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Objectives

1. Know the different types of headaches and migraines
2. Review of the pathophysiology behind migraines
3. Learn pharmacologic treatments in prevention and acute migraine attack
4. Learn non-pharmacologic migraine prevention and treatments
5. Understand when to escalate migraines to neurology or emergency care

Types of Headaches

Types of Headaches

- Migraine
- Tension-type headache
- Cluster Headache
- Secondary Headache

Definition of Migraine

- Disorder of recurrent headache attacks
- Typically unilateral
- Typically throbbing or pulsatile
- Often includes photophobia, phonophobia, nausea, vomiting

Migraine Subtypes

- Migraine with Brainstem Aura
- Hemiplegic Migraine
- Retinal Migraine
- Chronic Migraine
- Vestibular Migraine
- Menstrual Migraine

Migraine with Brainstem Aura

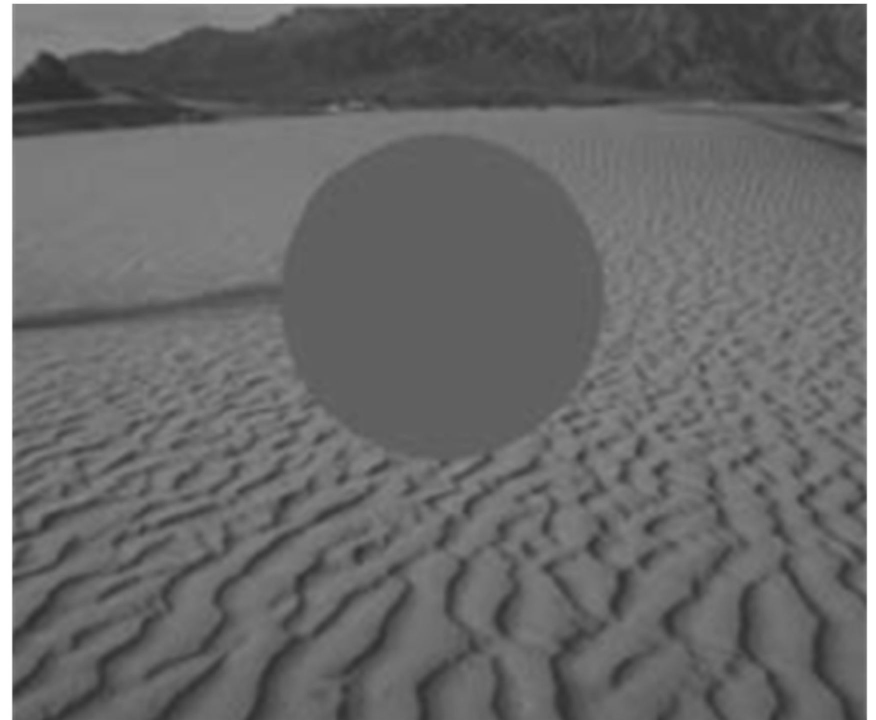
- Two of more aura symptoms are required:
  - Vertigo
  - Dysarthria
  - Tinnitus
  - Diplopia
  - Bilateral visual symptoms
  - Bilateral paresthesia
  - Decreased level of consciousness
  - Hypacusis
- Headache often comes after the Aura
- 10% of patients may never have a headache after the aura

Hemiplegic Migraine

- Motor weakness during the Aura phase is the #1 clinical symptom
  - Severe Headache
  - Scintillating scotoma & other visual disturbances
  - Sensory changes
  - Unilateral weakness
  - Aphasia
  - Fever
  - Lethargy
  - Coma
  - Seizure
- Symptoms typically last several hours, can last several days or weeks
- Genetic tests are available – but are not all inclusive
  - CACNA1A
  - ATP1A2
  - SCN1A

Retinal Migraine

- Repeated attacks of Monocular Scotomata or Blindness lasting less than one hour
- Followed by a headache



Chronic Migraine

- Headache occurring 15 or more days a month for more than 3 months
- Has migraine features on at least 8 days a month

Vestibular Migraine

- Recurrent episodes of transient vertigo mostly associated with migraine type headaches
- This is often developed over time – not the first presentation type of the individual's migraine
- Can have chronic daily vertigo in-between severe vertigo attacks
- Vertical nystagmus can often be seen during an acute attack

