

CLINICAL CORNER

An Ongoing Series

Headache

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CONCEPTS AND OBJECTIVES

The series objective is to review various clinical conditions/presentations, including the latest evidence on management, and to dispel common myths. In the process, core knowledge and management principles are enhanced. A clinical case will be presented. Cases will be drawn from real life but phrased in a context that is applicable to the Special Operations Forces (SOF) or Tactical Emergency Medical Support (TEMS) environment. Details will be presented in such a way that the reader can follow along and identify how they would manage the case clinically depending on their experience and environment situation. Commentary will be provided by currently serving military medical technicians. The medics and author will draw on their SOF experience to communicate relevant clinical concepts pertinent to different operational environments including SOF and TEMS. Commentary and input from active Special Operations medical technicians will be part of the feature.

The Case

You are a medical technician working with a military training assistance program (MTAP) in a semipermissive arid environment. You are at a very remote site with a multinational team. One evening, a 28-year-old team member approaches you regarding his headache. He describes a moderately severe headache with some nausea as well as symptoms of malaise, myalgia, and fatigue. He denies fever or neck pain; his symptoms have been present for the past 48 hours. He has vomited twice. He is otherwise healthy and has no medical allergies. He has a remote history of recurrent headaches. He reports that his mother suffers from migraines. He is taking atovaquone/proguanil for malaria prophylaxis and is compliant with his medication. He has been using his bug net at night and denies any trauma.

What Is Your Approach to This Patient?

This is a rather vague presentation that could be benign. However, given the remoteness of your location and the lack of advanced imaging and support, it is important to consider if this could represent the beginning of a more serious illness. Breaking down the presenting symptoms to a chief complaint can be helpful, but keep your differential diagnosis broad. This 28-year-old is complaining of a 2-day history of a new moderately severe headache. He has had headaches before and there is a family history of migraines. Before we assume this headache is a migraine or other benign recurrent headache, we must carefully consider other more serious causes of headache. Our approach should therefore be centered around ensuring this headache is not something more emergent.

Headache is a very common presentation. It is estimated to make up about 4% to 5% of emergency department visits.¹ An appropriate approach is to ensure that the presentation is not suspicious for a life-threatening cause of headache. An appropriate history is taken to look for “red flags” that might indicate a potentially dangerous source of the headache. Some clinicians will attempt to remember a list of questions that should be asked around headache; this is an appropriate strategy but a good understanding about what exactly those serious conditions are is essential. By knowing what medical emergencies could cause a headache, the clinician is more likely to know what to look for on history and physical examination. If serious pathology is not suspected, then the acute care physician can provide appropriate analgesic treatment. Ultimately, the patient must follow up with his or her primary care provider to address recurrent headaches or get a specifically tailored plan for the headache type.

The categories of dangerous causes of headaches that need to be considered include:

1. Traumatic
2. Infectious
3. Malignant
4. Hemorrhagic
5. Vasculitis
6. Other

Possible traumatic cause of headache includes subdural hematomas, epidurals, and fractures. The history will include some form of injury. The more significant the injury, the more suspicious a clinician should be. However, there are cases of relatively minor injury causing intracranial bleeding. Changes in level of consciousness, new-onset vomiting, or focal neurologic findings are also important historic considerations. If the patient is taking any form of anticoagulation, your index of suspicion should go up. On the clinical examination, signs of trauma, focal tenderness, and deformity need to be sought. If a traumatic headache is suspected, then emergent neuroimaging is required. Computed tomography is an appropriate initial test, although it is rarely available in a deployed setting.

A patient who presents with a headache and fever requires careful evaluation. Possible infectious causes of headache include meningitis and encephalitis, as well as more focal infections like sinusitis. In a deployed setting, consideration should be given to other tropical illnesses such as malaria. Inquiry with respect to fevers and the pattern of fever is important. In addition, the clinician needs to be clear on exposure and compliance with prophylaxis measures.

The “classic” presentation of meningitis includes fever, neck stiffness, and altered mental status. It should be noted that one or more of these features is commonly absent but 99% of meningitis cases have at least one of the classic features.² A history of preceding illness and infectious risk is helpful. A history of immunosuppression or intravenous (IV) drug abuse is particularly worrisome. A detailed physical examination documenting temperature and vital signs is important. A focused neurologic examination and the presence or absence of signs of meningeal irritation (nuchal rigidity) is critical. Nuchal rigidity refers to a state when a patient will be unable to touch the chin to the chest during active or passive flexion of their neck. This finding is not always present, but generally the sicker the patient, the more likely the finding is present.³ If an infectious etiology is suspected, then the patient requires urgent evacuation. It would be appropriate to start IV antibiotics on speculation, especially if there is going to be any delay in evacuation or definitive diagnosis.

