

## **Emergency and inpatient treatment of migraine: An American Headache Society survey.**

The objective of this study was to determine the practice preferences of AHS members for acute migraine treatment in the ED and inpatient setting. Expert opinion on the treatment of migraine, especially in circumstances where there is a lack of evidenced-based treatment protocols, should help guide the development of a better paradigm for treating patients.

### **Methods:**

The AHS Special Interest Section for Inpatient and Emergency Care developed these survey questions during and after section meetings. The goals of this survey included: (1) to determine pharmacologic preferences for emergency and inpatient treatment; (2) to identify indications for inpatient, as opposed to outpatient, treatment; (3) to assess differences in adult and pediatric acute migraine emergency and inpatient treatment. AHS distributed the survey via Survey Monkey, an internet based survey site, to the AHS membership on April 23, 2011, with a response deadline set for one week after distribution.

Survey questions are listed in Appendix A. Questions 7, 9, 13 were single choice, the remaining questions allowed selection of multiple answers. Respondents also had the option of submitting demographic data.

### **Results:**

The survey was distributed to 807 AHS members. There were 106 survey respondents with 87 respondents completing all 13 questions. 104 members responded to questions 1-3 and 93 responded to questions 1-9.

The most frequent choice for first line ED migraine treatment in an otherwise healthy adult was a dopamine antagonist [Table 1]. The most frequent second line treatments were valproic acid (31.7%), dihydroergotamine (DHE) (28.8%), and NSAIDs (26%). Opioids were chosen by 1% for first line and 4.8% for second line. No respondents selected barbiturate containing medications for either treatment [Table 1]. Oral triptans (55.8%), injectable sumatriptan (30.8%), and NSAIDs (30.8%) were the most common choices for outpatient use after ED discharge.

The most frequent medications for initial treatment during inpatient hospitalization for migraine were DHE (64.5%), dopamine antagonists (61.3%), and NSAIDs (37.6%). As a back-up if the initial treatment were not successful, the most frequent adjunctive treatments were valproic acid (35.5%) and corticosteroids (34.4%). [Table 2]

Nausea and vomiting was the most popular factor favoring inpatient admission (63.4%).

The majority of respondents suggested medication-overuse headache with opioids (68.3%) or barbiturates (58.1%) would be a factor in deciding on inpatient treatment for migraine. The majority of respondents, however, did not consider overuse of triptans (28.0%) or NSAIDs (15.1%) to warrant admission. Indications for inpatient treatment are listed in Figure 1. The majority of respondents (71%) indicated they would taper or stop opioid medication as a part of migraine treatment in patients admitted for intractable migraine who were taking opioids for an unrelated indication such as low back pain.

The majority of respondents considered ancillary services such as psychology (80.4%), physical therapy (65.2%), nutrition (51.1%), and psychiatry (46.7%) to be useful. Only 13% of respondents chose healing touch or Reiki therapy. The majority of respondents (60.9%) indicated they would discharge a patient who had improved but continued to

have mild headache, while the remainder (39.1%) would continue treatment with the goal of becoming headache free. Recommended follow-up was within 4 weeks of discharge for 79.3% of respondents, and 1 month or longer for 20.7%.

For the treatment of a pediatric patient, age 14 in the survey question, the most frequent choice for first line ED migraine treatment was NSAIDs (55.2%), followed by dopamine antagonists (37.9%), and intravenous hydration (35.6%). The most frequent second line treatments were NSAIDs (28.7%), intravenous valproic acid (27.6%), DHE (21.8%) and dopamine antagonists (21.8%) [Table 3]. Opioids were not chosen by any respondents for first line and by only 1.1% for second line. Barbiturate containing medications were no selected for either treatment. Oral triptans (67.8%), NSAIDs (44.8%) and triptan nasal spray (14.9%) were the most common choices for outpatient use after ED discharge.

**Discussion:**

This survey attempts to describe what clinicians treating headache consider the best practices in the treatment of migraine. As would be expected given the lack of clear guidelines for emergency treatment, respondents selected multiple different types of medications as first- or second-line treatment. Most selected multiple treatments for use as first-line and second-line therapy, suggesting that many AHS members consider migraine as seen the ED or in the inpatient setting to be challenging, and less likely to respond to a single agent. Given the prevalence of migraine, only a small minority of persons with migraine are ever admitted for inpatient care, which implies that those who are admitted tend to be refractory.

