Disclosures

- Provide consultation for LivaNova and Sanofi/Genzyme but none that are relevant to this talk

Objectives

- Review pathophysiology of headaches with a focus on migraines
- Evaluation of secondary causes of headache
- Focus on migraine treatment and management
  - Including the new class of CGRPs
- Assessing the difficult patient
- Briefly talk about trigeminal autonomic cephalgias
- Review inpatient treatment options
Headache Pathophysiology

If you're typing a status update that says you have a migraine, then you clearly don't know what a migraine is.

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Headache Pathophysiology

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Secondary causes of headache

6
Red flags for secondary causes of headache

- S – Systemic
  - Signs, symptoms, or disease
- N – Neurologic signs or symptoms
- O – Onset sudden
- O – Onset after 50 years of age
- P – Pattern change
  - Progressive
  - Precipitated by valsalva
  - Postural aggravation
  - Papilledema

A headache history

Documents of sick-headedness and head pain date back to Sumerian and Egyptian time.

Hippocrates documents:
- Most of the time he seemed to see something shining before him like a light, usually in part of the right eye; at the end of a moment, a violent pain supervened in the right temple, then in all the head and neck, where the head is attached to the spine . . . Vomiting, when it became possible, was able to divert the pain and rent it more moderate
**A headache history**

- Ergot was first treatment for migraine headaches
  - Derived from fungus *Claviceps purpurea*
  - Ergot derived from argot meaning rooster’s spur
- In 1842, used to hasten childbirth
- Edward Woakes
  - 1868, used to treat migraine
- Extract was unpredictable
  - 1918, Stoll isolated alkaloid ergotamine
  - 1926 and 1928, studies confirm effectiveness in migraine
  - 1943, dihydroergotamine was synthesized
  - 1945, dihydroergotamine was confirmed effective in migraine

**A headache history**

- Harold G Wolff
  - Suffered from Migraines himself
  - One of first to really experiment with etiology of migraine
  - Also identified the intracranial pain-sensitive structures
    - Dura, venous sinuses, dural and cerebral arteries
    - Published in the 1940
  - Factors that influence stopping a migraine
    - Looked at temporal artery pulsations
    - Correlated with blood pressure
    - Studied dihydroergotamine

**A history of headache workup**

- Prior to the 1970s
  - Plain x-rays – pituitary fossa, auditory meatus, position of calcified pineal gland
  - EEG was used to evaluate for focality
  - Direct puncture arteriogram
  - Pneumoencephalogram
  - Myelogram if concern for chiari malformation
- In the 1970s – Head CT
- In the 1990s – Brain MRI
Why focus on migraine?

- ICHD – 3 Criteria
  - At least five attacks fulfilling criteria in B-D
  - B – Headache attack lasting 4 to 72 hours
  - C – At least 2 of the following
    - Unilateral location
    - Pulsating quality
    - Moderate or severe pain intensity
    - Aggravation by or causing avoidance of routine physical activity
  - D – At least 1 of the following
    - Nausea and/or vomiting
    - Photophobia and phonophobia

Migraine epidemiology

- Three major studies
  - American Migraine Study-1 – 1989
  - American Migraine Study-2 – 1999
  - American Prevalence and Prevention Study – 2004
- Not much has changed for migraine
  - Overall prevalence is 11.7% to 12.6%
  - Females range from 15% to 20%
  - Males range from 4% to 7%
  - Prevalence is highest in the 25 to 55 age
  - Female to male ratio of 3:1
  - Below 11 y.o. male’s have a higher prevalence of migraine
Impact of migraine on society

- Clouse and Osterhaus in 1994
  - 1336 migraine suffers compared to controls, over 18 months
  - 2616 visits for migraine complaints
  - Migraine suffers had a total visit of 19,971
    - Compared to 13,072 visits from controls
- Edmeads and Mackell in 2002
  - Total cost of about 1 billion dollars per year
    - $100 per migraine suffer per year
    - 60% physician visits, 30% prescription drug, 1% for ED visits
  - Measure of money lost due to lack of productivity
    - $690 per year for males
    - $1127 per year for females

Current Migraine Treatment

Setting Realistic Expectations

- Two scales used typically
  - 4 point pain scale (4-PPS)
  - Are the visual analog scale (VAS)
- Most studies look at 50% reduction on the VAS or a 0 to 1 on the 4-PPS
- Goals of therapy
  - 50% reduction in intensity and frequency
  - Abortive therapy – make a headache tolerable
  - Preventative therapy – make headaches less frequent and abortive therapy more effective
Treatment plan

▪ Abortive therapy
  ▪ Medication to be taken at the onset of headache
  ▪ NSAIDs – Less then 15 per month
  ▪ Triptans – 10 or less per month

▪ Preventative therapy
  ▪ If headaches occur more then 2 times per week or headaches are too severe
  ▪ Taken every day to prevent headache

▪ Antinausea
  ▪ Compazine or reglan or phenergan
  ▪ Zofran can worsen headaches

Follow Up Assessment

▪ Abotive Therapy:
  ▪ After taking your migraine medication, do you feel in control of your migraine enough so that you feel there will be no disruption to your daily activities? (No / Sometimes / More then half)
  ▪ Do you miss any doses of your preventative medication? (No / Sometimes / More then half)
  ▪ If you miss your medication more then 1 time per week, is there a specific reason?

