The Differential Diagnosis of Headaches

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“Alice in Wonderland” Syndrome

“13 year-old headache” (Val Akula)

Get to the “Heart” of the Matter

- H = History (most important)
- E = Examination (both physical & ocular)
- A = Assess the need for further testing and/or diagnose.
- R = Refer, or
- T = Treat

Headache History

PQRST
P = Provocative & Palliative
Q = Quality
R = Region
S = Severity
T = Temporal Aspects
Headache History

**FORD (PARTS)**
- **F** = Frequency
- **O** = Onset
- **R** = Region
- **D** = Duration

**P** = Provocative Factors
- **A** = Associating Factors
- **R** = Relief
- **T** = Treatment
- **S** = Severity

<table>
<thead>
<tr>
<th>Structure</th>
<th>Sensitivity to Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain parenchyma</td>
<td>Not sensitive</td>
</tr>
<tr>
<td>Cranial nerves carrying pain fibers (S7, T1)</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Arteries of circle of Willis and first few cm of their medium-sized branches</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Meningeal (dural) arteries</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Large veins in brain and dura</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Portions of dura near vessels</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Most other parts of dura, arachnoid, and epidural</td>
<td>Not sensitive</td>
</tr>
</tbody>
</table>

Structures external to skull: external carotid artery and branches, scalp and neck muscles, skin and cutaneous nerves, cervical nerves and roots, muscles of mastication, and teeth

<table>
<thead>
<tr>
<th>Disease</th>
<th>Mechanism of Headache Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal dermal sinus (syringomyelia)</td>
<td>Displacement (traction) of pain-sensory vessels.</td>
</tr>
<tr>
<td>Low intercranial pressure (such as post-tamponade, puncture headache)</td>
<td>Traction through brain, negating normal vascular supply, spinal cord compression.</td>
</tr>
<tr>
<td>Meningitis, subarachnoid hemorrhage</td>
<td>Inflammation of vessels.</td>
</tr>
<tr>
<td>Temporal arteritis, intracranial vessels</td>
<td>Inflammation of vessels.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dysfunction</th>
<th>Mechanism of Headache Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraines</td>
<td>Neurovascular dysfunction, inflammation of dura, venous hypertension.</td>
</tr>
<tr>
<td>Cluster headaches</td>
<td>Neurovascular dysfunction, inflammation of internal carotid artery.</td>
</tr>
<tr>
<td>Tension-type headache</td>
<td>Unknown, may be increased sensitivity of pain-mediating systems in brain.</td>
</tr>
</tbody>
</table>

![Cranial Nerves](image)
"Tension-Type" Headache

- Most Common Headache
- Females > Males; Age of Onset (13 – 38)
- Characterized by gradual onset, bilateral, non-throbbing aching pain over the frontal and temporal regions, which often spreads to the occipital.
- Pain often worsens as day goes on.
- Usually no abnormal findings on physical exam.

Tension Headache

**Episodic** (several minutes – 7 days)
- or-
**Chronic** (at least 15 days / month)

- R/O signs of depression, anxiety, or environmental causes.
- "What do you think is causing your headaches?"

Tension Headache Management

- Remove or Reduce Stressors
- Relaxation Techniques
  - Massage, Heat, Hot Shower, Exercise, Hobbies.
- Medication
  - If Episodic => OTC Analgesics (aspirin, acetaminophen, ibuprofen +/- caffeine.
  - If Chronic => amitriptyline (tricyclic antidepressant)

**Avoid narcotic pain medication**
r1 Incorporate video of guy going through a cluster.

rbm, 6/4/2008
Cluster Headache

- Is among the most severe pain conditions!
- Vascular
- 8:1 Male: Female Ratio
- Onset usually > age 20
- 2-3 (usually nocturnal) attacks / day for months, then cease for months or years, only to recur.
- Pain peaks at 10-15 minutes and last 45 to 180 minutes.

