Swedish Hospital
Part of NorthShore

An Immunocompromised Male Presents with Headache, Diplopia, Ataxia, and Fever

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Introduction

A tuberculoma is a rare form of CNS tuberculosis infection in which a disseminated bacillemia of mycobacterium tuberculosis leads to formation of a granulomatous focus of coalescing tubercles in the brain or spinal cord.

Post-primary CNS dissemination is relatively common in children and immunocompromised young adults in regions where TB prevalence is high. This occurs in approximately 1% of all patients with TB.

Clinical manifestations of a tuberculoma are usually limited to symptoms due to the mass effect of a space occupying lesion, without showing systemic signs or symptoms. Therefore, establishing the diagnosis of tuberculoma presents many challenges.

Diagnosis is confirmed by needle biopsy, however surgical intervention should usually be avoided to prevent dissemination.

Patient Presentation

64 year old male presents with dizziness, headache, diplopia, and fever (Tmax 100.7). He states that day had been dropping boxes he was carrying. His "gait has felt off" for the past couple of days as he has been feeling dizzy and walking sideways. His headache is a throbbing pain in the back of his head and radiates to his right eye. No eye tearing, unintentional weight loss, night sweats, or sick contacts. His remaining review of systems is negative.

Past Medical History:
Multiple Myeloma status post stem cell transplant, hypertension, Type II Diabetes Mellitus, Hyperlipidemia. Patient noted to have a history of positive TB quantiferon with a lung lesion. Lung lesion was determined to be cryptogenic organizing pneumonia via biopsy, and thus patient was treated with steroids. Sputum cultures at that time were negative for AFB.

Medications:
Pomylast, Prednisone, Carfilzomib, and Solumedrol. Prophylactic Bactrim, Acyclovir, and Fluconazole. He has been leukopenic secondary to multiple myeloma medications (namely Pomalyst), and periodically receives Neupogen.

Epidemiological History:
The patient emigrated from Guatemala 40 years prior to presentation, he worked as a cabbage farmer there. He intermittently travels back to Guatemala to visit family. Denies sick contacts.

Physical Exam:
The patient was febrile to 102.4, however remaining vitals were all within normal limits. The patient appeared well, neurologic examination was markedly normal.

Results

The white blood cell count was at the low end of normal at 3.69 (reference range 3.4-10.8), however the remainder of complete blood count and complete metabolic panel were normal. Procalcitonin level was normal.

A head CT (figure 1) and brain MRI (figure 2) were obtained. Imaging findings are shown below.

Lumbar Puncture was performed. CSF was sent for culture, PCR for Lyme, EBV, JCV, CMV, Cryptococcal Antigen, and MTB PCR. CSF white blood cell count was 34 with 88% neutrophils and 12% lymphocytes, red blood cell count was 3, glucose 101, protein elevated at 74.8. MTB PCR was initially negative.

TB quantiferon while inpatient is interpreted as negative.

Brain biopsy was ultimately performed with resection of the lesion. Pathology results are represented in Figures 3, 4, and 5.

Imaging

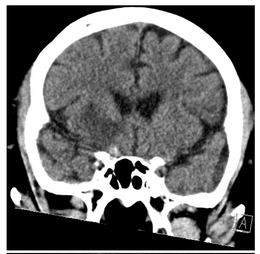

Figure 1. Small to moderate size area of ill-defined edema in the right inferior frontal temporal lobe with mild mass effect on the adjacent suprasellar cistern.

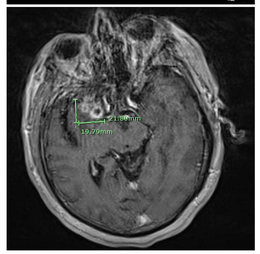

Figure 2. Centered inferior to the right lentiform nuclei, there is a 2.1 cm area of heterogeneous enhancement with surrounding nonenhancing T2 hyperintensity consistent with a mass. Findings are atypical for a pyogenic abscess.

Pathology

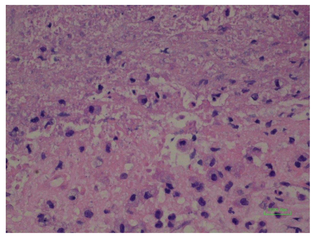

Figure 3. Brain, H/E stain, courtesy of Dr. Perry Guariglia

The lesion is composed of an admixture of inflammatory cells including abundant histiocytes. There are foci of necrosis.

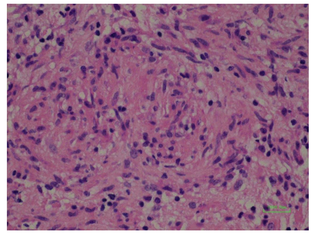

Figure 4. Brain, H/E stain, courtesy of Dr. Perry Guariglia

Focally ill-defined granulomata are identified.

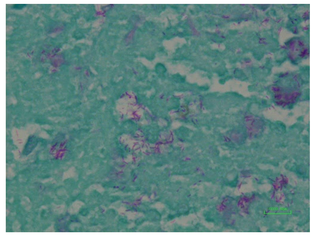

Figure 5. Brain, Acid Fast stain, courtesy of Dr. Perry Guariglia

Abundant organisms are demonstrated by acid-fast stain

Treatment and Follow Up

Patient was treated with 9-12 weeks of RIPE therapy, as well as Dexamethasone taper, however periodically returned to the hospital for continued dizziness and fevers.
Original CSF was sent out and returned 6 weeks later positive for TB PCR. Testing was sent out to identify a potentially resistant Mycobacterium species, RIPE therapy was pan sensitive. The patient unfortunately expired secondary to complications from Covid pneumonia during one of his admissions.

Discussion

- CNS manifestations of tuberculosis in the absence of pulmonary findings are relatively common.
- CNS tuberculosis is a two-staged process:
  - In the first stage, during the bacillemia, a hematogenous dissemination of tubercule bacilli during the primary or postprimary (reactivation of latent TB) phase of infection leads to the formation of a "Rich foci" of bacilli predominantly within the brain parenchyma. This can also occur in meninges or adjacent bone.
  - After a quiescent period of months to a few years, the second stage begins when either the bacilli and its antigenic components are released into the subarachnoid space causing tuberculous meningitis. Alternatively, instead of rupturing into the subarachnoid space, the intracranial tubercles may enlarge within the brain parenchyma and give rise to a space occupying lesion known as tuberculoma. The tuberculoma is walled off from the brain parenchyma by a thick fibrous capsule.
- Diagnosis is challenging. Imaging findings ensure a broad differential diagnosis (eg abscess, neurocysticercosis, toxoplasmosis, tumor). A presumptive diagnosis can be made with relevant clinical, epidemiologic factors; especially if the patient is with extraneural tuberculosis sites.
- Definitive diagnosis requires needle biopsy of CNS lesions for histopathology and AFB stain/culture. Although, surgical intervention should be avoided as it may precipitate meningitis. In some cases, surgical intervention may be indicated with acute complications or when diagnosis is not ensured.
- A lumbar puncture (which is usually avoided due to risk for herniation) will show elevated protein and pleocytosis (10-100 cells/microL).
- In some cases an empiric trial of treatment for toxoplasmosis (prior to brain biopsy) is useful.

Final Diagnosis

Tuberculoma of the Brain

References and Acknowledgments

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