The responses of AHS members indicate preference for dopamine antagonists, IV hydration and NSAIDs for acute migraine treatment in the ED, with the addition of DHE and/or valproic acid for adjunctive treatment. Opioids were rarely selected as first-line treatment. The responses for initial treatment of migraine in the inpatient setting indicated more frequent use of DHE than in the ED. The current survey allowed respondents to select multiple interventions but did not specifically address preferences for combination versus monotherapy of listed medications. The second most used second-line treatment in an inpatient setting, as represented by percentage of respondents, was corticosteroids (34.4%).

AHS members rarely recommend opioids and do not recommend barbiturates in persons the emergency treatment or inpatient setting. This survey did not focus on patients with secondary headache or contraindications to specific agents such as known cardiovascular disease – situations in which opioid use might be more acceptable. This reflects a difference in the treatment preferences of AHS members as compared to reports of ED prescribing practices. Many AHS members also indicated that they would taper or discontinue chronic opioids. This likely reflects prior studies that have demonstrated that the use of daily opioids for non-headache indications, such as arthritis and low back pain, can lead to progression of chronic daily headache and chronic migraine. Obviously, patients receiving very high doses of long-acting opioids for conditions such as cancer pain or failed back syndrome may not be able to discontinue opioid therapy. For patients with worsening migraine on daily opioids, clinicians need to consider the indication for opioids, the daily dose, any ongoing opioid-related adverse effects, and if there is clear relationship between opioid use and worsening migraine or not.

The goals of inpatient treatment may vary, depending on the indication for admission. Studies of tertiary headache centers have identified several conditions necessitating hospitalization, including medication overuse, failure of outpatient therapy, functional disability, or severe psychiatric comorbidity. Respondents considered the presence of vomiting, multiple ED visits and overuse of either opioids or barbiturates more problematic for outpatient treatment compared with the presence of a mood disorder or overuse of either triptans or NSAIDs. AHS member responses also reflected the published utility of ancillary services to address comorbid conditions such as anxiety and depression. Responses in this survey indicated most providers would discharge an improved patient rather than aim for complete headache resolution. This may reflect pressure on providers to reduce patient's length of stay. For those suffering from long-standing migraine and severe disability, perhaps longer admissions should be considered. of valproic acid and/or DHE for second line treatment.

The current study is limited by 18% non-completion rate. The drop in respondents at question 4, which addresses inpatient treatment, and question 10, which addresses a pediatric patient, may indicate that respondents did not answer questions that did not address their practice experience. Still this survey suggests some general principles for acute migraine management in the ED or inpatient setting. First of all, neuroleptics, NSAIDs and migraine-specific agents should be considered before opioids or barbiturates for both adults and children. In patients already on opioids, their dose should not be increased for migraine. The presence of opioid or barbiturate overuse is more concerning than triptan or NSAID overuse and may warrant inpatient treatment. Having ancillary

services available such as psychology is helpful. Outpatient follow-up after discharge is essential and ideally should occur within 1 month of discharge.

**Acknowledgements:**

The authors wish to thank the American Headache Society, especially Elizabeth Frye, for assistance in distributing the survey and preparing the results.

Table 1.-AHS member treatment recommendations for adult patient with acute migraine in the ED

Treatment option	First-line treatment (% response)	Second-line treatment (%response)
Dopamine antagonist	<b>58.7</b>	21.2
NSAIDs	<b>49.0</b>	<b>26.0</b>
IV hydration	<b>48.1</b>	16.3
DHE	33.7	<b>28.8</b>
SC sumatriptan	21.2	5.8
Corticosteroids	15.4	22.1
IV magnesium	15.4	14.4
IV valproic acid	7.7	<b>31.7</b>
Ondansetron	7.7	2.9
Oral triptan	5.8	3.8
Triptan NS	3.8	1.0
Peripheral nerve block	1.9	8.7
Opioids	1.0	4.8
IV levetiracetam	0	4.8
Barbiturate-containing combination medications	0	0