Cluster Headache

- Unilateral, penetrating, excruciating pain, affecting the retro-orbital temporal region.
- Patients prefer to be mobile, rather than lie down during an attack.
- Usually spontaneous, but may be provoked by alcohol, change in barometric pressure or sleep patterns.
- Associated w/ conjunctival injection, lacrimation, rhinorrhea, & Horner’s syndrome.

Cluster HA Management

- Avoid Trigger (mostly alcohol)
- Prophylactic Tx’s (Calcium Channel Blockers (Verapamil), Seratonin antagonist (Sansert, methysergide)
- Abortive TOC (Subcut. Sumatriptan) & Pure O2
- Surgery (ablation of trigeminal nerve components)
- NSAID: Indomethacin (Indocin)

Migraine Headache

- Inherited Neuronal / Vascular Disorder?
  - Unifying Theory: Neurovascular “Ping-Pong”
- 28 million Americans (1/2 being moderately to severely disabled). 3:1 female: male
- Onset +/- age 12; Peak 35-40; Subside +/- 50
- Accounts for 1 billion dollars in direct medical costs (13 billion / indirect)
- 75% self-medicate
- Provocative (Trigger) Factors (85%)

Migraine “Triggers”

- Dietary (25%)
  - Chocolate
  - Cheeses, Dairy Products
  - Alcohol (red wine)
  - Citrus fruits
  - Nuts
  - Chemical Additives
  - Caffeine
  -Skipping Meals
Migraine “Triggers”

- Hormonal (Mensus, BC Pill)
- Environmental
  - Smells (perfume, aftershave lotion, cigarette smoke, cooking odors)
  - Changes in barometric pressure (worse weather)
  - Stress, Excitement, Physical Activity (body movement, sex) or disruption of normal patterns.

The “Full House” Migraine

- Prodrome (60%)
- Aura (20%) lasting ½ to 1 hour
- “Calm before the storm” (15min to 3 hours)
- Unilateral, Throbbing or Pulsing Pain of Moderate to Severe Intensity, lasting 3 to 72 hours (Associated with nausea, vomiting, anorexia, photophobia, phonophobia, & osmophobia)
- Postdrome

Migraine Prodrome

- Depression or Elation
- Polydipsia & Polyuria or Fluid Retention
- Diarrhea or Constipation
- Chills, Fatigue, Pallor
- Food Cravings
- “Alice in Wonderland” Syndrome

Migraine Prodrome

- “Alice in Wonderland” Syndrome
  - Disoriented
  - Altered sense of time & self.
  - Illusions:
    - Enlargement
    - Shrinking
    - Elongation

Migraine “Aura”

(+ Visual Phenomena
  - Photopsias (flashes of light, spots, sparks, streaks of light, wavy lines)
  - Scintillations (flickering lights)
  - Fortification Spectra (jagged zigzag lines)
(-) Visual Phenomena
  - Homonymous or Quadrantic defects
  - Central Scotoma
  - Tunnel defect
  - Altitudinal Field defect
  - Complete Bilateral Blindness

Migraine “Aura”
Unusual Auras: When to Worry

- Aura’s always on the same side.
- Aura’s of short duration (5-10 minutes).
- Headache starts before or during the Aura.

Need vascular work-up to rule-out AV malformation, Intracranial neoplasm, epileptic aura, Cerebral venous malformation, CA or ICA dissection... Refer.

The “Full House” Migraine

- Prodrome (60%)
- Aura (20%)
- “Calm before the storm” (15 min to 3 hours)
- Unilateral, Throbbing or Pulsing Pain of Moderate to Severe Intensity, lasting 3 to 72 hours (Associated w/ nausea, vomiting, anorexia, photophobia and phonophobia)

Postdrome

Migraine Postdrome

- May persist for 24 hours following resolution of the headache:
  - Body Aches
  - Decreased Appetite
  - Decreased Concentration
  - Fatigue / Weakness

Migraine (Classification)

- Classic (Migraine with Aura)
- Common (Migraine without Aura)
- Ocular (Aura without the Migraine)
- Complicated
  - Basilar
  - Ophthalmoplegic
  - Retinal
Complicated Migraine

