Pain Modality at All Levels

Andrew Cathers, MD
Med Flight Faculty
University of Wisconsin-Madison
Andrew Cathers
@DrewCathers

HEMS Fellow at UW-Madison, EM Physician, Resuscitationist. Medicine, music, martial arts.

Wisconsin, USA

Joined February 2010

acathers@medicine.wisc.edu

AndrewCathers@gmail.com
Objectives

• Briefly review etiology and mechanism of pain
• Review the different classes of analgesic medications
• Review alternatives to pharmacologic therapy

#GOALS
There are 3 levels of pain: Pain, excruciating pain, and stepping on a Lego.
YOU ARE LEAVING
PAIN
ENJOY THE JOURNEY!
• “An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”
Physical pain is not a simple affair of an impulse, travelling at a fixed rate along a nerve. It is the resultant of a conflict between a stimulus and the whole individual.

Rene Leriche
Categories of Analgesics

- Topical
- NSAIDs
- Acetaminophen
- Salicylates
- Opioids
- Ketamine
Lidocaine
Ibuprofen
Ketorolac

![Chemical structure of Ketorolac]

![Image of Ketorolac vial]
Aspirin

**INN:** acetylsalicylic acid
Paracetamol
Intravenous Paracetamol (Acetaminophen)

Sean T. Duggan and Lesley J. Scott

Wolters Kluwer Health | Adis, Auckland, New Zealand, an editorial office of Wolters Kluwer Health, Conshohocken, Pennsylvania, USA

Contents

Abstract .................................................. 101
1. Pharmacodynamic Profile ................................ 102
2. Pharmacokinetic Profile ................................ 103
3. Therapeutic Efficacy .................................. 104
4. Tolerability ............................................ 109
5. Dosage and Administration ............................ 110
6. Intravenous Paracetamol: Current Status ........ 111

Abstract

Intravenous paracetamol (rINN)/intravenous acetaminophen (USAN) is an analgesic and antipyretic agent, recommended worldwide as a first-line agent for the treatment of pain and fever in adults and children.

In double-blind clinical trials, single or multiple doses of intravenous paracetamol 1 g generally provided significantly better analgesic efficacy than placebo treatment (as determined by primary efficacy endpoints) in adult patients who had undergone dental, orthopaedic or gynaecological surgery.

Furthermore, where evaluated, intravenous paracetamol 1 g generally showed similar analgesic efficacy to a bioequivalent dose of propacetamol, and a reduced need for opioid rescue medication.

In paediatric surgical patients, recommended doses of intravenous paracetamol 15 mg/kg were not significantly different from propacetamol 30 mg/kg for the treatment of pain, and showed equivocal analgesic efficacy compared with

Features and properties of intravenous (IV) paracetamol (rINN)/intravenous acetaminophen (USAN)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication</td>
<td>Short-term treatment of moderate pain and fever when administration by IV route is clinically justified</td>
</tr>
<tr>
<td>Mechanism of action</td>
<td>Inhibition of nitric oxide synthesis pathway; inhibition of prostaglandin synthesis</td>
</tr>
<tr>
<td>Dosage and administration</td>
<td>Adults weighing &gt;50 kg: 1 g (maximum 4 g/d); Children weighing &gt;33 kg, adolescents and adults weighing &lt;50 kg: 15 mg/kg (maximum 3 g/d); Children weighing &gt;10 to &lt;33 kg: 15 mg/kg (maximum 2 g/d); Full-term newborn infants, infants, toddlers and children weighing &lt;10 kg: 7.5 mg/kg (maximum 30 mg/kg/d); Route: 15-min IV infusion; Minimum duration between doses: 4–6 h</td>
</tr>
</tbody>
</table>
Opioid

Drug class
<table>
<thead>
<tr>
<th>Opiate</th>
<th>Opioid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opium</td>
<td>Any opiate</td>
</tr>
<tr>
<td>Codeine</td>
<td>Heroin</td>
</tr>
<tr>
<td>Morphine</td>
<td>Oxycodone</td>
</tr>
<tr>
<td></td>
<td>Hydrocodone</td>
</tr>
<tr>
<td></td>
<td>Fentanyl</td>
</tr>
<tr>
<td></td>
<td>Buprenorphine</td>
</tr>
<tr>
<td></td>
<td>Methadone</td>
</tr>
<tr>
<td></td>
<td>Meperidine</td>
</tr>
<tr>
<td></td>
<td>etc...</td>
</tr>
</tbody>
</table>
Total U.S. Drug Deaths

More than 64,000 Americans died from drug overdoses in 2016 -- 64,070
Age adjusted rates of drug overdose deaths

Source: National Vital Statistics System, Mortality File, CDC WONDER.
KETAMINE: PARTY OR MIRACLE DRUG?
The Dose Makes The Poison

- 0.15-0.3 mg/kg IV – sub-dissociative, analgesic
- 1 mg/kg IV – procedural sedation
- 2 mg/kg IV – rapid sequence induction
- 4-5 mg/kg IM – agitated delirium
TAKE-HOME MESSAGE
According to limited evidence, low-dose ketamine and morphine appear to provide similar levels of pain relief at 30 minutes; however, low-dose ketamine is associated with a higher rate of self-limited neuropsychological adverse events.

METHODS

DATA SOURCES
MEDLINE, EMBASE, Allied and Complementary Medicine Database, the Cumulative Index of Nursing and Allied Health, PubMed, the Cochrane Controlled Trial Registry, the Cochrane Database of

Is Low-Dose Ketamine an Effective Alternative to Opioids for the Treatment of Acute Pain in the Emergency Department?

