

CASE STUDIES IN THE DIFFERENTIAL DIAGNOSIS OF HEADACHE: MIGRAINE, SINUS HEADACHE, AND EPISODIC TENSION-TYPE HEADACHE

*A Continuing Education Program for nurse practitioners,
physician assistants, and pharmacists*



This CE/CME monograph is in the form of a PDF,
which can be printed directly from your computer.
There are separate evaluation forms for nurse practitioners,
physician assistants, and pharmacists.



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CASE STUDIES IN THE DIFFERENTIAL DIAGNOSIS OF HEADACHE

OVERVIEW

ACTIVITY OVERVIEW

Despite the advances of recent years, approximately half of all people with migraine have never received a medical diagnosis and most treat their headaches exclusively with nonspecific, over-the-counter medications. In addition, many patients are treated with less than optimal treatment strategies, in part because they are under the mistaken impression that their migraines are actually “sinus headaches,” a concept deeply ingrained in American popular culture. This new CD-ROM program sponsored by the National Headache Foundation, provides a comprehensive overview of the differential diagnosis of migraine, sinus headache, and episodic tension-type headache, and a practical, hands-on video case study of two patients: a woman with migraine who believes she has sinus headaches and a man with newly diagnosed episodic tension-type headache. The monograph is in the form of a PDF, which may be printed from your computer to provide an enduring resource.

LEARNING OBJECTIVES

After viewing the video and reading the monograph, participating nurse practitioners, physician assistants, and pharmacists should be better able to:

- Describe the epidemiology of migraine, sinus headache, and episodic tension-type headache
- Differentially diagnose migraine, sinus headache, and episodic tension-type headache
- Describe the medications likely to be effective in the treatment of episodic tension-type headache

ACCREDITATION STATEMENTS

This program has been approved for 1.0 contact hours of continuing education by the American Academy of Nurse Practitioners. Program ID 0502063. Expiration date: February 28, 2006.

ACCREDITATION STATEMENTS *continued*

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of Primary Care Network and the National Headache Foundation. Primary Care Network is accredited by the ACCME to provide continuing medical education for physicians.

Primary Care Network designates this educational activity for a maximum of 1 category 1 credit toward the AMA Physician's Recognition Award. Each physician should claim only those credits that he/she actually spent in the activity.

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The American Academy of Physician Assistants (AAPA) accepts category 1 credit from AOACCME, prescribed credit from AAFP, and AMA category 1 CME credit for the PRA from organizations accredited by ACCME.

Chicago College of Pharmacy, Midwestern University is approved by the American Council of Pharmaceutical Education as a provider of pharmaceutical education and complies with the criteria for quality for continuing pharmaceutical education programming. The program provides 1 contact hour (0.1 CEUs) of pharmacy continuing education. Participants must complete the entire program and post-test for credit and submit the evaluation form. A statement of completion will be mailed to all participants within four weeks of the program. The universal program number is 074-999-05-020-H04. Expiration date: February 28, 2008.

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FACULTY DISCLOSURE

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Lynda J. Krasenbaum has served as a consultant for Pfizer Inc. and MedPointe. She has served as a speaker for AstraZeneca, GlaxoSmithKline, Pfizer Inc., and MedPointe. She has served on an advisory board for Pfizer Inc. and MedPointe and has received honoraria from AstraZeneca, GlaxoSmithKline, Pfizer Inc., and MedPointe.

Danielle T. Sry has nothing to disclose.

STATEMENT OF COMMERCIAL SUPPORT

This program is supported through an educational grant from GlaxoSmithKline.

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DIFFERENTIAL DIAGNOSIS OF MIGRAINE AND SINUS HEADACHE

The accompanying video presents the case of a woman who attributed her frequent headaches to chronic sinus infections. Her symptoms included pressure and pain near her eyes, nasal congestion, and a runny nose. Her mother, who had similar headaches, had told her since the age of eight that these were “sinus headaches.” In fact, the concept of sinus inflammation as a cause of headache is widespread in American popular culture. This belief is reinforced by advertising for a variety of over-the-counter medications specifically intended for sinus headache. From the long list of available products (Table 1), one would assume that sinus headaches are quite common. “Sinus headache,” as reported by patients, is a popular conception, but it is often a mistaken one. The actual prevalence of sinus headache is not known, but specialists believe it to be a relatively rare condition, even in the presence of sinus inflammation.¹

Table 1. Nonprescription products for sinus headache

■ Actifed Cold & Sinus	■ Sinutab Sinus Allergy
■ Advil Cold & Sinus	■ Sudafed Sinus Headache
■ Aleve Sinus and Headache	■ Tavist Allergy Sinus Headache
■ Benadryl Allergy and Sinus Headache Caplets	■ Triaminic Allergy Sinus and Headache Soft Chews
■ Benadryl Severe Allergy and Sinus Headache Caplets	■ Tylenol Allergy Sinus
■ Motrin – Sinus Headache	■ Vicks DayQuil Sinus Pressure and Pain Relief