- **Basilar** (bilateral visual field changes, frontal or bi-occipital headache, diplopia, nystagmus, nausea and vomiting)
- **Ophthalmoplegic** (CN 3, 4, or 6 involved post headache)
- **Retinal** (monocular vision loss lasting 10 to 60 minutes followed by complete recovery)

Migraine Management

- **Reassurance**
- **Headache Diary**
- **Behavior Modification**
- **Abortive Treatment**
- **Prophylactic Treatment**

Migraine Management

**Headache Diary**

- How many HA’s occurred in that month?
- How long each lasted?
- How severe was each one? (Scale of 1-10)
- What trigger factors were there?
- What and how much medication was used?
- Was the medication effective?

Migraine Management

**Behavioral Modification**

- Avoid Triggers
- Don’t Skip Meals
- Get adequate / consistent hours of sleep
- Rest in a quiet, darkened room when HA is developing.

Migraine Management

**Abortive Treatment**

- Analgesics
- Migraine Specific
  - Ergotamine (Cafergot)
  - DHE (Migranol)
  - Sumatriptan (Imitrex)
  - Zolmitriptan (Zomig)
  - Rizatriptan (Maxalt)

**Prophylactic Treatment**

- Topomax (Topiramate)
- Beta-Blockers (Inderal)
- Calcium Channel Blockers (Procardia)
- Antidepressants (Elavil qhs)
- Serotonin Antagonists (Sansert)
Migraine Management

What about Feverfew?
- Randomized double-blinded placebo controlled crossover study (1998)
- Retrospective study of 6 random placebo controlled studies (2000)
- City of London Migraine Clinic Study (1984)
- 200-250mg qd • 70% + effect • +/- 5 months

Medication-Induced or “Rebound” Headache

- Analgesics + Opiate (Codeine)
  + Barbiturate (Butalbital)
  + Ergotamine
  + Caffeine

- Analgesics Alone?
# Medication-Induced or "Rebound" Headache

- Migraine sufferers > Tension
- They take their meds preemptively “because I know I’ll get a headache if I don’t”
- Prophylactic medication becomes useless and the causative abortive agent becomes less effective.
- Patients are depressed, experience sleep disturbances, have difficulty concentrating, and are irritable.

## "Rebound" Headache Characteristics

- Headaches are daily (or nearly daily) typically occurring between 2-5am.
- HA varies in type, severity, and location
- Pt uses abortive meds 20 or more days/mos
- Mild physical/mental activity incites HA

## "Rebound" Headache Management

- Patient counseling and support
- Family education
- HA diary
- CBC, Liver (BUN, creatinine) & Kidney (AST/SGOT) function studies.
- Abrupt d/c of responsible med(s), + / - Aleve, Feverfew, Magnesium inj. & Subcu Sumatriptan.

# Inflammatory Headaches

- Sinus-related headache
- Temporal Arteritis (GCA)
- Meningeal headaches
  - Infectious (bacterial, viral, incl. HIV)
  - Neoplasm (Carcinoma, lymphoma)
  - Granulomatous (Sarcoid, TB)

# Sinus Headache

- Sinusitis => The #1 health-care complaint in the US.
- Affects 31.2 million people
- Accounts for 16 million outpatient visits / year.
- Chronic Sinusitis => most common chronic disease in the country.

# "Rebound" Headache Management

- Lots of Love & Support.
- Remember…it easier to prevent this, than fix this.

"Fiorinal Call" – Val Akula
**Sinus Headache**

**Acute**
- Typically occurs after a cold or bout of acute allergic rhinitis.
- Symptoms last < 3 wks

**Chronic**
- Symptoms have to persist either:
  - 2 or more months, or
  - 4+ episodes of acute sinusitis that last >10 days within 1 year.

