

Abstract:

A 15-year-old adolescent boy presented to the emergency department with altered mental status and neurological deficits. The differential diagnosis of an adolescent presenting with these symptoms is extensive and challenging. A key clinical finding was the patient's forehead swelling. An extensive laboratory and imaging workup was performed which confirmed the diagnosis of Pott puffy tumor and revealed a foreign body in the sinus cavity. Ultimately, a more detailed history was obtained which led to the inciting cause of his symptoms and the origin of this foreign body. Presented at the Section on Emergency Medicine EmergiQuiz Competition, American Academy of Pediatrics National Conference & Exhibition; San Francisco, CA; October 22, 2016.

Keywords:

Pott puffy tumor; altered mental status; neurological deficits

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Deep Impact

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A 15-year-old adolescent boy presented to the emergency department with a chief complaint of altered mental status. His mother noted that he had cold-like symptoms with congestion, headache, rhinorrhea, and fatigue for the past 2 days. Subsequently, he was seen by his pediatrician, where he was clinically diagnosed with mononucleosis. Supportive care was advised with rest and increased hydration. Over the following 2 days, his mother noticed that he became confused and was unable to answer questions appropriately. She observed decreased strength in his right upper extremity, and he drooled with oral fluid intake. Because of these changes, his mother called 911, and he was taken to the local children's hospital. EMS administered methylprednisolone and naloxone en route to the hospital with no improvement in his symptoms.

Upon arrival to the emergency department, the patient's Glasgow coma scale (GCS) was calculated to be 13 (eye 4, verbal 4, motor 5). He was unable to recall his name and was answering questions with nonmeaningful "yes" or "no" statements. His vital signs were as follows: temperature 37°C, heart rate 66 beats per minute, respiratory rate 14 breaths per minute, blood pressure 90/40 mm Hg, and oxygen saturation of 100% on room air. His physical examination revealed an athletic male adolescent who was stuporous. He had dry mucous membranes, bilateral periorbital edema, forehead swelling, neck stiffness with flexion, and a diffuse blanching erythematous maculopapular rash. He demonstrated decreased muscle tone in his right upper extremity but was moving all 4 extremities, and his sensation was intact. Laboratory test including a complete blood count, basic metabolic panel, urinalysis, blood cultures, and urine drug screen were obtained. An intravenous isotonic sodium chloride solution bolus was initiated, and ceftriaxone and vancomycin were administered. After his initial evaluation and stabilization, a noncontrast computerized tomography scan of the head was performed.

Additional history was obtained from his mother and by medical record review while the patient was in radiology. He had no previous medical concerns and was not on any medications or herbal supplements. His last well child check was 6 months ago, when a thorough HEADSSS (home, education, activity, diet, sexuality, suicide, safety) assessment was performed. He was an average student with a current Individualized

Education Program through his school. He denied any drug/alcohol use or sexual activity. He was a competitive rugby player. His immunizations were up to date, and there were no recent sick contacts, exposures, or travel. He lives with his mother, father, and twin brother. There are no pets in the home. Laboratory results were as follows: white blood cell count of 16 000/ μ L (81% neutrophils, 6% lymphocytes, 12% monocytes, 1% bands), hemoglobin of 13.1 g/dL, hematocrit of 38.5%, and a platelet count of 211 000/ μ L. The patient also had serum electrolytes, renal function, urinalysis, and urine toxicology studies, which were within normal limits.

DIFFERENTIAL DIAGNOSIS

A standard measurement that is used in the initial evaluation of a patient's mental status is the GCS. This scale is based on motor responsiveness, verbal performance, and eye opening to appropriate stimuli and graded on a scale of 3 to 15.¹ The patient was noted to have a GCS of 13 and was immediately recognized to have altered mental status. Overall, the etiology of mental status change in an adolescent is oftentimes difficult to decipher. The challenge is rooted in the likely multidimensional cause of this complicated chief complaint.

The differential diagnosis for altered mental status is extremely broad. A commonly used mnemonic (AEIOUTIPS) for the differential diagnosis of altered mental status is shown in Table 1.

There are dozens of diagnoses in this table, but with extensive history, focused physical examination, and laboratory findings, the list narrows significantly to the following 6 diagnoses in this patient: meningitis, head trauma, toxin ingestion, stroke, brain abscess, and tumor.

An important piece of information to keep in mind while working through this narrowed differential diagnosis is the unique physical examination finding of periorbital edema and forehead swelling. Some of the patient's symptoms are vague and common (eg, headache and recent cold-like symptoms) and therefore may not be helpful in sorting out the primary diagnosis. The presence of unique history and physical examination findings can help rule in or out certain diagnoses.

Meningitis is a life-threatening cause of mental status changes and must be on the differential diagnosis of a patient with these symptoms. Meningitis has many causes, and although this word is typically used to refer to acute infectious causes, meningitis can also acutely be caused by noninfectious etiologies (such as irritant medications) and

TABLE 1 Causes of altered mental status.

	General Category Of Disease	Specific Disease Entities
A	Alcohol	Intoxication
	Acidosis	Metabolic acidosis, lactic acidosis
	Ammonia	Congenital metabolic disorder
	Arrhythmia	Nonperfusing rhythm, myocarditis
E	Endocrine	Adrenal insufficiency, hypertension
	Electrolytes	Hyponatremia, hypercalcemia
	Encephalopathy	Infectious, vasculitis, hepatitis
I	Infection	Sepsis/shock, acute or chronic meningitis, toxic shock syndrome
O	Oxygen	Hypoxia
	Overdose	Medication overuse
	Opiate use	
U	Uremia	Renal failure, congenital metabolic disorder
T	Trauma	Intracranial bleed, concussion
	Temperature	Hypothermia, hyperthermia
	Thiamine	Vitamin deficiency-associated encephalopathy
I	Insulin	Hypoglycemia, diabetic ketoacidosis
P	Poisoning	Toxin exposure, ingestion
	Psychiatric	Psychosis, somatoform disorder
S	Stroke	Ischemic, hemorrhagic, arteriovenous malformation
	Seizure	Seizure, postictal period
	Syncope	Vasovagal, neurocardiogenic
	Space-occupying lesion	Central nervous system tumor, high spinal cord tumor
	Shunt (hydrocephalus)	Cerebral venous sinus thrombosis, shunt malfunction

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