How can we reduce the burden of headache?

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What is the burden of headache?

- Lack of objective imaging/lab diagnostics
- Lack of pediatric headache guidelines
- Pain and related co-morbidities
- School/work disability
- Healthcare utilization

www.headachereliefguide.com

Why does my child hurt?

- Must alleviate underlying concerns about etiology before addressing lifestyle recommendations, treatment options and stress management
Headache Red Flags:
when it may not be a primary headache syndrome

- Systemic illnesses or symptoms
- Neurological symptoms
- Onset: sudden, abrupt, split second
- Older: age >50 or younger than 6
- Pattern: new change in headache pattern

Primary Headaches in Children

- Migraines with and without aura
- Tension Type Headaches
- New Daily Persistent Headache
- Chronic Daily Headache

International Headache Society Classification II

Migraine

- Lasts 2 or more hours if untreated
- Moderate to severe headache
- Worse with movement
- Throbbing
- Bifrontal-temporal
- Photophobia and phonophobia
- Nausea and/or vomiting

Pathophysiology of Migraine

- Cortical Spreading Depression
- Reactive blood vessel changes
- Increased plasma protein leakage
- Subsequent activation of trigeminal nucleus with central sensitization (alldynia)

Neurovascular Theory

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Cortical Spreading Depression

- A wave of short lasting neuronal excitation, followed by prolonged depression of cortical neuronal activity
- Confirmed by functional imaging in 1990’s
- Does not follow vascular pattern
CSD Stimulates Trigeminal Sensory Fibers (TSF)

Trigeminal nerve fibers in the meningeal vessels

Release of CGRP, substance P & Inflammatory Cytokines

CGRP antibodies expected on the market for adults in 2018. Pediatric studies starting over the next year.

Activation of Nociceptors

- The inflammation and edema activate peripheral meningeal pain receptors called nociceptors

Nociceptors transmit signals to the trigeminal ganglion and the TNC

Incidental Findings on MRI – be prepared

- Try to avoid saying “let’s order an MRI to see if we can figure this out”
- Try “we are more likely to find something that doesn’t matter like a cyst than something actually causing the headaches”
- Helpful Stats of Incidental Findings on MRI’s:
  - 3.6% have Chiari Malformation
  - 2-4% have pineal cysts
  - 2% have arachnoid cysts
  - 2.5% have developmental venous malformations

Believe the pain, improve the functioning

On a scale of “1 to Stepping on a Lego” how much pain are you in?

What is first line therapy?

- Lack of useful evidence based guidelines in pediatric headache management
- Shortage of headache specialists and headache medicine training
What is first line therapy?

- Lack of useful evidence based guidelines in pediatric headache management
- Shortage of headache specialists and headache medicine training
- UCNS 1-year headache medicine fellowship starting July 2018
What we do know…

- Avoid narcotics/butalbital
- Limit abortive medications to < 12 days a month
- Start prevention if > 4 days of headaches per month, chose first line based on limited side effects and family preferences
- Lifestyle and stress management are crucial
- Pain is embedded in perception (high placebo response in studies)

Abortive Medication Guidelines

- Avoid narcotics and butalbital
- Treat as soon as possible
- Limit to less than 10 days a month
- Do not use in high frequency headaches unless there are clear episodic more severe headaches (reduce burden of frequent office calls)

First Line Options

**NSAIDS**
- Ibuprofen 5-10mg q 8h
- Naprosyn 5-7mg/kg q 12h

**Triptans**
- Sumatriptan NS 5,20mg
- Sumatriptan PO 25,50,100 mg
- Almotriptan PO 6.25,12.5mg
- Rizatriptan PO/MLT 5,10mg
- Zolmitriptan NS 5mg
Triptans

- Age: 8 and above
- Avoid: cardiovascular disease, severe liver damage, migraine with motor weakness
- Triptan effect: 5% will have flushing, chest tightness, jaw pain, uncomfortable sensations between chest and head. Safe but not pleasant
- Dosing: Give at earliest onset. May repeat once after 2 hours. Limit to 2 days a week

Abortive Amplifiers

Anti-emetics
- Prochlorperazine
- Ondansetron

Miscellaneous
- Diphenhydramine
- Caffeine

Tips for starting prevention

- Start if non-pharmacological approaches are ineffective or not feasible
- Allow 8-12 weeks to see benefit
- Set up reasonable expectations
- Start with low doses
- Explain "not just covering up symptoms"
- Can taper off once excellent control for 6 months