**Most Common Infectious Pathogens:**
- Haemophilus influenza
- Strep pyogenes
- Strep pneumoniae
- Moraxella catarrhalis
- Staph (Chronic)

**Non-infectious Contributors:**
- Smoking
- Habitual use of:
  - Nasal Sprays
  - Inhalers

**Evaluation:**
- Hx of cold, allergy, URI, or decreased sense of taste?
- Look for purulent (yellow / green) nasal discharge.
- Check Temperature
- Percussion & transillumination of maxillary and frontal sinuses.
- Consider X-Ray or CT imaging.

**Sinus Trans-illumination**
Sinus Headache

**Treatment:**
- Antibiotics
- Analgesics (〇 ASA)
- Decongestants
  - Nasal Sprays vs. Oral
  - Afrin
- 〇 Oral Antihistamines
- Steroids?

**Additional Measures:**
- Nasal lavage w/ saline
- Long hot showers
- Humidifier
- Maintain Good Hydration (6-8 glasses of H2O / day)

If no improvement within 3 weeks, reconsider diagnosis and consider referral to ENT.

Sinusitis can progress to Mucocele formation, Preseptal Cellulitis, Orbital Cellulitis, Orbital Abscess, and possibly Cavernous Sinus Thrombosis (life-threatening!).
Look for more CT scans of Sinusitis

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Temporal Arteritis (GCA)

- An occlusive inflammatory process causing ischemic disease.
- HA (New onset, localized, progressive) is the major feature in 90% of cases. Otherwise, patients may be vague with their symptoms.
- Age of Onset: >50 (incident increases w/ age)
- Incidence: 20 per 100,000; Prev: 200 / 100,000
- 2:1 female > male

Temporal Arteritis (GCA)

- Signs & Symptoms:
  - Superficial Temporal Artery swelling, erythema, tenderness & pulselessness.
  - Scalp tenderness, jaw claudication, & pain in the throat, neck, teeth, gums, or eye.

Temporal Arteritis (GCA)

- Signs & Symptoms:
  - Neurologic = transient visual loss, diplopia, mental sluggishness, & rarely, stroke. (R/O AION)
  - Systemic = fever, weight loss, anorexia, malaise, myalgias (Polymyalgia Rheumatica), sweating, & chills.

Unfortunately, if they are sitting in your chair, they most likely have already experienced:

- Sudden, painless, non-progressive visual loss (count fingers) in at least one eye.

- Decreased VA => a “True” ophthalmic emergency.

AION

- + APD
- Pale, swollen disc, + / - flame hemorrhage
- Altitudinal VF defect
- Occasionally:
  - CRAO
  - VI N. Palsy
Do search to see about auscultation of temporal artery with stethoscope.

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Temporal Arteritis (Dx)

- Lab Tests:
  - CBC w/ Differential
  - Anemia
  - Elevated platelet count
  - ESR (Westergren) (90-95%) 
    - Men (age / 2)
    - Women (age + 10 / 2)
  - >40 is suspicious
  - C-Reactive Protein (99%)
  - Fibrinogen
  - Temporal Artery Biopsy

Temporal Arteritis (Tx)

- Neuro MD Phone Consult
- Schedule office consult & TAB (Temporal Artery Biopsy).
- Consider B/G Oral Prednisone (40-80mg)

Infectious Meningitis

- Acute onset severe “global” headache
- Fever (may be low grade)
- Neck stiffness, photophobia, irritability, lethargy, myalgias, nausea & vomiting.
- Possible papilledema
- Varying levels of consciousness
- Refer for prompt CT, MRI w/ Gadolinium, CSF, & Tx!
What is the normal range for Fibrinogen?
Look-up Color Duplex Ultrasonography of Temporal Arteries.
rbm, 6/4/2008
Infectious Meningitis

- May occur in any age group!
  - Children Ages 2-5 => Hemophilus Influenza
  - Older Children / Adolescents => Neisseria Meningitis
  - Adults => Streptococcal Pneumonia
    - Typically found in patients taking immunosuppressive agents.