EBEM Commentators
Michael Gottlieb, MD
Kelly W. Ryan, MD
Christine Binkley, MD, MPH
Department of Emergency Medicine
Rush University Medical Center
Chicago, IL
La Crosse Ambulance Service Using Essential Oils Instead Of Opioids

Tri-State Ambulance Using Aromatherapy To Treat Minor Pain, Nausea To Scale Back Pain Medication Use

Tuesday, May 8, 2018, 10:05am
By Hope Kirwan
Research Article

The Effectiveness of Aromatherapy in Reducing Pain: A Systematic Review and Meta-Analysis

Shaheen E. Lakhan,1,2 Heather Sheafer,1 and Deborah Tepper3

1 Global Neuroscience Initiative Foundation, Los Angeles, CA, USA
2 California University of Science and Medicine, School of Medicine, Colton, CA, USA
3 Neurological Institute, Cleveland Clinic, Cleveland, OH, USA

Correspondence should be addressed to Shaheen E. Lakhan; slakhan@gnif.org

Received 1 September 2016; Accepted 7 November 2016

Academic Editor: Giustino Varrassi

Copyright © 2016 Shaheen E. Lakhan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Background. Aromatherapy refers to the medicinal or therapeutic use of essential oils absorbed through the skin or olfactory system. Recent literature has examined the effectiveness of aromatherapy in treating pain. Methods. 12 studies examining the use of aromatherapy for pain management were identified through an electronic database search. A meta-analysis was performed to determine the effects of aromatherapy on pain. Results. There is a significant positive effect of aromatherapy (compared to placebo or treatments as usual controls) in reducing pain reported on a visual analog scale (SMD = −1.18, 95% CI: −1.33, −1.03; p < 0.0001). Secondary analyses found that aromatherapy is more consistent for treating nociceptive (SMD = −1.57, 95% CI: −1.76, −1.39, p < 0.0001) and acute pain (SMD = −1.58, 95% CI: −1.75, −1.40, p < 0.0001) than inflammatory (SMD = −0.53, 95% CI: −0.77, −0.29, p < 0.0001) and chronic pain (SMD = −0.22, 95% CI: −0.49, 0.05, p = 0.001), respectively. Based on the available research, aromatherapy is most effective in treating postoperative pain (SMD = −1.79, 95% CI: −2.08, −1.51, p < 0.0001) and obstetrical and gynecological pain (SMD = −1.14, 95% CI: −2.10, −0.19, p < 0.0001). Conclusion. The findings of this study indicate that aromatherapy can successfully treat pain when combined with conventional treatments.
Aches & Pains
Synergistic Blend
With 100% Pure Essential Oils
Cruelty Free

Breathe Blend
Synergistic Blend
With 100% Pure Essential Oils
Cruelty Free

Anxiety Release
Synergistic Blend
With 100% Pure Essential Oils
Cruelty Free

Stress Relief
Synergistic Blend
With 100% Pure Essential Oils
Cruelty Free

Sleepy Time
Synergistic Blend
With 100% Pure Essential Oils
Relaxing
Cruelty Free

Joyful Spirit
Synergistic Blend
With 100% Pure Essential Oils
Uplifting
Cruelty Free
Isopropyl Alcohol Nasal Inhalation for Nausea in the Emergency Department: A Randomized Controlled Trial

Kenneth Lee Beadle, DSc, MPAS; Antonia R. Helbling, MD; Sue L. Love, DSc, EMPA-C; Michael D. April, MD, DPhil*; Curtis J. Hunter, MD

*Corresponding Author. E-mail: Michael.D.April@post.harvard.edu, Twitter: @michaeldapril1.

Study objective: We compare nasal inhalation of isopropyl alcohol versus placebo in treating nausea among emergency department (ED) patients.

Methods: A convenience sample of adults with chief complaints of nausea or vomiting was enrolled in a randomized, double-blind, placebo-controlled trial conducted in an urban tertiary care ED. Patients were randomized to nasally inhaled isopropyl alcohol versus nasally inhaled normal saline solution. Patient nausea and pain were measured with previously published 11-point verbal numeric response scale scores; patient satisfaction was measured by a 5-point Likert scale. The primary outcome was reduction in nausea 10 minutes poststart. Secondary outcomes included patient satisfaction and pain reduction measured at 10 minutes poststart.

Results: Of 84 recruited patients, 80 (95.2%) completed the study. Thirty-seven (46.3%) received nasally inhaled isopropyl alcohol and 43 (53.8%) received nasally inhaled normal saline solution. At 10 minutes postintervention, median nausea verbal numeric response scale score was 3 in the isopropyl alcohol arm versus 6 in the placebo arm, for an effect size of 3 (95% confidence interval 2 to 4). Median satisfaction score was 4 in the isopropyl alcohol arm versus 2 in the placebo arm, for an effect size of 2 (95% confidence interval 2 to 2). There were no significant differences between the 2 arms in median pain verbal numeric response scale scores or subsequent receipt of rescue antiemetics.

Conclusion: We found that nasally inhaled isopropyl alcohol achieves increased nausea relief compared with placebo during a 10-minute period. [Ann Emerg Med. 2016;68:1-9.]

Please see page 2 for the Editor’s Capsule Summary of this article.
Oral Transmucosal Fentanyl Citrate (OTFC)

Equivalent to 400 mcg fentanyl base

Warning: May be habit forming.

WARNING: Keep out of the reach of children. Accidental ingestion of this medicine by a child could be harmful or fatal. Read enclosed OTFC Medication Guide for important warnings and directions.
Key Takeaways

- EMT
- Paramedic
- RN Pre-Hospital/ED
- RN Inpatient

#GOALS
Questions?