

13. HEADACHE¹

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We identified articles on the evaluation and management of headache by conducting a MEDLINE search of English language articles between 1990 and 1995 (keywords headache, diagnosis, treatment) and by reviewing two textbooks on primary care (Pruitt, in Goroll et al., 1995; Bleeker and Meyd, in Barker et al., 1991) and one for children and adolescents (Prensky in Oski, 1994). Of the fourteen relevant articles that were retrieved, nine were review articles and five were observational studies. Several of these articles addressed the selection of diagnostic tests and principles of pharmacological management, with a focus on tension headache and migraine. We did not find controlled trials that analyzed elements of an appropriate history or physical examination, and for these topics expert opinion was the primary source of information.

IMPORTANCE

The prevalence of frequent headaches among children has been estimated to be 2.5 percent for 7-year-olds and 15.7 among 15-year-olds (Prensky, in Oski, 1994). Among children presenting to a physician with headache, about half are experiencing migraines.

EFFICACY AND/OR EFFECTIVENESS OF INTERVENTIONS

Diagnosis

The International Headache Society (IHS) has developed a thorough and comprehensive etiologic classification system for headaches (Dalessio, 1994). Common categories include: tension, migraine, cluster, noncephalic infection (e.g., influenza), head trauma, intracranial vascular disorders (e.g., hemorrhage), intracranial nonvascular disorders (e.g., meningitis, neoplasm), substance withdrawal, and neuralgias. Much of the initial diagnostic work-up for

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headaches focuses on distinguishing benign etiologies like tension headaches from the more serious causes like meningitis, hemorrhage, or neoplasm. Once that distinction is made, clinicians should distinguish among the more common benign etiologies in order to prescribe the most efficacious treatment.

All sources recommended a detailed history as the first step in making these distinctions. Essential elements include: temporal profile (chronology, onset, frequency), associated symptoms (nausea, aura, lacrimation, fever), location (unilateral, bilateral, frontal, temporal), severity, and family history (Dalessio, 1994; Bleeker and Meyd, in Barker et al., 1991). There is less confusion about the essential elements of the neurologic examination, though most sources recommend at least an evaluation of the cranial nerves, a fundoscopic examination to rule out papilledema, and examination of reflexes (Dalessio, 1994; Larson et al., 1980; Frishberg, 1994).

One of the most difficult diagnostic decisions in the evaluation of new onset headache is the indications for computerized tomography (CT) and magnetic resonance imaging (MRI) of the head to find structural lesions like arteriovascular malformations, subdural hematomas, and tumors. Several observational studies suggest that a head CT scan is a low-yield evaluation tool in patients with normal neurological examinations (Larson et al., 1980; Masters et al., 1987; Becker et al., 1988; Nelson et al., 1992; Becker et al., 1993; Frishberg, 1994), though even in such patients severe headaches may indicate subarachnoid hemorrhage and constant headaches may indicate intracranial tumors. As a consequence, guidelines from a 1981 National Institutes of Health (NIH) Consensus Panel on the use of CT recommended imaging only when the patient has an abnormal neurological examination or a severe or constant headache (NIH Consensus Statement, 1981). Others have expressed reservations that using severity alone as criteria for head imaging may lead to extensive overuse (Becker et al., 1988). The American Academy of Neurology (1993) previously reviewed 17 case series to define the yield of pathology when CT or MRI scanning is used to evaluate headache patients. In 897 migraine patients, they found only 4 abnormalities, none of which were clinically unsuspected. Of the 1825 patients with

headaches and normal neurologic examinations, 2.4 percent had intracranial pathology. Based on these data, the Academy recommended against scanning migraine patients, but concluded there was insufficient evidence to recommend for or against scanning other headache patients with normal neurologic examinations.

Head trauma is another strong indication for imaging. In a study of 3658 head trauma patients, the Skull X-Ray Referral Criteria Panel identified focal neurologic signs, decreasing level of consciousness and penetrating skull injury as indications for CT scanning (Masters et al., 1987). In a separate study of 374 blunt trauma patients there were 7 abnormal head CT results in patients without abnormal neurological findings, but the best initial treatment for these cases was observation alone (Nelson et al., 1992).

While there is still some debate as to the proper indications for CT or MRI in headache patients, there is little controversy surrounding the use of skull radiographs in such patients. Clinical trials have shown skull radiographs to be poor predictors of adverse outcomes in patients with head trauma or others presenting for evaluation of headache (Masters et al., 1987).

