Best Practices for Diagnosis and Treatment of Headache

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Disclosures

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Medical Chart Quotes

“The patient was in his usual state of good health until his airplane ran out of gas and crashed.”

“The patient lives at home with his mother, father, and pet turtle, who is presently enrolled in day care three times a week”
Medical Chart Quotes

“The patient has been depressed ever since she began seeing me in 2013.”

Headache Challenges

- HA training in the GME setting is lacking
- If all neurologists only saw headache patients, only a small proportion of headache patients would be treated
- Primary care providers provide the majority of headache care and will do so in the future
- If you would benefit from a headache template, see “30 Questions” in syllabus

Headache (HA) Topics

- HAs requiring timely medical intervention
- Primary Headache Clinical Diagnosis
- Secondary Headaches
- Management primary headache types
  - Altering the environment-prevention
  - Acute management
  - Chronic management-prophylaxis
- Medication Overuse Headache

Old Headaches vs. New Headaches

- Severity of headaches only occasionally helpful with diagnosis
- Historical risk factors:
  - New-onset – elderly, immunosuppressed
  - Focal neurologic signs
  - Postural – supine or standing
  - Fever, incr HR, rash, stiff neck-meningsitis
  - Sudden onset over 1-2 seconds-hemorrhage
Q1: Which Statement Regarding Postural Headaches is False?

1) Due to low or high intracranial pressure
2) Common after an LP
3) May require brain imaging to see if CSF pathways are obstructed
4) Usually require a follow-up LP
5) Low ICP headache may require a search for the anatomic source of the leak

Postural Headaches and Intracranial Pressure (ICP)

- Low ICP-headache worse with standing and resolves with supine position but not meds
  - Post-LP (risk about 5-10%)
  - Spontaneous/traumatic leaks
- Elevated ICP-Headache worse when supine
  - Mass lesions that obstruct flow CSF pathways
  - Infection (meningitis), hemorrhage, cancer
  - Nocturnal-CO 2 retention with vasodilatation

Low ICP Headache-Management

- Post LP
  - Bed rest for 5-7 days, generous caffeine
  - Persistent-anesthesiology/radiology for epidural blood patch
- Not post-LP
  - Neurologic exam and medical history
  - Brain/spine MRI for sagging brain/spinal block
  - CSF to measure opening pressure
  - CT/MR myelogram-source of leak

High ICP Headache-Management

- Neurologic exam and medical history
- Ophthal eval for papilledema + visual fields
- Brain MRI with MR venogram
- MRI negative, LP-opening pressure (OP)
- IIH (Idiopathic Intracranial Hypertension)
  - Preserve vision and relieve symptoms
  - Diamox, Lasix, steroids
Q2: Which one of the following is not a primary headache type?

1) Cluster HA
2) Cervicogenic HA
3) Migraine with aura
4) Migraine without aura
5) Tension HA

Primary Headaches (HA)

• Migraine without aura
• Migraine with aura
• Tension-type headache
• Cluster headache
• Together, these make up 98% of the headaches you will see

Migraine Without Aura

• HA attacks last 4-72 h (untreated or refractory to treatment)
• Prodrome in 75%-irrit, depression, euphoria
• HA Features-unilateral and pulsating
  – Worse with usual physical activity (climbing stairs, walking)
  – Accompanied by nausea or emesis, photophobia or phonophobia
  – Patient feels better in a dark room

Migraine with Aura

• Prefer > one aura symptom-visual, sensory, speech or language, motor, brainstem
• Aura spreads gradually over more than 5 minutes (not a sensory seizure over 1-5 seconds) and lasts 5-60 minutes
• Aura accompanied or followed by headache in < 60 minutes
### Chronic Migraine

- Meets diagnostic criteria for migraine on 15+ days per month for more than 3 months
- More than 5 attacks over 3 months
- Affected more than 8 days/mo x 3 months
- Frequent HAs compromise daily functions
- HA responsive to ergot or triptan
- Does not meet criteria other HA diagnosis

### Tension Type HA

- More than 2 of the following 4 traits:
  - bilateral location
  - pressing or tightening (non-pulsating) quality
  - mild or moderate intensity
  - not aggravated by routine physical activity
- Both of the following:
  - no nausea or vomiting
  - no more than one: photophobia or phonophobia

### Cluster HA-I

- Severe/very severe unilateral orbital, supraorbital and/or temporal pain lasting 15-180 min
- Frequency from 1-2/d to 8/d for > half the time when active
- Either or both of the following:
  - A sense of restlessness or agitation
  - At least one ipsilateral symptom or sign

