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Clinical Review

BENIGN HEADACHE MANAGEMENT IN THE EMERGENCY DEPARTMENT

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☐ **Abstract—Background: Headache is a common complaint managed in the emergency department (ED), with emergency physicians focusing on evaluation for life-threatening conditions while treating pain and nausea. Objective: This review evaluates the treatment of benign, primary headaches in the ED, with recommendations provided based on the literature. Discussion: Headaches are a major cause of disability in the United States and a common condition managed in the ED. The primary objectives of emergency evaluation of these patients include evaluation for a life-threatening, secondary cause of headache, with treatment of primary headaches. Close evaluation for a secondary cause of headache include consideration of red flags and focused neurologic examination. The diagnosis of primary headaches is clinical. Literature has evaluated medication efficacy in headache treatment, with antidopaminergic medications demonstrating high rates of efficacy when used in combination with nonsteroidal inflammatory drugs or acetaminophen. Dexamethasone can be used for the reduction of headache recurrence. If dehydration is present, intravenous fluids should be provided. Diphenhydramine is not recommended for analgesia but may reduce akathisia associated with prochlorperazine. Ketamine, propofol, and nerve blocks demonstrate promise. Triptan agents are also efficacious, provided absence of contraindications. Most patients are appropriate for discharge with pain improvement. Conclusions: A variety of medications is available for the treatment of primary headaches in the ED. Antidopaminergic agents demonstrate the highest efficacy and should be provided with acetaminophen and nonsteroidal inflammatory drugs. Dexamethasone may reduce headache recurrence. Other treatments include ketamine, propofol, and nerve blocks. Published by Elsevier Inc.**

☐ **Keywords—headache; primary; medication; tension; migraine; cluster; therapy**

INTRODUCTION

Headache Epidemiology

Headache is a major cause of disability, affecting close to half of adults at least once per year (1–3). It accounts for a significant percentage of emergency department (ED) visits annually, with rates over 4% (1–3). Headaches more commonly affect women and those of working class age (4–6). The goal of the emergency physician is to first differentiate a life-threatening secondary cause of headache (the minority of patients) from the more benign primary headache syndrome, because failure to recognize a serious headache may result in morbidity and mortality (6–11). Table 1 lists primary and secondary headaches. The second goal is to relieve symptoms, no matter if the etiology is primary or secondary (6–12). This review will first discuss benign versus secondary headaches, but it will primarily focus on treatment of benign headaches.

A careful, focused history and physical examination are paramount in the evaluation of patients with headache

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Table 1. Headache Etiologies*

Primary Headache	Secondary Headache
Cluster	Intracranial hemorrhage (traumatic or spontaneous)
Tension	"Sentinel" aneurysmal hemorrhage
Migraine	Meningitis/encephalitis
Paroxysmal hemicranias	Abscess
Hemicrania continua	Carotid or vertebrobasilar dissection
Trigeminal neuralgia	Reversible cerebral vasoconstriction syndrome
Medication overuse	Cerebral venous thrombosis
	Temporal arteritis
	Idiopathic intracranial hypertension
	Hypertensive encephalopathy
	Posterior reversible encephalopathy syndrome
	Acute hydrocephalus (e.g., colloid cyst obstructing the third ventricle)
	Pituitary apoplexy
	Acute angle closure glaucoma
	Carbon monoxide poisoning

* Data taken from multiple sources (6–12).

Table 2. Headache Red Flags*

Characteristic	Finding
Onset	Sudden, traumatic cause, or exertion
Symptoms	Seizure, altered mental status, fever, neurologic deficit, meningismus, or visual changes
Medications	Recent antimicrobials, immunosuppressive medications (corticosteroids, methotrexate, cyclosporine, etc.), or anticoagulant/antiplatelet
History	No previous headache, change in headache, sudden or maximal in onset, worsening over months, associated trauma, concern for toxic exposure (carbon monoxide)
Other conditions	History of malignancy, history of immunosuppression (HIV), vasculitis, sarcoidosis, pregnancy or within 4 weeks of birth, age >50 years
Examination	Abnormal vital signs, including fever, altered mental status, meningismus, focal neurologic deficit, or papilledema

* Data taken from multiple sources (6–8,10).

in the ED. If these factors are discovered on history or physical examination in Table 2, then the emergency physician should consider further evaluation targeted toward the likely etiology (6–8). However, patients at low risk for a dangerous, secondary headache typically have no significant change in headache pattern, no concerning history or physical examination features (i.e., fever or focal neurologic deficit), and no high-risk comorbidity (6–8,10).

More than 90% of benign, primary headaches can be classified as tension, migraine, or cluster (3,4,7–11). Tension type headache is the most common headache in population-based studies, but migraine is the most common type of headache in patients presenting to the ED (2–5). Headache characteristics for the most common types of primary headache are shown in Table 3. Other types of primary headache are less common and not discussed further, including hemicranias continua, trigeminal neuralgia, paroxysmal hemicranias, and short-lasting unilateral neuralgiform headache with cranial autonomic symptoms or with conjunctival injection and tearing (3–5,12,13).

DISCUSSION

Symptomatic treatment is paramount. Once a secondary etiology of headache is not considered likely based on history, examination, and consideration of red flags, the goal is to provide reassurance and ensure pain and other symptoms, such as nausea/vomiting, improve (6–8). Medications have primarily been evaluated in patients with migraine; however, these treatments also provide relief in patients with undifferentiated headache of likely primary etiology. More than 20 different parenteral, intranasal, subcutaneous, and oral medications and combination of medications are available for treatment (6–12). Significant heterogeneity exists in ED headache management because of the lack of strong recommendations, physician experience, concern for short-term side effects, institutional culture, and patient request. An ideal medication provides rapid, sustained pain relief without complications and allows patients to return to normal daily activity. However, this medication does not exist (6–12). Studies show that less than a third of patients treated in the ED experience sustained pain relief (10,14). Complications include vascular complications, tardive dyskinesia, gastrointestinal disease (hemorrhage and gastritis), and medication dependence (14,15). The American Headache Society's 2016 recommendations are shown in Table 4 (9).

Despite these recommendations, a variety of medications are available for treatment (5–8,10–15). Many studies have evaluated the efficacy of these medications in treatment for benign headaches. This review will evaluate common medications used in the ED for headache management.

Approach

In the ED, management focuses on evaluating for secondary cause of headache requiring further evaluation via laboratory assessment (lumbar puncture, electrolytes, or complete blood cell count) and imaging (such as