The top three responses for each category are indicated in bold. NSAIDs=non-steroidal anti-inflammatory drugs; IV=intravenous, DHE=dihydroergotamine; SC=subcutaneous; NS=nasal spray

Table 2.-AHS member treatment recommendations for hospitalized migraine patient

Treatment option	First-line treatment (% response)	Second-line treatment (%response)
DHE	<b>64.5</b>	<b>21.5</b>
Dopamine antagonist	<b>61.3</b>	14.0
NSAIDs	<b>37.6</b>	18.3
Corticosteroids	22.6	<b>34.4</b>
IV valproic acid	21.5	<b>35.5</b>
IV magnesium	16.1	19.4
SC sumatriptan	11.8	2.2
Peripheral nerve block	6.5	<b>21.5</b>
IV lidocaine	4.3	6.5
Oral triptan	4.3	2.2
Triptan NS	3.2	2.2
Acetaminophen	2.2	0
Opioids	1.1	4.3
IV ketamine	1.1	4.3
IV levetiracetam	0	6.5
Barbiturate-containing combination medications	0	0

The top three responses for each category are indicated in bold.

DHE=dihydroergotamine; NSAIDs=non-steroidal anti-inflammatory drugs;

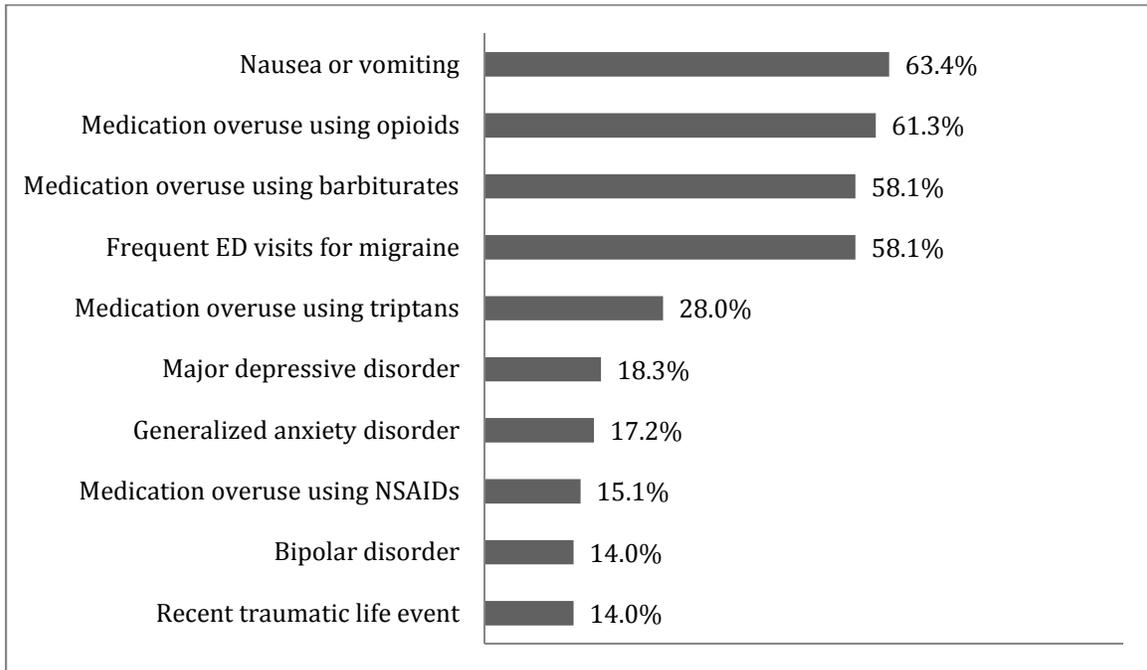
IV=intravenous; SC=subcutaneous; NS=nasal spray

Table 3.-AHS member treatment recommendations for pediatric patient with acute migraine in the ED

