

# Clinical update no. 520

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Thunderclap headache requires exclusion of SAH. However there are other causes and workup varies, requiring LP and/or advanced imaging. There is an updated IHS classification and recent review in *Annals*.

CT within 6 hours of onset is adequate to exclude a bleed, or at least reduces risk to 1:500-1,000, but is subject to some important caveats as detailed below.

LP still has a role after 6hr; the role of CT-angiogram after a -ve CT is not validated.

NEUROLOG/EXPERT CLINICAL MANAGEMENT

Managing Patients With Nontraumatic, Severe, Rapid-Onset Headache

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[Ann Emerg Med. 2018;71:400-408.] [LR+] 4.1) or stiffness on examination (LR+ 6.6)

ICHD-3

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Headache Classification Committee of the International Headache Society (IHS)

The International Classification of Headache Disorders, 3rd edition

 <https://www.ichd-3.org/>

IHS CLASSIFICATION ICHD-3

## Thunderclap headache

- A headache that is severe and sudden-onset, taking seconds to minutes to reach maximum intensity

Clarify what the patient means when they answer yes to whether it is sudden onset. Specify the exact time course, which might not be as sudden as suggested, and avoid leading questions. It makes a huge difference to the workup required.



Everyone has had the worst headache of their life. It's usually not SAH.

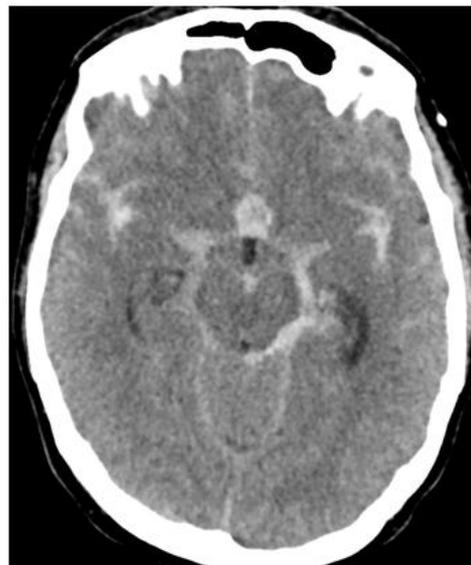
And SAH may not be their worst headache.

Table 1. Differential diagnosis of thunderclap headache

Diagnosis
Subarachnoid hemorrhage
Unruptured cerebral aneurysm
Reversible cerebral vasoconstriction syndrome
Hemorrhagic stroke
Cerebral venous sinus thrombosis
Cervical artery dissection
Posterior reversible encephalopathy syndrome/hypertensive encephalopathy
Spontaneous intracranial hypotension
Pituitary apoplexy
Colloid cyst of third ventricle
Sphenoid sinusitis
Meningitis/encephalitis
Isolated acute-onset headache would be a rare presentation

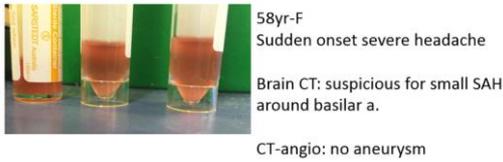
There is a differential for thunderclap headache. To sort out most need LP, some need further imaging. The history e.g. being recurrent, will guide the correct approach.

59yr female with thunderclap headache



A large SAH. A CT-angiogram done 10 months before reported no aneurysm. Following the bleed a complex aneurysm was coiled. A CT-

angiogram does not rule out aneurysm or give reassurance as to the risk of future SAH.



The CT in this SAH was equivocal, and an LP confirmed a bleed. The CT-angiogram showed no aneurysm. There can be non-aneurysmal SAH, however imaging can miss an aneurysm.

A CT-angio does not rule out either SAH or aneurysm, or the risk of future SAH.

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REVIEW ARTICLE

14 % of patients with angiographically negative SAH, MRI can identify an underlying cause such as a cavernous malformation, vasculitis, spinal vascular malformation, or neoplasm

There are uncommon causes that require further imaging. The history will guide.

**Reversible cerebral vasoconstriction syndrome**

**Multiple thunderclap headaches during days or weeks is pathognomic**  
**There is usually a "trigger" to the headache**

Initial imaging may be –ve in RCVS. Recurrent headaches usually resolve over time, but there is a risk of stroke.

**Diagnostic algorithm for sudden onset "thunderclap" headache**

Noncontrast brain CT

LP, with 2 exceptions

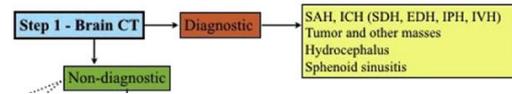
CT -ve within 6 hours of onset

Multiple TCHs

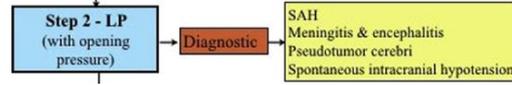
CTA/MRA to diagnose RCVS

LP following a –ve CT-brain is recommended. The exceptions are a CT within 6hr of onset which reduces risk of SAH to 1:500-1,000; and if imaging is indicated to evaluate RCVS. However diagnostic criteria for RCVS requires a normal LP, so the exception is for *recurrent* episodes of TCH after an initial –ve CT/LP.

An approach, from Edlow in *Annals*.



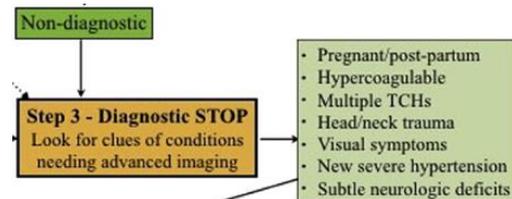
An initial CT may confirm a diagnosis.



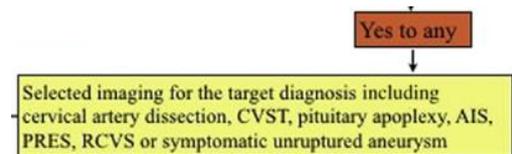
An LP is next, done 12hr after onset. Measure opening pressure (ref: 6-25 cm H2O). Visual inspection for xanthochromia is accurate (flourescent light better); spectrophotometry is more sensitive but less specific.

Important caveats if relying on a –ve CT within 6hr to rule out SAH are accurate timing, isolated thunderclap, no meningismus, normal neuro exam, high resolution CT <5mm cuts (at least 16 slice though no precise criteria given; no movement artefact), HtCt >30% (dilute blood may be missed); appropriately qualified reading radiologist with indication for scan communicated.

CSF criteria are not precise but no xanthochromnia and RBC <2,000 essentially rules out. If clearly a traumatic tap then waste 5-10ml of CSF until clears (10ml CSF is replaced in <30 minutes).



If CT and LP are not diagnostic, then STOP and consider other possible causes and risk factors; pregnancy related, hypercoagulable states, multiple thunderclap headache, trauma, visual symptoms, hypertension and findings on neuro exam.



These updates are a review of current literature. They do not replace local treatment protocols and policy. Treating doctors are individually responsible for following standard of care.