Menstrual Migraine

- Occur up to 2 days prior and 2 days following menses
- Patients who have migraine auras can likely not candidates for estrogen containing contraceptives due to increased stroke risk
- Various types of hormonal triggered migraines – typically associated with changes in estrogen levels

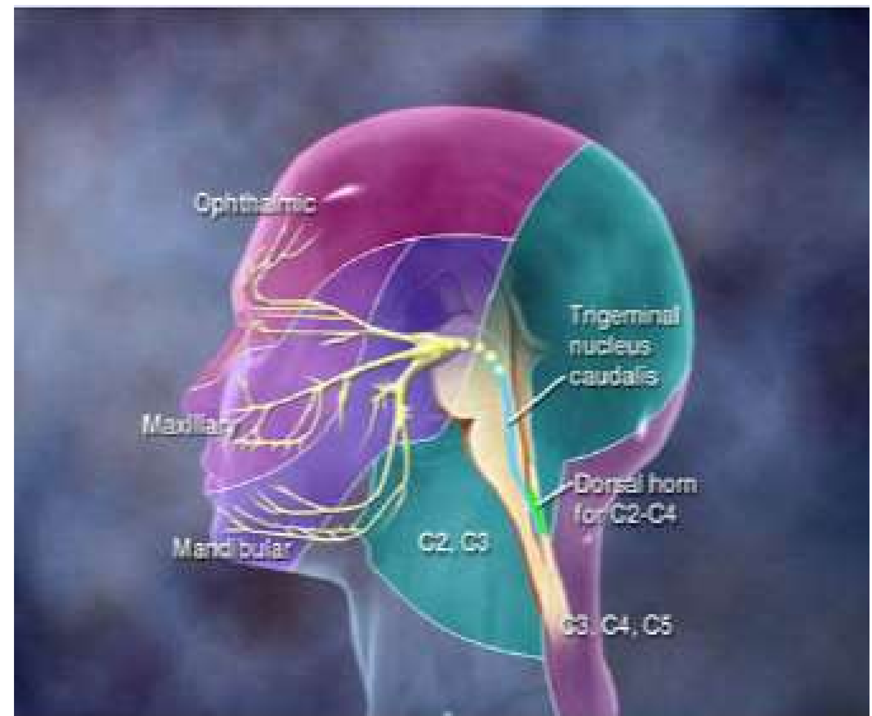
Pathophysiology

What Causes Migraines?

- Cortical Spreading Depression
- Described as a wave of neuronal and glial depolarization that spreads across the cerebral cortex
  - May cause the migraine aura
  - May activate trigeminal nerve afferants
  - May alter blood-brain barrier

What Causes Migraines?

- Trigeminovascular System
  - Inflammatory neuropeptides are released from the trigeminal nerves
  - CGRP is thought to be the cause of pain during a migraine



What Causes Migraines?

- Sensitization
  - Neurons become increasingly responsive to stimulation
  - Overtime the amount of stimulation to induce a response becomes less, the response increases, and the neurons involved can increase
  - This may be driven by an overstimulation of the meninges
  - This is often seen in the form of Allodynia – often relieved with the use of IV steroids

Making the Diagnosis

How common are Migraines?

- 14% of population in the U.S.
- 3x more common in women
- 76% -94% of Headaches seen in Primary Care are likely to be Migraines
- Often underdiagnosed (up to 52% of people with migraines are not diagnosed due to not seeking help or misdiagnosis)

The HA Exam

- HA history
  - Headache characteristics
  - Associated symptoms
  - Neurologic symptoms
- Physical Exam
  - Vitals – Eye Exam – Cranial Nerves – Muscle Strength – Reflexes – Cerebellar Testing
- Rule out Secondary HA

Primary HA Disorder

Migraine with Aura

- 15-30%
- Visual
- Sensory
- Motor
- Speech

Migraine without Aura

- 70-85%
- Must meet diagnostic criteria
- Probable Migraine without aura only must meet 2/3 of diagnostic criteria

ID-Migraine Screening

- Answering yes to at least 2 of the following questions classifies the headache as Migraine
- During the last 3 months, did you have the following with your headaches?
  - You felt nauseated or sick to your stomach
  - Light bothered you (a lot more than when you don't have headaches)
  - Your headaches limited your ability to work, study, or do what you needed to for at least one day