Treatment option	First-line treatment (% response)	Second-line treatment (%response)
NSAIDs	<b>55.2</b>	<b>28.7</b>
Dopamine antagonist	<b>37.9</b>	<b>21.8</b>
IV hydration	<b>35.6</b>	11.5
IV magnesium	14.9	12.6
SC sumatriptan	13.8	10.3
Oral triptan	13.8	9.2
Ondansetron	12.6	3.4
Triptan NS	9.2	3.4
DHE	8.0	<b>21.8</b>
Corticosteroids	8.0	18.4
IV valproic acid	6.9	<b>27.6</b>
Peripheral nerve block	2.3	5.7
Acetaminophen	2.3	1.1
IV levetiracetam	1.1	1.1
Opioids	0	1.1
Barbiturate-containing combination medications	0	0

The top three responses for each category are indicated in bold. NSAIDs=non-steroidal anti-inflammatory drugs; IV=intravenous; SC=subcutaneous; NS=nasal spray; DHE=dihydroergotamine

Figure 1.-AHS member response percent for indications for hospitalization for migraine treatment



ED=emergency department; NSAIDs= non-steroidal anti-inflammatory drugs

## Appendix A

The following is a series of questions developed by the inpatient and emergency section of AHS to gauge the opinions of our members and develop recommendations for best clinical practices. Unless otherwise specified, you may choose as many responses as you would like.

### Questions 1-3: Emergency room treatment

1. An otherwise healthy adult with migraine presents to your emergency department with a prolonged attack of 3 days of their typical migraine. Usual attacks are responsive to medication and last less than 2 days with about 2-3 migraines/month. Exam is normal and there are no “red flags” to indicate secondary headache or need for further diagnostic testing. Assuming the patient has no allergies or contraindications to medication, what treatment(s) would you recommend as first line treatment?

2. The patient has mild improvement with the initial treatment. What treatment(s) would you recommend as a second line treatment if the initial treatment was inadequate?

Note 1: the potential answers for 1-2 are the same and can be placed side by side.

Note 2: can choose as many answers as you like

- a) Oral triptan
- b) Triptan nasal spray (sumatriptan or zolmitriptan)
- c) Injectable sumatriptan
- d) Dihydroergotamine (DHE) IV, IM or NS
- e) Dopamine antagonist (i.e. prochlorperazine, promethazine, metoclopramide) IV or IM or PO
- f) Peripheral nerve block
- g) Ondansetron (zofran)
- h) Opioids
- i) Barbiturate-containing combination medications (i.e. Fioricet, Fiorinal)
- j) Non-steroidal anti-inflammatory medication (i.e. ketorolac, ibuprofen)
- k) Corticosteroids (i.e. dexamethasone, methylprednisolone)
- l) Intravenous valproic acid (Depacon)
- m) Intravenous levetiracetam (Keppra)
- n) Intravenous magnesium
- o) Intravenous hydration

3. The patient is significantly improved and would like to be discharged. What treatment(s) would you recommend for home use after discharge?

- a) Oral triptan
- b) Triptan nasal spray (sumatriptan or zolmitriptan)
- c) Injectable sumatriptan
- d) Dihydroergotamine (DHE)

- e) Dopamine antagonist (i.e. prochlorperazine, droperidol)
- f) Opioids
- g) Barbiturate-containing combination medications (i.e. Fioricet, Fiorinal)
- h) Non-steroidal anti-inflammatory medication (i.e. ketorolac, ibuprofen)
- i) Corticosteroids (i.e. dexamethasone, methylprednisolone)

Questions 4-7: Inpatient treatment

4. An adult patient with intractable migraine, disabled from work due to migraine, is admitted for migraine treatment. The patient is not currently on preventive therapy. Which of the following treatment(s) would you begin on admission?

5. The patient has not significantly improved after 1 day. Which of the following treatments would you add as a back-up treatment.

Note 1: the potential answers for 1-2 are the same and can be placed side by side.

Note 2: can choose as many answers as you like

- a) Oral triptan
- b) Triptan nasal spray (sumatriptan or zolmitriptan)
- c) Injectable sumatriptan
- d) Dihydroergotamine (DHE) IV, IM or NS
- e) Dopamine antagonist (i.e. prochlorperazine, promethazine, metoclopramide) IV or IM or PO
- f) Peripheral nerve block
- g) Opioids
- h) Barbiturate-containing combination medications (i.e. Fioricet, Fiorinal)
- i) Acetaminophen
- j) Non-steroidal anti-inflammatory medication (i.e. ketorolac, ibuprofen)
- k) Corticosteroids (i.e. dexamethasone, methylprednisolone)
- l) Intravenous valproic acid (Depacon)
- m) Intravenous levetiracetam (Keppra)
- n) Intravenous magnesium
- o) Intravenous lidocaine
- p) Intravenous ketamine

6. Which of the following factors would make you likely to recommend inpatient treatment for migraine, as opposed to outpatient treatment or infusion?

