Migraine: what is it and what matters for the patient?

Marius Birlea, MD, FAHS
Associate professor of Neurology clinical practice
University of Colorado Anschutz Medical Campus
Impact

Migraine: $6^{th}$ most common disease on the planet and 2nd most disabling

Lancet Neurology, 2018; 17;954-976- GBD study

Kristin Chenoweth and Terrell Davis bond over Living with Migraine:

“You Have Somebody that Understands”

Migraine World Summit, 2019
Disability

Global, regional, and national burden of neurological disorders, 1990-2016:

Lancet Neurol. 2019

Females

Males

Age group (years)

DALUs (thousands)

Disability

Global, regional, and national burden of neurological disorders, 1990-2016:

Lancet Neurol. 2019

Females

Males

Age group (years)

DALUs (thousands)

Disability

Global, regional, and national burden of neurological disorders, 1990-2016:

Lancet Neurol. 2019

Females

Males

Age group (years)

DALUs (thousands)

Disability

Global, regional, and national burden of neurological disorders, 1990-2016:

Lancet Neurol. 2019

Females

Males

Age group (years)

DALUs (thousands)
What do the patients say?

**Cause**
- “I want to get to the root of the problem”
- “What is causing my headaches?”

**Treatment**
- “I want to get rid of my migraines”
- “How can I stop my migraines?”
- “I don’t want to have a headache every day”
- “I am at my wit’s end with the headaches”
- “Tried everything”

**Function**
- “I want to be able to work and take care of my family”

**Indifference**
- “I don’t know, my doctor sent me here”
What do the patients say?

Cause
• “I want to get to the root of the problem”
• “What is causing my headaches?”

Treatment
• “I want to get rid of my migraines”
• “How can I stop my migraines?”
• “I don’t want to have a headache every day”
• “I am at my wit’s end with the headaches”
• “Tried everything”

Function
• “I want to be able to work and take care of my family”

Indifference
• “I don’t know, my doctor sent me here”
Diagnostic algorithm

Detailed History and Examination

Are there red flags?

Primary Headache Disorder

Secondary Headache Disorder
“Doctor, I have a sinus headache”
“Doctor, I have a migraine”
• 28 yo woman with hx. of migraine since age 13, had to interrupt high school at age 17-18 due to frequent and severe headaches.
• Pressure or throbbing, front-temples, with radiation to the back. Most of the days, her headaches are manageable and respond to OTC analgesics.
• High scores for impact and disability (HIT 6 and MIDAS)
• Low score for depression (PHQ9)
• Exam normal.
• Meds: Oral contraceptives, simple analgesics, Frova, rare Norco, rarely goes to ED
• Offered preventive treatment
Individual trajectories of episodic and chronic migraine

Serrano et al, Journal of Headache and Pain, 2017
Phases of a migraine attack

Timeline of a Migraine Attack

**Phases**
- Premonitory
- Aura
- Headache
- Postdrome

**Symptoms**
- Yawning, Polyuria
- Neck Pain, Fatigue, Mood change
- Light sensitivity, Sound sensitivity
- Nausea
- Visual changes
- Numbness/tingling
- Language dysfunction
- Cognitive dysfunction
- Brainstem symptoms

**Brain Activation**
- Hypothalamus, Brainstem, Cortex
- Cortex
- Brainstem
- Thalamus
- Hypothalamus
- Cortex, Thalamus, Hypothalamus

**Cutaneous allodynia**

Dr. Andrew Charles, UCLA
Disability during attack

“Most bothersome symptom”

Correlations with global attack disability

- Worse mental effort (0.90*)
- Pain (0.88)
- Dif. thinking (0.85*)
- Photophobia
- Kinesiophobia
- Worse physical effort (0.81)
- Phonophobia
- Nausea (0.68)
- Symptom related disability (0.59)

Gil-Gouvela et al, Cephalalgia 2016
Migraine as a deficit in filtering of sensory inputs—a model

Ho et al, Nat Rev Neurol 2010
Migraine Strikes as Neuronal Excitability Reaches a Tipping Point

mathematical model

Scheffer et al, PlosOne 2013
What do the patients say?

**Cause**
- “I want to get to the root of the problem”
- “What is causing my headaches?”

**Treatment**
- “I want to get rid of my migraines”
- “How can I stop my migraines?”
- “I don’t want to have a headache every day”
- “I am at my wit’s end with the headaches”
- “Tried everything”

**Function**
- “I want to be able to work and take care of my family”

**Indifference**
- “I don’t know, my doctor sent me here”
Life with migraine

A) Worry About Covering the Household Expenses

Chi-square = 541
P < 0.001

B) Worry About Having Long-term Financial Security

Chi-square = 369.7
P < 0.001

C) Worry About Losing Job or Being Laid Off

Chi-square = 153.4
P < 0.001

D) Harder for Partner to Advance in His/Her Job

Chi-square = 73.46
P < 0.001

E) Partner Misses More Work Than He/She Should

Chi-square = 38.83
P < 0.001

F) Partner Had to Change Jobs/Reduce Hours

Chi-square = 26.5
P < 0.001

G) Partner Had to Leave Job or Pass Up Job They Would Really Like

Chi-square = 47.35
P < 0.001
Headache Acceptance Questionnaire (HAQ).