Another important consideration is whether this headache is due to the development of a new malignant tumor or metastases from prior cancer. This is less likely a

consideration in a typical younger military population but must be considered. History should be elicited for prior cancer history, including childhood events. A slow insidious daily headache with exacerbation after lying down and with morning vomiting is particularly worrisome. Any new cognitive or neurologic findings are also red flags. Physical examination should focus on a detailed neurologic examination including funduscopic examination for papilledema or lateralizing findings. Ultimately, if this is suspected, dedicated imaging is required.

Another “can’t miss” headache is caused by a subarachnoid hemorrhage (SAH). This typically occurs as a small arterial aneurysm ruptures, leaking blood into the cerebro spinal fluid. It is most common in middle-aged men with history of hypertension.⁴ The classic presentation is a “thunderclap” headache that is abrupt and maximal in intensity in a few seconds or minutes.⁴ SAH can also be associated with syncope and neck pain.⁴ Other concerning pathology is associated with a sudden-onset headache including arterial dissections and sinus venous thrombosis. Any history that suggests a sudden thunderclap headache warrants advanced imaging and communication with a higher medical authority. Other questions should include syncope or onset with neck pain. Physical examination should include level of consciousness, neck symptoms, and fundi examination.

A type of vasculitis known as temporal arteritis can lead to onset of severe headaches. This is commonly unilateral and may exhibit focal tenderness over the temple. Visual symptoms and jaw claudication may be present. Jaw claudication refers to the development of pain in the masseter muscle after chewing. This typically affects the elderly. There may be a history of autoimmune disease. The patient may have unilateral temporal tenderness.

Other potentially serious headaches should be considered. These will largely be evident based on the history. In the military environment, several environment-specific headaches should be considered. Your index of suspicion will depend on the operational or environmental context in which your patient has been in. For instance, at altitude a severe headache and confusion might indicate high-altitude cerebral edema. A headache post deep diving might indicate decompression illness. In a tropical environment, consider malaria or other infectious disease processes. Carbon monoxide poisoning presents early with headache and nausea and is a good thing to keep in mind when forming your differential diagnoses.

If a serious source of headache is suspected, then the deployed clinician must institute the best treatment available and communicate with the higher medical authority. Transportation or evacuation for further treatment and or diagnostic testing should not be delayed.

Important questions to illicit on headache history

- Sudden onset
- Difference from prior headaches
- Presence of fever
- Altered mental status or behavior
- Prior history of cancer
- Recent trauma
- Immunosuppression
- Infection risk
- Focal neurologic findings
- Presence of syncope, seizure, or neck stiffness
- Environmental specific questions

You Take a Detailed History

Your patient describes a gradual onset headache over a few hours with a fluctuating course during the past 2 days. It is similar to some prior headaches he has experienced. He has not had a fever or any change in his mental status. He has experienced no unusual neurological symptoms, syncope, or neck stiffness. He is not immunosuppressed and has not experienced any trauma.

Physical Examination

Every clinician tailors his or her physical examination for a headache somewhat differently. It is important to consider your differential diagnoses when conducting the examination. If you are strongly considering an infectious etiology, careful examination looking for possible sources of infection is critical. The following list is essential with other features of the physical examination added to address your working and differential diagnoses.

- Temperature
- Full vital signs
- Mentation, alertness, and orientation
- Eye examination: pupils, visual fields, extraocular muscle, and fundi
- Speech character: receptive and expressive
- Head and neck examination for trauma: signs of basal skull fracture, step or depression deformity
- Neck stiffness or nuchal rigidity
- Focal signs of infection
- Temporal tenderness
- Gait and coordination

Examination Results

On examination, you find the patient is afebrile and alert with no concerning findings on examination of the head and neck. He has no cervical adenopathy and no meningeal findings. He has no temporal tenderness, and

there are no signs of trauma. The rest of his physical examination is largely unremarkable. Notably, he has normal vital signs with pulse of 88, blood pressure of 125/75mmHg, temperature of 36.8°C, and an SpO₂ of 98%. He has no other adenopathy and a benign chest, cardiac, and abdominal examination. His speech and gait are normal. He has mild photophobia.

What Is Your Next Step?

You have taken a detailed history and conducted a physical examination and have identified no concerning red flags for serious pathology. It is appropriate to institute treatment and monitor this patient.

The experienced clinician knows that the response of a headache to medication is not diagnostic. If you suspect serious etiology, then institute an appropriate diagnostic and treatment plan. Do not be falsely reassured by your patient's response to your treatment. There are many case examples of SAH improving with treatment and the patients being discharged only to return with more advanced symptoms.

Treatment

There are a vast number of treatment options for benign headaches. Every clinician has his or her favorite. We will focus on evidence-supported treatments that can be implemented in the tactical medicine environment. Unless your teammate has recurrent headache and specifically carries abortive medicine, you will be limited to what you carry in your "sick parade box." This might include nonsteroidal anti-inflammatory drugs (NSAIDs), antiemetics, and or opiates.

