NEUROLOGY
PRACTICE GUIDELINE-HEADACHES

CLINIC/PROGRAM: Pediatric Neurology

TITLE OF GUIDELINE: Management and Treatment of Children with Headaches

I. INCIDENCE: Epidemiologic studies have shown that by age 15 years, 80-90% of children will have had a complaint of significant headache. By the age of 15, it is estimated that approximately 15.5% of children will have experienced a migraine headache, with another 15% experiencing daily or almost-daily tension-type headache.

II. SUBJECTIVE DATA/HISTORY:

A. New patient history should include pertinent family history, pregnancy and birth history, review of early developmental milestones and current developmental status. Current functioning should include sleep patterns and any stressors in child's/family's life, acute or chronic. Complete medical history should be obtained, including history of presenting problem.

B. Headache history should be organized, detailed and carefully elicited. Questions should include:
-age of onset
-provocative/palliative factors
-quality of pain
-location of pain, including any radiation
-severity of pain
-prodromata and/or associated symptoms and severity of those
-timing of headache including frequency, time of day, intermittent or constant, and duration
-functional level between headaches

III. PHYSICAL EXAMINATION:

A. Physical examination should include pertinent body systems as evidenced by history, expanded HEENT exam, and full neurologic examination, including bilateral fundoscopic examination.

IV. DIFFERENTIAL DIAGNOSIS:

A. Idiopathic: Normal neurologic exam is generally found with migraine, tension-type (acute or chronic), rebound, and cluster headache.

B. Intracranial: Signs or symptoms suggesting potential intracranial pathology:
1. Nighttime wakings
2. Morning headaches
1. Focal neurologic signs
2. Papilledema, diplopia
3. Headaches aggravated by sneezing, coughing, straining
4. Evidence of cranial trauma
5. Depressed level of consciousness
6. Recurrent localized headache
7. Persistent vomiting
8. Progressive frequency or severity
9. Lack of response to medication
10. New onset complicated migraine
11. Neurocutaneous syndrome
12. Macrocephaly
13. Growth abnormalities
14. Meningismus

C. Systemic disease: Inflammatory, infectious or systemic disorders may cause headache. Specific disorders should be considered based on history and physical examination.

V. DIAGNOSTIC/LABORATORY TESTS

A. Neuroimaging, labwork or further medical diagnostics are not indicated if history and physical examination do not suggest underlying intracranial or systemic pathology.

B. If history/physical examination suggest secondary etiology, work-up may include chemistry profile, complete blood count and urinalysis. Urine and blood drug screens should be used if drug or medication use/abuse is suspected as the etiology.

C. Neuroimaging with MRI or CT scan is indicated if the headache had a severe, abrupt onset, if the character of the headache suddenly changes, if abnormal neurologic or physical findings are noted indicating CNS involvement, or if headaches are not easily managed by standard medications.

D. Lumbar puncture is indicated if subarachnoid hemorrhage or benign intracranial hypertension (pseudotumor cerebri) are considered, or if infectious etiology is suspected. If subarachnoid hemorrhage or benign intracranial hypertension are suspected, imaging should be performed prior to lumbar puncture.

E. EEG is indicated for children with chronic paroxysmal headache with no history of migraine. This is especially true if additional focal/paroxysmal neurological symptoms are noted such as paresthesias or other sensory symptoms, clonic/tonic motor activity, changes in mental status, or behavioral automatisms. If interictal spike discharges are seen, prolonged EEG monitoring should be obtained (ambulatory or inpatient).

VI. MANAGEMENT/TREATMENT PLAN

A. Pharmacologic treatment:

1. Migraine:

a. Abortive therapy: Given only as needed, at the onset of aura/headache.
Initial treatment with non-habituating analgesics

<u>Acetaminophen</u> every 4 to 6 hours
10-15 mg/kg/dose, not to exceed 5 doses/day

<u>NSAIDs</u>
Naproxen sodium: 5-7 mg/kg/dose every 8-12 hours
Ibuprofen: 10 mg/kg/dose every 6 hours

<u>Triptans:</u> Naratriptan, Sumatriptan, Zolmitriptan, Rizatriptan, Eletriptan, Frovatriptan
Triptan dosing: give one dose at onset of headache, may repeat in 2 hrs for max 2 doses/24 hrs.
** Exceptions are
-Frovatriptan only one dose per day
-Naratriptan 1 dose at onset, repeat in 6 hrs (max 2 doses/ 24 hrs.)
-Subcutaneous sumatriptan 0.06 mg/kg, x1 only
Side effects: tingling/numbness, dizziness, warm/hot sensations, injection-site reactions, flushing, feeling of heaviness/tightness,
pressure sensation, chest discomfort, musculoskeletal weakness, taste disturbance with nasal spray
Triptans are contraindicated in complicated migraine, cerebrovascular or cardiovascular disease due to risk of vasospasm
**Triptans should not be used concurrently with SSRIs due to risk of serotonin syndrome

<u>Salicylates</u>: Aspirin may be as monotherapy or in combination product; i.e., Excedrin Migraine (ASA + acetaminophen + Caffeine).
Contraindicated in children if child has febrile illness, influenza or varicella infection.
Dose: 10-15 mg/kg/dose, max 4 gm/day

Midrin: Combination of isometheptene mucate 65 mg, acetaminophen 325 mg, and dichloralphenazone 100 mg
Dose: 1-2 capsules immediately; repeat 1 capsule every hour until relieved to maximum of 3/day or 5/week