Many patients with so-called sinus headaches actually meet International Headache Society (IHS) diagnostic criteria for migraine. In a follow-up to the 1999 *American Migraine Study*, 39.9% of patients meeting IHS criteria for migraine had been previously diagnosed with sinus headache, with or without other headache types, by a physician.² By extrapolation, over 11 million Americans diagnosed with sinus headache actually have migraines.²

Cady et al conducted a study of 47 patients with self-reported sinus headaches.² These patients either presented to a headache clinic or were recruited by an advertisement that asked, “Do you have sinus headaches?” The patients were aged 18 to 65 and had a history of at least one year of self-described sinus headaches and had at least six headaches during the previous six months. Patients were excluded if they had been previously diagnosed with migraine or had taken triptans. They were also excluded if they had had radiographic evidence of a sinus infection during the year prior to the study.

Forty-six of the 47 “sinus headache” patients (98%) actually had symptoms meeting IHS criteria for either migraine (70%) or migrainous headache (28%). Although 66% of these patients had consulted physicians for their headaches, not one had been diagnosed with migraine. The patients were then instructed to treat two of their headaches with 50-mg sumatriptan tablets. The triptans are highly specific for the physiologic mechanism that triggers migraine. The patients treated 71 headaches, with headache-relief and pain-free rates comparable to those seen in controlled clinical trials of triptans. These results provide further evidence that these “sinus headache” patients were actually suffering from migraines.

Schreiber et al conducted a study to determine the prevalence of IHS-defined migraine without aura or migrainous disorder in patients with a history of self-described or physician-diagnosed “sinus” headache.³ During a visit to a clinic, patients with histories of

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TABLE 2.

Headache attributed to rhinosinusitis, IHS diagnostic criteria⁴

■ **Diagnostic criteria:**

- A.** Frontal headache accompanied by pain in one or more regions of the face, ears, or teeth and fulfilling criteria C and D
- B.** Clinical, nasal endoscopic, CT and/or MRI imaging and/or laboratory evidence of acute or acute-on-chronic rhinosinusitis
- C.** Headache and facial pain develop simultaneously with onset or acute exacerbation of rhinosinusitis
- D.** Headache and/or facial pain resolve within 7 days after remission or successful treatment of acute or acute-on-chronic rhinosinusitis

Notes:

1. Clinical evidence may include purulence in the nasal cavity, nasal obstruction, hyposmia/anosmia and/or fever.
2. *Chronic sinusitis* is not validated as a cause of headache or facial pain unless relapsing into an acute stage.

“sinus” headache, no previous diagnosis of migraine, and no evidence of infection were assigned an IHS headache diagnosis based on their headache histories and reported symptoms. A total of 2991 patients were screened. Of the total, 88% of those with a history of self-described or physician-diagnosed “sinus” headache fulfilled IHS migraine criteria (80%) or migrainous criteria (8%). Many of these patients reported the presence of symptoms in the sinus area: 84% noted sinus pressure, 82% reported sinus pain, and 63% reported nasal congestion. The authors note that, in patients with recurrent headaches without fever or purulent discharge, sinus-area symptoms may actually be part of the migraine process.

Why do so many migraineurs believe they have sinus headaches? The presence of nasal symptoms plays a likely role. In the study described above, 87% of the patients reported experiencing either nasal stuffiness or a runny nose. Although the IHS diagnostic criteria for migraine do not include nasal symptoms, they commonly occur in migraine. *Cady et al* propose that nasal symptoms during migraine are the result of activation of the parasympathetic nervous system, resulting in orbital pain, rhinorrhea, nasal congestion, miosis, lacrimation, and facial sweating.²

Sinus infections are more common in children than adults, but are much less frequent today than in the pre-antibiotic era. Acute sinusitis may last up to three weeks, while chronic sinusitis lasts more than three months.⁵ The IHS diagnostic criteria for sinus headache are listed in Table 2, those for migraine without aura are listed in Table 3.

The differential diagnosis of sinus headache and migraine is especially important because the two headache types respond to very different treatments. Migraines respond well to the triptans, but are unlikely to respond to the broad-spectrum oral antibiotics effective in sinusitis. Finally, more physicians and patients need to recognize that migraines are often accompanied by nasal symptoms. Migraine continues to be an underdiagnosed condition. In the *American Migraine Study II*, only 48% of survey participants who met IHS criteria for migraine received a physician diagnosis of migraine.⁶ The misdiagnosis of migraine as sinus headache contributes substantially to this problem.

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TABLE 3.

