Relieving the Ache; Tackling Pain Management in the Acute Care Setting

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Disclosures

- Nothing to Disclose.

Objectives

- Identify barriers to effective pain management in the acute care setting
- Understand the importance of timeliness and effectiveness of pain control
- Discuss the various pain assessment tools and their optimal use in different patient populations
- Recognize strategies to provide optimal pain management, including alternative medications and routes of administration

History of Pain

- Oldest medical issue
  ◦ Only universal physical affliction
- Historical Treatment
  ◦ Religious Offerings
  ◦ Trepanation
  ◦ Electric Eels
  ◦ Opium/Laudanum
  ◦ Morphine (1820s)
  ◦ Oxycodone/Hydromorphone/Fentanyl (20th Century)
- Relief of pain is good
  ◦ Medical consensus since mid-19th century

Meldrum ML. *JAMA.* 2003
Young VB. *Crit Care Nurs Clin N Am.* 2017
Wikipedia (photo)

Acute Pain Definitions

- An unpleasant sensory sensation associated with actual or potential tissue damage (IASP)
  - An inherently subjective experience and should be assessed and treated as such
    - AAP, APS

- Examples
  - Post-op pain
  - Bone fractures
  - Appendicitis
  - Soft tissue injury

Young VB. *Crit Care Nurs Clin N Am.* 2017

Importance of Pain Management

- Recent increase in pain recognition
  - 5th Vital Sign – American Pain Association (1995)
  - JCAHO Standards (2001)
    - Recognize the right of patients to appropriate assessment and management of pain
    - Screen patients for pain during their initial assessment and, when clinically required, during ongoing, periodic re-assessments
    - Educate patients suffering from pain and their families about pain management
- Ethics – obligated to treat pain/minimize suffering

Importance of Pain Management

▸ Recent increase in pain recognition
  ◦ HCAHPS (2006)
    • Scores – Public Information
    • Tied to reimbursement (CMS)
      • Ties removed for FY2018
      • Publicly reported
  ◦ Pressure to assess and effectively treat pain in all patients
  ◦ Proposal of new questions
    • Focus on communication

13. During this hospital stay, how often was your pain well controlled?

  ^{1}☐ Never
  ^{2}☐ Sometimes
  ^{3}☐ Usually
  ^{4}☐ Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

  ^{1}☐ Never
  ^{2}☐ Sometimes
  ^{3}☐ Usually
  ^{4}☐ Always

Hcahpsonline.org

Importance of Pain Management

▸ Increased pain incidence
  ◦ Top 10 ER complaints (2010)

#1 Abdominal Pain	#5 Back Pain
#2 Chest Pain	6
3	7
#4 Headache	#8 Pain, NOS

CDC. Medical Care Survey. 2010.

Acute Pain Management

▶ General Principles
  ◦ Pain often brings patients to the ED/UC/Clinic
    • Pain relief is a priority
  ◦ Procedures/Diagnostics can add to pain
    • Venipunctures, Tubes, Catheters, Positioning, Etc
  ◦ Pain should be addressed in a timely fashion
    • Facilitates patient care
    • Physiologic benefits
  ◦ Pain will likely be an ongoing issue
    • Throughout visit
    • At discharge

Thomas SH. *ISRN Emerg Med*. 2013

So, why is pain control so difficult??

Acute Pain Management

- Obstacles in pain management
  - Failure to acknowledge pain
  - Poor assessment/documentation of pain
  - Inability to meet patient's expectations
- Barriers to adequate pain control
  - Environment
  - Culture
  - Opiophobia
    - State Prescription Drug Monitoring Program (PDMP)

Motov SM. *J Pain Res.* 2009

Acute Pain Management

- PDMP
  - Tracks outpatient dispensing of controlled substances
  - Functions:
    - Assist with outpatient opioid dose confirmation
    - Identify/deter potential misuse/diversion
  - Many facilities have PDMP access integrated into EMR system

Deadiversion.usdoj.gov

Acute Pain Management

Status of Prescription Drug Monitoring Programs (PDMPs)

