Narcotics in the Emergency Room: Helpful or Harmful for Headaches?

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Diamond Headache Clinic Inpatient Unit
Chicago, IL
Disclosure

All planners, presenters, and reviewers of this session report no financial relationships relevant to this activity.
Objectives

At the end of this presentation, attendees will be able to:

• Apply strategies to select effective, non-narcotic medications tailored to an emergency room (ER) migraine patient's needs.

• Employ validated headache questionnaires to identify undiagnosed migraine sufferers and assess their current treatment.

• Propose pharmacists' actions that can improve transitions of care between ER and outpatient settings.
Pre-presentation Question

The American Headache Society endorses sumatriptan, metoclopramide, prochlorperazine and which other medication as “should offer” for acute migraine in the ER?

a. Hydrocodone injection
b. Morphine injection
c. Oral zolmitriptan
d. Droperidol injection
e. None of the above
Pre-presentation Question

Which validated questionnaire assesses a patient’s current migraine medications’ efficacy?

a. ID Migraine
b. Migraine ACT
c. Headache Impact Test
d. MIDAS
e. None of the above
To prevent headache recurrence after ER discharge, which is a “Should” offer?

A. Dexamethasone
B. Prednisone
C. Ketorolac injection
D. Intravenous fluids
Virtually every human being on the planet will experience a headache during their lifetime.
World Health Organization (WHO)

- #1 = dental caries = 2.4 billion people
- #2 = tension headache = 1.6 billion people
- #3 = migraine headache = 0.9 billion people
Audience poll

Diabetes = 9%
Epilepsy = 1%
Asthma = 8%
Migraine = 16%

Headache 2013;53:427-436
www.aesnet.org/for_patients/facts_figures
www.cdc.gov/nchs/products/databriefs/db94.htm
Migraine

• In the United States, approximately 30 million adults
  • 22 million women
  • 8 million men

• Costs
  – $11 billion for society, primarily due to lost productivity

Headache 2013;53:427-433
Diagnosis

• International Headache Society (IHS) *Primary Headache* criteria
• Standardized research
• Cumbersome in clinical practice
  – Categories not mutually exclusive
  – Symptoms-based
  – only 50% of people reporting headaches fulfilling migraine criteria are diagnosed by a physician

www.ichd-3.org/classification-outline/
Headache 2007;47:355-363
IHS Migraine Criteria

A. At least five attacks fulfilling criteria B-D
B. Headache attacks lasting 4-72 hours (untreated/unsuccessfully treated)
C. At least two:
   1. unilateral location
   2. pulsating quality
   3. moderate or severe pain intensity
   4. aggravation by or causing avoidance of routine physical activity (e.g., walking)
D. At least one:
   1. nausea and/or vomiting
   2. photophobia and phonophobia
E. Rule out organic illness
Migraine = WHO’s 7th Most Disabling Illness

<table>
<thead>
<tr>
<th>Examples of disabling illnesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia</td>
</tr>
<tr>
<td>Quadriplegia</td>
</tr>
<tr>
<td>Active psychosis</td>
</tr>
<tr>
<td><strong>Acute, severe migraine</strong></td>
</tr>
</tbody>
</table>
Biomarker

• No biomarker exists for primary headaches
  – symptoms-based diagnosis
  – research ongoing, but useable test is years away

• Until biomarker found, optimal diagnosis and treatment unlikely
Problematic in ER

• Without biomarker, history is paramount
• History-taking barriers
  – lack of patient/clinician familiarity
  – patient’s pain hinders questioning
  – evaluate for substance abuse
  – noisy, sensory-overload environment
  – others
Why do patients go to ER?

