

HEADACHES

Pain-sensitive Structures

- Venous sinuses
- Dural arteries
- Proximal 50% of the larger arteries of the circle of Willis
- Dura at the base of the brain
- All extracranial structures

Pain-insensitive Structures

- Brain parenchyma
- Ependyma
- Choroid
- Pia
- Arachnoid
- Dura over convexity
- Skull

General Mechanisms of Headache

- **Traction** on major intracranial vessels
- **Distention and dilation** of intracranial arteries
- **Inflammation** near pain sensitive structures
- **Direct pressure** on cranial or cervical nerves
- Sustained **contraction** of scalp or neck muscles
- **Stimulation** from disease of eye, ear, nose and sinuses

Epidemiology

- 60-75% of adults have at least one headache/year
- 5-10% will seek physician evaluation
- 2.8 million annual emergency room visits for headache (U.S. statistics)
- Less than 10% of emergency room patients with chief complaint of headache will have emergent secondary cause

Classification of Headaches

- Primary headache disorders
- Secondary headache disorders

Epidemiology

Approach to a Patient with HEADACHE

How to approach the patient
with a headache

- Need to distinguish primary from secondary headache disorders
- This can be done by obtaining an accurate history and performing a focused physical exam

Questions to Ask in Obtaining a Headache History

- Is this your FIRST or WORST headache?
- How bad is your pain on a scale of 1 to 10?
- Do you have headaches on a regular basis?
- Is this headache similar to prior headaches?
- When did this headache begin?
- How did it start (gradually, suddenly, other)?

Questions to Ask in Obtaining a Headache History

- How long does the headache usually last?
- What symptoms do you have before the headache starts?
- What symptoms do you have during the headache?
- What symptoms do you have right now?
- How often do you have these headaches?

Questions to Ask in Obtaining a Headache History

- Where is your pain?
- Does the pain seem to spread to any other area? If so, where?
- What kind of pain do you have (throbbing, stabbing, dull, other)?

Questions to Ask in Obtaining a Headache History

- Do you have other medical problems? If so, what?
- Do you take any medicines? If so, what?
- Do any of your family members have headaches?

Performing the physical exam

- The primary purpose of the physical examination is to identify causes of secondary headaches
- Only a minority of headaches are secondary, but this category contains the most life-threatening conditions

Performing the physical exam

- PE should include vital signs, cardiovascular, head, and neck examinations
- A complete neurologic examination is essential (including funduscopic exam)

Performing the neurological exam

- mental status
- level of consciousness
- cranial nerve testing
- pupillary responses
- funduscopic exam
- motor strength testing
- deep tendon reflexes
- sensation
- pathologic reflexes (e.g. Babinski's sign)
- cerebellar function and gait testing
- signs of meningeal irritation (Kernig's and Brudzinski's signs)

Funduscopy exam

- Papilledema

Abnormal neurologic exam

- Babinski sign

Abnormal neurologic exam

- Brudzinski sign

-When patient flexes knees in response to neck flexion

Abnormal neurologic exam

- Kernig sign

-Pain is elicited in the Hamstring with extension of the knee with the hip at 90-degree angle

-Should produce pain on both sides

Diagnostic Alarms

- Onset after age 50

- Sudden onset

- Increased frequency and severity

- New onset with risk factors for HIV or cancer

- Associated with systemic illness (fever, meningismus, rash)

- Altered consciousness or focal neurologic deficits

- Papilledema

- Significant trauma

Warning Signs

- Suspected recent subarachnoid hemorrhage or meningitis

- Other abnormal neurological signs

-hemiparesis

-diplopia

-ataxia

- Decrease in visual acuity or temporary loss of vision

Warning Signs

- Persistent or increasing vomiting

- Seizures

- Endocrine disturbances (e.g. acromegaly, diabetes insipidus, amenorrhea, galactorrhea, impaired male sexual function or beard growth and poor growth in children)