Chronic Meningitis

- HA similar to that of IIH.
- More subtle than Acute Infectious form
- More commonly associated w/ neoplasm or granulomatous disease (Sarcoi, TB)
- Possible Papilledema
- + / - Neck Stiffness

Pseudotumor Cerebri (IIH)

- Syndrome characterized by signs & symptoms of increased intracranial pressure w/o localized neurological findings.
- Annual Incidence = 1/100,000
- 90% are obese / 90% are women
- Average age at the time of diagnosis = 30 yrs
Pseudotumor Cerebri (IIH)

Diagnosis:
- Papilledema
- Neuro-imaging normal (MRI preferred).
- Elevated CSF (200-250mm H2O) w/ normal composition.

Other Findings:
- VI N. Palsy
- Various VF Deficits

Treatment:
- Weight Loss
- Acetazolamide (Diamox) 250-500mg QID po
- Systemic steroids (controversial)
- Optic N. Sheath Decompression
- Lumboperitoneal shunt

Follow-up: Every 2-3 weeks to monitor VA and VF’s.

Brain Tumors

Cancer is the second leading cause of death in the US (behind heart disease and in front of stroke)

Brain Tumors are the:
- 2nd leading cause of cancer-related deaths in children / adolescents (<20).
- 3rd leading cause of cancer-related deaths in males ages 20-39.
- 4th leading cause of cancer-related deaths in females ages 20-39.

13,000 people in US die of malignant brain tumors each year.

Brain Tumors

- Incidence: 17 / 100,000
- Males slightly greater than females
- Metastatic brain tumors more common 4:1 over primary brain tumors.
- Most common metastatic tumors:
  - Breast, Lung, Skin (Melanoma), and Colon
Brain Tumors

- Most common primary brain tumors (Adults):
  - Pituitary Tumor (20-34)
  - Meningioma (35-44)
  - Glioblastoma (45-74)
  - Meningioma (75+)

- Most common primary brain tumors (Children):
  - Medulloblastoma (0-9)
  - Astrocytoma (10-14)
  - Pilocytic Astrocytoma (15-19)

Brain Tumor Headache

- Retrospective Imaging Study:
  - 50% diagnosed w/ BT reported HA
  - Only 1/3 were imaged because of CC of HA
  - Only 10% were imaged b/c of HA sx alone.
  - Less than 1% of those imaged with HA only, had a mass lesion.

Brain Tumor Headache

- Retrospective Imaging Study #2:
  - 402 patients (HA as only finding)
  - All HA types considered (Typical vs. Atypical)
  - Typical => 2.4% for pathology
  - Atypical => 12.5%

- “Classic” Brain Tumor HA: Severe, worse in the am, nausea & vomiting =>
  - Faster Growing +/- Infratentorial Mass Lesions (17%)
  - Subdural Hematomas & Brain Abscesses (50%)
  - Watch out for Pituitary Apoplexy
  - Slower growing (ie low grade supratentorial neoplasms) are more likely to present as seizure, than HA (5%)

Table 10.2: Common Clinical Features of Space-occupying Headache

<table>
<thead>
<tr>
<th>Nonspecific bilateral headaches</th>
<th>Headache profile resembles tension-type or “viral” headaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache profile is subacute and progressive</td>
<td>Moderate to severe intensity</td>
</tr>
<tr>
<td>Resistant to analgesics</td>
<td>More often associated with malignant or rapidly growing masses</td>
</tr>
<tr>
<td>Early headache presentation with posterior fossa lesions</td>
<td>Headache is rare in isolation without one or more of the following features:</td>
</tr>
<tr>
<td></td>
<td>Nausea and/or vomiting</td>
</tr>
<tr>
<td></td>
<td>Confusion</td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
</tr>
<tr>
<td></td>
<td>Weakness</td>
</tr>
<tr>
<td></td>
<td>Aggravation with changes in position</td>
</tr>
<tr>
<td></td>
<td>Abnormal neurologic signs</td>
</tr>
</tbody>
</table>
Brain Tumor Headache

- More often, the HA is intermittent, dull, aching, unilateral or bifrontal, and mild in the beginning.
- Worsens with a change in body position, coughing or straining.
- Resistant to Analgesics
- DDx: Tension, Sinus, and Stroke-related Headaches.

