Migraine and other headaches

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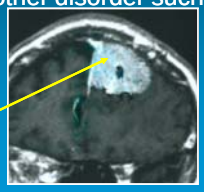
Objectives:

- To review essentials and pitfalls in the diagnosis of migraine and other headache
- To understand the impact of migraine and how it can worsen
- To evaluate atypical headaches and recognize when it's not a migraine

Headache

- Can be a disorder unto itself such as migraine
- Or a symptom of another disorder such as
  - Head injury
  - Stroke
  - Brain tumor



Headache Disorders: Two Major Categories

Primary
- Migraine
- Tension
- Cluster
- Others

Secondary
- Meningitis
- Hemorrhage
- High pressure
- Tumor
- Infection

Headache Diagnosis:

- Primary headaches are common
- Headache disorders often overlap
- Secondary headaches can mimic primary headache disorders
- Almost anything can make underlying headache disorders worse.

Patient #1: Bad headaches

- 25 yo w severe headaches
- Occur almost every month. Usually right sided.
- Severe nausea and often occasionally misses work (once every 2-3 months)
- Most headaches resolve with sleep and are gone the next day. They usually last at least a few hours
- Over the counter medication usually not effective
- Exam is normal

Migraine is …

Common

Underdiagnosed

More than a headache

Potentially progressive

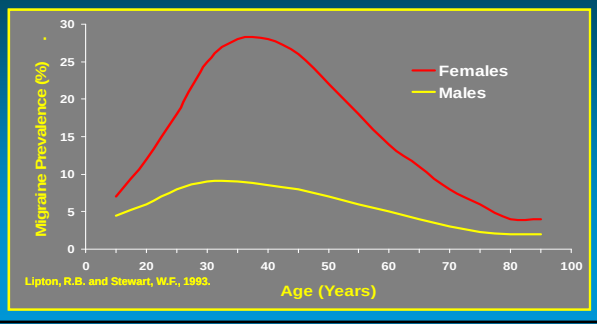
It's Likely migraine

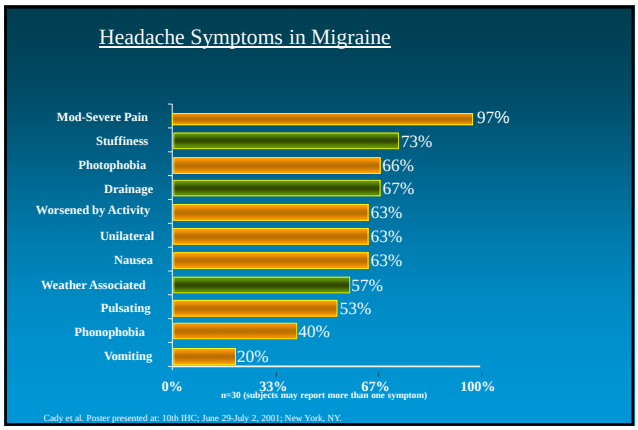
- Stress headache
- Sinus headache
- Allergy headache
- Disabling headache

Migraine is BY FAR the most likely diagnosis of a recurrent disabling headache disorder with nausea or light-sensitivity

Lipton Neurology. 2003 Aug 12;61(3):375-82.

Migraine Prevalence





What is Migraine anyway??

Phases of the Migraine Attack

1. Prodrome
2. Aura
3. Headache
4. Postdrome

Prodrome: Premonitory Phenomena

Mental State
- Depressed
- Euphoric
- Irritable
- Hyperactive/Restless
- Talkative
- Drowsy

Neurologic
- Photophobia
- Phonophobia
- Hyperosmia
- Difficulty concentrating
- Dysphasia
- Yawning

General
- Stiff neck
- Cold feeling
- Sluggish
- Thirst, urination
- Food cravings
- Anorexia
- Diarrhea or constipation
- Fluid retention

Phases of the Migraine Attack

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Aura

Migraine With Aura

Headache preceded by ≥ 1 neurologic symptom

- Visual
  - Scintillating scotoma
  - Fortification spectra
  - Photopsia
- Sensory
  - Numbness
  - Paresthesia
- Other
  - Weakness
  - Aphasia

Migraine Aura

Scintillating scotoma

Migraine Aura Without Headache

- Neurologic dysfunction without headache
- Diagnose as migraine only after full investigation and prolonged followup
- Accompanying headache will help in diagnosis
- 44% of migraineurs with aura patients had aura without headache at some time
  - More frequent in older patients

