



A Case of Sudden Severe Headache

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A 32 year old female presented to the emergency department complaining of a sudden, acute onset, vertex headache that radiated into her neck. Symptoms began three hours prior to presentation and were associated with nausea and lightheadedness. The patient had had a similar headache five days prior that resolved with naprosyn.

The patient had a past history of migraines with aura (scintillating lights followed by nausea and right temporal throbbing headache. The present headache was different in intensity, onset, and location. There was no past medical history. Medications included naprosyn prn for headaches, and birth control pills. The patient neither smoked nor consumed alcohol; there was a family history of migraines in her mother.

The physical examination as documented on the chart included BP 118/70, RR 16, HR 72, T 97. The patient was alert, cooperative, but appear uncomfortable holding the top of her head. Pupil exam was not documented, cranial nerves were “intact”, gait was “normal”. A diagnosis of migraine was made, prochlorperazine was given with complete resolution of the headache and the patient was discharged . . . only to return in 24 hours.

A Case of Sudden and Severe Headache

Introduction

One to 3 per cent of emergency department (ED) patients have a chief complaint of headache. Of those patients, only 1% to 5% have a serious underlying etiology; the challenge for the emergency physician is to identify and treat those patients and thus avoid significant morbidity and mortality. The emergency physician must determine whether the headache is emergently life-threatening, versus the secondary manifestation of an underlying process, or a primary headache disorder, see Table 1 for differential diagnosis. In most cases, the history guides diagnosis and the urgency of management. Acuity of onset, fever, altered mental status, or focal neurologic deficits help to stratify headache patients at risk for significant morbidity.

Cranial nerves V, IX, X and XI transmit pain, with the trigeminal nerve responsible for pain reception above the tentorium, of the face and most of the scalp, while the IX, X, and XII cranial nerves are responsible for areas below the tentorium. The brain parenchyma itself is insensitive to pain. Pain responsive areas are the dura, large blood vessels, and the periosteum. Headache is the result of direct pressure, displacement, stretching, or inflammation of pain sensitive areas. Cervical nerves 1,2 and 3 are responsible for transmitting pain from the posterior scalp and neck and thus pain involving these areas can represent cervical disease.

The pathophysiologic mechanisms responsible for headache and its perpetration in syndromes such as migraine are becoming better understood with the identification of serotonin mediated pain receptors and pathways. There are at least four 5-HT receptors, 5-HT₁₋₄, and four subtypes of 5-HT₁, a-d. Stimulation of 5-HT₁ receptors results in vasoconstriction and partially explains the effect of sumatriptan and DHE. Other serotonin receptors are involved in centrally mediated nausea and vomiting, thus the emphasis on identifying drugs that have selective receptor response.

Differential Diagnosis and Initial Stabilization

Fever and acute headache suggests bacterial meningitis, though more often a headache is seen in patients with systemic infections as a result of dehydration, vasodilatation, or hypotension. Patients with non-bacterial meningitis tend to have less acute presentations. When bacterial meningitis is suspected, establish intravenous access, send bloods for complete blood count and platelets, electrolytes, glucose, PT, PTT. A lumbar puncture can be performed without a computed head tomogram (CT) if the patient has a nonfocal neurologic exam and a normal fundoscopic exam including the presence of venous pulsations; otherwise, obtain a CT before lumbar puncture. Give antibiotics to patients with suspected bacterial meningitis within the first one-half hour of arrival in the ED.

Headaches associated with new focal neurologic deficits are seen in intracranial aneurysms, abscesses, expanding mass lesions, and stroke. These patients require immediate stabilization,

followed by a head CT, initially without contrast. Variants of migraine headache can present with focal neurologic deficits which occur before the headache commences. In those patients presenting with their first migraine with neurologic deficit, the diagnosis is one of exclusion.

Headache associated with altered mental status, including subtle changes noted only by family, are suspicious for acute intracranial vascular accidents, infection, toxic exposure such as carbon monoxide exposure, or metabolic derangements, especially hypoglycemia. Because of the potential for life-threatening disease, these patients need aggressive stabilization with intravenous access using a non-dextrose solution, immediate serum dextrose determination, pulse oximetry and ECG monitoring. Blood testing, arterial blood gas with carboxyhemoglobin levels, and head CT are directed by findings on the history and physical.