Migraine without aura, IHS diagnostic criteria⁴

■ **Diagnostic criteria:**

- A.** At least 5 attacks fulfilling criteria B-D
- B.** Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)
- C.** Headache has at least two of the following characteristics:
 - 1. Unilateral location
 - 2. Pulsating quality
 - 3. Moderate or severe pain intensity
 - 4. Aggravation by or causing avoidance of routine physical activity (eg, walking or climbing stairs)
- D.** During headache at least one of the following:
 - 1. Nausea and/or vomiting
 - 2. Photophobia and phonophobia
- E.** Not attributed to another disorder

DIAGNOSIS AND TREATMENT OF TENSION-TYPE HEADACHE

The distinction between migraine and episodic tension-type headache (ETTH) is the subject of ongoing debate. Migraine pain is usually unilateral and throbbing, although the IHS criteria note that patients can have migraines that are neither unilateral nor throbbing. While the pain of ETTH is usually bilateral and viselike, some patients who complain of ETTH may actually be experiencing mild or early-phase migraine. Some research suggests that ETTH may represent two distinct entities: one that is actually a mild form of migraine and another that is “pure” ETTH without features of migraine, such as photophobia, nausea, or sensitivity to movement.⁵

ETTH is by far the most common primary headache disorder, with a lifetime prevalence of 78%, compared with a lifetime prevalence of 16% for migraine.⁷ However, the vast majority of patients who present with headache in clinical practice have migraine.⁸ The dividing line between these two disorders is also the

subject of debate. Some researchers view migraine and ETTH as completely distinct disorders. Others believe that migraine and ETTH are different points on a headache continuum, which is defined primarily by severity. In this view both headaches have similar biological bases, but migraine is a very severe form of headache characterized by additional symptoms. This view is supported by the observation that the symptoms characteristic of migraine (nausea, photophobia, etc.) are strongly associated with headache severity.⁹ The IHS diagnostic criteria for ETTH are listed in Table 4. Note that the IHS tends to classify ETTH by exclusion, by listing those characteristics of migraine that ETTH does not have. As a result, ETTH remains the most nonspecific of the primary headaches.¹⁰

Spierings et al conducted telephone interviews of 38 patients with migraine and 17 patients with tension-type headaches to determine whether there are headache precipitating and aggravating factors that differentiate between the two headache types.¹¹ The

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TABLE 4.

Infrequent episodic tension-type headache, IHS diagnostic criteria⁴

■ **Description:**

Infrequent episodes of headache lasting minutes to days. The pain is typically bilateral, pressing or tightening in quality and of mild to moderate intensity, and it does not worsen with physical activity. There is no nausea, but photophobia or phonophobia may be present.

■ **Diagnostic criteria:**

- A.** At least 10 episodes occurring on <1 day per month on average (< 12 days per year) and fulfilling criteria B-D
- B.** Headache lasting from 30 minutes to 7 days
- C.** Headache has at least two of the following characteristics:
 - 1. Bilateral location
 - 2. Pressing/tightening (non-pulsating) quality
 - 3. Mild or moderate intensity
 - 4. Not aggravated by routine physical activity such as walking or climbing stairs
- D.** Both of the following:
 - 1. No nausea or vomiting (anorexia may occur)
 - 2. No more than one of photophobia or phonophobia
- E.** Not attributed to another disorder

questionnaire inquired about the following precipitating and aggravating factors: physical activity, straining, bending over, stress/tension, coughing/sneezing, fatigue, reading, driving, lack of sleep, specific foods/drinks, alcohol, not eating on time, smoke, smell, light, noise, menstruation, and weather. The most common precipitating factors in both groups were stress/tension, not eating on time, fatigue, and lack of sleep. The effects of weather, smell, smoke, and light differentiated migraine from tension-type headache. They found no precipitating or aggravating factors differentiating tension-type headache from migraine. The investigators concluded that there are precipitating and aggravating factors differentiating migraine from tension-type headache, but not vice-versa.

ACUTE TREATMENT OF ETTH

There have been few studies of the pharmacological treatment of ETTH, in part because many of the potentially useful drugs are generic and OTC.¹⁰

Furthermore, most patients (80%) with ETTH never seek help from a clinician; headache severity may be a determining factor. As with acute treatment of migraine, acute ETTH therapy usually begins with OTC acetaminophen or aspirin for mild-to-moderate headache. For more severe headache, NSAIDs or combination preparations that include aspirin or acetaminophen with caffeine may be used. Patients should be strongly counseled to avoid overuse of medications to avoid dependence, abuse, and medication-overuse headache, as well as the possibility of developing chronic daily headache. A useful rule of thumb is that both OTC and Rx medications should be limited to no more than two days per week to prevent medication-overuse headache.

OTC ANALGESICS

Both acetaminophen and aspirin have demonstrated good efficacy in the treatment of mild-to-moderate ETTH.⁵ Side effects are relatively mild and infrequent;

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aspirin may cause gastric distress and bleeding, and should be avoided in patients with upper GI risk factors such as history of ulcer or bleeding, or those over age 65.