<table>
<thead>
<tr>
<th>Patient reported reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to healthcare</td>
<td>46%</td>
</tr>
<tr>
<td>Perceived emergent condition</td>
<td>33%</td>
</tr>
<tr>
<td>Preference (ER versus outpatient)</td>
<td>6%</td>
</tr>
<tr>
<td>Geographic/transportation</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>13%</td>
</tr>
</tbody>
</table>

Headache 2014;54:1131-1145
Headache in ER

• 3 to 5 million visits annually
  – 5th leading ER-visit reason
  – 3rd leading reason for adult women

• 1.2 million migraine visits annually
  – 3300 per day

• 37,000 hospital admissions annually
  – 100 per day

Cephalalgia 2014;35:301-290
Headache 2008;48:931-938
ER diagnosis

- 42% of patients are discharged with a migraine diagnosis

- 42% of patients are discharged as “NOS”
  - NOS = headache not otherwise specified
  - Some (likely the majority) of NOS patients are migraineurs

Headache 2008;48:931-938
Costs

• Per ER visit = $775
  – Cumulative = $700 million

• Per inpatient hospitalization = $7317
  – Cumulative = $375 million

• Exceeds $1 billion annually
Patient example

• 43-year-old female, two-decade migraine history
• Presented to ER with debilitating headache, nausea, vomiting
• Persisted for over 24 hours despite self-administration of naproxen, oral/injectable sumatriptan, oral/rectal promethazine
• Twice in preceding year similarly presented to ER
• Afebrile, blood pressure 138/88,
• Neurological exam, CT, EKG, and serum labs “normal”
• What would you prescribe?
<table>
<thead>
<tr>
<th>Description of Charge/Service</th>
<th>DESCRIPTION OF SERVICES</th>
<th>Charge(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABORATORY</td>
<td></td>
<td>296.00</td>
</tr>
<tr>
<td>CT SCAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMERGENCY ROOM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EKG/ECG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Current Account Balance: $4451.00

Total Amount Expected: $4451.00

Estimated Balance Due: $0.00

Patient Name: [Redacted]

Account Number: [Redacted]

Service Date: 11/06/07

Account Due: $4451.00

Primary Insurance: [Redacted]

Group #: [Redacted]

Policy #: [Redacted]

Effective: 05/01/2007

Secondary Insurance: [Redacted]

Group #: [Redacted]

Policy #: [Redacted]

Effective: [Redacted]

Statement Date: 12/07/07

Due Date: 12/07/07

Current Amount Due: $0.00

Account Number: [Redacted]

Amount Enclosed: [Redacted]
ER *narcotic* use

- Authoritative sources recommend **AGAINST** narcotics as a treatment-of-choice for acute migraine within ER
Choosing Wisely

American Headache Society (AHS)

Five Things Physicians and Patients Should Question

Released November 21, 2013

Don’t prescribe opioid or butalbital-containing medications as first-line treatment for recurrent headache disorders.

These medications impair alertness and may produce dependence or addiction syndromes, an undesirable risk for the young, otherwise healthy people most likely to have recurrent headaches. They increase the risk that episodic headache disorders such as migraine will become chronic, and may produce heightened sensitivity to pain. Use may be appropriate when other treatments fail or are contraindicated. Such patients should be monitored for the development of chronic headache.
ER Prescribing

• Narcotics
  2001 = 20%  2010 = 35%

• Hydromorphone was largest increase = 461%
  2001 = 1%  2010 = 10%

• Codeine use declined and hydrocodone use remained stable

ER Prescribing

- Triptans decreased
  - 2001 = 10%  2010 = 7%
- Only medication group:
  1. FDA-approved for acute migraine
  2. Demonstrated to restore function
- Intravenous fluid
  - 2001 = 20%  2010 = 34%

ER narcotic use

• Injectable narcotics administered in 49% of headache visits
  – hydromorphone = 25%
  – meperidine = 7%

• Including oral combination products
  – narcotics = 59%

• In year 1998:
  – hydromorphone = less than 1%
  – meperidine = 37%
Upon ER discharge

- 20% are pain-free
  - thus, 80% are NOT pain-free
- 64% experienced headache recurrent within 24 hours
- Majority lacked outpatient medications
- Majority lacked follow-up recommendations

