Computed tomography for spontaneous subarachnoid hemorrhage diagnosis



When a clinical suspicion for SAH exists based on history and physical examination, non-contrast computed tomography (CT) is the first diagnostic tool. It is also valuable in excluding other pathologies such as intracranial hemorrhage, malignancy, or abscess.

In patients presenting with thunderclap headache and normal neurological examination, normal brain CT within 6 hours of headache is extremely sensitive in ruling out aneurysmal subarachnoid hemorrhage¹⁾.

Timing of Computed Tomography

At the onset of the bleed, subarachnoid hemorrhage is the most readily visible on CT, but it becomes more difficult to appreciate as red blood cell (RBC) degradation progresses. Advances in neuroimaging have increased the sensitivity of non-contrast CT, raising questions regarding the need for lumbar puncture (LP) in the face of a negative CT.

A meta-analysis published in 2016 attempted to answer the question of CT sensitivity with relation to time from symptom onset ²). The analysis, which included five studies, assessed patients with a thunderclap headache and normal neurologic exam. While the results carry many of the limitations of a meta-analysis, a conservative statistical analysis showed that a non-contrast CT completed within six hours of headache onset had a sensitivity of 98.7% with confidence intervals 97.1%–99.4%. The authors took into consideration the following criteria: patient must have a hematocrit > 30% and an isolated thunderclap headache without seizure, syncope, or neck pain; and the CT image must be third generation or newer, of high quality, read by an attending-level radiologist, and evaluated with the indication for imaging being thunderclap headache or concern for SAH. If these criteria are met, many consider a negative head CT within six hours to be a "rule-out" study given the sensitivity and confidence intervals ³.

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