OTC AND PRESCRIPTION NSAIDS

NSAIDs of varying efficacy and strength are frequently used successfully for treatment of ETTH. OTC ibuprofen and naproxen are often effective, for many patients more so than acetaminophen or aspirin. Both provide rapid relief and should be recommended for treatment of moderate-to-severe ETTH. Naproxen has an extended window of activity (plasma half-life of 14 hours), which can be useful for patients who tend to suffer prolonged headache. Other NSAIDs (ketoprofen, ketorolac, or indomethacin) may also be effective, but the clinical evidence is not as well-established. In chronic use, they may also be associated with GI bleeding or renal failure.

COX-2 INHIBITORS

COX-2 inhibitors (COXIBs) are agents with a more selective mechanism than NSAIDs; they act preferentially against an enzyme, cyclo-oxygenase 2, that produces pain and inflammation without affecting a similar enzyme, cyclo-oxygenase 1, that helps protect the stomach lining. Unfortunately the cardiovascular safety of this class of drugs has come into question: rofecoxib was removed from the market in September 2004 because of an increased risk of heart attack and stroke. At the time of publication, the future of the COXIBs remains in doubt; at the very least, these agents should not be administered to patients with cardiovascular or cerebrovascular disease.

COMBINATION PRODUCTS

A variety of prescription combination preparations are available, combining butalbital with codeine, caffeine, and aspirin or acetaminophen. These preparations can be quite effective, but, as with all abortive medications, their use should be limited to two days per

week. The presence of caffeine may cause insomnia, nervousness, or anxiety if the drugs are overused. In addition, overuse may lead to medication-overuse headache. Side effects are the same as those for the agents used as monotherapy. Numerous OTC aspirin or acetaminophen/caffeine combinations are also available. The clinician should be aware, however, that these medications may also lead to medication-overuse headache.

MUSCLE RELAXANTS

Although muscle relaxants such as baclofen, diazepam, tizanidine, or cyclobenzaprine are sometimes prescribed for patients who suffer frequent ETTH, little research has been done to establish their efficacy.⁵ In practice, however, some clinicians have found this class of drugs to be helpful.

*Both OTC
and Rx medications
should be limited to
no more than two days
per week to prevent
medication-overuse
headache.*

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BEHAVIORAL MANAGEMENT OF ETTH

A multifaceted approach that combines pharmacologic therapy with behavioral management may be more effective than either approach alone. Behavioral treatment of ETTH produces benefits more slowly than pharmacological treatment, but the improvement can often be maintained for long periods. Electromyographic (EMG) biofeedback training, relaxation techniques, or a combination of both can produce a 50% reduction in headache frequency. Cognitive behavioral interventions, such as stress management programs, may also be effective, especially when combined with relaxation and biofeedback.¹²

CONCLUSIONS

Headache is one of the most common human ailments, yet it continues to present significant challenges to diagnosis and treatment. Because headaches are defined primarily by their symptoms, the creation of diagnostic categories that reflect their underlying biologic mechanisms remains a persistent challenge. The two case reports in the accompanying video underscore some of the difficulties — and the crucial importance — of obtaining an accurate diagnosis. It also emphasizes what is, perhaps, the most tragic act of this disabling disorder: that, on a nationwide scale, migraine continues to be underdiagnosed and inadequately treated.

- ▶ *References on page 10*
- ▶▶ *Post-test on page 11*
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POST-TEST

Seven correct answers are required for credit.

1. Sinus inflammation is a common cause of secondary headache.
 A. True B. False
2. In the American Migraine Study II, what percentage of patients meeting IHS criteria for migraine had been previously diagnosed with sinus headache?
 A. 15.5%
 B. 26%
 C. 39.9%
3. Nasal symptoms during migraine (pain, congestion, and rhinorrhea) may be the result of activation of the parasympathetic nervous system.
 A. True B. False
4. IHS diagnostic criteria cite chronic sinusitis as a possible cause of headache.
 A. True B. False
5. Some patients with episodic tension-type headache (ETTH) may actually be experiencing a mild form of migraine.
 A. True B. False
6. What is the lifetime prevalence of ETTH?
 A. 50%
 B. 16%
 C. 78%
7. The head pain of ETTH tends to be...
 A. Unilateral and vise-like
 B. Bilateral and vise-like
 C. Unilateral and throbbing
8. What percentage of patients with ETTH never seek help from a clinician?
 A. 26%
 B. 50%
 C. 80%
9. Ibuprofen and naproxen are good choices for moderate-to-severe ETTH.
 A. True B. False
10. Cognitive behavioral interventions are generally ineffective in the treatment of ETTH.
 A. True B. False

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