Sudden, severe headache that is worse than any headache the patient has ever had is the classic red-flag for subarachnoid bleed; however, it can also occur with cerebral sinus thrombosis, arterial dissections, and idiopathic intracranial hypertension. Monitor these patients with pulse oximetry, watch blood pressure and ECG closely, establish intravenous access, and obtain an emergency head CT. Elevate the head of the bed to 30 degrees.

All patients suspected of headaches of emergent life-threatening etiologies can rapidly deteriorate and thus require frequent reassessments. They should be well oxygenated, have secure intravenous access, and continuous ECG and pulse oximetry monitoring.

History

The history often provides the key to the etiology of a headache and every effort should be made to be as comprehensive as possible, including interviewing family and care givers when necessary. Table 2 lists danger signals in the headache patient that prompts further diagnostic evaluation.

Timing, rapidity of onset, quality and location of pain are important. Obtain a history and description of past headaches. In particular, a change in character from past headaches can indicate serious new pathology. New headaches in patients over 50 years of age raises concern for glaucoma, intracranial mass lesions or bleeds, and temporal arteritis. In patients with a past history of headaches, care must be taken not to be biased, thus discounting the complaint.

Headaches that are severe and sudden (referred to as "thunderclap") suggest a subarachnoid bleed, though as mentioned above, cerebral sinus thrombosis and arterial dissections may also present with this complaint. In SAH there is often a history of preceding, less severe, sentinel headaches. Subarachnoid bleeds can be associated with mental confusion, nausea, vomiting, pain radiating into the neck or even in a sciatic distribution, fever, and ECG dysrhythmias.

Throbbing quality suggests vascular etiologies such as migraine. Headaches due to mass lesions such as tumors or hydrocephalus tend to be dull and steady in nature.

Headache location is at times helpful, but rarely diagnostic. Migraines tend to begin unilaterally, while tension headaches are frequently bandlike. Occipital headaches suggest cerebellar lesions, tension or cervical radiculopathy etiologies. Vertex headaches are seen in sphenoid sinusitis. Orbital headaches suggest glaucoma, optic neuritis, or cavernous sinus thrombosis. Unilateral facial pain is seen in trigeminal neuralgia, sinusitis, and carotid artery dissection.

Time course of the various headache types is also variable. Migraines tend to be constant and can last for days while tension headaches are intermittent, waxing and waning. Cluster headaches are acute, intense, unilateral and associated with lacrimation, rarely lasting more than two hours.

A history of malignancy is suspicious for metastatic brain or skull lesions. The "classic" brain tumor headache, described as severe, present in the morning and associated with nausea and vomiting, is rare. In one series of 111 patients with brain tumors, headache was present in only 48%, was most frequently bifrontal, and present during the morning in only 36%. (15)

History of immunocompromise, including histories of HIV+ and alcoholism, requires careful consideration for intracranial infection. These patients often do not mount a fever or elevate their white blood cell counts, and must always be considered for cerebral spinal fluid (CSF) examination.

A history of trauma introduces the possibility of chronic subdural or post-traumatic headache syndrome. The challenge in these cases is that patients can be amnesic to the event or the trauma can be sufficiently removed that an accurate history is unobtainable. Up to 20% with chronic subdural have no identifiable etiology or can present with symptoms up to three months from a known traumatic event (2,8) The elderly, alcoholics, epileptics, and patients on dialysis or with coagulopathies are at risk for chronic subdural hematomas. Post-traumatic headache syndromes are reported in 40% to 70% of patients post head trauma; symptoms include headache, dizziness, sleep disturbances, nausea, and difficulty concentrating.

Document a menstrual history in all women of child bearing age. Headache in pregnancy can indicate pre-eclampsia or cavernous sinus thrombosis.

Identify medication type and frequency in all patients with headache. Headache can be the direct side effect of numerous medications or the indirect consequence of hypotension or hypoglycemia. Anticoagulant use can be a red flag for possible intracranial bleed.

An occupational history may uncover a toxin exposure, such as carbon monoxide. Headache and dizziness are the two most common complaints in occult carbon monoxide poisoning, seen in 90% and 82% of patients respectively. Other occupational headaches include muscle contraction and eye strain types which are frequently seen with sedentary jobs.