Instructions: Below you will find a list of statements. Please rate how true each statement is for you using the scale below.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never true</td>
<td>Very rarely true</td>
<td>Rarely true</td>
<td>Sometimes true</td>
<td>Frequently true</td>
<td>Almost always true</td>
<td>Always true</td>
</tr>
</tbody>
</table>

1. I must limit my activities to avoid anything that might trigger a headache.
2. I avoid making plans if I think I might get a headache.
3. I avoid putting myself in situations where I might get a headache.
4. My headaches keep me from trying to be productive.
5. I would gladly sacrifice important things in my life to better control my headaches.
6. I am doing my best to live a normal life with my headaches.

Scoring: Items 1–5 are reverse scored in order to obtain a total headache acceptance score. Total scores range from 6 to 42, with higher scores indicating greater acceptance of headache.
What do the patients say?

Cause
• “I want to get to the root of the problem”
• “What is causing my headaches”

Treatment
• “I want to get rid of my migraines”
• “How can I stop my migraines?”
• “I don’t want to have a headache every day”
• “I am at my wit’s end with the headaches”
• “Tried everything”

Function
• “I want to be able to work and take care of my family”

Indifference
• “I don’t know, my doctor sent me here”
Suicide risk in patients with migraine, migraine with comorbid depression, and migraine with comorbid depression and fibromyalgia
What do the patients say?

Cause
• “I want to get to the root of the problem”
• “What is causing my headaches”

Treatment
• “I want to get rid of my migraines”
• “How can I stop my migraines?”
• “I don’t want to have a headache every day”
• “I am at my wit’s end with the headaches”
• “Tried everything”

Function
• “I want to be able to work and take care of my family”

Indifference
• “I don’t know, my doctor sent me here”
**Nonmodifiable:** age, female, white, low educational/socioeconomic status, genetics

**Modifiable:** attack frequency, suboptimal treatment of attacks, obesity, analgesics and caffeine overuse, sleep apnea, psychiatric comorbidities, stressful life events

- Weight loss
- “Detoxification”
- CPAP
- Decrease caffeine intake
- Treatment of other chronic pain

Abortive and preventive therapy
- Behavioral treatments
- Non-pharmacological treatments

Bigal and Lipton, Neurology 2008
Team players against migraine

- Best drug treatment
- Cognitive behavioral therapy
- Multidisciplinary treatment
- Education
- Physiotherapy
- Relaxation training

Gaul et al, Plos One 2013
Preventive treatment: to ↓ attacks frequency/severity

Regular lifestyle behavior

Yohannes et al, J Neurol 2016
### Preventive treatment: to ↓ attacks frequency/severity

<table>
<thead>
<tr>
<th>Anticonvulsants</th>
<th>Antihypertensives</th>
<th>Antidepressants</th>
<th>Anti CGRP Antibodies</th>
<th>Other Prescriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topiramate (Topamax, Tro.)</td>
<td>Candesartan (Atacand)</td>
<td>Amitriptyline (Elavil)</td>
<td>Erenumab (AIMOVIG)</td>
<td>Memantine (Namenda)</td>
</tr>
<tr>
<td>Gabapentin (Neurontin)</td>
<td>Metoprolol (Lopressor)</td>
<td>Nortriptyline (Pamelor)</td>
<td>Fremanezumab (AJOVY)</td>
<td>Methylergonovine (Methergine)</td>
</tr>
<tr>
<td>Valproic acid (Depakote)</td>
<td>Propranolol (Inderal)</td>
<td>Venlafaxine (Effexor)</td>
<td>Galcanezumab (EMGALITY)</td>
<td>Aspirin</td>
</tr>
<tr>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Eptinezumab (VYEPTI)</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Botox injections** for Chronic Migraine (Onabotulinium toxin A)