Headache 2014;54:1131-1145
Median time to discharge

<table>
<thead>
<tr>
<th>Drug</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any triptan</td>
<td>90</td>
</tr>
<tr>
<td>Ketorolac</td>
<td>142</td>
</tr>
<tr>
<td>Prochlorperazine</td>
<td>159</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>178</td>
</tr>
<tr>
<td>Metoclopramide</td>
<td>193</td>
</tr>
<tr>
<td></td>
<td>Narcotic</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Length of stay (hours)</td>
<td>5</td>
</tr>
<tr>
<td>ER return within 7 days (%)</td>
<td>7.6</td>
</tr>
</tbody>
</table>
Possible explanations

• Effective analgesics with few contraindications
  – enough narcotic can diminish - at least momentarily - virtually any pain

• Easily reversed with readily available antagonists

• Physician knowledge/comfort:
  – narcotics
  – FDA-approved medications
  – guideline recommendations

• Concern with safety/adverse effects of non-narcotics

• Other
ER doctors

- ER doctors are physicians most likely to be a migraineurs’ 1st-prescriber of narcotics
- Narcotic administration associated with prior visit to the same ER within the previous 12 months
Think!!!
And Then Teach!!

• Narcotics unlikely to restore function
  – Particularly when used on an intermittent basis

• Indeed, narcotics decidedly decrease function due to CNS effects
  – Thwarts patient’s ability to engage in life’s activities
Risks

• Over time, persistent narcotic consumption among headache sufferers can yield:
  – Tolerance
  – Paradoxical hyperanalgesia
  – Refractory headache
U.S Headache Consortium’s guidelines

**Acute migraine treatment goals include:**

- Treat attacks rapidly and consistently, without recurrence
- **Restore patient’s ability to function**
- Optimize self-care and reduce subsequent use of resources

Neurology 2000;55:754-762
www.neurology.org/cgi/reprint/55/754.pdf
# Patients’ Medication Wants

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete pain relief</td>
<td>87%</td>
</tr>
<tr>
<td>No recurrence</td>
<td>86%</td>
</tr>
<tr>
<td>Rapid onset</td>
<td>83%</td>
</tr>
<tr>
<td>No side effects</td>
<td>79%</td>
</tr>
<tr>
<td>Relieve associate symptoms</td>
<td>76%</td>
</tr>
<tr>
<td>Route of administration</td>
<td>56%</td>
</tr>
</tbody>
</table>

Headache 1999;39[suppl 2]:S20-S26
Ideal parenteral medication [for ER] would

1. offer rapid and sustained headache freedom,
2. without short or long-term sequelae,
3. and allow patients to return rapidly to work or usual daily activities [emphasis added]
Challenges Assessing ER Literature

• More than 20 medications studied
• Numerous efficacy measures
• Varying diagnostic, inclusion, & exclusion criteria
• Too few patients for robust statistical analysis
• Tolerability infrequently assessed
• Few studies assess patients’ willingness re-take medication
• Comparative studies often lack equivalent doses
• Post-discharge assessment uncommon
Prime Target for Quality Improvement

Goals:

1. increase FDA-approved/evidence-endorsed drugs
2. decrease narcotic use
3. Optimize patient-education and transitions of care
Target Patients

• Ten percent of ER headache patients are “repeaters”
• Account for **fifty percent** of headache-related ER visits

• In comparison to non-repeaters, repeaters are more:
  – Triptan-naïve
Tools you can use to......

• better identify migraine (and other primary headaches)
• better assess severity,
• better assess at-home drug therapy
• guide improved medication selection
1. Has a headache limited your activities for a day or more in the last 3 months?

2. Are you nauseated or sick to your stomach when you have a headache?

3. Does light bother you when you have a headache?
ID Migraine

- Nine of 10 people answering “Yes” to at least 2 questions will fulfill IHS migraine criteria

- Positive predictive value = 0.93
  - Sensitivity = 0.81
  - Specificity = 0.75

- Regardless of gender, age, presence of other comorbid headaches, or previous diagnostic status.

