SECTION 1

Acute headaches

1

Introduction to the acute headaches

"Acute headaches" are those that appear suddenly. Acute headaches that are severe and reach maximal intensity within seconds to minutes are called "thunderclap headaches." Acute headaches are medical emergencies as they can be manifestations of a serious underlying abnormality such as subarachnoid hemorrhage. The potential morbidity and mortality associated with many of the causes of acute headaches makes it essential for all practitioners to be aware of the possible causes and the initial evaluation of patients presenting with an acute headache.

Patients with acute headaches often present to the emergency room for evaluation. They may have a history of a primary headache disorder such as migraine or tension-type headache. However, the acute headache stands out from the patient's usual headache. The rapid onset of a thunderclap headache and the speed by which it reaches its most severe intensity differentiate this headache type from the episodic headache. Although widely touted in traditional teaching about the headaches of subarachnoid hemorrhage, simply asking if the present headache is "the worst headache ever" is insufficient to determine if a thunderclap headache is present. Many patients who have presented emergently for evaluation of a headache will respond affirmatively to this question. However, to properly recognize a thunderclap headache the mode of onset must be considered in conjunction with headache intensity. Patients with

a thunderclap headache can generally recall the moment that their headache began and can often describe this moment in vivid detail. They may liken the headache onset to "being hit in the head with a hammer" and they are frequently quite concerned about a serious underlying cause for this unusual headache.

The emergent evaluation of the patient presenting with an acute headache is initially targeted at the possibility of an underlying subarachnoid hemorrhage. The practitioner must take a quick but comprehensive history and perform physical and neurologic examinations in search of symptoms and signs suggestive of a secondary headache. The first diagnostic test should be a noncontrast computed tomography (CT) scan of the brain to look for evidence of subarachnoid blood. Since the sensitivity of CT for subarachnoid hemorrhage is less than optimal and because the risk associated with a missed diagnosis is high, lumbar puncture should be performed when brain CT is unrevealing. Evaluation by lumbar puncture should include measurement of the opening pressure and cerebrospinal fluid cell counts, protein, glucose, inspection for xanthochromia, and spectrophotometry for bilirubin when available. In patients in whom lumbar puncture evaluation is also unrevealing, evaluation of the brain with magnetic resonance imaging (MRI; with gadolinium) and evaluation of the cerebral and cervical vasculature is most often indicated in the search for other potential causes of the acute headache. A comprehensive evaluation will be negative at times, suggesting a diagnosis of "primary thunderclap headache."

In the following chapters, conditions which may present with acute headaches are discussed. Those included in Section 1 are:

- Subarachnoid hemorrhage
- Cervical artery dissection
- Acute hypertensive crisis
- Ischemic stroke

- Pituitary apoplexy
- Colloid cyst of the third ventricle
- Primary thunderclap headache
- Intracranial infection

Disorders discussed elsewhere in this text that may also occasionally present with acute headache include:

- Cerebral venous sinus thrombosis
- Spontaneous intracranial hypotension
- Complicated sinus headaches

Primary stabbing, sexual, and cough headaches may also have acute onset but tend to be episodic and are thus discussed in Section 2.

2

Subarachnoid hemorrhage

Key points

- Subarachnoid hemorrhage is the diagnosis of greatest urgency that must be considered in patients with the acute onset of a severe headache ("thunderclap headache")
- Up to ¼ of patients with thunderclap headache have a subarachnoid hemorrhage
- Sentinel headache, which is a thunderclap headache that precedes subarachnoid hemorrhage by days to weeks, occurs in up to 40%
- Brain CT scan is the initial evaluation, followed by cerebrospinal fluid analysis, if there is no imaging evidence of subarachnoid hemorrhage or an alternative diagnosis

General overview

- Subarachnoid hemorrhage most commonly presents as a severe headache of acute onset, termed "thunderclap headache"
- Patients may present with thunderclap headache in isolation, or in conjunction with other neurologic symptoms (see "Clinical features")
- Patients suspected of having subarachnoid hemorrhage must be evaluated emergently

- Rupture of an intracranial saccular aneurysm is the most common cause of subarachnoid hemorrhage; less common causes include: nonaneurysmal perimesencephalic hemorrhage, transmural arterial dissection, arteriovenous malformation, dural arteriovenous fistula, mycotic aneurysm, and cocaine use
- Although morbidity and mortality from subarachnoid hemorrhage remain high, early diagnosis and treatment is associated with improved outcomes

Clinical features

- Headache
  - Headache is the most common clinical manifestation of subarachnoid hemorrhage
  - Headache may occur in isolation in about one-half of patients
  - Headache is often sudden and with maximal intensity at onset or within minutes
  - Typically, the headache lasts a few days. It is atypical for the headache to last less than 2 hours
  - May be preceded by physical exertion or Valsalva
- Loss of consciousness
  - ⅓ of patients
- Seizures
  - 5%–10% of patients
- Delirium
  - 15% of patients
- Strokes
- Visual disturbances
- Nausea and vomiting
- Neck stiffness
- Photophobia