* Click on state abbreviation to view PDMP contacts *

Operational PDMPs (51)

No PDMP (1)
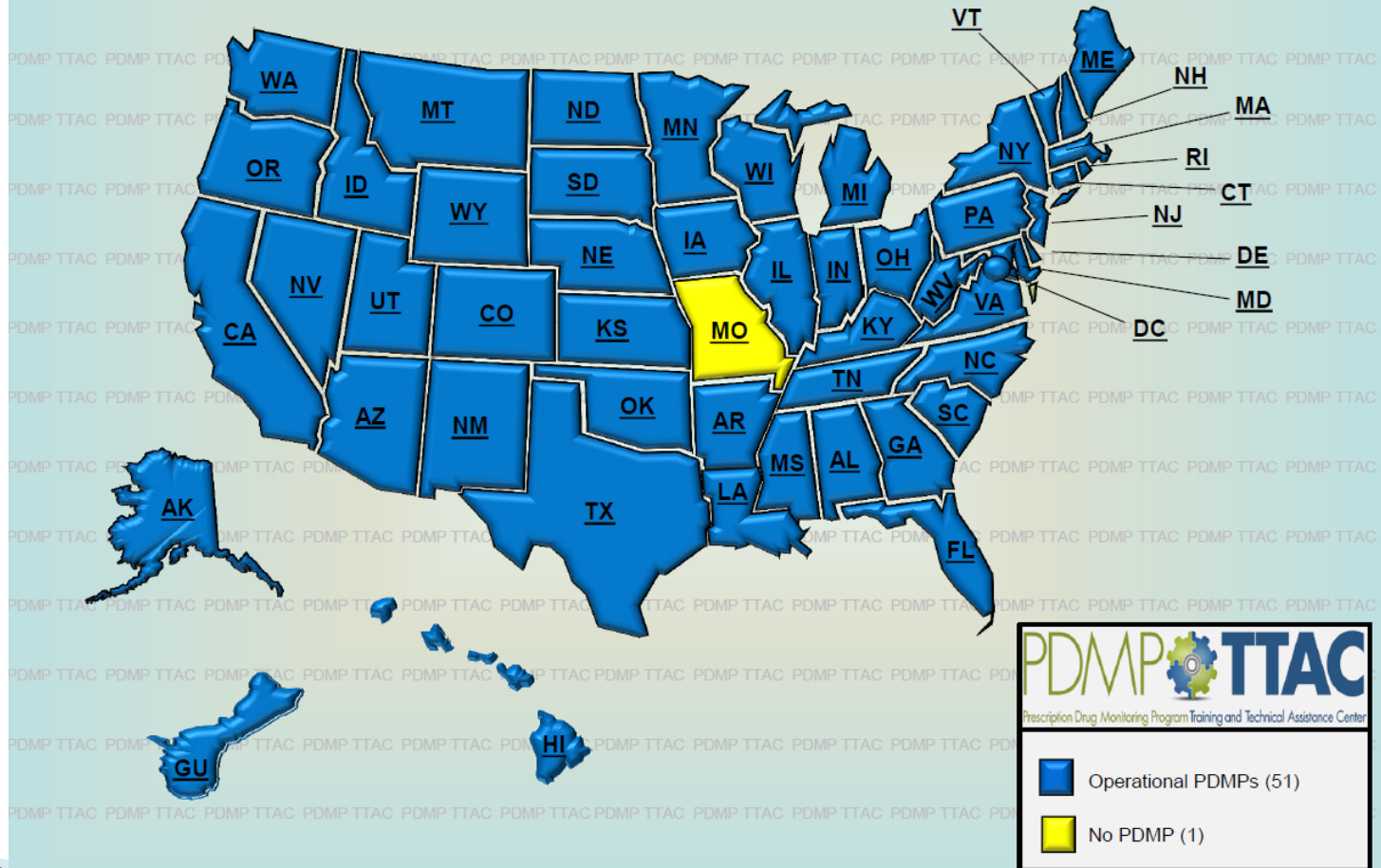
Research is current as of October 18, 2016

