

Expert Opinion

Headache in the Emergency Department

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Headaches are one of the most challenging problems for emergency physicians.

CASE

This 35-year-old man has a 3-year history of headaches occurring about once a month described as a right-sided throbbing with an intensity of 4/10 with light and noise sensitivity but no nausea or aura. He takes ibuprofen and the headache lasts about 6 hours. He has had 4 similar headaches in the last 2 years which intensify to an intensity of 10/10 with nausea and vomiting not responding to ibuprofen lasting 8 hours. He had 2 within 10 days and went to the emergency room with both. A computerized tomography of the brain was negative. The headache improved with an injection of an opiate and promethazine. He was diagnosed with a sinus infection and given an antibiotic and a butalbital combination medication. The charges for both emergency room visits were \$2900 (he has a \$3000 deductible).

Questions.—How common are headaches in the emergency department (ED)? Do emergency medicine physicians typically follow society guidelines for treatment of primary headaches? Why might neuroimaging be overutilized in the ED? What training do emergency medicine physicians have in headache medicine?

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EXPERT COMMENTARY

Acute headache is a frequent cause of presentation to US ED. Two million visits per year place headache as the fifth most common reason for visit to an ED – more common than low back pain but less common than chest or abdominal pain.^{1,2} Of the acute headaches, migraine is the most frequent actual diagnosis,³ but because emergency physicians are often focused on excluding pathological headaches that acutely threaten life and limb, migraines are often lumped into a category of benign or nonspecific headache.⁴

Medical management of acute migraine in the ED has lagged behind evidence-based care. In 1998, opioids were used more often than triptans or DHE.⁵ My own review of national data from 2005 revealed that not much has changed: use of meperidine has been replaced by hydromorphone, but opioids are still used much more commonly. The obvious question of why this is so has not been addressed systematically.

What is the optimal parenteral therapy for a patient who presents to the ED with an acute exacerbation of an underlying migraine disorder? Assume the patient has 10/10 pain (which has been the median baseline pain score in many of the ED-based migraine clinical trials I have conducted) precluding a detailed history and physical exam. Assume that the patient has an elevated blood pressure, which is not uncommon in patients who present to an ED with acute pain. Assume that the headache duration has been more than 8 hours, which is typical for ED patients, and thus the efficacy of subcutaneous sumatriptan may be limited. Is there any role for

1 parenteral opioids in these patients with acute severe
2 pain who may or may not have cardiac risk factors or
3 other contra-indications to first-line migraine medica-
4 tion? The appeal of opioids is that they are excellent
5 analgesics with few contraindications and, if need be,
6 are easily reversed with readily available antagonists.
7 Does the harm of opioids outweigh their convenience
8 in the acute setting? Frequently used oral opioids are
9 associated with exacerbation of the underlying
10 migraine disorder,⁶ but the same has not been dem-
11 onstrated for infrequent use of parenteral opioids
12 in the ED. Meperidine is associated with return
13 visits to the ED,⁷ but the same may not be true of
14 morphine.

15 On the other hand, the reality is that despite their
16 pain, most migraine patients can give a brief but rel-
17 evant history, and there are quite a few effective and
18 evidence-based parenteral therapies that can be
19 administered without cardiac risk stratification, such
20 as prochlorperazine,⁷ metoclopramide,⁸ and ketoro-
21 lac.⁹ Many migraine patients who use an ED have
22 been to that ED before. While there may be a need
23 for opioids in some patients, these medications should
24 not be used as commonly as they are.

25 So why then the rampant use of opioids in the
26 ED? It may be that despite the fact that the emer-
27 gency medicine literature is replete with high-quality
28 clinical studies demonstrating effective alternates to
29 opioids, emergency physicians have not been con-
30 vinced of the harm of opioids. Or it may be that, in
31 the mind of some, the safety or adverse event profile
32 of parenteral alternatives is still concerning.

33 Physician use of opioids may also be related to
34 patient request, “Doc, please, just give me my
35 Demerol.” The easiest way to deal with recidivist
36 patients, at least in the short term, is to give in to their
37 demands, particularly in an overcrowded ED. Strate-
38 gies to deal with the “frequent flyers” are best deter-
39 mined between clinical shifts, using an inter-
40 disciplinary approach, medication contracts, and
41 patient-specific strategies that are applied in the same
42 way by all practitioners in the department.

43 Now with regard to the specifics of the case pre-
44 sented, one is left bewildered why this patient left the
45 ED with a prescription for antibiotics. There is little
46 evidence this patient had sinusitis, let alone acute bac-

47 terial sinusitis. Much has been written on the misdi-
48 agnosis of migraine as sinusitis,¹⁰ and it seems that this
49 problem has not exempted the ED. I do wish to draw
50 a distinction between the inaccurate diagnosis made
51 in this case and the willful conflation of the various
52 primary headache disorders into the catchall
53 “benign” or nonspecific headache. One can under-
54 stand the reasoning behind the conflation: specific
55 diagnosis will not change the parenteral therapy used.
56 Acute migraine and acute tension-type headache
57 both respond to sumatriptan,¹¹ the dopamine-
58 antagonist,¹² ketorolac, and the opioids. The trouble
59 with not providing a specific headache diagnosis is
60 most problematic after ED discharge: specific and
61 accurate diagnoses can be used by patients to educate
62 themselves and to seek out further care.