Treatment

Our quality indicators address the two most common etiologies for headaches in children and adolescents: migraine and tension headaches. Unlike adults, migraines are more commonly found among males (66 percent vs. 33 percent among adults) (Prensky in Oski, 1994).

The treatment of migraine headache depends on the frequency and severity of symptoms. Placebo-controlled trials support the use of aspirin, acetaminophen, and nonsteroidal anti-inflammatory medications in mild cases. In children under age 5, the usual dose is 1 grain per year of age; for those aged 5-10, the dose is 5 grains; and for those over age 10, the dose is 10 grains (Prensky in Oski, 1994). For more severe pain, clinicians often rely on ergot preparations, antiemetics, opioids, and sumatriptan. Children under 12 should not take more than 3 mg of ergot per headache; older children should not take more than 6 mg (Prensky in Oski, 1994). Though clinical trials have found intravenous

dihydroergotamine to be effective in reducing both pain and emergency room use, three clinical trials failed to find any effect of oral ergotamines on migraine pain. Metoclopramide and chlorpromazine also have clinical trial support in the treatment of acute migraine headaches. The newest agent in the migraine pharmacopoeia is sumatriptan, a 5-hydroxytryptamine 1D agonist, available only in injectable form in the United States. Sumatriptan reduced the pain and associated symptoms of migraine headaches in 70 to 90 percent of subjects in several clinical trials (Kumar and Cooney, 1995). However, sumatriptan should not be used concurrently with ergotamine due to an interactive vasoconstrictive effect (Raskin, 1994; Kumar and Cooney, 1995). At the time this was written, the safety and effectiveness of sumatriptan in children had not been established (Physicians' Desk Reference, 1995).

A consensus exists that if a patient has more than two migraine headaches per month then prophylactic treatment is indicated, and this concept has been endorsed by the International Headache Society. The use of beta blockers, valproic acid, calcium channel blockers, tricyclic antidepressants, naproxen, aspirin, cyprohepatadine and valproate are supported by controlled clinical trials. No clinical trials have compared any of these agents with another in preventing migraines (Raskin, 1993; Sheftell, 1993; Raskin, 1994; Rapoport, 1994; Kumar and Cooney, 1995).

Treatment options for tension headaches include aspirin, acetaminophen, and nonsteroidal anti-inflammatory agents. At least one clinical trial found prophylaxis with tricyclic antidepressants to be beneficial. Tension headache and migraine have been considered to be part of a continuum of the same process and as a result clear distinctions between appropriate treatments for the two diagnoses are not always present. While clinical trials support the effectiveness of oral opioid agonists and barbiturates in these two conditions, most sources recommend against initial therapy with these agents due to the risk of dependence. Butorphanol nasal spray has been encouraged as an outpatient opioid agent because it is less addictive and has been shown

to reduce emergency room visits for severe migraine headache (Markley, 1994; Kumar, 1994).

Follow-up Care

The need for physician visits depends on the frequency and severity of headache and cannot be precisely defined. Indeed, in the United States, most people who experience headaches do not seek evaluation or treatment from physicians (Kumar and Cooney, 1995). Accepted guidelines for specialist referral are not present in the literature, and most cases of migraine and tension headache can be handled adequately by a primary care physician.

RECOMMENDED QUALITY INDICATORS FOR HEADACHE

These indicators apply to children ages 2 to 18.