PDMPassist.org

Acute Pain Management

- ## South Dakota
  - ◦ Codified Laws, Chapter 34-20E
    - -3: Every controlled substance dispenser in SD must submit data to the central repository at least once daily
    - -2.1: Any person with a controlled drug or substance registration to prescribe or dispense any controlled substances in South Dakota must register with the program
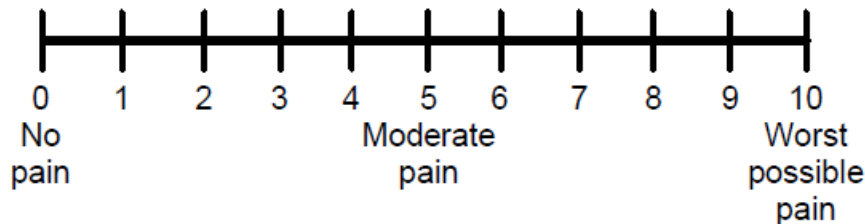
Acute Pain Assessment

- Pain management assessment
  - Self report is the gold standard
    - As young as 3-5
  - Behavioral observation scales can be substituted
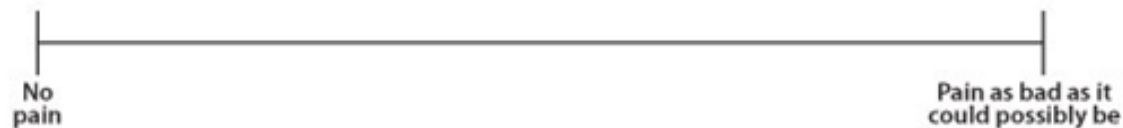   - Facial expressions, motor movement, crying

Acute Pain Assessment

- ▶ Assessment Tools (Adults)
  - ◦ Numeric Rating Scale (NRS)

0	1	2	3	4	5	6	7	8	9	10
No pain					Moderate pain					Worst possible pain

  - ◦ Visual Analog Scale (VAS)

No pain — Pain as bad as it could possibly be

  - ◦ Both validated and equally sensitive
    - • NRS more common, easier to use

Breivik H. *Br J Anaesth.* 2008.

Acute Pain Assessment

ED Pain Management

- Assessment Tools (Adults)
  - In conjunction with Pain History

Basic elements of a pain history

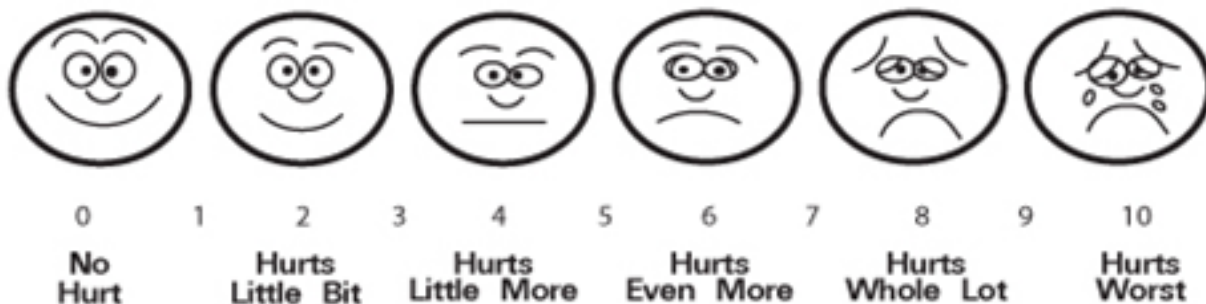|	
Site of pain	Primary location and any radiation
Conditions associated with pain onset	e.g. time of onset, precipitating events
Character of the pain	e.g. sharp, dull, colicky, throbbing, aching, burning, shooting
Intensity of the pain	At rest and on movement
	Duration
	Whether continuous or intermittent
	Any aggravating or relieving factors
Associated symptoms	e.g. nausea, sweating
Function	Effect of pain on mobility, activities and sleep
Current and prior treatments for pain	Doses of analgesic drugs, frequency of use, efficacy, side effects
Relevant medical history	Prior or coexisting medical and pain conditions and treatment outcomes

Macintyre P. Acute Pain Management. 2007.