### Cluster HA-At Least one Ipsilateral Symptom or Sign

- Conjunctival injection and/or lacrimation
- Nasal congestion and/or rhinorrhea
- Eyelid edema
- Forehead and facial sweating or flushing
- Sensation of ear fullness
- Pupillary miosis or eyelid ptosis (Horner’s syndrome)-temporary or permanent
### Diagnosis of Primary Headaches

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Migraine</strong></td>
<td>unilateral, throbbing, nausea, wants to lay down in a dark room, +/- aura</td>
</tr>
<tr>
<td><strong>Tension-type HA</strong></td>
<td>milder, bilateral band around head, no nausea, no aura</td>
</tr>
<tr>
<td><strong>Cluster</strong></td>
<td>Unilateral, supraorbital/orbital, brief, cyclic, other symptoms affecting the eye, restless and wants to move around</td>
</tr>
</tbody>
</table>

### Secondary Headaches-Associated with Medical Comorbidities

- Trauma or injury to the head or neck
- CNS disease (e.g. vascular, trauma)
- Use or withdrawal of a substance
- Headache/facial pain attributed to disorder of cranium, neck, eyes, ears, nose, sinuses, teeth, mouth, other facial/cranial structure
- Psychiatric disorder

### Post-Traumatic Headache

- Key component persistent post-concussive syndrome
- Can resemble other headache types including migraine
- Resistant to treatment-Nortriptyline 30-50 mg/night
- Categorized by cause or severity of head injury

### Cervicogenic Headache

- HA due to pathology in C-spine or neck
- Need to prove cause and effect (2 required):
  - HA onset temporally related to structural lesion
  - Cervical ROM reduced and HA worse with exam maneuvers
  - HA resolves with diagnostic block of the lesion or nerve supply of the lesion
  - HA improves with resolution of the pathology
Headaches from Vascular Disease

- **Intracranial vessels are pain-sensitive**
- Stroke-hemorrhagic, thrombotic, embolic
- Vascular anomalies-AVM, aneurysm
- Arteritis
- Carotid or other arterial dissection
- Cerebral venous thrombosis
- Post-endarterectomy

Cough Headache

- Immediate and transient headache pain with coughing or sneezing
- Can be a sign of structural disease at the foramen magnum
  - Arnold Chiari malformation-cerebellar tonsils protrude through the foramen magnum and compress the brainstem or spinal cord
  - May be associated with neurologic exam signs

Clinical Approach to HA Patient

- **Exclude urgent headaches** (e.g., infection, neoplasm, vascular dz, High ICP, low ICP)
- **Exclude other secondary causes of headache** by exploring comorbidities (med dz, drugs)
- Does clinical presentation fit primary HA syndrome (migraine, tension, cluster)?
- Consider all three management strategies-prevention, acute treatment, prophylaxis

Headache Disorders-Other Hx

- **Diurnal periodicity**
  - Divide day into quarters MN to 6 AM; 6 AM to noon; noon to 6 PM; 6 PM to MN),
  - Number HA out of 10 that begin in one quarter
- **Triggers**-foods, alcohol, sleep deprivation
- **Current meds and substances**-especially if new or prior to onset of headache
- **Family history**
Headache Disorders - Exam

- **General** - Vital signs
- **Head and Neck** - trauma, carotids, C-spine, TMJ, paranasal/other sinuses, greater occipital/supraorbital nerve, funduscopic exam, otoscopic exam
- **Neurological** - Screening neurologic exam on first visit: will be normal 95-98% of time

Headache– Labs to Consider

- Blood tests – Consider CBC, lytes, Ca, Mg, BUN, Cr, liver enz, thyroid, ESR, HIV
- C-spine X-ray, sinus X-rays
- MRI/CT - if new HA/risks for structural dz
- LP-suspect subarachnoid hemorrhage, high/low ICP, or meningitis/encephalitis
- Consider MRA, MRV, CTA, or cerebral angiography

Personalized Primary Headache Care

- Tailor management to the patient’s life circumstances
- Goal: Not cure; reduce frequency/severity of headaches and improve daily function
- How does the headache interfere with daily life (employment, family life, diet, sleep)?
- What are the 3 most intrusive/bothersome consequences of HA for the patient?

Q3: Predictable timing of HA aura/onset informs when to Rx.