Physical Exam

Document vital signs, a neurologic exam, and assessment of the patient's mental status. Abnormal vital signs do not consistently predict degree of pain. In patients with an elevated blood pressure, a decision must be made as to whether the headache is due to the blood pressure or vice versa. In general, most patients will not develop a headache unless the diastolic BP is higher than 120 mm/hg. As a general rule, focus initially on treating the pain.

The extent of the neurologic exam depends on the patient's history, but should at least include cranial nerve testing to identify early evidence of space occupying lesions resulting in II, III, IV, or VI nerve dysfunction. The motor, sensory, and deep tendon reflex exams are rarely helpful in patients with a primary complaint of headache.

Cerebellar hemorrhage is a neurosurgical emergency. Cerebellar testing can identify posterior fossa lesions. Cerebellar hemorrhage has a high incidence of accompanying headache which is usually occipital and associated with nausea and vomiting, dizziness, ataxia, and rotatory nystagmus.

When the headache etiology is undetermined perform a careful head and neck exam looking for sinus tenderness, temporal-mandibular joint tenderness, scalp, neck, or face tenderness. Patients over 50 should have their temporal arteries palpated searching for evidence of temporal arteritis.

Several headache etiologies are identified on eye examination. Decreased visual acuity can indicate headache secondary to eye strain, in which case a pin hole test should correct the refractory deficit. Corneal clouding and decreased visual acuity are seen in glaucoma. Periorbital swelling occurs in cavernous sinus thrombosis. Papilledema suggests increased intracranial pressure including idiopathic intracranial hypertension. Visual field defects indicate optic chiasm lesions. Double vision suggests mass lesions compressing the oculomotor cranial nerves. Optic neuritis presents with pain on eye movement, loss of central vision, loss of color vision, and the hallmark is a positive afferent nerve defect identified with the swinging flashlight test. There is a high correlation between optic neuritis and multiple sclerosis.

Migraine: Migraine and tension, or muscle contraction, headaches possibly exist on a continuum, unified by a common pathophysiologic mechanism. Migraine without aura (once referred to as common migraine) and migraine with an aura (once called classic migraine) are the two major groups of migraine headache.

The headache in migraine without an aura is moderate to severe in intensity, throbbing, and unilateral, though it can generalize bilaterally. It can be associated with nausea, vomiting, anorexia, photophobia, phonophobia, yawning, drowsiness, and difficulty concentrating. The diagnosis requires five previous attacks. Though there is no specific aura, there may be a nonspecific prodrome that precedes the headache by hours or days.

The headache in migraine with an aura is preceded by visual, sensory, or motor symptoms. Diagnosis requires at least two attacks having at least three of the following four characteristics: fully reversible focal cerebral, cortical, or brainstem dysfunction, at least one aura symptom, no aura symptom lasting more than 60 minutes, headache follows aura with a free interval of less than 60 minutes. (27)

Complicated migraine does not neatly fit into the International Headache Society's classification of migraines, but is a term used to describe neurologic defects that persist after resolution of migraine headache.(10,19) This includes migraines that have an aura lasting more than one hour, hemiplegic migraines, ophthalmoplegic migraines, and migrainous infarction. Hemiplegic migraines have unilateral tingling, numbness, or weakness that can last up to one week. (3) Ophthalmoplegic migraine refers to a clinical syndrome of prolonged unilateral headache followed by oculomotor nerve palsy.

Basilar migraines present with neurologic symptoms in the basilar artery distribution. The headache has an occipital location. Symptoms include visual field defects, dysarthria, vertigo, tinnitus, ataxia, confusion, or syncope.

Migraine equivalents, including acephalgic migraine, are a controversial subject. They refer to recurrent reversible symptoms that are produced by "migraine" but have no associated headache. The diagnosis is one of exclusion.(13)

Cluster: These headaches are severe, usually unilateral orbital or maxillary pain with sudden onset that lasts up to two hours before suddenly terminating. Rarely, patients have bilateral symptoms. Cluster periods last two to three months, and can stay in remission for several year. The headaches often demonstrate a circadian regularity, half of the time occurring at night. Attacks tend to occur in groups and are seen more frequently in men, between the third and fifth decades, though it can occur at any age. The pain is associated with lacrimation, rhinorrhea, miosis, and ptosis.