Overall Approach

Primary headache is the illness itself

Primary headaches

- Most common type

- Have no organic cause

- Usually recurrent

- Normal neurologic exam

- Key to correct diagnosis is the history

Presumed Mechanism of Primary Headache

The Primary Headache Disorders

- Migraine
- Tension-type headache
- Cluster headache

Primary Headache

Primary headaches

Differentiated by

–*Duration*

–*Frequency*

–*Location*

–*Severity*

–*Quality of pain*

Migraine headaches

- Unilateral
- Throbbing pain
- Moderate to severe
- Aggravated by movement
- 4-7 hours
- Nausea +/- vomiting
- Photophobia

Types of Migraine

- Migraine without aura (common migraine)
- Migraine with aura (classical migraine)

Phases of Migraine

- Premonitory phase
- Aura phase
- Headache phase
- Resolution phase

Migraine

- Occurs in more than 50% of cases
- Occurs hours to days before the headache
- The features are psychological, neurological and autonomic
- Reflects limbic/hypothalamic dysfunction

Migraine

Psychological

Migraine

- Present in classical migraine
- Develops in > 4 minutes, lasts less than one hour

- Characterized by visual, sensory, motor, language and brainstem dysfunctions
- Develops headache within one hour after end of aura
- Related to cortical spreading depression

Migraine

- Hemicranial
- Gradual onset
- Throbbing
- Moderate-severe
- Duration of 4 – 72 hours
- Aggravated by physical activity
- Associated features
- Related to trigeminovascular events

Migraine

- The patient feels bad or good after disappearance of the headache

The Modified Diagnostic Criteria of Migraine of the International Headache Society (IHS)

Migraine without aura

- At least 5 attacks fulfilling B-D
- Headache lasting 4-72 hours
- At least two of the following:
 - Unilateral location
 - Pulsating quality
 - Moderate to severe intensity
 - Worsened by physical activity
- At least one of the following: nausea, vomiting, photophobia, phonophobia
- Secondary headache is ruled out

Migraine with aura

- At least 2 attacks fulfilling B
- At least 3 of the following:
 - One or more fully reversible aura
 - At least one aura symptom develops gradually over more than 4 minutes
 - No single aura lasts longer than 1 hour
 - Headache follows aura within 1 hour of the end of aura
- Secondary headache is excluded

Trigger Factors of Migraine

Trigger Factors of Migraine

Environmental

Management of Migraine

- Behavioral modifications
- Headache treatment
 - *A. Abortive*
 - *B. Preventive*

Migraine management

- Regularization of meals, sleep, exercise
- Avoidance of migraine triggers
- Avoidance of overuse of analgesics
- Stress management

Migraine management

Migraine management

- Considerations in Abortive treatment
 - *Patient's preference*
 - *Co-occurring conditions*
 - *Associated symptoms*
 - *Intensity of headache*
 - *Mode of administration*
 - *Time of administration*
 - *Drug interaction*

Migraine management

Preventive Pharmacotherapy

Migraine management

- Indications of Preventive therapy
 - *Diagnosis of migraine*
 - *Acute therapy is needed more than 2x per week*
 - *Acute therapy is ineffective, intolerable, contraindicated*
 - *2 or more attacks/month that produce disability for > 3 days*
 - *Headache is associated with neurologic deficit*
 - *Attacks occur in predictable pattern*

Migraine management

- Issues in Preventive Pharmacotherapy
 - *Choice of drugs*
 - *Side effects*
 - *Failure of treatment*
 - *Dose of drugs*
 - *Duration of trial*
 - *Length of treatment*

Tension-Type Headaches

- Band-like, bilateral
- Tightness/pressure/ dull ache
- Radiates to neck and shoulders
- Mild to moderate
- Not aggravated by movement

- 30 min to several days

Tension-Type Headache (TTH)

- Previous Labels
 - Tension headache*
 - Psychogenic headache*
 - Muscle contraction headache*

Tension-type headache

- Types
 - Episodic tension-type headache*
 - Chronic tension-type headache*
 - TTH associated with disorder of pericranial muscles*
 - TTH unassociated with disorder of pericranial muscles*

Tension-type headache

IHS Diagnostic Criteria

Tension-type headache

Management

Management of TTH

- Abortive Pharmacotherapy
 - Analgesics: paracetamol*
 - NSAID's : aspirin, indomethacin, naproxen, ketorolac*
 - Combination: analgesic + caffeine +/- butalbital*
 - Muscle relaxants : no proven value*