Neurology 2003:61:375-382
ID Migraine

• If patient answers “yes” to at least two questions
  – Suspect migraine
  – Assess current therapy
  – Provide outpatient mediation & non-medication options
  – Consider outpatient referral
Migraine Disability Assessment Survey (MIDAS)

- Five questions
- Assessing headache-related debilitation
- Over last three months
- In work, school, & social domains

- Grade I = 0 to 5 days = little disability
- Grade II = 6 to 10 days = mild disability
- Grade III = 11 to 20 days = moderate disability
- Grade IV = 20+ days = severe disability
1. On how many days in the last 3 months did you miss work or school because of your headaches?
2. How many days in the last 3 months was your productivity at work or school reduced by half or more because of your headaches? (Do not include question 1 days)
3. On how many days in the last 3 months did you not do household work (such as housework, home repairs and maintenance, shopping, caring for children and relatives) because of your headaches?
4. How many days in the last 3 months was your productivity in household work reduced by half of more because of your headaches? (Do not include question 3 days)
5. On how many days in the last 3 months did you miss family, social or leisure activities because of your headaches?
MIDAS in the ER

- Diminishes avoidable delays
- Fosters stratified care
  - i.e. base treatment according to disease severity
- Promotes referral for outpatient

Migraine ACT

Assesses medications’ effectiveness

“When you take your treatment......

1. Does your migraine medication work consistently, in the majority of attacks?
2. Does the headache pain disappear within 2 hours?
3. Are you able to function normally within 2 hours?
4. Are you comfortable enough with your medication to be able to plan you daily activities?”

Headache 2006;46:553-562
Migraine ACT

• Score changes correlated with, and had a linear relationship with:
  – Short form (SF)-36
  – MIDAS

• **Migraine-ACT score greater than/equal to 2?**
  – consider medication changes

• 40% of studied patients scored greater than/equal to 2
  – signifies significant unmet treatment needs.

Headache 2006;46:553-562
Patient presents with headache

Diagnose
ID Migraine IHS

Assessments
MIDAS
Migraine ACT

Low Need
Diagnose, treat, educate

Moderate Need
Diagnose, treat, educate, discharge meds

High Need
Diagnose, treat, educate, discharge meds, follow-up care/referral
Intravenous fluids

- Sparse evidence
- Administered to 47% of patients
- No correlation of use and pain severity
- ER visit duration is greatest for patients receiving fluids compared to those who do not

Management of Adults With Acute Migraine in the Emergency Department: The American Headache Society Evidence Assessment of Parenteral Pharmacotherapies
Answered two questions

1. Which injectable medications should be considered 1\textsuperscript{st}-line treatment for adults who present to an ER with acute migraine?

2. Do parenteral corticosteroids prevent recurrence of migraine in adults discharged from an ER?
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wording</td>
<td>Must</td>
<td>May</td>
<td>Should</td>
<td>None</td>
</tr>
<tr>
<td>Value of benefit relative to risk</td>
<td>Large</td>
<td>Moderate</td>
<td>Small</td>
<td>Too close to call</td>
</tr>
<tr>
<td>Confidence in evidence</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>Strength of principle-based inferences</td>
<td>Compelling</td>
<td>Convincing</td>
<td>Plausible</td>
<td>Not plausible</td>
</tr>
</tbody>
</table>
Must offer

• Not a single drug!
• Reflects an unfortunate state of reality
• Also reflects the opportunity for research
Should offer

- Sumatriptan subcutaneous injection
- 6mg, may repeat in 2 hours
- FDA-approved for acute migraine
- Only guideline drug demonstrated to restore function [emphasis added]
Should offer

• Metoclopramide intravenously
• 10 to 20 milligrams per dose
• Although uncommon, warn about akathisia and drowsiness
• Effective for nausea/vomiting
# Nausea & Vomiting ER Impact

<table>
<thead>
<tr>
<th></th>
<th>With N/V</th>
<th>Without N/V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ER costs</strong></td>
<td>$1,499</td>
<td>$1,187</td>
</tr>
<tr>
<td><strong>Lost work productivity costs</strong></td>
<td>$10,344</td>
<td>$9,218</td>
</tr>
</tbody>
</table>

