CLINICAL VIGNETTE

Revisiting the Diagnosis: The Value of Lumbar Punctures for Progressive Encephalopathy

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A 76-year-old woman with history of hypertension and Meckel's cave schwannoma with recent radiation therapy was admitted for subacute progressive encephalopathy. She was unable to provide history, but her family reported a progressive decline in mentation and overall function over the last week after she was seen in the emergency department and treated for an *Enterococcus faecalis* urinary tract infection (UTI). Despite antibiotic therapy, her mentation and physical function worsened. At baseline, she was active and independently functioning, but was now unable to perform activities of daily living without significant support. There was no witnessed fall, trauma, or loss of consciousness.

Vitals were notable for a temperature of 38.6 C. Physical exam revealed a lethargic, thin woman with generalized decreased motor strength and normal cranial nerves. Mental status fluctuated. At times she was fully oriented, answering questions with short responses and following commands. Other times, the patient had significantly impaired attention and was unable to follow most commands.

Initial evaluation included MRI and MRA brain that showed chronic microvascular ischemic changes and an absence of significant vessel occlusion, respectively. EEG was without evidence of non-convulsive seizures. Sixteen days after admission, a repeat urine culture demonstrated *Citrobacter koseri* infection which was treated with an extended course of antibiotics. Serum studies demonstrated moderate hyponatremia (sodium level nadir 123 mmol/L) due to SIADH treated with sodium tablets and fluid restriction. Thyroid, folate, vitamin B12, thiamine, RPR, and HIV Ag/Ab were normal. Lumbar puncture (LP) was not pursued given the suspicion for UTI and symptomatic hyponatremia as etiologies of her encephalopathy.

Radiation oncology and neurology were consulted and did not believe that the patient's recent history of radiotherapy for schwannoma was contributory. Given progressive deterioration of encephalopathy with intermittent fevers, an LP was performed 22 days after admission revealing lymphocytic pleocytosis (356 WBCs with 94% lymphocytes), decreased glucose (24 mg/dL with serum glucose 168 mg/dL), and elevated protein (247 mg/dL). An extensive microbiological, autoimmune, and paraneoplastic workup of the cerebrospinal fluid was notable for positive IgG (1.64 IV) and undetectable IgM antibodies by ELISA for West Nile virus (WNV). The patient did not have IgM antibodies which would have confirmed WNV encephalitis; however, given the otherwise extensive negative work-up and lymphocytic pleocytosis, the patient was presumed to have WNV encephalitis. Despite supportive care, the patient became increasingly withdrawn and passed away on comfort-focused measures.

Discussion

This patient with progressive encephalopathy had a delay in a diagnosis of aseptic encephalitis because LP was deferred. LPs are not without risk and warrant discussion around which patients would most benefit. There is limited data regarding the ideal timing for an LP for the evaluation of encephalopathy. For immunocompetent individuals without neurosurgical history, a clinical presentation with fevers, headaches, or signs of meningismus in addition to encephalopathy characterized by progressive lethargy and confusion should prompt consideration of the procedure.[1]

This patient had a complex hospitalization with several possible and common etiologies for encephalopathy. A retrospective case series found that most hospitalized, older adults with fever and delirium have primary causes of confusion outside the central nervous system (CNS), with 25% of these patients diagnosed with a UTI.[2] In this patient, however, treatment of the UTI and hyponatremia did not result in recovery.

The patient had a prolonged hospital course and her waxing and waning mental status was characteristic of hospital-acquired delirium. The patient never fully recovered to her prior state even on days she was more alert, ultimately prompting further diagnostic workup with an LP. Delirium and confusion states are among the most common mental disorders encountered in patients with medical illness, particularly among those who are older. One third of hospitalized general medical patients who are 70 years or older have delirium. The condition being present in half on admission and the remainder develops during the hospitalization.[3] The high incidence of delirium in hospitalized older adults and association with UTIs led to the suspicion for delirium complicating the patient's hospital course. The case demonstrates the challenge of distinguishing delirium from other medical illnesses and serves as an important reminder that delirium remains a diagnosis of exclusion.

Conclusion

While the diagnosis of WNV encephalitis did not change the treatment course for this patient, it did aid in prognostication and understanding of her presentation for both the medical team and family. This case highlights the need to perform LPs in all patients with fever and encephalopathy. While other etiologies of encephalopathy should be considered and may be more probable, the diagnosis must be reassessed if a patient's clinical course significantly diverges from expectations. "Medicine is a science of uncertainty," stated William Osler. The uncertainty can be uncomfortable but reminds us to return to our foundational diagnostic schemas and pivot from anchored diagnoses with an open mind.

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