Trigeminal Neuralgia

"Tic douloureux" causes exquisitely severe, penetrating pain in the distribution of the second and third branches of the Vth cranial nerve. Episodes last from seconds to minutes but can be so debilitating that patients become hopelessly desperate. Attacks are often triggered by tactile or mechanical stimulation such as brushing teeth or chewing.

Temporal Arteritis: Temporal arteritis is a generalized arteritis that involves large and medium sized arteries. Suspect this disease in any patient over 50 with a recent onset headache. There is a female predominance and peak age occurs in the 70s. The dominant feature is scalp tenderness, especially over the temporal artery, though any artery can be involved and therefore a nontender temporal artery with good pulses does not exclude the diagnosis. Ten per cent of patients with temporal arteritis will have a normal temporal artery biopsy. (36). Pain is often

described as "needles and pins" and 65% have jaw claudication. Other symptoms can include weight loss, fevers, sweats, and arthralgias. Examine the fundus since ophthalmic artery involvement can lead to blindness. Recent onset headache with jaw claudication and temporal artery tenderness has a 100% predictive value for this final diagnosis. (36) Confirmation of a clinical diagnosis begins with obtaining a sedimentation rate.

Idiopathic Intracranial Hypertension (IIH): IIH is a syndrome of intracranial hypertension, headache, and papilledema with no focal localizing neurologic signs with normal cerebral spinal fluid composition. The diagnosis requires a documented increase in intracranial pressure, a normal neurologic exam (except for occasional sixth nerve palsies or in severe cases CN II deficits), absence of a space occupying lesion on head CT, and normal CSF composition. IIH results from either an overproduction of CSF or decreased CSF reabsorption; typically described in young, obese females, it has also been associated as a complication of various medications. Improved neuroimaging technology has demonstrated that many cases of "idiopathic" intracranial hypertension are the result of CNS blood flow included cerebral sinus thrombosis. If left untreated, as many as 50% of patients will develop some degree of vision loss.

Cost Effective Strategies

The differential diagnosis of headache and cost effective management decisions are guided by the history and physical. An unenhanced CT is indicated for evaluating suspected acute intracranial hemorrhage, cerebral masses, hydrocephalus, and sinusitis. A CT is not indicated in patients with recurrent headaches who present with a typical headache that has migraine characteristics, no history of seizures and who have a nonfocal neurologic exam. (14) Enhanced CT is rarely indicated from the emergency department though it can help in the diagnosis of aneurysms, AVM, abscess, and neoplasm.

A lumbar puncture is indicated in patients suspected of meningitis or subarachnoid bleed. Patients who are immunocompromised with a headache, even in the absence of fever or meningeal signs, should be strongly considered for a spinal tap. Another group of headache patients who benefit from a lumbar puncture are those with idiopathic intracranial hypertension. These patients clinically have headache, papilledema, normal mental status, and normal CT with an elevated opening pressure above 200 mm H₂O on spinal tap. (1)

Suspected anemia or infection is an indication for a complete blood count. If hypoxia is thought to be a contributing factor, a blood gas is recommended. Carboxyhemoglobin levels are indicated when carbon monoxide exposure is a consideration. Carboxyhemoglobin determination is indicated only when there is a history of potential exposure to a carbon monoxide generating source such as a space heater and should not be ordered as a screen to identify occult exposure. (20)

A sedimentation rate is indicated in any patient over 50 who presents with a new type of headache and in whom temporal arteritis is suspected. An elevated sedimentation rate occurs in

over 90% of patients on initial presentation, and eventually in 100% of patients with the final diagnosis of temporal arteritis. (4) An elevated sedimentation rate prompts consideration for prednisone treatment and arrangements for temporal artery biopsy.

Management

Since most headache pain is serotonin mediated, pain management is in essence the same regardless of underlying etiology. Consequently, the migraine literature is used as the reference point for discussing headache management with the understanding that response to therapy is not diagnostic of the the cause.