**Supplements**
- Boswellia; CoQ10; Melatonin; Magnesium; Vitamin B2 (Riboflavin)

**Devices**
- eTNS
- Gammacore
- eTNS
- Transcranial magnetic stimulator, TMS
Abortive treatment: to stop an attack

### MIGRAINE SPECIFIC

<table>
<thead>
<tr>
<th>Triptans</th>
<th>Gepants</th>
<th>NSAIDs</th>
<th>Antinausea</th>
<th>Other</th>
<th>Opipids/barbiturate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almotriptan (Axert)</td>
<td>Ubrogepant (Ubrelvy)</td>
<td>Aspirin</td>
<td>Chlorpromazine (Thorazine)</td>
<td>Acetaminophen (APAP)(Tylenol)</td>
<td>APAP &amp; Oxycodone (Percocet)</td>
</tr>
<tr>
<td>Eletriptan (Relpax)</td>
<td>Rimegepant (Nurtec)</td>
<td>Celecoxib (Celebrex)</td>
<td>Metoclopramide (Reglan)</td>
<td>Cyclobenzaprine (Flexeryl)</td>
<td>Butalbital/APAP/Caffeine (Fioricet)</td>
</tr>
<tr>
<td>Frovatriptan (Frova)</td>
<td></td>
<td>Diclofenac (Cambia)</td>
<td>Ondansetron (Zofran)</td>
<td>Dexamethasone (Decadron)</td>
<td>Hydromorphone (Dilaudid)</td>
</tr>
<tr>
<td>Naratriptan (Amerge)</td>
<td>Ditans</td>
<td>Ibuprofen (Motrin)</td>
<td>Promethazine (Phenergan)</td>
<td>Excedrin</td>
<td>Hydrocodone/APAP (Norco/Vicodin)</td>
</tr>
<tr>
<td>Rizatriptan (Maxalt)</td>
<td>Lasmiditan (Reyvow)</td>
<td>Indomethacin (Indocid)</td>
<td>Prochlorperazine (Compazine)</td>
<td>Lidocaine ns</td>
<td>Oxycodone (Oxycontin)</td>
</tr>
<tr>
<td>Sumatriptan (Imitrex)</td>
<td></td>
<td>Keterolac (Toradol)</td>
<td></td>
<td>Prednisone</td>
<td>Tramadol (Ultram)</td>
</tr>
<tr>
<td>(tb, inj, ns)</td>
<td></td>
<td>tb, inj, ns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treximet (Pernix)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tylenol/Codeine</td>
</tr>
<tr>
<td>Zolmitriptan (Zomig)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(tb, ns)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Non-specific pain relievers

<table>
<thead>
<tr>
<th>NSAIDs</th>
<th>Antinausea</th>
<th>Other</th>
<th>Opipids/barbiturate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>Chlorpromazine (Thorazine)</td>
<td>Acetaminophen (APAP)(Tylenol)</td>
<td>APAP &amp; Oxycodone (Percocet)</td>
</tr>
<tr>
<td>Celecoxib (Celebrex)</td>
<td>Metoclopramide (Reglan)</td>
<td>Cyclobenzaprine (Flexeryl)</td>
<td>Butalbital/APAP/Caffeine (Fioricet)</td>
</tr>
<tr>
<td>Diclofenac (Cambia)</td>
<td>Ondansetron (Zofran)</td>
<td>Dexamethasone (Decadron)</td>
<td>Hydromorphone (Dilaudid)</td>
</tr>
<tr>
<td>Ibuprofen (Motrin)</td>
<td>Promethazine (Phenergan)</td>
<td>Excedrin</td>
<td>Hydrocodone/APAP (Norco/Vicodin)</td>
</tr>
<tr>
<td>Indomethacin (Indocid)</td>
<td>Prochlorperazine (Compazine)</td>
<td>Lidocaine ns</td>
<td>Oxycodone (Oxycontin)</td>
</tr>
<tr>
<td>Keterolac (Toradol)</td>
<td></td>
<td>Prednisone</td>
<td>Tramadol (Ultram)</td>
</tr>
<tr>
<td>Meloxicam (Mobic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naproxen (Naprosyn)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Devices

<table>
<thead>
<tr>
<th>eTNS (CEFALY)</th>
<th>Gammacore (SAPPHIRE)</th>
<th>Nerivio (MIGRA)</th>
<th>eTNSTranscranial magnetic stimulator, TMS (eNEURA)</th>
</tr>
</thead>
</table>

Ergots (nonselective)
Preventive and abortive: devices

- CEFALY
- TMS
- GammaCore
- Nerivio
THANK YOU!

Questions?
“The impact of migraine on psychological well-being of young women and their communication with physicians about migraine: a multinational study”

- Frustrated: 59%
- Angry: 46%
- Depressed: 44%
- Disabled: 36%
- Anxious: 34%
- Confused: 29%
- Frightened: 19%
- Useless: 14%
- Isolated or alone: 13%
- Abnormal or like an outcast: 10%
- Out of control: 10%
- Unaccepted: 4%
During the last 3 months, did you have any of the following with your headaches?

1. You felt **nauseated** or sick to your stomach when you had a headache?

2. Light bothered you (a lot more than when you don’t have headaches)?

3. Your headaches **limited your ability** to work, study, or do what you needed to do for at least 1 day?
Migraine pathways
Vestibular migraine

Stolte et al, Cephalalgia 2014
Preventive treatment: to ↓ attacks frequency/severity