1) True
2) False
HA Prevention Strategies

- Anticipatory Treatment
  - If aura predictably precedes HA, take acute medication during aura
  - If HA occurs in a narrow time band, then take medication 1 hour before “at risk” time
- Lifestyle - exercise, sleep, avoid triggers
- Relaxation - Yoga, biofeedback, meditation
- Other - Manual therapy, acupuncture, TENS

Acute Migraine - Non-Specific Rx

<table>
<thead>
<tr>
<th>Medication</th>
<th>Trade</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naproxen sodium</td>
<td>Alleve</td>
<td>550 mg po</td>
</tr>
<tr>
<td>Indomethacin</td>
<td>Indocin</td>
<td>50 po, pty</td>
</tr>
<tr>
<td>Ketorolac</td>
<td>Toradol</td>
<td>30-60 mg IM</td>
</tr>
<tr>
<td>Promethazine</td>
<td>Phenergan</td>
<td>5 mg IM, IV</td>
</tr>
<tr>
<td>Prochlorperazine</td>
<td>Compazine</td>
<td>5-10 mg IV, IM</td>
</tr>
<tr>
<td>Chlorpromazine</td>
<td>Thorazine</td>
<td>10-25 mg IV, IM</td>
</tr>
<tr>
<td>Butorphanol</td>
<td>Stadol</td>
<td>1 mg nasal</td>
</tr>
<tr>
<td>Meperidine</td>
<td>Demerol</td>
<td>50-150 mg IM</td>
</tr>
<tr>
<td>Morphine</td>
<td></td>
<td>5-10 IM, 2.5 IV</td>
</tr>
<tr>
<td>Valproate</td>
<td>Depacon</td>
<td>500 mg</td>
</tr>
<tr>
<td>Mg Sulfate</td>
<td></td>
<td>1 g</td>
</tr>
</tbody>
</table>

Common Acute Migraine Rx - Adverse Events

<table>
<thead>
<tr>
<th>Medication</th>
<th>Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opioids</td>
<td>Addiction, tolerance</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>GI, renal</td>
</tr>
<tr>
<td>DA antagonists</td>
<td>Dystonia, akathisia</td>
</tr>
<tr>
<td>Ergots</td>
<td>Vasoconstriction</td>
</tr>
</tbody>
</table>

Acute Migraine - Specific Rx

<table>
<thead>
<tr>
<th>Medication</th>
<th>Trade</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatriptan</td>
<td>Imitrex</td>
<td>6 mg IM, 20 mg NS, 50-100 po</td>
</tr>
<tr>
<td>Naratriptan</td>
<td>Amerge</td>
<td>2.5 po</td>
</tr>
<tr>
<td>Rizatriptan</td>
<td>Maxalt</td>
<td>1-10 mg po</td>
</tr>
<tr>
<td>Zolmitriptan</td>
<td>Zomig</td>
<td>2.5-5 mg po</td>
</tr>
<tr>
<td>Almotriptan</td>
<td>Axert</td>
<td>12.5 mg po</td>
</tr>
<tr>
<td>Frovatriptan</td>
<td>Frova</td>
<td>2.5 mg po</td>
</tr>
<tr>
<td>Eletriptan</td>
<td>Relpax</td>
<td>40-80 mg po</td>
</tr>
<tr>
<td>Dihydroergotamine</td>
<td>DHE-50</td>
<td>1 mg IV, IM</td>
</tr>
<tr>
<td></td>
<td>Migranal</td>
<td>2 mg NS</td>
</tr>
</tbody>
</table>
Common Triptan Adverse Symptoms and Contraindications

**Adverse Symptoms:**
- Tingling
- Warmth
- Flushing
- Chest discomfort
- Dizziness
- Somnolence
- HA recurrence

**Contraindications**
- Hemiplegic/basilar migraine
- Uncontrolled hypertension
- Use within 24 hrs of an ergot
- Pregnancy category C

Migraine Prophylaxis Rx Options

Decrease the frequency and severity of chronic migraine HA
- Beta blockers—propranolol, atenolol
- Tricyclic antidepressant—amitriptyline, nortriptyline
- Ca channel blockers—verapamil, flunarizine
- Angiotensin receptor blockers—candesartan
- Anticonvulsants—topiramate, valproate

Migraine Prophylaxis-Dosing

- Anticonvulsants—topiramate 100-200 mg hs
- Beta blockers—propranolol 80 mg bid
- Tricyclic antidepressant—nortriptyline 30-70 mg hs
- Ca channel blockade—verapamil 80 mg tid
- Angiotensin receptor blockers—candesartan 8-16 mg