In general, 25% of migraine patients will improve from placebo effect alone. Narcotics are not accepted first-line drugs since they encourage drug seeking, are associated with drowsiness and nausea which delays return to full function, and their success rate is in the 50-60% range which is below that of other available drugs. Metoclopramide and prochlorperazine are 60% to 80% effective within 60 minutes in treating migraine headaches, do not cause significant drowsiness or hypotension, and studies suggest that these drugs are not associated with headache rebound. A good argument could be made to treat acute migraine with a combination of an anti-emetic plus ketorolac.

DHE and sumatriptan are serotonin receptor modulators that have been shown effective in treating migraine. Both drugs are given IM. DHE is associated with nausea and is therefore usually given with an anti-emetic, while sumatriptan has actually been associated with decreasing the nausea of migraine headaches. Both drugs have significant pain response profiles.

Cluster: The same drugs used in the acute management of migraine are effective in cluster headaches. Both DHE and sumatriptan have been studied and are well tolerated.(33) In addition to pharmacologic therapy, 70% of patients with an acute attack who were treated at headache onset had their pain relieved almost immediately with oxygen, 5 to 8 liters/minute, (22). The optimum mode of oxygen delivery is not well defined. Patients with refractory cluster headache can be tried on nasal 4% lidocaine, or dexamethasone, 8 mg/day for 3 to 4 days. There is no role for narcotics in the initial management of cluster headaches.

Trigeminal Neuralgia: The pain of trigeminal neuralgia is dramatically improved with either carbamazepine (Tegretol) or phenytoin (Dilantin) used individually or in combination. Carbamazepine can not be loaded due to its gastrointestinal side effects and is started at 200 mg twice a day and increased weekly by 200 mg increments up to 1.2 to 2 gm a day. Phenytoin can be loaded with 15 mg/kg orally or intravenously and the patient maintained on 300 mg at bedtime.

Temporal Arteritis: Patients suspected of temporal arteritis are started on prednisone 60 mg a day. There should be a positive response within 48 hours, otherwise the diagnosis is reassessed.

Idiopathic Intracranial Hypertension (IIH): Management of IIH focuses on removing offending agents or conditions (e.g., obesity) and lowering intracranial pressures to minimize the risk of vision loss. Serial lumbar punctures provide symptomatic relief but fail to provide lasting decreases in intracranial pressure since the CSF removed by a spinal tap is replenished within two hours of the procedure. Acetazolamide is the most frequently used drug; doses of 4 gm/day have been shown effective in decreasing intracranial pressures. Other diuretics and corticosteroids have been used but are of undetermined benefit. Rarely, patients with progressive vision loss despite medical management will require surgical interventions including optic nerve sheath decompression or lumboperitoneal shunting.

Controversies

Patient with a new onset headache and a focal neurologic deficit. Subarachnoid bleeds rarely have focal deficits though AVMs and aneurysms may cause compromise CN III, IV, or VI. Strokes and tumors are other diagnostic considerations. In complicated migraines, neurologic deficits can persist after headache resolution and resultant strokes are reported.(38) Carotid artery dissection presents with headache in the forehead, orbit, maxillary, or neck region and associated with focal deficits or Horner's syndrome.(12) In headache with visual loss migraine, optic neuritis, temporal arteritis, glaucoma, and pseudotumor cerebri are considered. A careful history and risk assessment obtained to guide the direction of testing. Sumatriptan and DHE are contraindicated in these patients.

Can a patient with a "thunderclap" headache who has a normal CT and LP still have a subarachnoid hemorrhage? There are rare anecdotal cases of thunderclap headaches representing the sentinel bleed of a dissecting or unruptured cerebral aneurysm. However, in a retrospective review of 71 cases of "thunderclap" headache with 3 years follow-up, no patient developed a subarachnoid bleed. (39). Likewise, in a prospective series of 14 patients, 8 of whom had angiography, no subarachnoids were found with 18 months follow-up. (18) "Thunderclap" headaches do exist, possibly are a variant of migraine, and patients with a normal CT and LP are consulted with neurosurgery, possibly observed for 6 hours, but do not necessarily need an angiogram, which has significant potential morbidity itself.