Diagnosis

Indicator	Quality of evidence	Literature	Benefits	Comments
<p>1. All patients with new onset headache should be asked about:</p> <ul style="list-style-type: none"> a. Location of the pain (e.g., frontal, bilateral) b. Associated symptoms (e.g., aura) c. Temporal profile (e.g., new onset, constant) d. Severity e. Family history 	III	Dalessio, 1994; Larson et al., 1980; Frishberg, 1994	Decrease symptoms of sinusitis (e.g., post nasal drip, fever) and prevent potential complications of mastoiditis, periosteal and epidural abscess. Decrease neurologic symptoms from migraines. Reduce tension headache symptoms and side effects of unwarranted therapy. Preserve neurologic function.	Location can distinguish sinus, tension, and cluster. Associated symptoms can distinguish migraine and cluster headaches. Temporal profile can distinguish cluster, tension, and tumors. Severity can distinguish hemorrhage. Family history can distinguish migraine. Accurate diagnosis of sinusitis can prompt antibiotic or decongestant treatment. Accurate diagnosis of migraine and cluster can prompt treatment (see below). Accurate diagnosis of tension headaches can prompt treatment (see below). Accurate diagnosis of tumors can prompt lifesaving radiation or surgery.
<p>2. All patients with new onset headache should have a neurological examination evaluating the:</p> <ul style="list-style-type: none"> a. Cranial nerves b. Fundi c. Deep tendon reflexes 	III	Dalessio, 1994; Larson et al., 1980; Frishberg, 1994	Preserve neurologic function.	Abnormal neurologic examination is an indication for CT or MRI scanning. Increased detection of tumors, cerebrovascular accidents and intracranial hemorrhage can lead to lifesaving radiation or surgery.
<p>3. CT or MRI scanning is indicated in patients with new onset headache and any of the following circumstances:</p> <ul style="list-style-type: none"> a. Abnormal neurological examination b. Constant headache c. Severe headache 	III	NIH Consensus Statement, 1981	Preserve neurologic function.	Recommendations of NIH Consensus Panel on Computed Tomographic Scanning of the Brain.
<p>4. Skull X-rays should not be part of an evaluation for headache.</p>	II	Masters et al., 1987	Averts side effects (e.g., radiation) of skull X-ray. Averts delays in CT or MRI scanning where indicated.	Four observational trials found a combined incidence of pathology of 0.7% in patients who would not otherwise receive a CT or MRI scan.

Treatment

Indicator	Quality of evidence	Literature	Benefits	Comments
5. If the patient has an acute mild migraine or tension headache, he or she should receive aspirin, tylenol, or other nonsteroidal anti-inflammatory agents before being prescribed any other medication.	I	Kumar and Cooney, 1995	Reduced migraine symptoms* with fewest side effects from other potential agents.*	More effective than placebo in reducing headaches, nausea and photophobia, but no effect on vomiting.
6. If the patient has an acute moderate or severe migraine headache, he or she should receive one of the following before being prescribed any other agent: a. Intramuscular ketorolac b. Intravenous dihydroergotamine c. Intravenous chlorpromazine d. Intravenous metaclopramide	I	Kumar and Cooney, 1995; Raskin, 1993; Raskin, 1994; Sheftell, 1993; Rapoport, 1994	Reduced migraine symptoms.*	All listed agents have clinical trial support, but none have been compared against one another. Clinical trials did not find an effect for oral ergot preparations alone, though they have not been evaluated in their usual combination with caffeine or barbiturates. Sumatriptan has not been approved for use in children.
7. Recurrent moderate or severe tension headaches should be treated with a trial of tricyclic antidepressant agents.	I	Kumar and Cooney, 1995	Reduced rate of tension headache recurrence. Improve quality of life and functioning.	Clinical trials show reduction in pain scores.
8. If a patient has more than 2 migraine headaches each month, then prophylactic treatment is indicated with one of the following agents: a. Beta blockers b. Calcium channel blockers c. Tricyclic antidepressants d. Naproxen e. Fluoxetine f. Valproate g. Cyproheptadine	I	Kumar and Cooney, 1995; Sheftell, 1993; Markley, 1994	Reduced rate of recurrent migraine symptoms.*	All listed agents have clinical trial support, but none have been compared against one another.
9. Sumatriptan and ergotamine should not be concurrently administered.	III	Kumar and Cooney, 1995	Averts adverse effects of vasoconstriction: exacerbation of chest pain in ischemic disease, hypertension, painful extremities.	Synergistic effect may cause prolonged vasoconstriction.
10. Opioid agonists and barbiturates should not be first-line therapy for migraine or tension headaches.	III	Markley, 1994; Kumar, 1994	Averts adverse effects of opiate therapy.*	Other less habit-forming alternative treatment should be tried first. If patient has already tried other medications at home, administration of opioid agonists is not considered first-line.

* Side effects of migraine therapeutic agents include:

Ergotamines: vasoconstriction, exacerbation of coronary artery disease, nausea, abdominal pain, somnolence

Opiates: dependence, somnolence, withdrawal

Phenothiazines: dystonic reactions, anticholinergic reactions, insomnia

Migraine symptoms include: headache, nausea, photophobia, vomiting, phonophobia, scotomata, other focal neurologic symptoms

Quality of Evidence Codes:

- I: RCT
- II-1: Nonrandomized controlled trials
- II-2: Cohort or case analysis
- II-3: Multiple time series
- III: Opinions or descriptive studies

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