Management of TTH

- Indications for preventive pharmacotherapy
 - Headache frequency of > 2x per week*
 - Headache duration of > 3-4 hours*
 - Headache severity that leads to disability and overuse of abortive drugs*

Management of TTH

- Tricyclic antidepressants
- Selective serotonin re-uptake inhibitors
- Migraine preventive drugs

Cluster headaches

- Unilateral
- Hot poker/ stabbing pain
- Excruciating
- Autonomic dysfunction
- Restless
- 15 min to 3 hours

Clinical Features of Cluster Headache

- Striking periodicity: cluster starts in the same season; headache starts at the same time
- Stereotypical features: same side, same location
- Pain : excruciating, deep, boring
- Associated features: autonomic
- Headache frequency: usually 1-2/day
- Headache duration: 30-180 minutes
- Cluster periods: 1-2/year
- Cluster duration: 1 week – 1 year

Types of Cluster Headache

- Episodic cluster headache
- Chronic cluster headache

Cluster Headache

IHS Diagnostic Criteria

Management of Cluster Headache

- Abortive treatment
- Preventive treatment
- Avoidance of triggers
- Surgery of the trigeminal ganglion

Cluster Headache

- Abortive treatment
 - 100% O₂ at 7-10 L/min. for 15 mins
 - Sumatriptan 6 mg SC
 - Dihydroergotamine 1mg IV/IM
 - 4-6 % Lidocaine, nasally

Cluster Headache

- Preventive treatment
 - Verapamil 120-480 mg
 - Ergotamine 3-4 mg/day
 - Lithium carbonate 300 mg BID
 - Methysergide
 - Valproate
 - Corticosteroids

Secondary headache

is the symptom

Secondary Headaches

- Certain features of the history will make you suspect secondary headache
- Physical exam will be abnormal
 - Focal neurologic findings
 - Signs of infection
 - Evidence of head trauma

Secondary Headaches

Findings on history

- First or worst HA ever*
- Sudden-onset headache*
- Increase frequency & severity of usual HA*
- Age > 40 years old*
- Increase in pain with coughing, sneezing, straining*
- Wakes patient from sleep or disturbs sleep*

Secondary Headaches

Findings on history

- HIV +*
- History of cancer*
- History of head trauma*
- Symptoms of infection*
- Fever, nausea, and vomiting*
- Photophobia*
- Stiff neck*

Secondary Headaches

Findings on PE

- unilateral loss of sensation*
- unilateral weakness*
- unilateral hyperreflexia*
- signs of infection*

Secondary Headaches

Findings on PE

- Head trauma*
- Papilledema*
- Changes in mental status*
- Ataxia*

Secondary Headaches

- Signs of infection*
- Fever*
- Nuchal rigidity*
- + *Brudzinski sign*
- + *Kernig sign*
- Petechial rash*
- Confusion/delirium*
- CSF abnormalities*

Red Flags on history

- Onset after age 40*

- Temporal arteritis*
- Mass lesion*
- Increase frequency and severity
- Subdural hematoma*
- Mass lesion*
- Medication overuse*

Red Flags on history

- Sudden onset of headache
- Subarachnoid hemorrhage*
- Vascular malformation*
- Mass lesion or hemorrhage into mass lesion*

Red Flags on history

- History of head trauma
- Intracranial hemorrhage*
- Subdural hematoma*
- Epidural hematoma*
- Post-traumatic headache*

Red Flags on history

- History of HIV or cancer
- Meningitis*
- Brain abscess*
- Metastasis*
- Opportunistic infection*

Red Flags on PE

- Papilledema
- Meningitis*
- Mass lesion*
- Pseudotumor cerebri*

Diagnostic Studies

- Computerized tomography
- Hemorrhage, tumor, abscess, AVM*
- Lumbar puncture
- Hemorrhage, infection, increased CSF pressure*
- MRI, MRA, or Angiography as indicated
- Laboratory studies based on suspected etiologies
- ESR: Temporal arteritis*
- Carboxyhemoglobin: Carbon monoxide*