Acute Pain Management

▶ Assessment Tools (Pediatrics)
  ◦ FLACC (Observational) (Age 0-3)
    • Assessment of non-verbal cues
    • Face-Legs-Activity-Cry-Consolability
  ◦ Wong-Baker Faces (Age 3+)

Wong Baker Face Scale

0	1	2	3	4	5	6	7	8	9	10
No Hurt		Hurts Little Bit		Hurts Little More		Hurts Even More		Hurts Whole Lot		Hurts Worst

    • Other validated scales also exist
      • Oucher Pain Scale, Faces Pain Scale

Breivik H. *Br J Anaesth.* 2008.

Pain Management Myths

- Myth #1
  - Analgesics "mask" abdominal pain diagnosis

Pain Management Myths

- Myth #1
  - Analgesics "mask" abdominal pain diagnosis

- False
  - Similar diagnostic accuracy b/t morphine vs. placebo in abdominal pain in both adults and children
  - Current literature (though limited) not supportive of this claim

Gallagher EJ. *Ann Emerg Med.* 2006
Thomas SH. *J Am Coll Surg.* 2003
Bailey B. *Ann Emerg Med.* 2007
Bromberg R. *Can Fam Physician.* 2007

Pain Management Myths

- Myth #2
  - Opiate addiction is a frequent consequence of opiate use for acute pain

Pain Management Myths

- Myth #2
  - Opiate addiction is a frequent consequence of opiate use for acute pain

- It depends…
  - Generally low risk ($\leq$5%) with short courses
  - Literature has correlated risk with certain variables

Pain Management Myths

- J Gen Intern Med 2016
  - Retrospective, database review
  - Opioid–naïve pts filling first opioid rx
    - 536,767 pts included in study
    - 26,785 (~5%) became "long term users"
  - Rate of long term use increased with:
    - **Increasing fills during initiation month**
      - OR 2.25 for 2 fills, OR 2.62 for 3 fills
    - **Increasing MMEs dispensed during the initiation month**
      - OR 2.22 for 280–399 MMEs, OR 16.3 for 3200–3999 MMEs

Deyo RA. *J Gen Intern Med*. 2016

Pain Management Myths

- CDC MMWR, 2017
  - Retrospective, database review (IMS Lifelink+)
  - Opioid-naïve adults filling first opioid rx
    - 1,294,247 pts included in study
    - 33,548 (~2.6%) had cont'd use at 1 yr
  - Rate of cont'd use at 1 year increased with:
    - **Increased duration of first Rx**
      - Marked increases after day 5, day 10, day 30
    - **Increasing fills/Rxs during initial episode**
      - Largest incremental increase on 3rd prescription/fill
    - **Treatment initiation with a long-acting opioid**
      - 27.3% cont'd use at year 1, 20.3% at year 3