Psychiatric Co-Morbidities in Adolescent Chronic Daily Headache

- 21% Major Depression
- 19% Panic Disorder
- 20% Current High Suicide Risk
- Most correlated to migraine with aura


Headache Prevention

Medications
- Amitriptyline
- Topiramate
- Magnesium
- Propranolol
- Cyproheptadine
- Valproic Acid
- Gabapentin
- Tizanidine
- Beta-blockers
- Botulinum toxin
- Pericranial injections
- Fluoxetine
- Verapamil
- Magnesium

Non-pharmaceutical
- Magnesium
- Butterbur
- Riboflavin
- Feverfew
- Coenzyme Q10
- Melatonin
- Acupuncture
- Cefaly
Amitriptyline
- Starting Dose: 20% of target dose (10mg)
- Target Dose: 1mg/kg q hs
- Benefit: sleep aid, may help other pains
- Side Effects: mood changes, QT prolongation, constipation, tachycardia, sedation, weight gain
- Avoid: suicide risk, h/o arrhythmias
- EKG?

Topiramate
- Starting Dose: 25mg
- Target Dose: 50mg PO BID
- Benefit: weight loss
- Side Effects: mood changes, nephrolithiasis, cognitive dysfunction, paresthesias, altered taste, stomach upset
- Avoid: suicide risk, anorexia/thin build, nephrolithiasis

Magnesium Gluconate
- Starting Dose: 500mg daily
- Target Dose: 500mg daily
- Side Effects: nausea, diarrhea
- Avoid: kidney failure
- Benefit: helps constipation

Butterbur (petadolex, petasites hydribus)
- Starting Dose: adolescent 75mg BID
- Target Dose: adolescent 75mg BID
- Side Effects: “burping”
- Avoid: 40 cases of liver toxicity reported to WHO
- Benefit: typically very well tolerated (GI and mood)

Melatonin
- Starting dose: 3mg (immediate release, ?formulation)
- Target dose: up to 6mg
- Side Effects: mild daytime sleepiness
- Benefits: improved sleep
- Avoid: better tolerated than amitriptyline

Cognitive Behavioral Therapy
- Meta-analysis of 14 studies indicate a greater than 50% decrease in headaches. Up to 88% response combined with amitriptyline
- Barriers: cost, time, access, perception bias
- Self-regulation skills (biofeedback, progressive muscle relaxation, hypnosis, mindfulness)
Acupuncture

- 2016 Cochrane review: "overall in these trials acupuncture was associated with slightly better outcomes and fewer adverse effects than prophylactic drug treatment"

Zhao L. The Long Term Effect of Acupuncture for migraine prophylaxis: A randomized control trial. JAMA Intern Med April 2017

School disability

- Most studies indicate an average of approximately 1 day of school missed a month amongst migraineurs

Albers L. Migraine and tension type headache in adolescents at grammar school in Germany - burden of disease and health care utilization. The Journal of Headache and Pain 2015

Headache Related disability

- Headaches accounted for 18% of all children on medical homebound
- Migraine is the 3rd cause of disability below the age of 50 according to the Global Burden of Disease
- Headaches account for more DALY’s than all other neurological conditions combined

Local School District Headache

School Accommodations

- Allow preferential seating in the classroom
- Allow healthy snacks and water through the day
- Permit student to rest his/her head on the desk for brief periods during class
- Allow an extra 20 minute rest break up to twice a day
- Permit flexibility in attendance policy
- Allow flexibility in the school’s emesis policy
- Have a plan in place for making up work in missed classes
Treating the whole person

- Mood disorders, sleep patterns, stressors, exercise routine, healthy eating, learning needs, peers/bullying, family/abuse, concussion, trigger points, posture, vestibular dysfunction, amplified pain
- Comprehensive Headache Clinic – headache doctor, pain psychologist, social worker
- Comprehensive Aggressive Migraine Protocol (CAMP) – 5 day outpatient DHE infusions with multi-disciplinary team for highly disabled kids

Migraine in the Emergency Room

- > 15% of migraine visits are in the ER
- National opiate usage increasing (35% of headache related ED visits)
- Children’s Mercy Clinical Practice Guideline
- In 2018, pilot the Acute Headache Treatment Clinic