

Oh, My Aching Head! Headache Management in the ED

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Disclosures

- I have NO financial relationships or conflicts of interest

Learning Objectives:

- Discuss the incidence of headaches presenting to the Emergency Department.
- Describe different types of headaches seen in the Emergency Department.
- Illustrate the most recent evidence-based guidelines for treating migraines in the Emergency Department.

Statistics

- Headache is one of the most common complaints seen in the Emergency Department (ED)
- Headache was the fourth leading cause of visits to the ED in 2009-2010, accounting for 3.1% of all ED visits
- Headache accounts for more than 5 million visits annually
- Many treatment options available

Ahmed et al. (2017); Burch et al. (2015)

Primary vs. Secondary Headaches

- Primary- characteristics of the headache cannot be attributed to another cause or disorder
- Secondary- characteristics of the headache can be attributed to another cause

Fontebasso (2016)

Types of Headaches

- Tension headache (primary)
- Cluster headache (primary)
- Subarachnoid hemorrhage (secondary)
- Giant cell arteritis (secondary)
- Migraine (primary)

Fontebasso (2016)

Tension Headache (Tension-Type Headache, TTH)

- Lifetime prevalence in the general population between 30% and 78%
- Most common type of headache
- Affects approximately 1.4 billion people or 20.8% of the population
- Less commonly present to acute care setting
- Thought to be precipitated by emotional stress or anxiety/depression

Ducros et al. (2013)

TTH Diagnostic Criteria

- At least 10 episodes of headache occurring on <1 day per month **PLUS**
- Lasts from 30 minutes to 7 days
- At least 2 of 4 of the following:
 - Bilateral location
 - "Vice-like", pressing or tightening (non-pulsating) quality
 - Mild or moderate intensity
 - Not aggravated by routine physical activity such as walking or climbing stairs
- Both of the following:
 - No nausea or vomiting
 - No more than one of photophobia or phonophobia

Ducros et al. (2013)

TTH Characteristics

- Bilateral
- "Headband" configuration
- Non-throbbing
- Mild to moderate pain
- Lasts 30 minutes to 7 days
- Does not typically impact activity
- Usual time of onset in daytime

Barkley Jr. et al. (2015)

TTH Treatment

- Rest
- Aspirin
- NSAIDs
- Acetaminophen
- Muscle relaxers
- Ketorolac IM

Barkley Jr. et al. (2015); Weisman et al. (2014)

Cluster Headache (CH)

- Estimated lifetime prevalence of 124 per 100,000
- Men are 3x more prone (80% of CH are male)
- Onset is typically between ages 20 and 40
- Thought to be precipitated by alcohol or excessive smoking

Choong et al. (2017); Ducros et al. (2013); Fishera et al. (2008)

CH Diagnostic Criteria

- At least 5 attacks meeting the following criteria:
- Severe or very severe unilateral orbital, supraorbital and/or temporal pain lasting 15-180 minutes when left untreated
- Either or both of the following:
 - At least one of the following s/s, ipsilateral to the headache:
 - Conjunctival injection and/or lacrimation
 - Nasal congestion and/or rhinorrhea
 - Eyelid edema
 - Forehead and facial sweating

Ducros et al. (2013)

CH Diagnostic Criteria cont.

- Either or both of the following:
 - At least one of the following s/s, ipsilateral to the headache:
 - Forehead and facial flushing
 - Sensation of fullness in the ear
 - Miosis and/or ptosis
 - A sense of restlessness or agitation
- Attacks have a frequency between one every other day and eight per day for more than half of the time when the disorder is active

Ducros et al. (2013)

CH Characteristics

- Unilateral
- Behind right or left eye
- Throbbing, sometimes piercing
- Severe pain
- Lasts 15 minutes to 2 hours
- Does not typically impact activity
- Usual time of onset- nighttime

Barkley Jr. et al. (2015)

CH Treatment

- High flow oxygen
- Triptans (subcutaneous or intranasal)
- Ergotamine
- Lithium
- High dose verapamil
- Corticosteroids
- Certain anticonvulsants

Barkley Jr. et al. (2015); Choong et al. (2017)

Subarachnoid Hemorrhage (SAH)

- Incidence ranges from 10 to 25 per 100,000 per year
- Accounts for 1-3% of headaches
- One of the most serious causes of sudden headache
- Mortality rate of 40%-50%
- Can be caused by ruptured aneurysm, AVM, or head injury

Barkley Jr. et al. (2015); Ducros et al. (2013); Edlow et al. (2008); Mogenstern et al. (2001); Perry et al. (2002); Perry et al. (2017); Vermeulen et al. (1990)