Phases of the Migraine Attack

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Migraine Attack

Migraine Without Aura

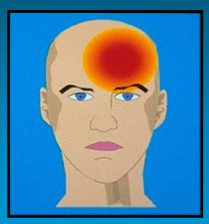
Headache has ≥ 2 of the following

- Unilateral
- Throbbing
- Moderate- Severe
- Aggravated by movement

One of the following

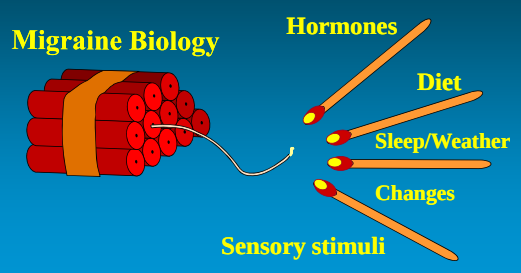
- Nausea
- Photo and phonophobia

Similar pain in past and no evidence of organic disease

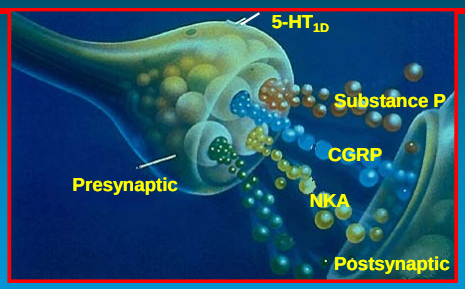


Migraine Triggers

Migraine Triggers

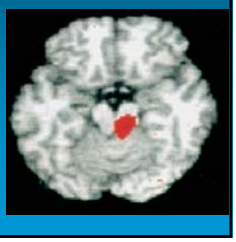


Trigeminal Vascular System



Migraine causes changes in brain function

- Spontaneous migraine without aura
- PET demonstrates activation pain regions and the **brainstem (pons)**
- May explain most migraine symptoms



The Migraine 'Threshold'

- Anyone can have a migraine attack occasionally
- Attacks involve physiological mechanisms initiated by migraine-specific triggers
  - ➔ Not the migraine attack but its repeated occurrence that is abnormal = migraine patient
- Genetic factors set an individuals threshold
- Environmental factors modulate this set-point

(Ferrari, Lancet, 351: 1043 1998)

Cortical Hyperexcitability

Transcranial Magnetic Stimulation

- Reduced threshold
- Increased responsivity
  - Proportional to attack frequency
- Increased sensitivity to light and sound

	Control	Mw A	P
Phosphene generation	27.3%	100%	0.001
Threshold	68.7 ± 3.1	44.2 ± 8.6	0.0001

Aurora et al: Neurology: 50:1111-1114:1998
Woodhouse and Drummond Cephalalgia 13:417-421 1993

Phases of the Migraine Attack

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Migraine Treatment

- **Medication**
  - Acute
  - Preventive
- **Patient education**
  - Avoidance of triggers
  - Correct diagnosis
- **Behavioral therapy**
  - Biofeedback, relaxation training
  - Stress management

Treatment:

Depends on:

- Making an accurate diagnosis
- Ruling out alternative etiologies
- Ordering appropriate studies
- Addressing headache's impact

Ultimate Goal: Headache Relief

Patients want to know what is wrong and that their complaints are taken seriously

Acute vs Preventive Therapy

Acute (Abortive)

- Taken after attack has begun to relieve pain and disability and stop progression

Preventive

- Taken daily to reduce attack frequency, severity, and duration
- Patients taking preventive medication can also use acute medication

General Principles of Acute Treatment

- Treat as early as possible
  - Do not wait until its gets more severe
- Use nonpharmacologic treatment
  - Rest, distraction
  - Avoid uncomfortable sensory stimuli
  - Cold compresses
- Use acute medications
  - Almost always indicated
  - Match treatment intensity to attack severity

Acute Migraine Medications

- **Non-specific**
  - NSAIDs
  - Combination analgesics
  - Opioids
  - Neuroleptics/antiemetics
  - Corticosteroids
- **Specific**
  - Ergotamine/DHE
  - Triptans

Acute Headache Treatment

- Stratify treatment
- Use different acute drugs
- Have
  - First line treatment
  - Backup treatment
  - Rescue treatment
- Tailor treatment to both patient and attacks

Triptans

- Act at serotonin 1B and 1D Receptors
- Constrict blood vessels and block "neurogenic Inflammation" and pain transmission
- Do not use: uncontrolled hypertension, known CAD or stroke