Diagnostic Criteria

- International Classification of Headache Disorders
- **Migraine without aura**
- At least 5 attacks including the following:
  - Headache attacks lasting 4 to 72 hours (untreated or treated)
  - Headache has at least two of the following:
    - Unilateral location
    - Pulsating quality
    - Moderate or severe pain
    - Aggravation by or causing avoidance of a routine physical activity
  - During headache at least one of the following:
    - Nausea, vomiting, or both
    - Photophobia and phonophobia

Diagnostic Criteria

- **Migraine With Aura**
- At least 2 attacks fulfilling criteria
  - One or more of the following fully reversible aura symptoms
    - Visual
    - Sensory
    - Speech/Language
    - Motor
    - Brainstem
    - Retinal

- At least three of the following six characteristics
  - One aura symptom spreads gradually over > 5 minutes
  - Two or more aura symptoms occur in succession
  - Each individual symptom lasts 5-60 minutes
  - At least one aura symptom is unilateral
  - At least one aura symptom is positive
  - The aura is accompanied, or followed within 60 minutes, by headache

Chronic Migraine

- Must meet criteria for Migraine diagnosis
- 15 or more HA days per month
- 8 or more migraine days per month

- More likely to also have
  - Depression
  - Anxiety
  - Sleep disorder

Migraine Prevention Strategies

Prevention Strategies

- Include pharmacologic and non-pharmacologic measures
- One should not be used without the other
- Key to having successful management of migraines

Pharmacologic Treatment of Migraine

Where to Start?

- Daily Prevention
  - Magnesium Oxide 400mg daily
  - Multivitamin
  - CoQ10 100mg daily

- When patients are treated with preventative measures, set a realistic goal – 50% reduction in HA frequency after 3 months of use

First-Line prophylactics

- Starting Doses:
  - Topiramate 25 mg daily
    - Do not use if patient is pregnant or has potential for pregnancy
  - Propranolol 40-80 mg daily
  - Amitriptyline 10-25mg daily HS
  - Valproic Acid 500mg daily
    - Do not use if patient is pregnant or has potential for pregnancy

Second Line Prophylactics

- Verapamil
  - 120-480mg daily
- Gabapentin
  - 100mg TID
  - Not as a stand-alone treatment
  - Can also help with acute migraine attack
- Nortriptyline
  - 10-100mg daily

Second Line Prophylactics

- Botulinum Toxin
  - For patients with > 15 migraine days per month
  - Dose of 155 units every 12 weeks

- CGRP Antagonists
  - Erenumab
  - Fremanezumab
  - Galcanezumab
  - Eptinezumab

  - Not good for patients with recent cardiovascular or cerebrovascular events

Acute Migraine Attack

- Ibuprofen
- Naproxen Sodium
- Ketorolac
- Diclofenac Potassium
- Celecoxib

- Loading dose at the first sign of Migraine is key with NSAID management
- Should not be used more than 15 days a month
- Can lead to medication overuse headache

Acute Migraine Attack

- Triptans
  - Sumatriptan
  - Rizatriptan
  - Eeletriptan
  - Naratriptan
  - Zolmitriptan
  - Almotriptan
  - Frovatriptan