Brain Tumor “Warning Signals”

1. Subacute or progressive headache over days to months.
2. HA w/ nausea & vomiting not explained by migraine or systemic illness.
3. Associated w/ nocturnal occurrence or morning awakening.
4. Precipitated or exacerbated by valsalva, position or posture change, exercise.
5. New onset in adult life (>40 years) or a change in an established headache pattern
6. Any HA associated with neurologic symptoms (confusion, weakness, etc.) or abnormal physical sign

Cranial Neuralgia

- Neuralgia => Pain felt in the distribution of a particular nerve, or nerve root.
- Characteristics => intermittency, brevity, severity, “electric-shock” like, or lancinating.
- Idiopathic
- The function of the involved nerve is normal (except for post-herpetic neuralgia)

Trigeminal Neuralgia “Tic Douloureux”

- Excruciating, lancinating, sharp, stabbing pain
- Last for seconds w/ pain free periods of sec-hours.
- During the attack, face may be contorted
- Followed by a dull, aching discomfort lasting hours
- Trigger zones are Dx.
Trigeminal Neuralgia

- Compression, distortion, disruption, stretching, of the trigeminal nerve root fibers by a branch of either the anterior or posterior inferior cerebellar artery.
- 10% => Brain Tumor
- Right side > Left (Rarely, both sides)
- Rarely V1 branch
- 15K new cases / year
- 1/2500 have TN
- Women > Men
- Onset > 40 years old

Medical Management

- Carbamazepine
  - Initially, 100 – 200mg bid, then escalated by 200mg for 2-3 days.
  - + effect within 48 hours
  - Maintenance dose => 600 to 1200mg
  - Side effects: Dizziness, anorexia, sedation

- Lioresal (Baclofen)
  - 5-10mg bid (md: 30-80)
  - Phenytin
  - (300-600mg)

Medical Management is 70% successful

Surgical Management

- Radiofrequency Trigeminal Rhizotomy
- Glycerol Gangliolysis (60-85%)
- Microvascular decompression (90%)
- Radiosurgery (“Gamma Knife”)
Post-Herpetic Trigeminal Neuralgia

Preventative Treatment
- Acyclovir (800mg 5X / day X 7-10 days)
- Famvir (500mg TID)
- Prednisone (3 week tapering schedule starting at 60mg)

Chronic Pain Management
- Tri-cyclic antidepressants (Amiritpyline)
- Carbamazepine ineffective b/c pain only in V1.

Cerebrovascular Headaches
- Subarachnoid hemorrhage
- Parenchymal brain hemorrhage
- Hypertensive Headache
- Cranial Vasculitis (ie, GCA)
- Intracranial veno-occlusive disease
- Arterial Dissection
- Atherosclerotic / Embolic Ischemic Disease

Stroke (CVA)
- Stroke is:
  - The 3rd leading cause of death (160,000/yr) in the US.
  - Approximately 730,000 Americans have a new or recurrent stroke each year.
  - Every minute in the US, someone experiences a stroke.
  - #1 cause of neurologic crippling in our nation.
  - 1/3 of all stroke survivors will have another w/1 5 years. The rate of having another stroke is 10% per year.

Ischemic Stroke
- Thrombosis
  - Most Common
  - Forms inside the brain.
- Embolus
  - Originates somewhere other than the brain
Stroke (CVA)

Hemorrhagic Stroke
- Aneurysm
  - Abnormal bulging of a blood vessel.
  - May be a weak spot from long term HTN
- AV Malformation
- Dissection

The “Warning Signs” of Stroke
- Sudden weakness, numbness or paralysis of the face, arm or leg (especially on one side of the body)
- Loss of speech or trouble talking or understanding language
- Sudden loss of vision, particularly in only one eye
- Sudden, severe headache with no apparent cause
- Unexplained dizziness, loss of balance or coordination (especially if associated with any of the above symptoms)

