NEW!

>>EMERGENCY IMAGING

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PROBLEM

Patient 1

Patient 2

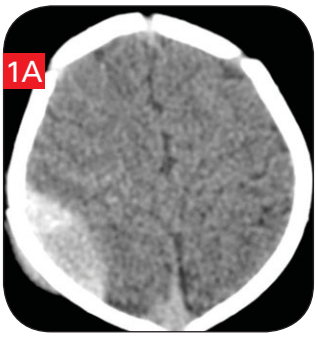
Patient 3

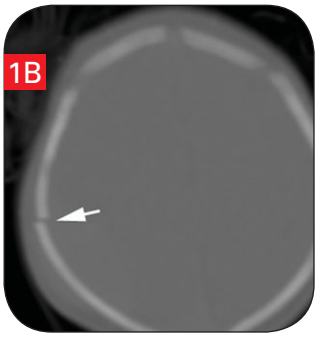
Patient 4

>>Four patients with a history of head trauma are brought to your emergency department. Computed tomography (CT) scans demonstrate an intracranial hemorrhage in all four patients. Based on the images above, which of these patients has a subdural hemorrhage?

Turn page for answers >>

ANSWER





Both Patient 1 and Patient 3 have subdural hematomas.

Patient 1 has bilateral-convexity subdural hematomas with layering hematocrit levels. Small subdural hemorrhages may be difficult to appreciate between the skull and brain. To assist you in viewing the images on a picture archiving and communications system with a wide-window setting, a so-called subdural window (a level of 25 to 35 Hounsfield units [HU] and a width of 200 to 250 HU) is recommended. This patient's hemorrhages are considered subdural due to their concave shape and the fact that they cross the suture lines of the skull. An epidural hematoma, on the other hand, is typically lentiform and does not cross any sutures of the skull (image 1A). Epidural hematomas are also frequently associated with fractures of the skull (image 1B).

Patient 2 has a parenchymal hemorrhage (image 2). In trauma patients, this type of hemorrhage most often occurs in the frontal and temporal lobes. This is the result of the brain compressing against the relatively sharp margins of the skull in these regions.

Patient 3 has a subdural hematoma layering along the posterior tentorium (image 3). This type of hemorrhage is common along the tentorium, and the area should always be closely examined after head trauma. The hematoma can be visualized as an apparent thickening of the tentorium (use the contralateral side for comparison) caused by subdural blood collecting on one side of it. This feature can help to distinguish a hemorrhage from dural calcifications.

Patient 4 has both a subarachnoid and an intraventricular hemorrhage. The subarachnoid hemorrhage appears as a high-density area within the sulcal spaces (white arrows). The intraventricular hemorrhage can be seen layering within the posterior horns of the lateral ventricles (black arrows) (image 4). Subarachnoid hemorrhages may also accumulate in the basal cisterns surrounding the brain stem (image 5).

These cases are typical of the various types of intracranial hemorrhage seen every day in the emergency department, but some cases may present in a way that makes it difficult to determine the type of hemorrhage.

SUGGESTED READING

Provenzale J: CT and MR imaging of acute cranial trauma. *Emerg Radiol* 14(1):1, 2007.

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