Consultant 360 Multidisciplinary Medical Information Network

WHAT'S YOUR DIAGNOSIS?

PEER REVIEWED

Uncovering The Source of a Headache Following a Fall

Badar Zaheer, MD, Zaki Zaheer, DO

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- **Introduction**. A 50-year-old man presented to the emergency department (ED) after slipping on a wet stone surface while fishing at a beer festival. He presents with altered mental status and a vague symptom of headache.

  History. The patient was transported via emergency medical services after a bystander called 911 after witnessing the patient fall. While in the ED, the patient was affable and made jokes with the staff while in no apparent distress. Although the patient was not visibly intoxicated, he was only able to somewhat articulate himself when communicating. When asked questions about his fall or the beer festival itself, the patient was unable to answer questions, saying “he wasn’t sure” or he would change the topic of conversation altogether. The patient endorsed having a headache but was unable to describe the characteristics or intensity of the headache. When the ER physician asked him “What is your name?” the patient responded with “Yes.” “What is the date today?” “Yes.” “Who is the president?” “Yes.” These answers demonstrated a change in the patient’s mental status from when he first presented. The ER physician immediately activated the call to the neurosurgeon team for a possible neurosurgical emergency.

  According to the patient, he had no relevant past medical history, family history, or surgical history. All of which could not be confirmed due to limited patient records.

  On a physical examination, the only positive finding was a moderate-sized subcutaneous hematoma, approximately 5 cm in diameter, on the right lateral aspect of the head. Pupils were bilaterally equal and reactive. Facial symmetry was normal. Strength in the extremities was 5/5. Tendon reflexes were +2 bilaterally. Heart and lungs were normal.

  Diagnostic Testing. The patient’s head CT without contrast showed a hyperdense crescent along the convexity of the brain extending into adjacent cranial compartments. Complete blood count, basic metabolic panel, vitals, and urine toxicology were within normal limits. The patient had a blood ethanol level of 200 mg/dL. Normal blood ethanol levels are <80 mg/dL, with values of 80 or above designated as intoxicated by US law.

What is your diagnosis based on the patient's severe ethanol intoxication, noted headache, and physical examination?

A. Epidural hematoma

B. Secondary headache due to ethanol intoxication

C. Ethanol-induced cerebrovascular event

D. Meningioma

E. Subdural hematoma

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- **Answer: E. Subdural hematoma**

Ethanol intoxication was suspected as the primary cause of his behavior and headache. However, due to his fall and altered mental status, the team determined a head CT without contrast was indicated to rule out intracranial hemorrhage. With positive imaging, the diagnosis of subdural hematoma (SDH) was determined.

SDH are the most common cause of intracranial mass lesions, and chronic alcohol use increases the risk factor of development. When intracranial hemorrhage is suspected, most if not all types of intracranial hemorrhages may be on the differential diagnosis, particularly when considering the patient's mechanism of injury, clinical findings, and patient age/history. The clinical features that may help differentiate between epidural, subdural, and subarachnoid hemorrhage are the lucid interval, progressively worsening headache, and thunderclap headache, respectively. The lucid interval describes a period where the patient regains consciousness and may have limited symptomatology. However, these patients will present with neurological symptoms after some time and begin to rapidly deteriorate. A CT of an epidural hematoma has the characteristic finding of an elliptical/lens shape hyperdensity that does not pass the suture lines.

A progressively worsening headache in conjunction with head trauma may be the presenting symptom of an SDH. The CT finding can be described as a crescent hyperdensity that may pass suture lines. This is also the only intracranial hemorrhage out of the three that has been seen to have an increased risk in alcoholics.

Finally, a thunderclap headache, or the worst of their life, is characteristic of a subarachnoid hemorrhage. On CT, a star-shaped hyperdensity will be seen.

In this patient with evidence of heavy alcohol use, head trauma, and a headache lacking descriptors, it is prudent to have all types of intracranial hemorrhage on the differential. With the CT finding of "a hyperdense crescent along the convexity of the brain extending into adjacent cranial compartments," we can rule out all but SDH.

Treatment and management. A call to the nearest tertiary care facility was activated and the patient was transferred to neurosurgery for surgical intervention. A craniotomy was performed, and the subdural hematoma was carefully evacuated.

Outcome and follow-Up. The patient was transferred, required surgical intervention, and ultimately recovered without any neurological deficits or consequences. The patient was admitted for a three-day observation period. The patient's previous aphasic symptoms resolved, and the repeat head CT showed a resolution of the subdural hematoma. On day three he was discharged home with plans for follow-up with his primary care physician.

Discussion. Headache is a very common presentation in the ED, comprising anywhere from 2-3% of ED visits each year,[1,2] which accounted for 5 million ED visits in 2011.[3] When evaluating headache, it is helpful to group etiologies into two categories. Primary headaches include migraine, cluster headache

helpful to group etiologies into two categories. Primary headaches include migraine, cluster headache, and tension headache, all of which are not life threatening.[4] On the other hand, secondary headaches often result from life threatening etiologies such as intracranial hemorrhage, cerebral venous thrombosis, carotid or vertebral artery dissection, meningitis, encephalitis, and intracranial mass, amongst others.[4–8] Luckily, for patients' sake, 95-98% of headaches prompting an ED presentation are of primary origin.[6,9] Despite the rarity of secondary headaches, evaluation of a patient with headache in the ED must always begin with ruling out of secondary causes due to the rapidly evolving and life-threatening nature of such presentations.

A thorough history and physical examination is critical to accurately determining whether a patient requires further workup for secondary headache or treatment for primary headache. There are red flag signs in a patient's history and physical examination that should raise the clinician's suspicion for secondary headache such as sudden onset, maximal severity at onset, progressive worsening, worsening of severity when laying down, fever, syncope, focal neurological deficit, seizure, immunocompromised state, cancer history, change in mental status, personality change, papilledema, and neck stiffness.[6–8,10] Diagnostic evaluation must be tailored to each patient's specific presentation based on the differential diagnosis. Typical modalities used include noncontrast CT, MRI, and lumbar puncture with CSF analysis.

The presented case illustrates that clinicians should not default to explaining away potential symptoms by attributing to the patient's personal traits, personality, lifestyle, or intoxication. What turned out to be altered mental status could have very easily been attributed to the patient's inebriation. However, as the patient was intoxicated and was brought in due to a fall, altered mental status should be appreciated as a sign of potential pathology rather than behavior. With this clinical understanding, the possibility of an acute brain injury must be considered. In cases of alcohol abuse, several studies have shown that patients are at greater risk of subdural hematomas. Ethanol abuse can lead to higher-risk activities that may result in a fall or a motor vehicle accident. In addition, pre-injury alcohol abuse has been correlated with more severe adverse outcomes in patients who develop SDH.[11]

With the prompt ordering of a non-contrast head CT, the SDH was collected, and a timely referral to neurosurgery was made. Had head imaging not been performed, the patient may have been discharged, only to be found obtunded later as the subdural fluid continued to collect.

Conclusion. When treating patients with headaches, it is crucial to differentiate between primary and secondary causes. In this case, an intoxicated patient with behavioral changes had a limited ability to elicit a full history. In the setting of head trauma, a change in mood or personality should not be explained away by recent alcohol or other substance abuse. Concurrent substance abuse necessitates a detailed and systematic process to rule out all other possible causes that could be masked.

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