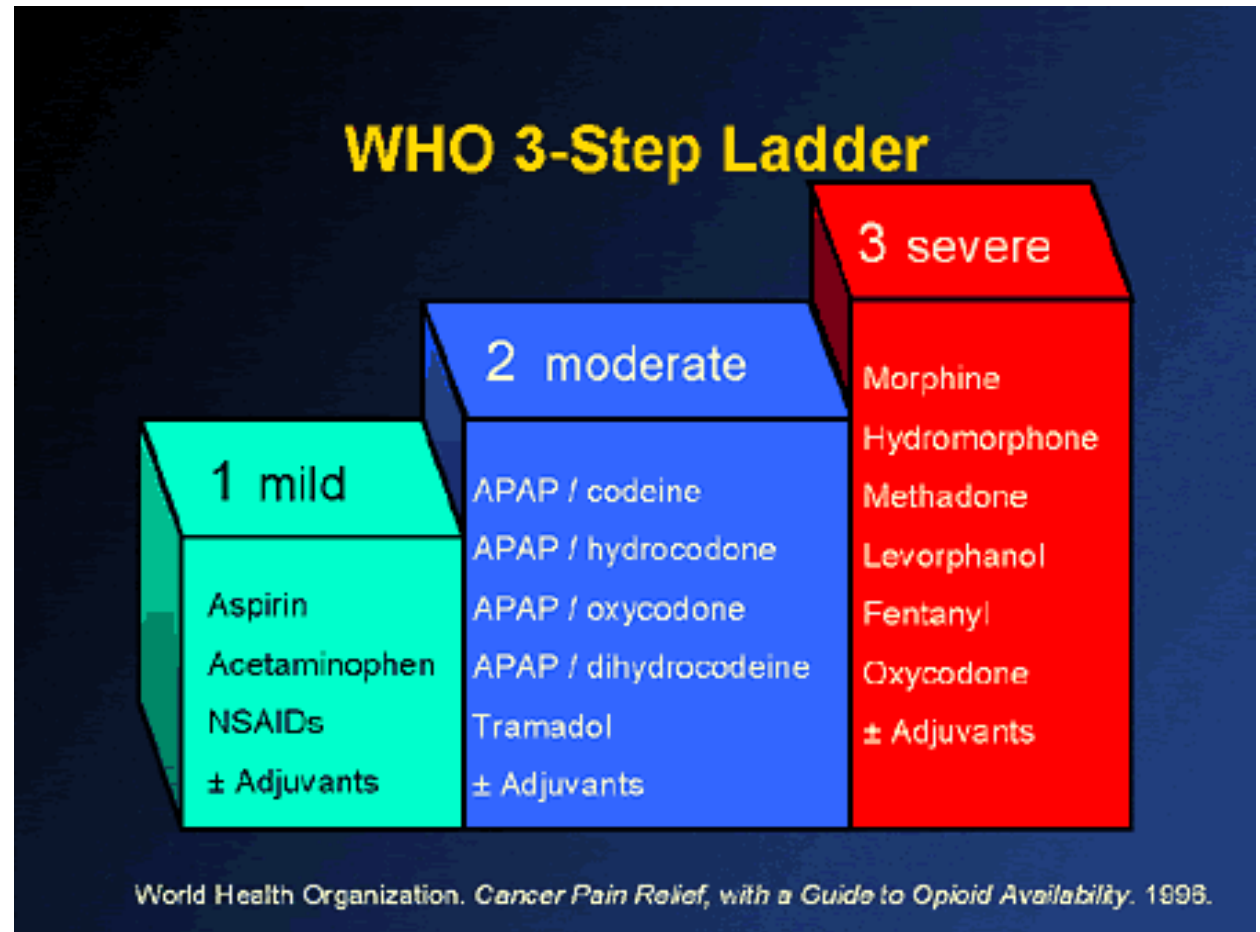Shah A. *MMWR Morb Mortal Wkly Rep.* 2017

Pain Management

- Opioid Prescribing for Acute Pain
  - CDC Guidelines – 2016
    - Acute pain – recommend <u>lowest effective dose</u> of immediate-release opioids and <u>no greater quantity than needed</u> for the expected duration of pain severe enough to require opioids. Three days or less will often be sufficient…
  - ACEP – Acute Pain Treatment in the ED (2017)
    - "As a general principle, those being prescribed opioids should only receive immediate-release opioids in the <u>lowest effective dose</u> for the <u>shortest reasonably practical course</u>."

Pain Medication Selection

- Variables
  - Type of pain
  - Allergies
  - Age
  - Weight
  - Mental status
  - Vital signs
  - Home medications

Pain Medication Selection

- WHO Pain Ladder

WHO 3-Step Ladder

1 mild
Aspirin
Acetaminophen
NSAIDs
± Adjuvants

2 moderate
APAP / codeine
APAP / hydrocodone
APAP / oxycodone
APAP / dihydrocodeine
Tramadol
± Adjuvants

3 severe
Morphine
Hydromorphone
Methadone
Levorphanol
Fentanyl
Oxycodone
± Adjuvants

World Health Organization. *Cancer Pain Relief, with a Guide to Opioid Availability.* 1996.