SAH Diagnostic Criteria

- Evidence of causation demonstrated by at least 2 of the following:
 - Headache has developed in close temporal relation to other symptoms and/or clinical signs of SAH, or has led to the diagnosis of SAH
 - Headache has significantly improved in parallel with stabilization or improvement of other symptoms or clinical or radiological signs of SAH
- Headache has sudden or "thunderclap" onset

Ducros et al. (2013)

SAH Characteristics

- "Worst headache of my life"
- Sudden onset
- Mental status change
- Nausea and vomiting
- Possible nuchal rigidity, low back pain
- Possible seizures
- Photophobia

Barkley Jr. et al. (2015)

SAH Treatment

- Stool softeners
- Morphine sulfate
- Nimodipine
- Phenobarbital
- Phenytoin
- Vasodilators

Barkley Jr. et al., (2015)

Giant Cell Arteritis (GCA), also known as Temporal Arteritis

- Most common form of primary systemic vasculitis
- Overall incidence of 15-25 per 100,000 per year
- Typically affects individuals age 50 and older
- 2-6 times more common in women than men
- Approximately 50% also have polymyalgia rheumatica
- In up to 20% of cases may lead to permanent blindness

Barkley Jr. et al., (2015); Ness et al., (2013); Ponte et al., (2015)

GCA Diagnostic Criteria

- Age > 50
- New onset of localized headache
- Throat pain
- Jaw claudication
- Abnormality of temporal artery (tenderness, reduced pulsation)
- Elevated ESR
- Abnormal arterial biopsy

Barkley Jr. et al., (2015); Ness et al., (2013)

GCA Characteristics

- Abrupt-onset headache (typically unilateral and in temporal area)
- Scalp tenderness
- Jaw and tongue claudication (pain on chewing)
- Visual symptoms (diplopia, loss of vision, etc.)
- Constitutional symptoms (fever, night sweats, weight loss)
- Polymyalgic symptoms (especially stiffness of neck, shoulder, pelvis)
- Limb claudication (especially arm)

Daugupta et al., (2010); Ness et al., (2013)

GCA Treatment

- High-dose glucocorticoids with taper
- Bone protection (increased risk of osteoporosis)
- PPIs
- Aspirin

Daugupta et al., (2010)

Migraine

- Acute migraine accounts for 3-5 million emergency department (ED) visits annually
- Migraine is the 5th most common complaint in the ED
- Economic impact is nearly \$17 billion annually
- Fewer than 25% of patients experience sustained headache freedom after treatment in the ED
- 3:1 female-to-male ratio
- Various treatment combinations

Ahmed et al., (2016); Barkley Jr. et al., (2015); Orr et al., (2016); Woldeamanuel et al., (2015)

Migraine Diagnostic Criteria

- Duration of 4-72 hours
- Must have at least 2 of the following:
 - Unilateral location- can be generalized or lateralized
 - Pulsating or throbbing quality
 - Moderate to severe intensity
 - Aggravated by routine physical activity
 - Interferes with ADLs

Barkley Jr. et al., (2015)

Migraine Diagnostic Criteria cont.

- At least one of the following:
 - Nausea or vomiting
 - Photophobia, osmophobia, and/or phonophobia
- At least 2 attacks that fulfill the preceding criteria
- No evidence of organic disease
- Can be preceded by at least one of the following, which gradually develops over 5-60 minutes (aura):
 - Visual symptoms
 - Somatosensory disturbance of the face or arms

Barkley Jr. et al., (2015)

Migraine Characteristics

- Unilateral (more common) or bilateral
- Throbbing
- Moderate to severe pain
- Last 4-72 hours
- Nausea, vomiting, photophobia, phonophobia
- Often substantial impact on daily life
- Usual time of onset- early morning

Barkley Jr. et al., (2015)

Migraine Treatment

- Triptans
- Dihydroergotamine mesylate (DHE)
- 100% oxygen inhalation
- Ergotamine tartrate
- Opioids
- Antihistamines
- Acetaminophen
- Dexamethasone
- Ketorolac
- Metoclopramide

Barkley et al., (2015); Orr et al., (2016)

Triptans

- Can be given oral, SQ, or intranasal
- Have been proven safe and effective for acute migraines
- Constricts blood vessels
- Inhibit the release of inflammatory peptides in the meninges
- Can increase blood pressure
- Side effects: chest pressure, neck tightness, limb heaviness, tingling, dizziness, flushing
- Contraindications: vascular disease, coronary artery disease, uncontrolled hypertension, pregnancy