▪ Preventative Therapy:
  ▪ Number of headaches per month:
  ▪ Number of headache days per month:
  ▪ Maximum Intensity: _____/10
  ▪ Typical Intensity: _____/10

▪ Anti-Nausea Medication:
  ▪ After taking your migraine medication, are you pain free within 2 hours? (No / Sometimes / More then half)
  ▪ Does one dose of your migraine medication relieve your headache and keep it away for at least 24 hours? (No / Sometimes / More then half)
  ▪ Are you comfortable enough with your migraine medication to be able to plan your daily activities? (No / Sometimes / More then half)

Headache Hygiene

▪ Eat small regular meals about 3 hours apart
▪ Get at least 64 fluid ounces of water per day, add 8 ounces for every 8 ounce caffeinated beverage that you have
▪ Perform at least 30 minutes of mild-moderate exercise 3-4 times per week
▪ Avoid excessive or fluctuations in caffeine intake
▪ Get at least 6-8 hours of regular sleep per night
▪ Avoid using abortive medications for headaches more than 10 times in a month
▪ Keep a headache diary
▪ Stop smoking
**Triptan Therapy**

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Dose</th>
<th>Route</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almotriptan</td>
<td>Axert</td>
<td>12.5 mg (25 mg/day)</td>
<td>Oral</td>
<td>Less side effects</td>
</tr>
<tr>
<td>Eletriptan</td>
<td>Relpax</td>
<td>40 mg (80 mg/day)</td>
<td>Oral</td>
<td>Fast onset, Long acting</td>
</tr>
<tr>
<td>Frovatriptan</td>
<td>Frova</td>
<td>2.5 mg (5 mg/day)</td>
<td>Oral</td>
<td>NS, Long acting</td>
</tr>
<tr>
<td>Naratriptan</td>
<td>Amerge</td>
<td>2.5 mg (5 mg/day)</td>
<td>Oral</td>
<td>NS</td>
</tr>
<tr>
<td>Rizatriptan</td>
<td>Maxalt</td>
<td>10 mg (20 mg/day)</td>
<td>Oral, ODT</td>
<td>NS, Fast onset</td>
</tr>
<tr>
<td>Sumatriptan</td>
<td>Imitrex</td>
<td>100 mg (20 mg/day)</td>
<td>Intranasal, SQ, oral,</td>
<td></td>
</tr>
<tr>
<td>Zolmitriptan</td>
<td>Zomig</td>
<td>2.5-5 mg (10 mg/day)</td>
<td>Intranasal, oral, ODT</td>
<td>NS</td>
</tr>
</tbody>
</table>

**None prescription treatments**

- ButterBur 75 mg BID (Petadolex)
- Riboflavin 400 mg
- Coenzyme Q10 100 mg TID
- Magnesium 500-1000 mg daily
- Feverfew 100 mg – 300 mg daily
- Melatonin up to 15 mg qHS
- Behavioral Therapy
  - Biofeedback
  - CBT

**Preventative Therapy**
**Calcitonin Gene Related Peptide Antibodies**

- **Aimovig (erenumab-aooe)**
  - Dosing 70 mg or 140 mg SQ q 28 days

- **Ajoyv (fremanezumab-vfrm)**
  - Dosing 225 mg SQ q 30 days or 675 mg q 90 days

- **Emgality (galcanezumab-gnlm)**
  - 120 mg SQ q 30 days

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**CGRP Efficacy**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Episodic Migraine Migraine Day Reduction</th>
<th>Chronic Migraine Migraine Day Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aimovig 70 mg</td>
<td>0.6 vs 2.6</td>
<td>3.5 vs 6.0</td>
</tr>
<tr>
<td>Aimovig 140 mg</td>
<td>0.6 vs 3.2</td>
<td>3.5 vs 6.8</td>
</tr>
<tr>
<td>Ajoyv 225 mg</td>
<td>2.2 vs 3.7</td>
<td>2.5 vs 4.6</td>
</tr>
<tr>
<td>Emgality 120 mg</td>
<td>2.8 vs 4.7</td>
<td>2.7 vs 4.8</td>
</tr>
</tbody>
</table>

Data from LIBERTY, HALO, and EVOLVE/REGAIN

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**Other primary headaches to know about**
Trigeminal Autonomic Cephalagias

- Highest attack frequency
- Lowest attack frequency
- Cluster
- Paroxysmal hemicrania
- Hemicrania continua
- Shortest duration of acute attacks
- Longest duration of acute attacks


A migraine is not a "headache" it is a neurological exploding party in the brain that pain happens to be invited to.
Hospital Treatment of Migraine

- HYDRATION
- Ketorolac 30 mg IV
- Compazine 10 mg IV
- Reglan 10 mg IV
- Benadryl 25 mg IV
- Depakote 500-1000 mg IV
- Magnesium 1 gm IV
- Dexamethasone 10 mg IV
- Thorazine 12.5 – 25 mg IV
- DHE 1 mg up to q 8 H IV

Questions?

References