Should offer

- Prochlorperazine intravenously
- 10 milligrams per dose
- Effective for N/V
- Warn about akathisia and drowsiness

My comment – return to function unlikely
May Offer
(my vignettes)

- Droperidol injection
  - (Drowsiness, may improve N/V)
- Valproate injection
  - (well tolerated, infuse over 5 minutes)
- Acetaminophen intravenous
  - (well tolerated, costly)
- Chlorpromazine injection
  - (drowsiness, may give via infusion)
- Haloperidol injection
  - (drowsiness, consider giving benztropine for EPS)
- Ketorolac injection
  - (No drowsiness, well tolerated)
- Acetylsalicylic acid intravenous
- Dexketoprofen injection
- Diclofenac injection
May Avoid

- Hydromorphone intravenous
- Morphine intravenous
- Octreotide intravenous
- Diphenhydramine injection
No recommendation

• Meperidine intravenous
Prevent Migraine Recurrence

• Must offer
  – No drug

• Should offer
  – Parenteral dexamethasone
  – Ideal dose not known
    • studied doses include 10mg, 20mg, and 24mg

Headache 2016;56:911-940
Non-pharmacologic options

• Cognitive Behavioral
  – endorsed by guidelines, e.g. biofeedback

• Also consider
  – Room with minimal sensory stimulation (i.e. low light & noise)
  – Cool cloth/ice to forehead

Neurology 2000;55:754-762
www.neurology.org/cgi/reprint/55/754.pdf
Pharmacists’ opportunities

- Treatment largely based on physicians’ discretion
  - Substantial practice variations
  - Target efforts at physicians’ knowledge, whether individual or group

- Advocate for:
  - Preferential use of endorsed medications
  - Narcotic avoidance unless patient-specific factors necessitate use
  - Incorporating evidence summaries into the electronic/paper drug-ordering processes
  - Transitions of care coordination
An Algorithm for Opioid and Barbiturate (BCP) Reduction in the Acute Management of Headache in the Emergency Department

Next slide

Headache 2017;57:71-79
### Results, Pre- and Post-Algorithm Implementation

<table>
<thead>
<tr>
<th></th>
<th>Pre (%)</th>
<th>4 months (%)</th>
<th>1 year (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N = 50</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated with narcotic or BCP</td>
<td>66</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>P&lt;0.001</strong></td>
</tr>
<tr>
<td>Discharged with narcotic or BCP</td>
<td>37</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>P = 0.02</strong></td>
</tr>
<tr>
<td>Follow-up appointment</td>
<td>54</td>
<td>97</td>
<td>73</td>
</tr>
</tbody>
</table>
Cleveland Clinic Emergency Department
Acute Headache Management Algorithm

Patient presents with complaint of HEADACHE

1. Does patient have new or different headaches in past 6 mos?
   - YES
   - NO

2. Are headaches recurrent that interfere with work, family or social function?
3. Do headaches last at least 4 h untreated?
   - YES TO BOTH QUESTIONS
   - NO

**Diagnosis: MIGRAINE**

**TREATMENT**
Assess for contraindications: pregnancy, allergies, comorbid conditions

**NO**

**AVOID OPIOIDS**

**STEP 1**
Ketorolac 30 mg IV or 30-60 mg IM
AND
Metoclopramide 10 mg IV over 2 min or Ondansetron 8 mg IV
AND
Diphenhydramine 25-50 mg IV
AND
IV fluids for hydration

**Evaluate for Red Flags**
- Systemic symptoms: fever, chills, meningismus
- Secondary risk factors: malignancy, immunosuppression
- Neurologic symptoms or abnormal signs
- Onset: sudden/abrupt
- Older age >50 years
- Pattern change: first headache or different from previous headache history
   - YES
   - NO

