterococcal infections of the CNS are extremely rare and are thought to make up only 0.3-4% of bacterial meningitis, with *E. faecalis* accounting for 76% of cases. Enterococcal meningitis most commonly presents with fever, mental status changes, and purulent meningitis. Cases typically occur in the setting of CNS hardware or secondary infection from bacteremia (58%) or other enterococcal infections; however, cases of spontaneous enterococcal meningitis have been described. Risk factors include cardiovascular disease, congenital heart abnormalities, diabetes, immunocompromised status, head trauma, CNS structural abnormalities, and CNS hardware. Due to its rarity, minimal data exists to guide treatment for ampicillin-susceptible enterococcal meningitis, though studies suggest at least dual therapy with IV ampicillin and ceftriaxone with gentamicin or streptomycin for 14-21 days. This case also highlights the need for updated treatment recommendations for enterococcal meningitis related to aminoglycoside toxicity.