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

Why does my child hurt?
- Must alleviate underlying concerns about etiology before addressing lifestyle recommendations, treatment options and stress management

Disclosure: Independent learning grant from Pfizer

www.headachereliefguide.com
### 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

#### Neurovascular Theory

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

#### 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:
  - 3.8% 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

Original Article
Trial of Amitriptyline, Topiramate, and Placebo for Pediatric Migraine

Scott W. Powers, Ph.D., Christopher S. Coffey, Ph.D., Leigh A. Chamberlin, R.D., M.Ed., Dixie J. Ecklund, R.N., M.S.N., Elizabeth A. Klinger, M.S., Jon W. Yankey, M.S., Leslie L. Korbee, B.S., Linda L. Porter, Ph.D., Andrew D. Hershey, M.D., Ph.D., for the CHAMP Investigators

N Engl J Med
Volume 376(2):115-124
January 12, 2017

Study Overview

- In childhood and adolescent migraine, amitriptyline and topiramate were no better than placebo and not significantly different from each other in achieving a 50% or greater reduction in days with headache.
- The trial was stopped early for futility.

Placebo response increasing in the US
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
  - Propranolol
  - Cyproheptadine
  - Topiramate
  - Magnesium
  - Riboflavin
  - Feverfew
  - Coenzyme Q10
  - Melatonin
  - Acupuncture
  - Cefaly
- **Non-pharmacological**
  - 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)**

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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

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