**Evaluate for Yellow Flags**
- Drug seeking with underlying chronic pain
- Recurrent ED visits without appropriate outpatient management/PCP follow-up or
  - OARIS report shows opiate use ± polypharmacy
   - YES
   - NO

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Diphenhydramine 25-50 mg IV
AND
IV fluids for hydration

**OR**
Directly to step 3 if previous response to sumatriptan or DHE45

**STEP 2**
Desmopressin 4-8 mg
AND
Valproic acid sodium 500-1,000 mg/50 mL NS over 20 min
AND
Magnesium sulfate 1 g IV over 1 h

**NO**

**STEP 3**
Assess for contraindications: uncontrolled HTN, pregnancy, history of stroke or ICH, or
Sumatriptan, 8 mg sc — may repeat in 1 h

- Max dose 12 mg in 24 h period
- DHE45: Start with 0.25 mg IV over 1 min or sc; if needed repeat in 1 h 1 mg IV over 1 min or 5 mg sc.
- Choose an alternative:
  - Prochlorperazine 10 mg IV over 30 sec
  - OR
  - Motoclopramide 10 mg IV over 2 min
  - OR
  - Ondansetron 4-8 mg IV over 30 sec

**Discharge Patient**
1. Dispose
2. No opiate script
3. If responsive to ketorolac:
   - Discharge with toroulbutar 10 mg PO tid for up to 5 d
4. If responsive to sumatriptan, discharge with script
5. If responsive to DHE:
   - Discharge with script for Migranal nasal spray or DHE subcutaneous
6. If responsive to valproate, viaproc tape 250 tid for 3 d, 250 bid fored
7. Discharge with DHE follow-up
8. If headaches are frequent >4 per month or repeat ED visits, follow up with neurology at Lakewood hospital
9. If no DHE, refer to PCP

**KEY**
- OD, once daily
- CAD, coronary artery disease
- DHE, Dihydroergotamine
- ED, emergency department
- IM, intramuscular
- IV, intravenous
- PO, by mouth
- Qd, four times daily
- SQ, subcutaneous
- Tid, three times daily

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**Admission Criteria**
- High frequency headaches with significant disability
- Intractable vomiting
- Dizziness
- Severe depression
- Psychologic symptoms
- Medications that may require hospitalization for withdrawal
- Unable to care for self
- Social support systems

**Consult Neuro/Admit or, if local and not sedated from medications, same day appointment with PCP**

If headaches are frequent >4 per month or frequent ED visits, appointment with Lakewood Neurology within 1 week of discharge
Should narcotics *EVER* be administered?

- Yes
- “Never say never”
**Per AHS, use Narcotics for Acute Migraine if:**

A headache has lasted longer than 4 hours,

AND

A patient cannot tolerate triptans,

AND

The risk of abuse has been addressed and sedation will not put the patient at risk,

AND

The patient has previously responded to an opioid

*Headache 2016;56:911-940*
Case example

• 34 year old female, no physician diagnosis
• “Worst headache ever”
• OTC products previously effective
  – Consumption is escalating
  – Took 8 Excedrin tablets prior to ER
• ID Migraine, “yes” to all questions
• MIDAS = Grade III
• What do you do?
Key Takeaways

#1. Headache is exceedingly common in ERs...as is INEFFECTIVE narcotic usage

#2. Pharmacists are well-positioned to promote improved screening, assessment, and drug selection for migraine sufferers

#3. Authoritative recommendations endorse non-narcotic approaches
The American Headache Society endorses sumatriptan, metoclopramide, prochlorperazine and which other medication as “should offer” for acute migraine in the ER?

a. Hydrocodone injection
b. Morphine injection
c. Oral zolmitriptan
d. Droperidol injection
e. None of the above
Pre-presentation question

Which validated questionnaire assesses a patient’s current migraine medications’ efficacy?

a. ID Migraine
b. Migraine ACT
c. Headache Impact Test
d. MIDAS
e. None of the above
To prevent headache recurrence after ER discharge, which is a “Should” offer?

A. Dexamethasone
B. Prednisone
C. Ketorolac injection
D. Intravenous fluids