- a) Generalized anxiety disorder
- b) Major depressive disorder
- c) Bipolar disorder
- d) Recent traumatic life event
- e) Medication overuse using non-steroidal anti-inflammatory medication
- f) Medication overuse using triptans
- g) Medication overuse using opioids
- h) Medication overuse using barbiturate-containing combination medications

- i) Frequent ER visits for migraine
- j) Nausea or vomiting/inability to take oral medications

7. A patient with intractable migraine reports taking oxycodone/APAP 5/325 mg 1-2 tablets at least twice daily for lower back pain for 6 months. The patient reports it has been mildly helpful for back pain. How would you manage this patient on opioid therapy when admitted for migraine?

- a) Chronic opioids may worsen migraine – taper or stop in the hospital if possible
- b) Maintain the opioids for back pain or change to another formulation which is longer-acting but do not increase dose for migraine
- c) Increase the opioid dose to help both migraine and back pain

8. What ancillary services are useful when patients are admitted for intractable migraine?

- a) Psychology consult
- b) Psychiatry consult
- c) Physical therapy
- d) Nutrition
- e) Healing touch or Reikki therapy

9. After 3 days of treatment, the patient is steadily improving but continues to have mild headache rated as 3/10 on an 11-point scale or “mild.” You recommend (choose one):

- a) Discharge with an updated acute and preventive plan
- b) Continue treatment, with the goal of becoming headache free by discharge

#### Questions 10-11: Pediatric migraine

10. A 14 year-old patient presents for migraine to the emergency room. Although more prolonged and severe than usual, none of the symptoms are unusual for the patient’s typical migraine. Exam is normal and there are no “red flags” to indicate secondary headache or need for further diagnostic testing. Assuming the patient has no allergies or contraindications to medication, what treatment(s) would you recommend as first line treatment?

11. The patient has mild improvement with the initial treatment. What treatment(s) would you recommend as a second line treatment if the initial treatment was inadequate?

Note 1: the potential answers for 1-2 are the same and can be placed side by side.

Note 2: can choose as many answers as you like

- a) Oral triptan
- b) Triptan nasal spray (sumatriptan or zolmitriptan)
- c) Injectable sumatriptan
- d) Dihydroergotamine (DHE)
- e) Dopamine antagonist (i.e. prochlorperazine, promethazine, metoclopramide)

- f) Ondansetron (Zofran)
- g) Peripheral nerve block
- h) Opioids
- i) Barbiturate-containing combination medications (i.e. Fioricet, Fiorinal)
- j) Acetaminophen
- k) Non-steroidal anti-inflammatory medication (i.e. ketorolac, ibuprofen)
- l) Corticosteroids (i.e. dexamethasone, methylprednisolone)
- m) Intravenous valproic acid (Depacon)
- n) Intravenous levetiracetam (Keppra)
- o) Intravenous magnesium
- p) Intravenous hydration

12. The patient is significantly improved and would like to be discharged. What treatment(s) would you recommend for home use after discharge?

- a) Oral triptan
- b) Triptan nasal spray (sumatriptan or zolmitriptan)
- c) Injectable sumatriptan
- d) Dihydroergotamine (DHE)
- e) Dopamine antagonist (i.e. prochlorperazine, droperidol)
- f) Opioids
- g) Barbiturate-containing combination medications (i.e. Fioricet, Fiorinal)
- h) Acetaminophen
- i) Non-steroidal anti-inflammatory medication (i.e. ketorolac, ibuprofen)
- j) Corticosteroids (i.e. dexamethasone, methylprednisolone)

13. After discharge, when do you typically recommend follow-up in the office?

- a) Within 2 weeks
- b) Within 2-4 weeks
- c) 1 month
- d) 2 months or longer