- Hunt and Hess grading system (correlates with prognosis)
  - Grade 1: Asymptomatic
  - Grade 2: Severe headache, stiff neck, no neurologic deficit except cranial nerve palsy
  - Grade 3: Drowsy, minimal neurologic deficit
  - Grade 4: Stuporous, moderate or severe hemiparesis
  - Grade 5: Deep coma, decerebrate posturing
- "Sentinel headaches"
  - These represent a premonitory warning of impending intracranial aneurysm rupture that occurs in the following days to weeks
  - Sentinel headaches occur in approximately 10%–45% of patients who have subarachnoid hemorrhage
  - Sentinel headaches are similar to those that occur with subarachnoid hemorrhage in that they begin suddenly and reach maximum intensity within seconds to minutes ("thunderclap headache")
  - Sentinel headache must be considered in the differential diagnosis of all patients who present with thunderclap headache
  - If sentinel headaches are recognized as such, appropriate intervention may allow time to intervene and avoid a catastrophic aneurysmal rupture and subarachnoid hemorrhage

Diagnosis (Fig. 2.1)

- Physical exam
  - Fundal hemorrhages
    - 20%–40% of patients
    - More often found in those with decreased level of consciousness
    - Detection may be difficult when photophobia is present and because of patient distress

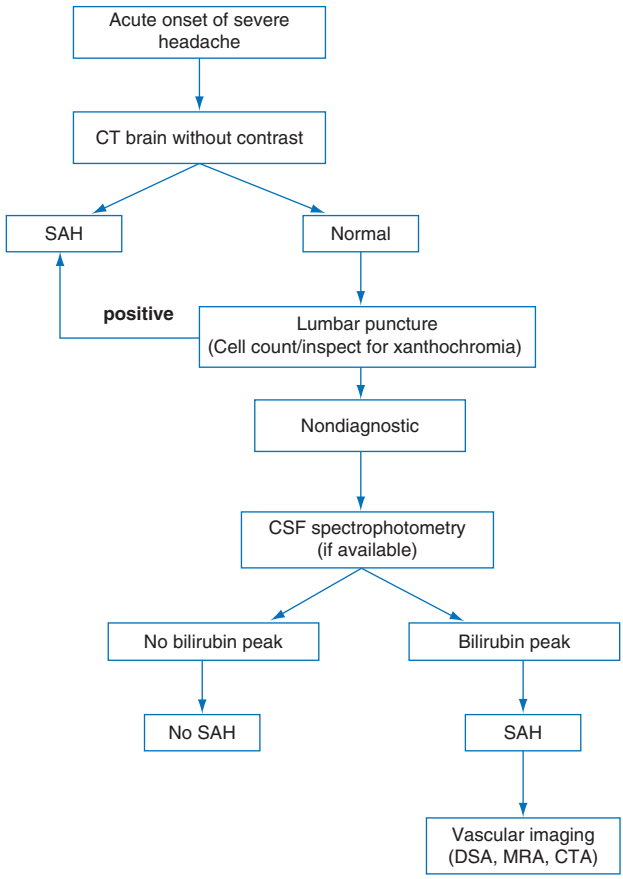

Fig. 2.1 Evaluation of suspected subarachnoid hemorrhage.
SAH, subarachnoid hemorrhage; DSA, digital subtraction angiography; MRA, magnetic resonance angiography; CTA, computed tomographic angiography.

- Meningismus
- Altered level of consciousness
- Focal neurologic deficits

- Noncontrast CT brain
  - First test in the evaluation of suspected subarachnoid hemorrhage
  - Perform as soon as possible after the onset of symptoms
    - Sensitivity nears 100% within the first 12 hours of subarachnoid hemorrhage
    - Sensitivity decreases to 50% by 1 week after hemorrhage
- Lumbar puncture
  - Perform when diagnosis is not reached by brain CT
  - Measure opening pressure, routine cell counts, and visually inspect for xanthochromia
  - Perform analysis by spectrophotometry if available
    - More sensitive after the first 12 hours – 95%
- Angiography
  - In patients with subarachnoid hemorrhage, angiography is required in search of a ruptured aneurysm
  - Conventional digital subtraction angiography (DSA) is the gold standard
  - Magnetic resonance angiography (MRA) or computed tomographic angiography (CTA) may also be used
    - MRA sensitivity ranges from 70% to 100% depending on the size of the aneurysm
      - If aneurysm is ≥6 mm, sensitivity is >95%
    - CTA sensitivity ranges from 85% to 98%

Treatment

- Intensive care unit
- Possible ventriculostomy for intracranial pressure monitoring

- Monitor for development of vasospasm
  - Transcranial Doppler ultrasound monitoring
  - Triple H therapy – modest hemodilution, induced hypertension, hypervolemia
  - Nimodipine
- Seizure prophylaxis with antiepileptic drugs (controversial)
- Aneurysm repair
  - Surgical clipping
  - Endovascular therapy – coiling

Outcome

- 10% of patients die before reaching the hospital
- There is 50% overall case fatality
- One-third of survivors have major morbidity requiring dependency for activities of daily living

Further reading

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