Diagnose this

A 72 Year-Old Woman with Sudden Loss of Consciousness

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A 72 year-old woman presented to the emergency department of her local hospital, having fallen and struck the left side of her face. She complained of headache and dizziness. One week later, she returned to the emergency department, complaining of diplopia that was initially intermittent, but now constant. An unenhanced CT scan was obtained (Figure 1A).

Five weeks later, she was found at home, unresponsive. She was taken to the emergency department, and an unenhanced CT scan was obtained (Figure 1B,C). She was intubated and transferred to the Halifax Infirmary. Upon arrival, her Glasgow Coma Scale was 6T: her pupils were weakly reactive and she was withdrawing to painful stimuli, better on the right side than the left side. Her general physical examination was unremarkable.

Choose the BEST answer:

A. The patient has a diffuse pattern of subarachnoid hemorrhage
B. The patient has a subdural hemorrhage
C. The patient has hydrocephalus
D. The patient has likely bled from a right posterior communicating aneurysm
E. All of the above

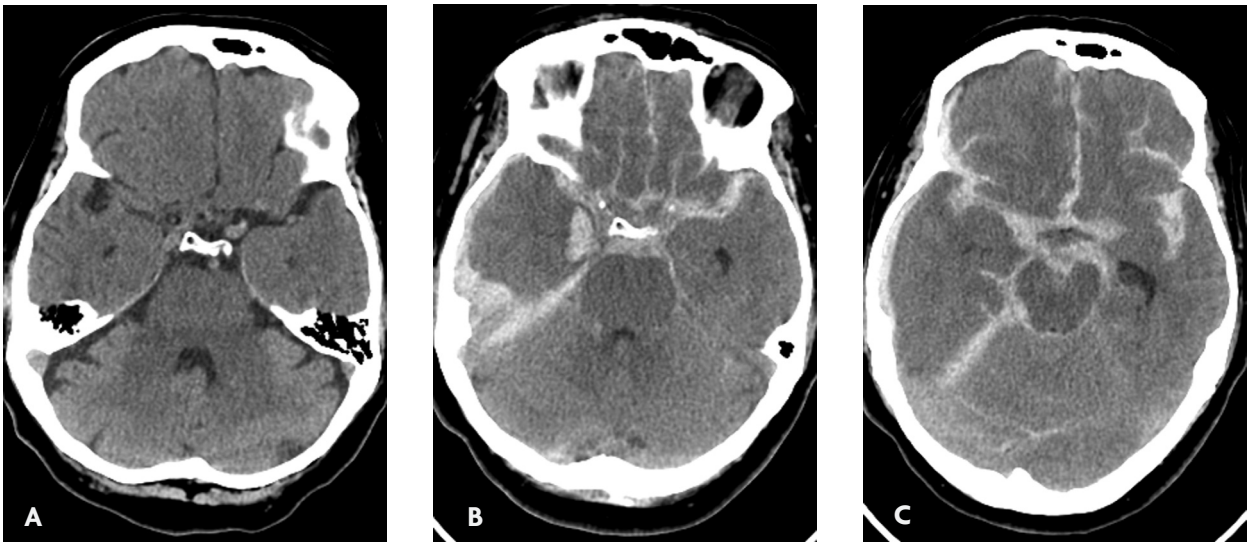

Figure 1. Unenhanced CT scans at one (A) and six (B,C) weeks after initial emergency department presentation. A: Image at the level of the pons. B: Image at the level of the pons. C: Image at the level of the midbrain.

The correct answer is:

A. The patient has a diffuse pattern of subarachnoid hemorrhage
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Imaging Studies

Although the patient's initial unenhanced CT scan appears unremarkable, a posterior communicating artery aneurysm can be identified adjacent to the right posterior clinoid process in retrospect (Figure 2A). This aneurysm was later confirmed with CT angiography (not shown). Enlargement of a posterior communicating aneurysm can cause diplopia by compressing the third nerve.[1] The patient's subsequent CT scan shows diffuse subarachnoid blood, as well as a right-sided subdural hematoma (Figure 2B,C). Although aneurysmal hemorrhage is typically subarachnoid, it can occasionally involve the subdural space.[2-4]

Postulated mechanisms of subdural extension of hemorrhage include adherence of the aneurysm to the arachnoid membrane through repeated, minor episodes of hemorrhage, and tearing of the arachnoid membrane by a jet of blood at the time of aneurysm rupture.[2-4] Focal clot can be a good clue to the location of a ruptured aneurysm. In this case, clot adjacent to the right posterior clinoid process suggests a posterior communicating aneurysm (Figure 2B).