Triptans: Formulations

- Sumatriptan (Imitrex) - oral tablet, SC, IN
- Sumatriptan/Naproxyn – oral tablet
- Zolmatriptan (Zomig) - oral tablet or MLT
- Rizatiptan (Maxalt) - oral tablet or MLT
- Naratriptan (Amerge) - oral tablet
- Almotriptan (Axert) - oral tablet
- Frovatriptan (Frova) - oral tablet
- Eletriptan (Relpax) - oral tablet

Dihydroergotamine (DHE)

- IV or IM 0.25-1 mg
- Outpatient: nasal spray, inhaler (awaiting FDA approval)
- Side effects: flushing, hypertension, NAUSEA, muscle cramping, diarrhea
- Used for daily headache, migraine for days with an antiemetic as a premedication

Rescue Therapy

When initial and backup therapy fail

- To stop suffering and avoid ED visit
- Choices include
  - Opioids
  - Neuroleptics
  - Corticosteroids

Non-Opioid Terminators

Some medications are effective in terminating the headache cycle

These can be given repetitively IV

- DHE
- Neuroleptics
  - prochlorperazine, chlorpromazine, droperidol
- Corticosteroids
- Valproate sodium
- Magnesium
- Ketorolac
- Lidocaine
- Nerve block

Common Preventive Medications for Migraine

- **Anticonvulsants**
  - Valproate, gabapentin, topiramate
- **Antidepressants**
  - Tricyclic antidepressants (nortriptylline), SNRI (duloxetic or venlafaxine)
- **ßeta-adrenergic blockers**
  - Propranolol, Metoprolol
- **Calcium channel antagonists**
  - Verapamil
- **Botulinum Toxin**
- **Others**
  - NSAIDs, riboflavin, magnesium, neuroleptics

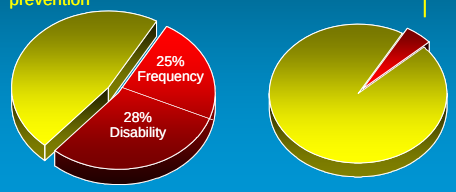
Why use preventatives?

- Too many headaches
- Too severe
- Too many pain pills
- Too sick to take pills
- Too disabled
- Too short or severe for pain pills to work
- Too much to do (patient preference)
- Too much aura (i.e. hemiplegic migraine)
- Too scary

Migraine Prevention Utilization

53% of migraineurs meet disability and frequency criteria for prevention

< 5% of migraineurs use preventive therapy



Lipton RB et al. *Headache*. 2001; Lipton RB et al. *Neurology*. 2002

Preventive Drugs

- **High-efficacy**
  - β -blockers (propranolol, timolol)
  - TCAs (amitriptyline)
  - Divalproex
  - Topiramate
- **Moderate-efficacy**
  - β -blockers (atenolol, metoprolol nadolol)
  - Verapamil
  - Some NSAIDs
  - SSRIs (fluoxetine)
  - Gabapentin
  - Riboflavin
  - Butterbur
- **High-efficacy?, ↑AEs**
  - Methysergide*
- **Unproven-efficacy**
  - Other antidepressants (MAOIs*, TCAs, SNRIs)
  - Cyproheptadine
  - Phenytoin
  - Levitiracetam
  - Lamotrigine
  - Lithium*

*Significant adverse effects

Botulinum Toxin

- Recent studies show decreased migraine and HA days compared to placebo injections
- Most efficacy for chronic daily headache (mostly migraine) compared to chronic tension or episodic migraine
- ? Cluster, focal headache
- Advantages: compliance, low side effects, effective for chronic migraine
- Disadvantages: cost, ? dose or injection method

Chronic Daily Headache

- Most common cause is migraine
- Can evolve over time or quickly
- Most common reason we see patients
- 2-4% of the population
- Common in secondary headache as well

Transformed Migraine

Infrequent Migraines → Daily (or almost daily) Headache

Risk Factors:
Acute Medication Overuse
Head Trauma
After Pregnancy
Obesity
Affective Disorders
Kindling?

