Pretest

1. What is the maximum effective dose of Ibuprofen for pain?
   - A) 400 mg
   - B) 600 mg
   - C) 800 mg
   - D) 1000 mg
2. How long does it take for the analgesia peak of intranasal fentanyl?
   - A) 1 minute
   - B) 5 minutes
   - C) 15 minutes
   - D) 30 minutes

3. Which dose of Toradol works best for pain?
   - A) 10 mg
   - B) 15 mg
   - C) 30 mg
   - D) They all work about the same
4. Which of the following are side effects of Tramadol?
   - A) Serotonin syndrome
   - B) Seizures
   - C) Increases INR in patients on coumadin
   - D) All of the above

5. 4 mg IV Zofran dose is Bio-equivalent to what PO dose?
   - A) 2 mg
   - B) 4 mg
   - C) 6 mg
   - D) 8 mg
6. Which of the following would be a good choice for antibiotic treatment of a cutaneous abscess?
   - A) Keflex
   - B) Clindamycin
   - C) Azithromycin
   - D) Bactrim

7. 2.5 mg nebulized Albuterol is approximately equivalent to:
   - A) 2 puffs thru a spacer
   - B) 5 puffs thru a spacer
   - C) 10 puffs thru a spacer
   - D) Nobody would give albuterol acutely thru a spacer!
8. Which of the following is true re. corticosteroid dosing route:
   - A) IV doses are more effective than oral doses
   - B) IM doses last longer than oral doses
   - C) Nebulized doses work the quickest
   - D) Oral dosing works as well as any other route
Ibuprofen

- Ceiling effect for analgesia between 400-600
- Ceiling effect for inflammation higher
- Swelling not synonymous with inflammation
- No ceiling effect known for side effects
Adding Acetaminophen to Ibuprofen works better

- **Dose**: 1-2 mcg/kg
  - 70% bioavailable
- **Volume**: < 1 ml per nostril for IN meds
  - 50 mcg/ML
  - Allows maximum of 100 mcg fentanyl

Intranasal fentanyl
Intranasal Versed

• Dose 0.2 – 0.5 mg/kg
• Requires the higher 5 mg/ml concentration for most kids due to volume restriction of < 1 ml / nostril
  • Allows maximum dose 10 mg
  • 50 kg kid x 0.2 mg/kg > 10 mg

• Sedation in 5-10 minutes

Intranasal fentanyl

• Plasma peak 13 minutes

• Analgesia peak 15.5 minutes

Three reasons not to use Toradol

- Multiple studies show that Toradol is no better than Ibuprofen for pain

- More GI toxicity than Ibuprofen

- COST ($10 / dose vs 10 cents / dose)

Ketorolac (Toradol): more is not better

- Recent study in Annals Emergency medicine heating up the blogosphere re. Toradol dosing
  - S. Motov et. al., Annals of Emerg. Medicine, Aug 2017 (SAEM 2016)
Comparison of Intravenous Ketorolac at Three Single-Dose Regimens for Treating Acute Pain in the Emergency Department: A Randomized Controlled Trial

- 312 patients approached > 240 enrolled
- 80 patients each dose group
- No difference pain scores 10 vs 15 vs 30 mg IV
• Turns out some early studies also showed that more Toradol was not better
  
  • Double-blind parallel comparison of multiple doses of ketorolac, ketoprofen and placebo administered orally to patients with postoperative dental pain, M.V.Olmedo et al, *Pain, 90, 2001*

• A double blind study with placebo control of Intramuscular Ketoralac Tromethamine in the treatment of cancer pain, Maurice Staquet, *Clinical Pharmacology*, Nov. 1989

---

• Not FDA approved Pediatrics (2017)

• Three reasons not to prescribe Tramadol
  
  • empharmd.blogspot.com/2015/05/three-reasons-not-to-prescribe-tramadol
  
  • Mathew Delaney, MD, FACEP, FAAEM
Three reasons not to prescribe Tramadol

1- It may not work
   - No better than Acetaminophen in blinded studies

2- It may hurt our patients
   - Erratic metabolism
   - Seizures
   - Hypoglycemia
   - Serotonin syndrome
   - Drug interactions
Tramadol major drug interactions

- 444 major drug interactions per drugs.com

Short list:
- Most antidepressants (MAOI, SSRI, Tricyclics)
- Antifungals
- Antibiotics (macrolides, linezolid)
- Coumadin
- Seizure meds
- Tryptans
- Other opiate pain meds
Three reasons not to prescribe Tramadol