NSAIDs

NSAIDs are at the forefront of treatment for benign headaches. They are inexpensive and readily available and have a reasonable safety profile. Many patients will have already tried ibuprofen or another NSAID before seeking medical attention. Some patients will have been unable to tolerate the medication due to vomiting; IV or intramuscular (IM) ketorolac is an option in these cases. However, all NSAIDs can cause gastric irritation and renal dysfunction. This is especially worrisome if the patient is dehydrated.

Ketorolac can be given IV and IM. The traditional dose was 30 mg either IV or IM. However, a recent article suggests a 10-mg IV dose was effective and had fewer side-effects.⁵

Antiemetics

This category of drugs includes metoclopramide and prochlorperazine. They are primarily carried as antiemetic medications, but their effect on migraine or benign headaches is thought to come from their dopamine-blocking

ability. These drugs are particularly effective if the patient's benign headache is accompanied by severe nausea or vomiting. One side-effect of these medications is the symptom of akathisia. Akathisia is a state of agitation or restlessness. It can be mitigated by the concurrent use of 12.5mg to 25mg IV diphenhydramine. Typical doses for migraine would be metoclopramide 10mg to 20mg IV or prochlorperazine 10mg IV. Prochlorperazine has been demonstrated to be more effective than IV metoclopramide, but both are more effective than placebo.⁶

Ergots and Triptans

These classes of drugs are effective at treating migraine headache but are not typically carried in the operational setting. They are typically not carried when deployed due to their cost and lack of other medical indication. Drugs in the ergot class include ergotamine and dihydroergotamine (DHE), and a common drug in the triptan class is sumatriptan. Both ergot and triptans are effective in the treatment of migraine.⁶

Opiates

The use of opioids for chronic benign headaches or migraine is not recommended. This is true in both the civilian and military settings. The use is complicated for their potential for abuse, dependence, and tolerance.⁷ NSAIDs and antiemetic medications are effective and have a more favorable operational side-effect profile.

Case Conclusion

Due to his nausea and vomiting you elect to treat your patient with IV fluids and 10mg IV metoclopramide with 25mg diphenhydramine. After about 40 minutes, he is feeling significantly better, rating his pain 4/10. You recheck his vital signs and reexamine him for the development of new symptoms. You elect to repeat the dose of metoclopramide, and after another hour, he is dramatically improved. You instruct him to return to his cot and get some sleep. You check on him again in 3 to 4 hours recheck his temperature and ensure he has no nuchal rigidity. He has no new findings and is feeling much better.

Summary

Headache is an acute presentation. In the deployed setting, the clinician must ensure that the headache is not a harbinger of a more serious underlying illness. A clear understanding of potential causes of dangerous headaches is essential and a careful history and physical examination looking for "red flags" that might indicate a serious illness is critical for all clinicians.

Disclaimers

The views and medical opinion herein represent those of the authors. They do not reflect the operation practice or views of the Canadian Forces or other organizations. The cases are provided to be educational and thought provoking; at no time does the author suggest that the tactical clinicians exceed the scope of their practice or act against the direction of their medical protocols or recommendations of their medical leadership.

Disclosure

The authors have nothing to disclose.

References

1. Torelli P, Campana V, Cervellin G, et al. Management of primary headaches in adult emergency departments: a literature review, the Parma ED experience and a therapy flow chart proposal. *Neurol Sci.* 2010;31:545.
2. van de Beek D, de Gans J, Spanjaard L, et al. Clinical features and prognostic factors in adults with bacterial meningitis. *N Engl J Med.* 2004;351:1849.
3. Tunkel AR. Clinical features and diagnosis of acute bacterial meningitis in adults. In Calderwood SB, editor. UpToDate. www.uptodate.com. Accessed 3 April 2017.
4. Cutrer FM. Evaluation of the adult with headache in the emergency department. In Hockberger RS, Swanson JW, editors. UpToDate. www.uptodate.com. Accessed 10 April 2017.
5. Motov S, Yasavolian M, Likourezos A, et al. Comparison of intravenous ketorolac at three single-dose regimens for treating acute pain in the emergency department: a randomized controlled trial. Presented at the Society for Academic Emergency Medicine Annual Meeting, May 2016, New Orleans, LA. *Ann Emerg Med.* In press.
6. Agency for Healthcare Research and Quality. Acute migraine treatment in emergency settings. In Comparative Effectiveness Review Summary Guides for Clinicians. www.ncbi.nlm.nih.gov/books/NBK164542/. Accessed 2 April 2017.
7. Bajwa ZH. Acute treatment of migraine in adults. In Swanson JW, editor. UpToDate. www.uptodate.com. Accessed 15 April 2017.

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