APPROACH TO HEADACHE

VERY COMMON → 3-5% OF PRESENTATIONS. MOST DO NOT HAVE A SINISTER CAUSE. HOWEVER, THERE IS A HIGH MISS RATE ON SUBARACHNOIDS, PARTICULARLY THOSE WITH SALVAGEABLE FUNCTION

PATHOPHYSIOLOGY:

- The brain parenchyma is INSENSITIVE TO PAIN
- Pain sensitive areas include:
  - The meninges
  - Blood vessels
  - Tissues lining skull cavities (i.e. sinuses)
- Much of the pain associated with headache is mediated through the TRIGEMINAL NERVE
- Localization is rare

DIAGNOSTIC APPROACH:

- The major priority in evaluation of the patient with headache is to exclude the following:
  - SUBARACHNOID HAEMORRHAGE
  - INTRACRANIAL HAEMORRHAGE
  - MENINGITIS/ENCEPHALITIS
  - MASS LESIONS
    - Carbon monoxide toxicity, but is an important (and potentially fatal) environmental cause of headache

Table 16-1 Differential Diagnosis

ORGAN SYSTEM	CRITICAL DIAGNOSES	EMERGENT DIAGNOSES	NONEMERGENT DIAGNOSES
Neurologic, CNS, vessels	Subarachnoid hemorrhage	Shunt failure Traction headaches Tumor/other masses Subdural hematomas	Migraine, various types Vascular, various types Trigeminal neuralgia Post-traumatic Postlumbar puncture Headaches
Toxic/metabolic Environmental	Carbon monoxide poisoning	Mountain sickness	
Collagen vascular disease	Temporal arteritis		
Eye/ENT		Glaucoma/sinusitis	Dental problems/temporomandibular joint disease
Musculoskeletal			Tension headaches Cervical strain
Allergy			Cluster/histamine headaches
Infectious disease	Bacterial meningitis/encephalitis	Brain abscess	Febrile headaches/nonneurologic source of infection
Pulmonary/O_2		Anoxic headache Anemia	
Cardiovascular		Hypertensive crisis	Hypertension (rare)
Unspecified			Effort-dependent/coital headaches

CNS, central nervous system; ENT, ear, nose, and throat.

RAPID ASSESSMENT AND STABILISATION:

- For the purposes of initial assessment headache can be broken down in to TWO categories → those with ALTERED MENTAL STATE and those without
- SEVEN MAJOR CAUSES OF EVOLVING BRAIN INJURY (form the tenets of "brain resuscitation"):
  - Lack of substrate (oxygen, glucose)
  - Cerebral oedema

- Intracranial mass lesion (haematoma, abscess)
- Endogenous or exogenous toxins
- Metabolic alterations (fever, seizures)
- Ischaemia
- Elevated ICP

HISTORY:

- Pattern and onset of pain
  - A marked variation in headache pattern can signal a new or serious problem
  - Pain with rapid onset of a few seconds to a few minutes is more likely to be vascular. Almost all studies of patients with SAH moved from pain-free to severe pain within seconds to minutes "THUNDERCLAP" → even if pain is improving at time of evaluation
- Activity at the onset of pain:
  - Severe exertion is related to vascular headache
  - Coitus → syndrome of post-coital headache is well known, but coitus is also a common time for onset of SAH
- History of head trauma
- History of HIV or immunocompromise → think toxoplasmosis, Cryptococcus and abscess. All of these can occur without typical signs or symptoms of systemic illness
- Intensity of pain
- Character → seldom helpful
- Location → helpful if can be localized → temporal arteritis, TMJ disease, dental and sinus infections all produce localized area of discomfort
- Exacerbating/relieving factors → remove from environment and it gets better think carbon monoxide. Worse on awakening → think brain tumour
- Associated symptoms → N+V are TOTALLY NON-SPECIFIC
- Prior history of headache → does not rule out sinister pathology but a previous work up for severe disease is very helpful

RISK FACTORS FOR SPECIFIC HEADACHE SYNDROMES:

- **CARBON MONOXIDE:**
  - Breathing engine/heating exhaust in enclosed spaces
  - Multiple family members with similar symptoms
  - Relief when removed from setting associated with headache
- **MENINGITIS/ENCEPHALITIS/ABSCESS:**
  - Hisotyr of sinus or ear infection
  - Recent surgical procedure
  - Immunocompromise
  - Acute febrile illness
  - Extremes of age
  - Lack of immunization
  - Close living conditions
- **TEMPORAL ARTERITIS:**
  - Age > 50
  - Female preponderance (4:1)
  - History of other collagen vascular disease

    - Previous chronic TB, parasitic infection, meningitis
- **GLAUCOMA:**
    - Age > 30
    - Prior glaucoma
    - Pain increasing in DARK
    - Not associated with usual headache patter
- **ELEVATED ICP:**
    - History of previous benign intracranial hypertension
    - Presence of VP shunt
    - Congenital anomalies
- **SUBARACHNOID HAEMORRHAGE:**
    - Sudden severe pain, worst headache ever
    - Acute severe pain following sexual intercourse or straining
    - History of SAH or aneurysm
    - History of polycystic kidney disease
    - Family history of SAH
    - HT (severe)
    - Previous vascular lesions elsewhere in the body
    - Young and middle-aged
- **SUBDURAL HAEMATOMA:**
    - Alcohol abuse (with and without trauma)
    - Anticoagulants
- **EXTRADURAL HAEMATOMA:**
    - Traumatic injury
    - Lucid mentation followed by acute altered mentation or somnolence

PHYSICAL EXAMINATION:

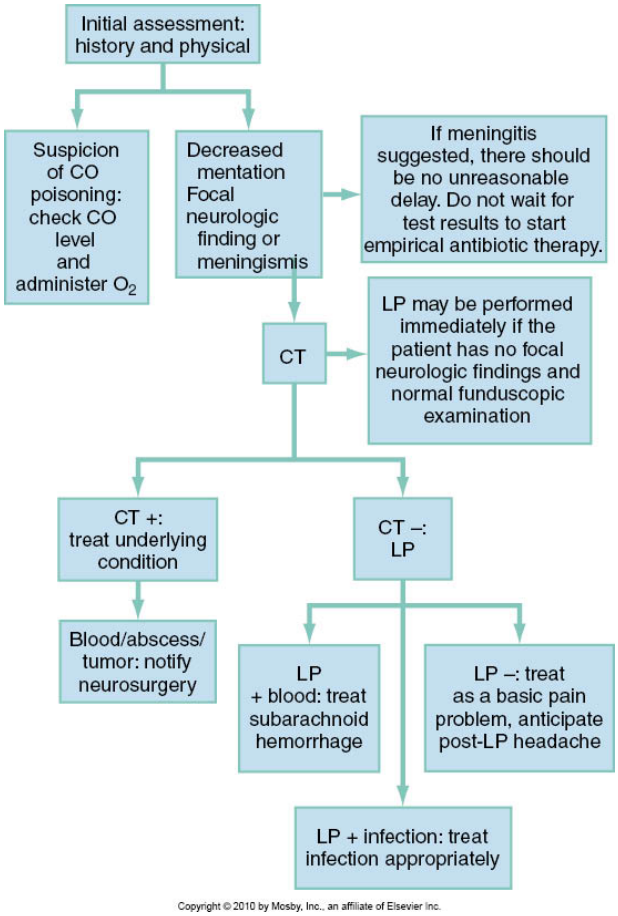
Table 16-3 Pivotal Findings on Physical Examination

SIGN	FINDING	POSSIBLE DIAGNOSES
General appearance	Alteration of mental status—nonfocal	Meningitis/encephalitis Subarachnoid hemorrhage Anoxia Increased CSF pressure
	Alterations of mental status with focal findings	Intraparenchymal bleed Tentorial herniation Stroke
	Severe nausea/vomiting	Increased CSF pressure Acute angle-closure glaucoma Subarachnoid hemorrhage
Vital signs	Hypertension with normal heart rate or bradycardia	Increased CSF pressure Subarachnoid hemorrhage Tentorial herniation Intraparenchymal bleed
	Tachycardia	Anoxia/anemia Febrile headache Exertional/coital headaches
	Fever	Febrile headaches Meningitis/encephalitis
HEENT	Tender temporal arteries	Temporal arteritis
Fundi—loss of spontaneous venous pulsations or presence of papilledema	Increased CSF pressure	Mass lesions
	Subhyaloid hemorrhage	Subarachnoid hemorrhage
	Acute red eye (severe ciliary flushing) and poorly reactive pupils	Acute angle-closure glaucoma
	Enlarged pupil with third nerve palsy	Tentorial pressure cone Mass effect (i.e., subdural, epidural, tumor, intraparenchymal hemorrhage)
Neurologic	Lateralized motor or sensory deficit	Stroke (rare) Subdural hematoma, epidural hematoma, hemiplegic or anesthetic migraine (rare)
	Acute cerebellar ataxia	Acute cerebellar hemorrhage Acute cerebellitis (mostly children) Chemical intoxication—various types

CSF, cerebrospinal fluid; HEENT, head, eyes, ears, nose, and throat.

ANCILLARY TESTING:

- The vast majority of headache patients do not require additional testing
- The biggest mistake is to believe that a single CT brain clears the patient of the possibility of SAH:
    - CT can miss up to 6-8% of patients with SAH (grade 1, i.e. the one that most benefit from treatment)
    - Sensitivity of CT declines by 10% at 12 hours and 20% at 3-5 days post onset of headache



- If meningitis is suspected → antibiotics should precede lumbar puncture

Table 16-4 Diagnostic Adjuncts in Headache Assessment

TEST	FINDING	DIAGNOSIS
Erythrocyte sedimentation rate (ESR)	Significant elevation	Temporal arteritis
ECG	Nonspecific ST-T wave changes	Subarachnoid hemorrhage
		Increased CSF pressure
CBC	Severe anemia	Anoxia
CT—head	Increased ventricular size	Increased CSF pressure
	Blood in subarachnoid space	Subarachnoid hemorrhage
	Blood in epidural or subdural space	Epidural/subdural hematoma
	Bleeding into parenchyma of brain	Intraparenchymal hemorrhage
	Areas of poor vascular flow	Pale infarct
	Structural/mass lesion	Traction headache secondary to mass effect
Lumbar puncture/CSF analysis	Increased pressure	Pseudotumor cerebri
		Mass lesions
		Shunt failure
	Increased protein	Tumor/other structural lesions
	Increased RBCs	Subarachnoid hemorrhage
	Increased WBCs	Infection
	Positive Gram's stain	Infection
	Decreased glucose	Infection

CBC, complete blood count; CSF, cerebrospinal fluid; CT, computed tomography; ECG, electrocardiogram; RBC, red blood cell; WBC, white blood cell.

DIFFERENTIAL CONSIDERATIONS:

- Testing should be performed in all patients who present with the following "RED FLAGS":
  - Sudden onset of headache
  - Worst headache ever
  - Decreased or altered mental status
  - True meningismus
  - Unexplained fever or bradycardia
  - Focal neurologic deficits on examination
  - Symptoms refractory to treatment or worsening under observation

    - New onset of headache with exertion
    - History of HIV
- Patients who do not require further investigation when all of the following are present:
    - Previous identical headaches
    - Normal alertness and cognition
    - Normal examination of neck with no meningism
    - Normal vital signs
    - Normal neurological examination
    - Improvement under observation