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

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

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

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
  - Psuedotumor 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