Corticosteroids : For prolonged, severe headache (lasting > 1-2 days) or for frequent recurrent headache with no pain-free periods

Antiemetics: May be used in combination with analgesics
Promethazine (Phenergan): 0.25-1 mg/kg up to QID prn (po/pr)
Chlorpromazine (Thorazine): 0.5-1mg/kg oral, q 4-6 hrs
Prochlorperazine (Compazine): 0.4 mg/kg/day divided TID-QID (po/pr)
Metaclopromide (Reglan): 0.2 mg/kg oral

Sedatives:
Ultram (tramadol) 50-100 mg po every 6 hrs as needed

b. Prophylaxis: Given daily for headaches that occur more than once per week, or that interfere with routine activities. Considered effective if it reduces the frequency, intensity and duration of headache attacks by at least 50%.

* Tricyclics:
Amitriptyline: 1-2mg/kg/day **(Drug of choice for migraines in older children and adolescents)**
Nortriptyline: 1-3 mg/kg/day
Doxepin HC: 1-3 mg/kg/day
Side effects: sedation
Start dosing low, advance over 2-3 weeks to desired dose
** AHA recommends baseline EKG prior to starting TCAs due to effects on QT interval.

* Anticonvulsants:
Topiramate: 15-200 mg/day. Start dosing low, increase weekly. Dosing is based on tolerance vs therapeutic effect
Side effects: Drowsiness, appetite suppression, kidney stones (low incidence), narrow angle glaucoma
Valproic acid: 15-30 mg/kg/day, may divide BID
Side effects: Drowsiness, irritability, alopecial, erythema multiforme, nausea, vomiting, thrombocytopenia, prolonged bleeding time, transient increased liver enzymes, *liver failure (can be fatal), tremor

* Beta blockers:
Inderal (propanolol)
Dose: 1-2 mg/kg/day divided BID
Nadolol: 0.25-1 mg/kg divided BID
Atenolol: 25-50 mg/day once daily
Side effects: Depression, hypotension, bradycardia, exercise intolerance
Precautions: Do not use in children with asthma or reactive airway disease. Can use selective beta blockers with caution (metoprolol)

* Antihistamines: **Drug of choice in children under 6 years of age**
Cyroheptadine
Dose: 0.3 mg/kg/day, divided BID-TID
Has serotonergic effect, useful for headaches

* Calcium channel blockers:
Verapamil: 4-8 mg/kg/day divided TID

Side effects: sleepiness or difficulty sleeping, rash, increased appetite, dry mouth, dizziness
**helpful for headaches with vertigo/dizziness, exertional headaches

* SSRIs:
Trazodone 1.5-6 mg/kg/day divided BID-TID
Paroxetine: 10-40 mg q day

2. Vitamins and herbs:
   * Riboflavin: food sources: dairy products, liver, meat, green vegetables, eggs, dried beans and peas.
   Supplement with 200 mg BID
   Caution: Urine may turn bright yellow! Excess is excreted in the urine.
   * Magnesium: food sources: nuts, legumes, vegetables, whole grains, cereals/breads, seafood.
   Supplement 10-20 mg/kg/dose up to QID.
   Toxicity signs: lethargy, flushing, respiratory difficulty, abdominal cramps, muscle weakness, diarrhea.
   * Butterbur root (Petadolex brand) up to 75 mg BID may be effective
   * Not enough data to support feverfew or coenzyme Q

3. Rebound headache syndrome:
   a. Taper daily analgesics. Naproxen sodium or other NSAID may be used to replace other analgesic during weaning as rebound headache is less likely to recur. Expect intensifying of the headache in the initial period, duration varies. Hospitalization may be needed to wean completely.

   b. If needed, amitriptyline: 0.1 mg/kg/day, advance as tolerated over 2-3 weeks to 0.5-2 mg/kg/day

B. Nonpharmacologic treatment: ** Reassurance to parents and patient of lack of serious disease is of primary importance.

   At the time of the attack:
   a. Breathing and relaxation exercises
   b. Sleep as needed
   c. Avoid light and noise
   d. Ice pack/cool cloth to head or site of pain
   e. Soft music, other forms of relaxation/distraction

   Preventive/lifestyle strategies
   a. Adequate fluid intake
   b. Discontinue caffeine
   c. Regular meals. Do not skip meals
   d. Ensure adequate sleep with no naps
   e. Daily exercise 3-5 days per week
   f. Stress management strategies to include biofeedback, breathing and relaxation exercises
   g. Cognitive behavioral therapy for pain management
   h. Mental health services for child and family as indicated

VII. EDUCATION
1. Emphasize lifestyle factors described above.
2. Child should avoid headache triggers, if identified.
3. Avoid over-use of over-the-counter analgesics which could precipitate rebound headache syndrome.
4. Avoid caffeine as much as possible as frequent use can cause rebound headache when caffeine is withdrawn.

5. Headache diary may be helpful to monitor frequency, duration and intensity of headaches, precipitating and/or exacerbating factors, medication intake or other pain relief methods, and subjective rating of degree of pain relief with recommended strategies.

VIII. FOLLOW-UP:

A. Follow-up scheduled based on patient/family need. Generally, if acutely ill, child should be seen within 1-2 weeks. If difficult management, or for new patient, every 2-3 months. Routine follow-up may be every 6-12 months. Phone management may occur in addition to/in lieu of clinic appointments as necessary.