Kelley et al. (2011); Meshtaghian et al. (2014)

Dihydroergotamine Mesylate (DHE)

- Can be given IV, IM, nasal, or SQ
- Associated with low headache recurrence rate
- Generally non-sedating
- Blocks release of prostaglandins from the glia
- Can increase blood pressure
- Side effects include: n/v/d, abdominal cramping, vasoconstriction, leg pain
- Contraindications: vascular disease, uncontrolled hypertension, pregnancy

Kelley et al. (2011)

100% Oxygen Inhalation

- Inexpensive, widely available
- Excellent safety profile
- Studies have shown hyperoxia has vasoconstrictive effects
- Reduces inflammation and blood-brain barrier damage
- Helps with headache and visual symptoms
- Side effects: drying of mucous membranes
- Contraindications: none

Singhal et al., (2017)

Ergotamine Tartrate

- Can be given oral (rectal in some countries)
- Given with caffeine
- Causes vasoconstriction
- Can increase blood pressure
- Side effects: n/v, weakness, coldness, numbness, pain in hands, feet, arms, or legs
- Contraindications: peripheral vascular disease or poor circulation, arteriosclerosis, hypertension, angina, liver or kidney disease, serious infection, pregnancy

Dahlhof et al., (2012)

Opioids

- Can be given oral, IM, IV, intranasal
- Meperidine is most studied for ED headache treatment
- Can modulate nociceptive input to the trigeminocervical complex
- Do not affect inflammatory processes or neurovascular changes that occur in migraines
- Increases the risk of medication-overuse headache
- Side effects: sedation, dizziness, respiratory and cardiac depression, increased risk of dependency
- Contraindications: severe respiratory depression with previous use, paralytic ileus, circulatory shock, MAO inhibitor use in past 14 days

Kelley et al., (2012b)

Antihistamines

- Can be given oral, IV, or IM
- Usually used in combination with another agent
- Anti-emetic and sedative properties
- Used to prevent akathisia and dystonic reactions
- Can boost the headache-relieving properties of analgesics
- Side effects: weakness, drowsiness, a feeling of heaviness, dizziness, impaired coordination, ataxia
- Contraindications: CNS depressant use, QT prolongation

Kelley et al., (2012a)

Acetaminophen

- Can be given PO, IV, or rectal
- IV form is expensive
- Analgesic mechanism of action unknown
- May reduce production of prostaglandins in the brain
- Side effects: nausea, headache, hepatotoxicity, nephropathy (chronic use)
- Contraindications: hepatic impairment, renal impairment, chronic alcohol use

Meyerling et al., (2017)

Dexamethasone

- Can be given PO, IV, or IM
- Used to reduce frequency of headache recurrence
- Can act to suppress the sterile inflammation underlying migraine
- Side effects: drowsiness, restlessness, nausea, adrenal insufficiency, emotional lability, dizziness
- Contraindications: systemic fungal infection, immunosuppression, renal impairment

Kelley et al., (2012b)

Ketorolac

- Can be given PO, IV, or IM
- Can inhibit the neuroinflammatory cascade, prostaglandin synthesis, and platelet aggregation associated with the release of vasoactive substances
- Can inhibit the release of prostaglandins that activate nociceptive neurons in the spinal trigeminal nucleus
- Side effects: nausea, hypertension, dizziness, somnolence, photosensitivity, tinnitus
- Contraindications: GI bleeding, pregnancy, renal impairment, coagulation disorder, active bleeding, volume depletion

Kelley et al., (2012b)

Metoclopramide

- Can be given PO, IV, or IM
- Produces antiemetic effects by antagonizing central and peripheral dopamine receptors
- Stimulates upper GI tract motility
- Side effects: drowsiness, restlessness, fatigue, dizziness, hypertension, bradycardia, confusion
- Contraindications: tardive dyskinesia hx, seizure disorder, pheochromocytoma, Parkinson's disease

Kelley et al., (2012b)

Some Other Treatments

- Anti-CGRP treatments (monoclonal antibodies); erenumab (Aimovig), fremanezumab (AJOVY)
- Botox injections
- SPG nerve blocks
- Alternative treatments:
 - Acupuncture
 - TENS
 - Marijuana
 - Avoidance of triggers

Conclusion

- Headache is one of the most common complaints at presentation to the Emergency Department
- Several different types of headaches exist
- It is important to be able to differentiate between the types of headaches presenting to the Emergency Department because treatment differs
- Migraines are a common complaint presenting to the Emergency Department, and there are numerous different treatment modalities

Thank You!

For a full list of references,
please e-mail me at
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