Underlying Heart Condition Revealed in an Adult With a Brain Abscess

Introduction

Congenital cyanotic heart disease is an important predisposing factor to the development of brain abscess in the pediatric population. Brain abscesses occur in adults, but rarely are associated with congenital heart disease.1 This is an interesting case of a 60 year old male who presented with a brain abscess associated with a previously undiagnosed atrial septal defect.

Case Report

A 60 year old African American male presented to the Emergency Department, ED, with headache and confusion for four days. His family noted worsening confusion and slurred speech on the day of presentation. He was only able to provide his name, and the family had to provide the rest of his history. The patient did not experience any recent fever or weakness in the arms or legs. The family did not recall any history of facial drooping. There was no history of falls, trauma, loss of consciousness, or vision changes. He denied any chest pain, shortness of breath, abdominal pain, nausea, vomiting, diarrhea, or constipation. The family also did not note any cough, complaints of urinary symptoms, sore throat, or neck stiffness.

The patient had a past medical history significant for hypertension and dyslipidemia. Home medications were Atorvastatin 10mg once daily, Benzonatate 200mg three times daily, and Bystolic 10mg daily, although the family states he had been noncompliant for seven days. The patient had no known drug allergies.

On exam, the patient was a well appearing, well nourished male in no distress. The temperature was 99.5°F. His blood pressure was 172/98 mm Hg with a pulse of 105 beats per minute, and a respiratory rate of 20 breaths per minute. Oxygen saturation was 96% on room air. His head was normocephalic and atraumatic. Pupils were equal, round, and reactive to light, and extraocular eye movements showed a partial palsy. Tympanic membranes were clear bilaterally. The patient had no rhinorrhea or tonsillary hypertrophy, and his swallowing reflex was intact. His neck was supple and non-tender, with no tracheal deviation, jugular venous distension or cervical lymphadenopathy. Brudzinski and Kernig’s signs were negative.

He had normal chest excursion with respiration, and no murmurs, rubs, or gallops were appreciated on auscultation. The patient had normal S1 and S2 heart sounds, with regular rate and rhythm. Breath sounds were equal bilaterally, with no wheezes, rhonchi, or rales.

The abdomen was non tender and non distended with normal bowel sounds. There was no organomegaly on palpation. The back and pelvis were atraumatic and non tender to palpation. The patient had no CVA tenderness. He had normal range of motion in all four extremities, with distal pulses intact. The skin was normal for age and race, with good turgor and no apparent lesions or exudate.
A mini mental status exam and NIH stroke scale were assessed. The patient was alert to person and situation, but confused to time and place. The patient could not correctly state the month or his age. The patient demonstrated partial gaze palsy with partial hemianopia. Flattened nasolabial folds were noted. There was ataxia in two limbs. Sensory was intact by pinprick to all four extremities and the trunk. He demonstrated severe aphasia when asked to describe pictures and read a sentence. Speech was nearly unintelligible when asked to repeat words. The patient was assigned an NIH stroke score of 13.

Labs were significant for a white blood cell count of 15.3 X 10^3/µL, a C-Reactive protein of 18.54 mg/dL, and a glucose of 184 mg/dL. Blood cultures were negative. Chest X-ray, electrolytes, toxin screen and EKG were all non remarkable. The patient had amber urine with a protein of 100 mg/dL. This did not contribute to his clinical course.

A noncontrast head CT was obtained and showed a 2.3 x 2.6 cm in diameter thick walled mass in the left temporal lobe with surrounding vasogenic edema. Neoplasm, infarction, and abscess were considered as the etiology of this patient’s presentation. The patient was given IV Vancomycin and IV Cefepime in the Emergency Department, and then later admitted for further workup. Neurology, Neurosurgery, and Cardiology were consulted. The patient was started on Keppra for seizure prophylaxis. Empiric antibiotics and supportive care were continued, pending evaluation by inpatient services.

A more thorough history than that obtained in the ED was difficult to acquire from the patient, due to his confused state. With further questioning, however, it was revealed by the daughter that he had a history of recent dental abscesses and refused to visit a dentist, despite having dental insurance. Instead, he pulled his own teeth at home.

Follow up MRI showed a bilobed, ring enhancing subependymal mass in the medial aspect of the left temporal lobe. Findings included a left lateral ventricular ependymal enhancement, consistent with ventriculitis, and a mild subfalcial shift of the midline structures to the right. The overall characteristics and enhancement pattern favored the presence of an intracranial abscess versus a cyst or a tumor.

An erythrocyte sedimentation rate, cryptococcal antigen, HIV antigen, and hepatitis panel were ordered, all of which were negative. Metastatic work up included a CT of the chest, abdomen, and pelvis, which was normal. Trans thoracic Echocardiogram revealed a small secundum atrial septal defect with a left-to-right shunt. The patient had an ejection fraction of 60% and no evidence of endocarditis. A follow up Trans esophageal echocardiogram revealed a moderate secundum atrial septal defect with bidirectional shunt.

A needle brain biopsy was performed and aspirated purulent fluid consistent with brain abscess. A frozen section was sent to neuropathology. Findings were consistent with reactive gliosis and a brain abscess. The fluid grew gram positive cocci, later identified as streptococcus viridans susceptible to Ceftriaxone.

The patient remained confused for the duration of his stay, although his white blood cell count improved to 11 X 10^3/µL within 24 hours of admission, and remained normal until discharge. After a
nine day hospital course, the patient was discharged to an inpatient rehab clinic, where he was to receive 6 weeks of IV Ceftriaxone and oral Metronidazole, in addition to his home medications and the Keppra. A head CT performed approximate one month after discharge showed a persistent 17mm mass in the left temporal lobe with evidence of ventriculitis. There was no evidence of new masses or hemorrhage.

**Discussion**

Brain abscesses, while very serious, are also a very rare occurrence (1/1000), due to barriers provided by anatomy. The most common presenting complaints associated with brain abscess are fever (52.5%), headache (42.4%), and focal neurological defects (34%).

45-50% percent of brain abscesses are caused by direct contiguous spread. 25% are caused by hematogenous spread. Of these, the most commonly affected lobes are the frontal and temporal. Brain abscesses occurring from hematogenous spread are commonly attributed to cyanotic heart disease, pulmonary arteriovenous malformations, endocarditis, and chronic lung disease. Brain abscesses associated congenital heart disease are rarely seen in adults. They are usually seen in congenital cyanotic heart disease in children in the age range of 4-7 years. This includes conditions such as tetralogy of Fallot and transposition of the great vessels.

Empiric antibiotic therapy for brain abscesses consists of IV Vancomycin, IV Metronidazole, and a fourth generation cephalosporin. This patient was started on empiric antibiotics until culture sensitivities were returned. Maximal therapy consists of appropriate intensive antibiotic therapy in addition to aspiration and drainage.

This patient presented with a brain abscess as an adult in the absence of any of the pathologies expected of an individual in his age group. With attention to detail and knowledge of standard of care in the face of a brain abscess, he was treated successfully, and an underlying heart condition was revealed in the process.

**References**