Calcitonin Gene-Related Peptide (CGRP) Receptor Antagonists

- Rx based on basic pain research
- Prophylactic monthly SQ; $5000/yr; none for acute Rx yet
  - Erenumab (Aimovig) approved by FDA for migraine prophylaxis—injector kit
  - Fremanezumab (Ajov) self-injection
  - Galcanezumab
- Side effects—constipation common, severe fatigue, long term unclear
"Two for One" Headache Treatment

- HA + HTN-Propranolol or Candesartan
- HA + seizures-Valproate
- HA + neuropathic pain-Nortriptyline
- HA + obesity-Topiramate

Migraine Prophylaxis-What Patients May Try

- B2
- Magnesium
- CoQ 10
- Melatonin
- Ginger
- Significant placebo effects in HA Rx

Cluster HA Treatment

- Acute treatment
  - Oxygen 8-10 L/min
  - Sumatriptan SQ
  - Occipital nerve blocks
- Break Cycle-Prednisone
- Prophylaxis:
  - Ca channel blockers-Verapamil, Amlodipine
  - Lithium
  - Antiepileptics -Valproate, Lamotrigine

Tension HA Treatment

- Acute treatment
  - Acetaminophen
  - NSAIDs
  - Triptans
  - Manual therapy
- Prophylaxis
  - Lifestyle-exercise, sleep
  - Relaxation techniques and manual therapy
  - Tricyclic antidepressants
Q4: Which statement regarding medication overuse HA is false?

1) Occurs when a drug intended for acute Rx is used almost constantly and for long term
2) May require inpatient management
3) Is easily addressed with a bridging strategy
4) Requires cessation of causative medication
5) Requires exclusion of other HA diagnoses

Medication Overuse HA (MOH)

- HA on ≥ 15 days/month in a patient with a pre-existing headache disorder
- Regular overuse for ≥3 mo of one or more drugs that can be taken for acute and/or symptomatic treatment of headache
- Exclusion of other HA diagnoses

Possible Mechanisms of Medication/Substance Overuse HA

- Direct medication/substance effect
- Withdrawal of medication/substance
- Medication Overuse
  - Tolerance-more medication for smaller benefit
  - Dependency-withdrawal or rebound HA

Medications Can Induce HA-I

- Hydralazine
- Isosorbide, Nitroglycerin
- Nifedipine, Enalapril (Vasotec)
- Amantadine, L-Dopa
- Phenothiazines
- Ranitidine, famotidine, cimetidine
- Sildenafil (Viagra); also Levitra, Cialis
- Trimethoprim-Sulfa, Tetracyclines
Medications Can Induce HA-II

- Estrogen, Progesterone, Tamoxifen
- Theophylline
- Pseudoephedrine, sympathomimetics
- Tetracyclines, Trimethoprim
- Indomethacin, NSAIDs
- Cyclophosphamide
- Amphetamines, Cocaine

Management Approach for Medication Overuse HA

- Educate patient, family, significant others
  - Inadvertant overuse to treat HA pain
  - Rebound headaches/other symptoms when trying to stop causative medication
- Stop the offending medications
- Design a “bridge therapy” to rescue from rebound HA

Bridge Rx for Chronic Medication Overuse HA

- Start HA prophylactic medications
- Choose effective acute Rx medication
- Steroids
- Clonidine
- Caffeine (No Doz)
- DHE
- NSAIDs

Challenges of Outpt Medication Overuse HA Management

- Rebound HA or withdrawal can be difficult to treat as an outpatient
  - Offer outpatient or inpatient treatment
  - Therapeutic environment managed only by the patient and family as an outpatient
  - Can the family manage 24/7 all the symptoms of withdrawal by themselves?
- If outpatient bridge therapy does not work, inpatient Rx is still an option
The UCSF Headache Center

- Headaches (especially intractable migraine) refractory to medical treatment and other unusual or difficult headache disorders
- Outpatient treatment
- Inpatient treatment
- Telemedicine for follow-ups
- Research
- Children with Headache

Inpatient Rx of Refractory Headaches

- Inpatient service at UCSF for management of headaches refractory to medical treatment
  - Requires insurance authorization
  - Socially and medically safe discontinuation of habituating medications
- Intravenous Dihydroergotamine (DHE)
- Intravenous Chlorpromazine
- Intravenous Lidocaine

Headache Management-Conclusions

- HA management requires exclusion of urgent and secondary causes of HA first
- Common Primary HAs: Migraine (with or without aura), Tension HA, and Cluster
- Management approaches: prevention, acute treatment, and prophylaxis
- Medication overuse headache is difficult to manage; may require inpatient admission