Treatment

Refractory Migraine Patients who do not respond to the first dose of sumatriptan will not benefit from repeat or higher dosing and another class of drug should be tried. Narcotics are reserved for the elderly, selected pregnant patients, and possibly in those patients who fail all other types of medications. Patients who are in status migrainosus are admitted to the hospital and managed with DHE and dexamethasone. (28,31)

Post-lumbar puncture headache: Headache is common after lumbar puncture and several different treatments are effective. Symptomatic relief is often obtained with hydration, keeping the patient flat, and using nonsteroidals or opioids. An epidural blood patch has a proven success

rate, however, when not available, an infusion of 500 mg of caffeine sodium benzoate in one liter normal saline over one hour may be of benefit. (24)

Patients with chronic headache: There is a subset of patients whose headaches are chronic and daily, and secondary to analgesic overuse or medication rebound. One study reported that 72% of 300 patients had chronic headache from analgesic rebound.(31) When history suggests this diagnosis, care should be discussed with the primary care provider since proper management depends on a coordinated detoxification program, often times in the hospital.

Conclusion

Headache can result from a primary disorder, e.g., migraine, or be secondary to an underlying central or systemic process. The goal of the emergency physician is to identify life-threatening underlying etiologies. Once the patient has been stabilized and the initial evaluation completed, care for the patient with a new onset headache should be coordinated with their primary care provider, or the appropriate specialist, since they will usually need close follow-up. Patients discharged from the ED are carefully advised on how to use their medications, under what circumstances they should return to the ED versus when to see their primary care provider. Migraine patients are advised of the possibility that their headache might return and prescriptions for rescue medications should be provided. Patients whose headache can not be controlled in the ED should be admitted to the hospital for further diagnostic testing and symptomatic treatment.

TABLE 1: Differential Diagnosis of Headache

CNS vascular event

- arteritis
- carotid artery dissection
- cerebral dural venous thrombosis
- epidural
- intracerebral bleed/infarct
- subarachnoid
- subdural

Infection

- meningitis
- encephalitis
- abscess
- sinusitis
- systemic

Increased intracranial pressure

- tumor
- hydrocephalus
- pseudotumor cerebri
- hypertensive crisis

Ophthalmologic

- glaucoma
- optic neuritis

Toxin/Metabolic

- hypoglycemia
- hypoxia
- carbon monoxide poisoning

Tension-Vascular Headache Syndromes

- migraine
- cluster
- tension

Post-Traumatic Headache Syndromes

Drug effect and Drug rebound headaches

Trigeminal Neuralgia

Temporal Mandibular Joint Disease

TABLE 2: Danger Signals in Headache

- Worst headache the patient has ever had
- Progressive headache
- Headache that begins with exertion
- Altered mental status
- Presence of meningeal signs
- Presence of fever, or history indicating immunocompromise
- Focal neurologic findings
- Headache associated with position
- New onset of headache after age 50 or during pregnancy
- Headache that is different from past headaches

Treatment Essentials

Migraine

- Assess patients for dehydration and hydrate as indicated.
- Anti-emetics and im/iv drugs in patients with nausea or vomiting, except when using sumatriptan which has anti-emetic properties.
- Assess for pregnancy and avoid ergots and sumatriptan if positive.
- Ergots and sumatriptan are contraindicated in patients with coronary artery disease, hypertension, hepatic or renal impairment, or patients with new neurologic deficits.
- In general, narcotics are avoided in treating migraine

Acute Migraine

Naproxen sodium	275 mg po	2-3 tabs at onset, repeat 1-2 tabs in 2 hours if needed
Ibuprofen	200 mg po	1-4 tabs
Ketorolac	60 mg im	
Isometheptene	65 mg po	2 capsules at onset then 1 capsule q1 hour up to 6
Acetaminophen	325 mg po	
Dichloralphenazone	100 mg	
Aspirin	330 mg po	1-2 tabs q 4 hours up to 6 tabs in 24 hours
Caffeine	40 mg	
Butalbital	50 mg	
Prochlorperazine	25 mg po/pr 5-10 mg im/iv	
Metoclopramide	10 mg po/im/iv	
Chlorpromazine	1 mg/kg im .5 mg/kg iv	
Ergotamine	1 mg po/sl	1-4 mg at onset followed by 1-2 mg q 1/2 hour up to a max of 5 mg in 24 hours
Ergotamine	2 mg pr	1/2-1 suppository at onset followed by 1/2 suppository 1/2 hour up to a max of 5 mg in 24 hours
DHE	0.5-1 mg iv/im	repeat q 1 hour for total max of 3 doses in 24 hours
Sumatriptan	6 mg subcut	can repeat once in 12 hours
Prednisone	80 mg po	rapid taper over 1 week
Dexamethasone	20 mg po	rapid taper
Lidocaine	1 mg/kg iv	