3- It isn’t a “safe” opioid

Acetaminophen dosing

- All Acetaminophen liquid now 160 mg / 5 ml
  - @16 mg/kg = 5 ml for 10 kg kid

- Ibuprofen liquid 100 mg/5 ml
  - @10 mg/kg = 5 ml for 10 kg kid
Acetaminophen

- Rectal dose should be 30-40 mg/kg to get levels 10-20 ug/ml
  - Some sources (e.g., Epocrates) still list 10-20 mg/kg rectally
    - Don't bother

Ondansetron (Zofran)

- 4 mg IV = 6 mg PO
  - Consider 8 mg PO dose in larger patients
- 8-15 kg (and > 6 months old) 0.15 mg/kg or 2 mg PO
  - 0.1 mg/kg IV
  - Prolonged QT
  - Serotonin syndrome
Antibiotics for cutaneous abscess

- Presume MRSA
- Bactrim
- Doxycycline > 8 yrs old
- Linezolid (Zyvox)
  - Off patent, also covers strep pneumonia
  - MAOI

Antibiotics for cutaneous abscess

- NOT Clindamycin
  - Resistance to MRSA > 40%

- NOT Keflex
  - Still Listed in some sources (e.g., Medscape)
**Bonus!**

**Antibiotics that work as well by mouth as by IV route**

- Clindamycin
- Fluoroquinolones
- Metronidazole
- Doxycycline, Minocycline (group 2 tetracyclines)
- Trimethoprim-Sulfa
- Linezolid

---

**Albuterol HFA vs. Nebulizer**

- 4-8 puffs thru spacer is equivalent to 2.5 mg nebulized for acute asthma exacerbations

  - Idris AH, McDermott MF, Raucci JC et al. Emergency department treatment of severe asthma. Metered-dose inhaler plus holding chamber is equivalent in effectiveness to nebulizer. *Chest. 1993*;

  - Replacement of nebulizer therapy by an albuterol inhaler and valved holding chamber, Leslie Hendeles et. Al, Am J Health-Syst Pharm—Vol 62 May 15, **2005**
    - Review with 17 reference studies
Succinylcholine

- Distributed in extracellular fluid, and younger children have more extracellular fluid
  - 2 mg/kg in children < 2 yrs old
    - I still pre-treat with atropine
  - 1.5 mg/kg 2-10
  - 1 mg/kg teenagers and adults

Corticosteroid Route

- IV might be ½ - 1 hour faster onset
- IM, oral, IN, S.C. essentially identical
- All routes have same duration
- Almost never reason to give IM steroids in the ED
IM Haloperidol for sedation of dangerous agitated patients

- IM Haldol
  - Peak action in agitated patients 30 – 45 minutes
    - Package insert, McNeil pharmaceutical
  - Duration of sedation not listed, ½ life 21 hours
  - Multiple side effects

Other options:
- IM ketamine (avoid in schizophrenics)
- IM Benzodiazepines (avoid in respiratory depressed)
- IM Droperidol (avoid in USA)
1. What is the maximum effective dose of Ibuprofen for pain?
   - A) 400 mg
   - B) 600 mg
   - C) 800 mg
   - D) 1000 mg

2. How long does it take for the analgesia peak of intranasal fentanyl?
   - A) 1 minute
   - B) 5 minutes
   - C) 15 minutes
   - D) 30 minutes
Post-test

• 3- Which dose of Toradol works best for pain?
  • A) 10 mg
  • B) 15 mg
  • C) 30 mg
  • D) They all work about the same

Post-test

• 4- Which of the following are side effects of Tramadol?
  • A) Serotonin syndrome
  • B) Seizures
  • C) Increases INR in patients on coumadin
  • D) All of the above
• 5- 4 mg IV Zofran dose is Bio-equivalent to what PO dose?
  • A) 2 mg  
  • B) 4 mg  
  • C) 6 mg  
  • D) 8 mg  

• 6- Which of the following would be a good choice for antibiotic treatment of a cutaneous abscess?
  • A) Keflex  
  • B) Clindamycin  
  • C) Azithromycin  
  • D) Bactrim
• 7- 2.5 mg nebulized Albuterol is approximately equivalent to:
  • A) 2 puffs thru a spacer
  • B) 5 puffs thru a spacer
  • C) 10 puffs thru a spacer
  • D) Nobody would give albuterol acutely thru a spacer!

• 8- Which of the following is true re. corticosteroid dosing route:
  • A) IV doses are more effective than oral doses
  • B) IM doses last longer than oral doses
  • C) Nebulized doses work the quickest
  • D) Oral dosing works as well as any other route