Pain Medication Selection

- General Principles
  - Treat pain early
  - Establish <u>REASONABLE</u> expectations!
  - Utilize history
    - Pain medication successes/failures
  - Evaluate home regimens
    - Start above home pain medication level
  - Utilized different modalities
    - PO vs. IV
    - NSAIDs vs. Opioids vs. Topicals
  - Non-pharmacologics

Non-Pharmacologics

- Should be in addition to medications
  - Decrease room "stress"
  - Walk through procedure/expectations
  - Distraction (TV, music, books, conversation)
  - Relaxation techniques
  - Swaddling +/- feeding in infants

Graphic: Disneystore.com

Medication Options

- Acetaminophen
  - PO,PR,IV
- NSAIDs
  - PO,IV,IM
- Opioids
  - PO,IV,IM,SubQ,Intranasal (IN)
- Ketamine
  - IV,IM
- Topicals

Medication Routes

- PO/PR (Oral/Rectal)
  - Pros: Non-Invasive, Patient acceptance (PO)
  - Cons: Delayed onset, Patient acceptance (PR)
- Intravenous (IV)
  - Pros: Immediate onset, Easily titrated
  - Cons: Invasive, Pain with IV start
- Intramuscular (IM)
  - Pros: Minimally invasive, Extended duration
  - Cons: Variable onset, Injection pain

Smith S. Drugs for Pain.2003

Medication Routes

- SubQ
  - Pros: Minimally invasive, Extended duration
  - Cons: Delayed onset, Injection pain (mild)
- Topical
  - Pros: Non-invasive, Localized effect
  - Cons: Delayed onset
- Intranasal (IN)
  - Pros: Non-invasive, Easily titrated
  - Cons: Need atomizer, Poor taste, Intermediate onset

Grassin-Delyl.*Pharma Ther.*2012

Medication Routes

- Intranasal
  - Fentanyl 2 mcg/kg
    - Max 100 mcg
    - Split to each nare

  - Aim away from septum
  - Gently inhale
  - Ok to swallow any residual

  - ~5-10 min onset

Mild – Moderate Pain

Acetaminophen

- Analgesic/Antipyretic
- Multiple routes of administration
  - PO, PR, IV
- Relatively safe
  - Liver damage with overuse (Max 3250 mg/day)
- Dosing:
  - Pediatric
    - PO:15 mg/kg every 4-6 hours
    - PR: 10-20 mg/kg every 4-6 hours
    - IV: age/Weight based
  - Adult
    - PO,PR 500-1000 mg every 4-6 hours
    - IV : 650-1000 mg every 4-6 hours

Acetaminophen. Micromedex.2017
Benzon. Essentials of Pain Medicine.2011

IV Acetaminophen

- Indications
- Faster onset and more predictable kinetics then PO or PR routes
- See increase use in surgery/post-op
- Evidence for use in ED is conflicting
- See some opioid sparing effect
- Consider if IV/IM opioids, or ketorlac are not options
- Consider if PO administration is not an option.

Sin. Academic Emergency Medicine.2016
Shastri. Pediatr Emer Care.2015
Pasero.Pain Manag Nurs.2012

NSAIDs

- Analgesic/Antipyretic/Anti-Inflammatory
- Multiple routes of administration
  - PO, IV, IM, Topical
- Use caution with renal dysfunction
- Ibuprofen
  - Pediatric
    - 6 months to < 12 years: 4-10 mg/kg PO Q 6-8 hrs
      - Max dose: 400 mg
      - Max daily dose: 2400 mg/day or 40 mg/kg/day
  - Adults
    - 200-800 mg PO Q4-6 hrs

Ibuprofen. Micromedex.2014
Ketorolac. Micromedex.2014
Benzon. Essentials of Pain Medicine.2011

NSAIDs

- Ketorolac Adult Dosing
  - IV: 15-30 mg
  - IM: 15-60 mg
  - Dose based in age, weight and route of administration
- Recent data suggest ketorolac has analgesic ceiling in ED patients with 10-15 mg IV