Hydrocephalus is a common complication of subarachnoid hemorrhage due to obstruction of the foramina of Luschka and Magendie by intraventricular clot, and due to obstruction of arachnoid granulations by blood over the convexity of the brain.[5] Prominence of the left temporal horn is consistent with the development of hydrocephalus in this case (Figure 2C). Hydrocephalus can impair cerebral perfusion after subarachnoid haemorrhage.[6] Vasospasm is another important threat to cerebral perfusion after subarachnoid hemorrhage.[7]

Prognosis

In the past, the mortality of subarachnoid hemorrhage was 50%. However, more recent studies report rates in the 10-24% range.[8] It should be noted that the case fatality rate of aneurysmal subarachnoid hemorrhage has been falling steadily over the past three decades, without a concomitant increase in the proportion

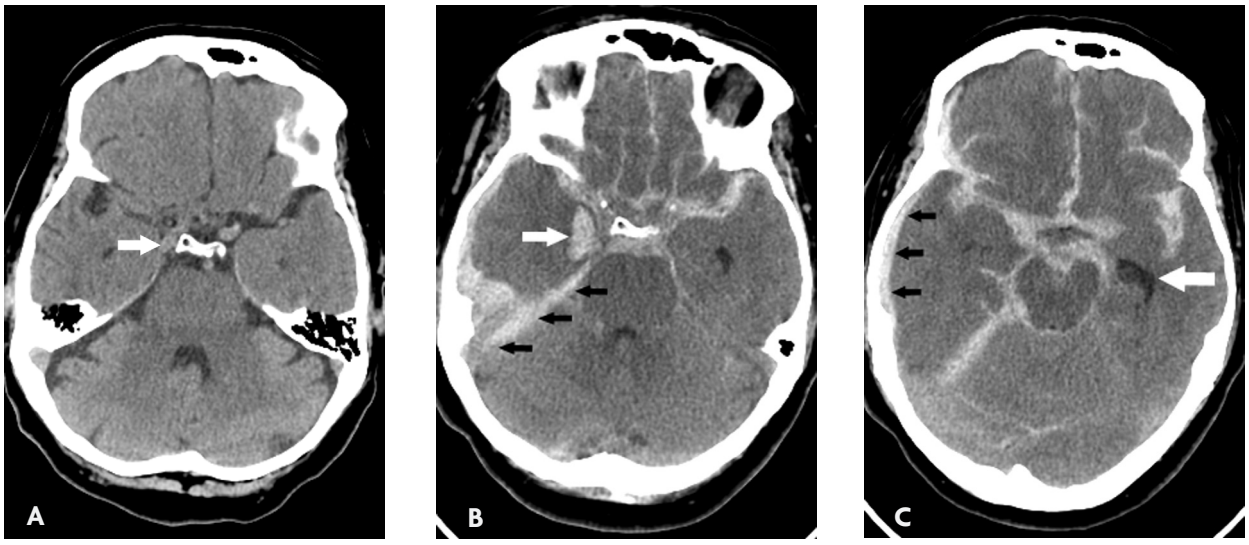

Figure 2. Unenhanced CT scans at one (A) and six (B,C) weeks after initial emergency department presentation.
A: A small density adjacent to the right posterior clinoid process in retrospect represents a posterior communicating aneurysm (white arrow). B: There is high density throughout the fissures, basal cisterns and sulci, consistent with a diffuse pattern of subarachnoid hemorrhage. There is subdural blood tracking along the tentorium cerebelli (small black arrows). There is a focal clot at the site of the posterior communicating aneurysm (large white arrow). C: The left temporal horn is prominent (large white arrow). There is subdural blood tracking along the inner table of the skull (small black arrows).

of survivors with severe disability.[9,10] This overall improvement in outcome is attributed to earlier diagnosis and treatment of ruptured aneurysms, as well as a number of advances in the clinical neurosciences (e.g. neuroimaging technology, endovascular embolization, calcium channel blockers).[9,10]

Case Outcome

Our patient was stabilized with a ventricular drain and endovascular coil embolization of her posterior communicating aneurysm. She was treated with calcium channel blockers, and she did not experience vasospasm during her hospitalization. Despite the severity of her presentation, she made an excellent recovery and was able to return home. She did require ventriculoperitoneal shunting for persistent hydrocephalus.

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