Medication Overuse Headache

- Use of ANY pain medication > 15 d/mon
- Use of triptans, combination drugs, opioids, barbituates > 10 d/mon
- Medications lose effect over time
- "Rebound" headache

Case 2: Severe headaches at night

- 48 yo man with new onset headaches starting in August (3 weeks ago)
- Severe headaches lasting 1-2 hours in the left eye as many as 2/day
- Often gets them after sleep and with these has to get up and pace around
- During the headaches, the left eye looks red and droopy

Cluster Headache

Cluster Headache: (defined)

- Severe unilateral orbital, supraorbital and/or temporal pain lasting 15-180 min untreated

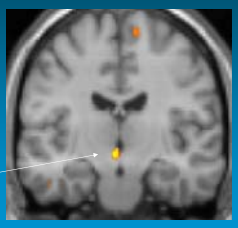
One or more autonomic symptom:

- 1. ipsilateral conjunctival injection and/or lacrimation
- 2. ipsilateral nasal congestion and/or rhinorrhea
- 3. ipsilateral eyelid edema
- 4. ipsilateral forehead and facial sweating
- 5. ipsilateral miosis and/or ptosis
- 6. a sense of restlessness or agitation
- Frequency from one qod to 8 per day

The International Classification of Headache Disorders: 2nd edition. *Cephalalgia.* 2004;24 Suppl 1:9-160.

Cluster Headache: Associated features

- Seasonal variation
- Cycles weeks-months
- Alcohol sensitive
- Nocturnal attacks
- Increased in smokers, men, head trauma
- Posterior hypothalamic activation



May et. al. The Lancet. 1998 Jul 25;352(9124):275-8.

Cluster Headache is NOT:

- Migraine that varies with seasons
- Migraine with allergy/sinus symptoms
- Multiple migraines in a week/month
- A severe migraine
- A man with migraine

Migraine vs Cluster Headache:

Clinical Features	Migraine	Cluster
Severe attacks	> 4 hours	3 hours or less
Side	Often bilateral	Unilateral
Location	Anywhere	Usually ocular
Character of pain	Usually throbbing	Often boring, stabbing
Onset and cessation	Usually gradual	Rapid
Autonomic features	Occasionally	Always
More common in	Women	Men
Response to subcutaneous sumatriptan	Usually	Almost always
Response to high-flow oxygen	Unknown	Usually
Seasonal attacks	Occasional	Common
Circadian periodicity	Uncommon	Very common
Comorbid conditions	Depression, anxiety, bipolar disease, epilepsy, Raynaud's	Tobacco abuse

Cluster Headache Treatment

- Acute: High flow o2 (10-15 L for 15 minutes), Sumatriptan SC
- Corticosteroids (short term)
- Verapamil, Valproate, Topiramate, Gabapentin, Lithium (chronic)
- Nerve block

Case #3: Sudden Onset

- 53 yo woman with explosive ha after a bowel movement
- No history of similar
- Improved after a few minutes then bad again
- BP 190/100 in the ER.
- CT head was normal
- LP no infection or bleeding

Secondary Headache: Red Flags

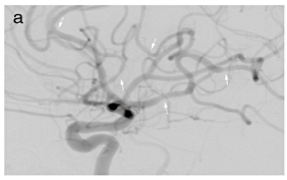
- SNOOP:
- **S**ystemic symptoms or illness
- **N**eurologic signs or symptoms
- **O**nset is new or sudden
- **O**ther associated conditions
- **P**rior headache history that is different

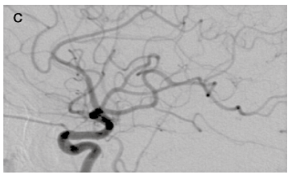
First,
Worst
Fifty-first
or Cursed

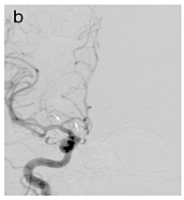
Thunderclap Headache

- Subarrachnoid
- Venous thrombosis
- Dissection
- Spinal fluid leak
- Severe Hypertension
- Sphenoid sinusitis
- Pituitary apoplexy
- Vasospasm

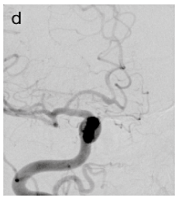
TREAST AS A NEUROLOGICAL EMERGENNCY







Initial angiogram



Three weeks later

CSF Leak Headache

- Positional
- Improves (usually resolves) with lying down
- Brain MRI is usually abnormal after 1 week

Severe eye pain and headache with decreased vision: Acute angle closure glaucoma

Temporal Arteritis

- Progressive headache in elderly patient
- Symptoms and signs:
- HA, jaw claudication, myalgia, fatigue, arthralgias
- Visual loss if untreated up to 60%
- ESR 41% > 100, 89% > 50

Headache Take Home Points

- Make a diagnosis
- Take it seriously (not “just a headache”)
- Medications + Non-medication strategies give better outcomes
- Look for red flags, especially in hospitalized patients