Ischemic Stroke Headache
- 25-50% of patients w/ stroke or TIA’s develop a new HA days or weeks before the deficit occurs.
- MOA is mystery.
- Characteristic of a vascular HA: usually unilateral, throbbing, worse on exertion, typically last hours.
- Key: Age of Onset

Management of Acute “Ischemic” Stroke
- Emergency CT, then MRI as needed
- tPA (tissue plasminogen activator)
  - Thrombolytic agent used to dissolve clots
  - Most effective when administered within 3 hours of onset of stroke. Outside effectiveness at 6 hours.
- Citicoline (Neuroprotective Agent)
- Hypothermia

Aneurysmal Subarachnoid Hemorrhage: Introduction
- 30,000 Americans suffer non-traumatic SAH each year
- Overall mortality rates are 35 to 40%
  - Up to 12% of patients die before reaching medical attention
  - Another 25% die in subsequent 3 months
- Morbidity among survivors is 50%
Subarachnoid Hemorrhage

“Thunderclap” HA
...“the worst headache of my life”
- Severe Supra-orbital Pain (@IC + PCA jxn)
- Sudden Onset
- Board-like Neck Stiffness
- Photophobia
- Altered consciousness

“Sentinel” “Leak” HA
- Onset during exertion
- Recurrent HA, neck-stiffness, photophobia.

Look for:
- 3rd n. palsy w/ pupil involvement.
- Pre-retinal heme (Terson’s Syndrome)

Outcome of Patients Initially Misdiagnosed and Correctly With SAH

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Misdiagnosis (n=45)</th>
<th>Correct Diagnosis (n=75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent/good</td>
<td>24 (53)*</td>
<td>68 (91)*</td>
</tr>
<tr>
<td>Fair</td>
<td>5 (11)</td>
<td>4 (5)</td>
</tr>
<tr>
<td>Poor/vegetative/dead</td>
<td>16 (36)*</td>
<td>3 (4)*</td>
</tr>
</tbody>
</table>

Values are number (%) in each clinical grade category.
- P<.001

Stroke 1996;27:1558-63

Computed Tomography

- Sensitive for blood
  - day of the bleed → 95%
  - within 12 hours of symptom onset → as high as 98%.
- Sensitivity drops when
  - symptoms are days in duration
  - amount of bleeding is small
  - study is difficult to interpret
- Patients with small or “sentinel” bleeds are more likely to receive an incorrect clinical diagnosis and are more likely to have a false negative CT

Computed Tomography

Characteristic hemorrhage after aneurysmal rupture

Computed Tomography

Lumbar puncture and CSF Exam in SAH

- CSF should be examined if the CT is negative, equivocal, or technically inadequate
- LP early after symptom onset will show frank blood or red blood cells on microscopy.
- Delayed CSF examination may show only xanthochromia or an inflammatory reaction
Subarachnoid Hemorrhage Treatment

- Secure aneurysm acutely
  - Clipping vs. coiling
- Vasospasm
- HHH therapy
- Angioplasty

Radiology 101 & Headache

Computerized Tomography (CT)

- Preferred imaging modality to exclude intracranial pathology, especially in acute cases.
- CT w/ Contrast when suspect tumor (90%)
- CT w/o Contrast for suspected bleed or infarct.

“Radiology 101” & Headache

MRI w/ Gadolinium
- Meningitis
- Lesion
- Pituitary
- Posterior Fossa
- Brain Stem
- Tumor (PRN)
- Infarct (PRN)

3-D CT or MRA
- Aneurysm or AVM

Cerebral Angiography
- Very Invasive

Carotid Doppler

HBP Headache

Malignant HTN
- Chronic (Diastolic >120)
- Dull, throbbing, “early morning” occipital HA
- Should be signs of chronic hypertensive retinopathy, +/- papilledema.

Acute HTN Crisis
- eg., 240/160
- Sudden, generalized, severe HA.
- Rule-out:
  - Cocaine
  - Amphetamines
  - MAOI + decongestants
Summary

- Develop the HA history acronym that best works for you.
- Order temperature, blood pressure, and consider visual fields w/ CC of HA.

**“Break Time”**