- Discharge patients after improvement, with medications in case of headache relapse.
- Notify primary care physician of patient's ED visit.
- Instruct patient on indications to return to ED and for follow-up with primary care physician.

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This is an excellent collective summary of all the studies performed up to 1999 on the acute management of migraine headache. Studies are graded based on their methodology and recommendations are made based on the strength of evidence.

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This is an evidence based document that evaluates the literature on acute migraine management and makes evidence based recommendations.

3. **American College of Emergency Physicians. Clinical Policy: Critical issues in the evaluation and management of patients presenting to the emergency department with acute headache. Ann Emerg Med; in print for publication in the Fall 2001.**

This is the second revision of ACEP's headache clinical policy and deviates from the first version by asking focused questions rather than approaching headache from an undifferentiated point of view. The four questions asked in the document include: Does response to therapy predict the etiology of an acute headache?; In which patients with a complaint of headache can a lumbar puncture be safely performed without a neuroimaging study?; Which patients with headache require neuroimaging in the ED?; Is there a need for emergent angiography in the patient with a sudden severe headache who has a negative CT and a negative lumbar puncture?

4. **Godwin A, Villa J. Acute headache in the ED: Evidence-based evaluation and treatment options. Emergency Medicine Practice 2001; 3:1-32**

This is an outstanding overview of acute headache presentations to the emergency department. The article takes an evidence based approach to diagnosis and management and focuses on clinical pathways in emergency care.

5. **Field A, Wang E. Evaluation of the patient with nontraumatic headache: An evidence based approach. Emerg Med Clin No Am 1999; 17:127-152.**

This is a well written review of literature regarding ED diagnostic testing on the patient with acute headache.

6. **Radhakrishnan K, Ahlskog E, Garrity J, Kurland L. Idiopathic intracranial hypertension. Mayo Clin Proc 1994; 69:169-180.**

This is an excellent review of the literature up to 1994 on idiopathic intracranial hypertension. The article reviews the epidemiology, pathophysiology, diagnostic approach, and treatment. It provides a practical approach to managing these patients.

7. **Giuseffi V, Wall M, Siegel P, Rojas P. Symptoms and disease associations in idiopathic intracranial hypertension. Neurology 1991; 41:239-244.**

This is a case controlled study comparing 50 patients with IIH to 100 age-matched controls. Symptoms, predisposing conditions, and response to treatment is analyzed. The study concludes that IIH is underdiagnosed and alerts clinicians to the need for early diagnosis in order to initiate treatment and minimize morbidity.

A Case of Sudden and Severe Headache

Questions

- 1. Which of the following is considered a first line treatment in the management of acute migraine headache?**
 - a. Morphine
 - b. Meperidine
 - c. Dihydroergotamine
 - d. Ketorolac
 - e. Prochlorperazine

- 2. Which of the following is primary neurotransmitter involved in headache?**
 - a. Dopamine
 - b. Acetylcholine
 - c. Glutamate
 - d. Serotonin
 - e. Norepinephrine

- 3. Which of the following is an indication to obtain a head CT in a patient with a headache in the emergency department?**
 - a. Sudden severe headache
 - b. Headache with a neurologic deficit
 - c. New headache in patient over 50 years old
 - d. New headache in a pregnant patient
 - e. All of the above

- 4. Which of the following are considerations in a patient with a sudden severe headache?**
 - a. Subarachnoid hemorrhage
 - b. Cerebral venous thrombosis
 - c. Carotid artery dissection
 - d. All of the above
 - e. None of the above

A Case of Sudden and Severe Headache

Answers

- 1. Answer e.**
- 2. Answer d.**
- 3. Answer e.**
- 4. Answer d.**