63 The overuse of advanced imaging is rampant and
64 not isolated to headache. Using a national database, I
65 recently identified a threefold increase in the rate of
66 advanced imaging in the ED for low back pain,
67 between 2002 (3%) and 2006 (9%). This may be
68 explained partly by the *Field of Dreams* principle: “If
69 you build it, they will come” – as scanners are more
70 readily available, they are used. Defensive medicine
71 may also play a role – the American College of Emer-
72 gency Physician acute headache guidelines discuss
73 when a head computerized tomography should be
74 performed but not when a head computerized tomog-
75 raphy is not necessary.¹³ Similarly, authoritative
76 reviews recommend a diagnostic workup for all
77 patients with a “First, worst, or changed” headache.¹⁴
78 In my experience, perhaps to justify the rationale for
79 their visit, most ED patients describe their headache
80 as “first,” “worst,” or “changed.”

81 Most of an emergency physician’s headache
82 training comes on-the-job, ie, caring for the 2 million
83 patients who present to EDs with headache. Emer-
84 gency physicians are required by the Accreditation
85 Council for Graduate Medical Education to be com-
86 petent in headache care, but this is done with limited
87 formal didactics. Most programs have no more than 2
88 hours of structured primary headache lectures per
89 year. Therefore, the quality of an emergency medicine
90 resident’s headache education depends largely on the
91 clinical teachers – attending emergency physicians
92 and consulting neurologists and headache specialists.

1 Is this sufficient? It is difficult to quantify the
2 adequacy of headache care delivered in EDs by emer-
3 gency physicians. On the one hand, there are many
4 stories of substandard care. On the other hand, when
5 surveyed, many headache patients seem satisfied with
6 the care they received in the ED.

7 It is clear that ED care of headache can be stream-
8 lined and homogenized through the use of a thought-
9 ful protocol.¹⁵ This would be developed by a team
10 of interested and informed clinicians representing
11 the relevant specialties. Protocols can be used
12 to standardize workup of secondary headaches,
13 determine criteria for admission to the hospital,
14 homogenize parenteral treatment and discharge pre-
15 scriptions, and expedite outpatient referral. Although
16 substantial time would be required to develop a useful
17 and flexible protocol appropriate for a specific medical
18 center, it could result in improved relations between
19 departments and a better experience for both the
20 clinicians and the patients. Ideally, a protocol would
21 decrease throughput time, determine the right balance
22 of diagnostic testing, decrease medical error, decrease
23 litigation, and improve pain outcomes for the millions
24 of migraineurs who utilize US EDs every year.

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26 **3 REFERENCES**

- 27 1. Goldstein JN, et al. Headache in United States
28 emergency departments: Demographics, work-up
29 and frequency of pathological diagnoses. *Cephalal-*
30 *gia*. 2006;26:684-690.
31 2. McCaig LF, Nawar EW. National Hospital Ambula-
32 tory Medical Care Survey: 2004 emergency depart-
33 ment summary. *Adv Data*. 2006;372:1-29.
34 3. Friedman BW, et al. Applying the International
35 Classification of Headache Disorders to the emer-
36 gency department: An assessment of reproducibility
37 and the frequency with which a unique diagnosis can
38 be assigned to every acute headache presentation.
39 *Ann Emerg Med*. 2007;●●:●●-●●.

- 40 4. Miner JR, et al. Droperidol vs. prochlorperazine for
41 benign headaches in the emergency department.
42 *Acad Emerg Med*. 2001;8:873-879.
43 5. Vinson DR. Treatment patterns of isolated benign
44 headache in US emergency departments. *Ann*
45 *Emerg Med*. 2002;39:215-222.
46 6. Bigal ME, et al. Acute migraine medications and
47 evolution from episodic to chronic migraine: A
48 longitudinal population-based study. *Headache*.
49 2008;48:1157-1168.
50 7. Jones J, et al. Randomized double-blind trial of
51 intravenous prochlorperazine for the treatment of
52 acute headache. *JAMA*. 1989;261:1174-1176.
53 8. Colman I, et al. Parenteral metoclopramide for
54 acute migraine: Meta-analysis of randomised con-
55 trolled trials. *BMJ*. 2004;329:1369-1373.
56 9. Friedman BW, et al. The relative efficacy of meperi-
57 dine for the treatment of acute migraine: A meta-
58 analysis of randomized controlled trials. *Ann Emerg*
59 *Med*. 2008;52:705-713.
60 10. Cady RK, Schreiber CP. Sinus headache or
61 migraine? Considerations in making a differential
62 diagnosis. *Neurology*. 2002;58(Suppl. 6):S10-S14.
63 11. Miner JR, et al. Sumatriptan for the treatment of
64 undifferentiated primary headaches in the ED. *Am J*
65 *Emerg Med*. 2007;25:60-64.
66 12. Cicek M, et al. Prospective, randomised, double
67 blind, controlled comparison of metoclopramide
68 and pethidine in the emergency treatment of acute
69 primary vascular and tension type headache epi-
70 sodes. *Emerg Med J*. 2004;21:323-326.
71 13. Clinical policy: Critical issues in the evaluation and
72 management of patients presenting to the emer-
73 gency department with acute headache. *Ann Emerg*
74 *Med*. 2002;39:108-122.
75 14. Edlow JA, Caplan LR. Avoiding pitfalls in the diag-
76 nosis of subarachnoid hemorrhage. *N Engl J Med*.
77 2000;342:29-36.
78 15. Dutto L, et al. Nontraumatic headaches in the emer-
79 gency department: Evaluation of a clinical pathway.
80 *Headache*. 2009;49:1174-1185.

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