Should not be used more than 10 days a month

Can lead to medication overuse headache

Acute Migraine Attack

Gepants

- Ubrogepant
- Rimegepant

Ditan

- Lasmiditan

Acute Migraine Attack

Acetaminophen – ASA – Caffeine

Naproxen & Sumatriptan

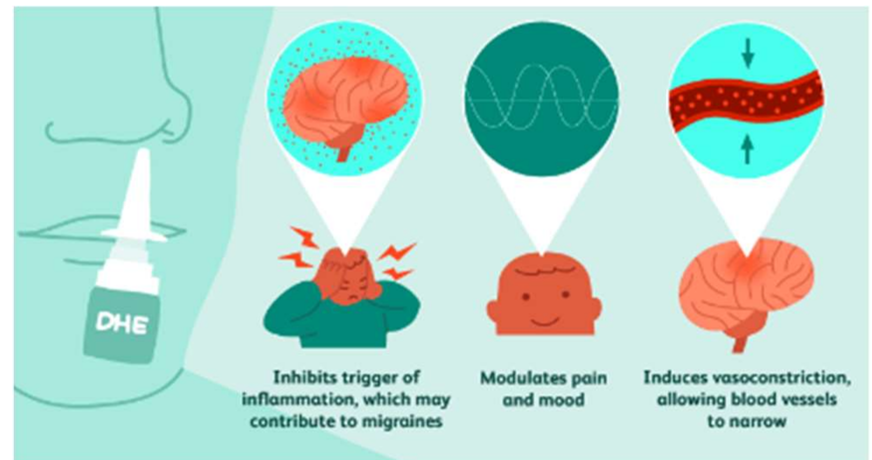
Acetaminophen – Butalbital – Caffeine

- No longer recommended as part of acute migraine attack relief by the National HA Foundation

Acute Migraine Attack

Ergots

- Dihydroergotamine
- Ergotamine



Acute Migraine Attack

- IV Magnesium 1g
- B Vitamin Infusion
- IV Acetaminophen

Non-Pharmacologic Treatment of Migraine

Migraine Labs and Other Tests

- TSH – T4 – T3
- Vitamin D
- Vitamin b12
- Sleep Study
- GI Evaluation – GERD – IBS
- Depression Screening

- If your patient has Aura's
  - Lipid Panel
  - Hemoglobin A1C

Common Co-Morbidities

- Depression
- Anxiety
- Panic Disorder
- Chronic Fatigue Syndrome
- Sleep Disorders
- GI Disturbance – GERD – IBS
- Fibromyalgia
- Stroke
- Cardiovascular Disease

Prevention for all patients

- Self Management Goals
  - Keep a Headache Diary
  - Get Adequate Sleep, recommended 8 hours in a 24 hours period
  - Regular physical exercise, 30 minutes of walking 3-5 days per week
  - Eat at least 3 meals a day on a schedule, 5-6 small meals is also ok. Eat a healthy source of protein with each meal
  - Prioritize obligations to create a sense of control over your choices, find healthy ways to cope with stress
  - Limit caffeine to one caffeinated beverage daily
  - Drink adequate amounts of water, 80 oz daily

Prevention Strategies

- Identify the trigger
    - Foods
    - Liquids
    - Daily activities
    - Allergies
    - Exercise
    - Work
    - Hours of sleep
    - Alcohol
    - Stress

Parts of a Headache Diary

- For the first month – keep a daily record of all activities regardless of headache
- As triggers are identified, patient can limit headache diary to days of headache

- Daily activities
- Allergies
- Medications taken
- Exercise
- Foods and liquids – including amounts
- Excess Stress – Self Care activities
- Headache – description of pain – pain scale – accompanying symptoms – medications taken and their effectiveness

Behavioral Therapy

- Psychiatric Evaluation
- Cognitive Behavioral Therapy
- Relaxation Therapy
- Thermal Biofeedback
- Electromyography Biofeedback
- Group Therapy – Support Groups

Physical Therapy

- Tension Type Headaches
- Hemiplegic Migraines with chronic weakness
- Vestibular Migraines

Acute Migraine Attack

Devices

- Gamma Core Sapphire
- Cefaly
- Nerivio
- sTMS Mini

Referral and
Emergency Treatment

When to be acutely concerned

- Sudden onset, “worst headache of my life”
- Acute severe neck pain with headache
- New Altered Mental State
- Blurry Vision, Papilledema
- Periorbital Tenderness
- Nausea, vomiting, unable to stay hydrated
- Acute focal neurologic changes

SNOOP4

- Systemic Systems
  - fever – weight loss –
- Neurologic signs and symptoms
  - hemiparesis – numbness – ataxia
- Onset
  - sudden onset new type of HA
- Older
  - new onset HA in a person > 50
- Progression
- Papilledema
- Position
- Precipitated by Valsava

Referral to Neurology

- Can take several months
- Not all neurologists specialize in HA treatment
- Recommend to have patient on prevention – have at least one acute migraine treatment available for patient
- Can obtain neuroimaging while waiting on neurology appointment – MRI WO is recommended over a CT

- Who needs MRI?
  - Unusual, prolonged aura
  - Increasing frequency, severity or CHANGE in migraine features
  - Migraine with brainstem aura

Questions?

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