Ketorolac. Micromedex.2014
Motov S. Ann Emerg Med. 2016

NSAIDs

- Ketorolac Pediatric Dosing
  - Not FDA Approved
  - Dose age $\geq$ 2
    - IV/IM: 0.5-1 mg/kg
  - Max single dose:15 mg IV or 30 mg IM
  - Do not exceed adult doses

Ketorolac. Micromedex.2014

Moderate-Severe Pain

Opioids

- Codeine
- Hydrocodone
- Oxycodone
- Hydromorphone
- Morphine
- Fentanyl
- Tramadol

Codeine

- New FDA Warning April 2017:
  - Codeine is contraindicated to treat pain or cough in children < 12 years old
  - Not recommended for treatment of pain in children 12-18 years old who are obese, have obstructive sleep apnea or severe lung disease
- Pediatric Black Box Warning:
  - Contraindicated in pediatric post-op tonsillectomy or adeniodectomy patients
- **General practice – avoid all use in pediatric patients in favor of better alternatives**

Codeine. Micromedex.2014
Benzon. Essentials of Pain Medicine.2011
FDA Drug Safety Communication.2017

Oral Opioids

- Most commonly in combination tablets
  - 325 mg acetaminophen
- Hydrocodone/APAP (Norco)
  - Adult starting dose:
    - 5 mg/325 mg tablets 1-2 PO Q4-6 hrs
  - Pediatric starting dose
    - Hydrocodone: 0.1-0.2 mg/kg PO Q4-6 hrs
- Oxycodone or Oxycodone/APAP (Percocet)
  - Adult starting dose Oxycodone/APAP
    - 5 mg/325 mg tablets 1-2 PO Q4-6 hrs
  - Pediatric starting dose:
    - Age $\geq$ 6 months, weight $<$ 50 kg: 0.1-0.2 mg/kg/dose q 4-6 hours
    - Weight $\geq$ 50 kg: 5-10 mg q 4-6 hrs

Hydrocodone/Acetaminophen. Micromedex.2014
Oxycodone. Micromedex.2014

Tramadol

- Not FDA approved for use if those $\leq$16 years
- Contraindicated for pain management after removal of tonsils and/or adenoids in children $<$ 18 years
- Not recommended for use in adolescents age 12–18 years who are obese, or have severe lung disease or obstructive sleep apnea
- Recommend using other agents for acute pain management

FDA Drug Safety Communication. 2017
Tramadol.Micromedex.2017

IV Opioids

Drug	Dose (IV route)	Onset	Duration
Fentanyl	Adult: 25–50 mcg Peds: 0.5–2 mcg/kg	Immediate	30 –60 min
Hydromorphone	Adult: 0.5–1 mg Peds: 0.01–0.015 mg/kg	5 min	1–4 hrs
Morphine	Adults: 2–4 mg Peds: 0.05–0.3 mg/kg	5–10 min	1–4 hrs

- IV Conversion
  - Equivalencies
    - 10 mg morphine
    - 1.5 mg hydromorphone
    - 100 mcg fentanyl

Barr. *Crit Care Med*. 2013
Fentanyl. Micromedex.2014
Hydromorphone. Micromedex.2014
Morphine. Micromedex.2014
Patanwala. *Ann Pharm*.2010

IV Opioids

- Morphine
  - ◦ Gold standard for pain control
  - ◦ Longer onset and duration of action
  - ◦ Accumulates in renal dysfunction
  - ◦ Histamine reaction
- Hydromorphone
  - ◦ Ok to use in renal dysfunction
  - ◦ Longer onset and duration of action
- Fentanyl
  - ◦ Immediate onset, short half-life
  - ◦ Opioid of choice in renal/hepatic failure

Barr. *Crit Care Med*. 2013
Fentanyl. Micromedex.2014
Hydromorphone. Micromedex.2014
Morphine. Micromedex.2014
Patanwala. *Ann Pharm*.2010

Opioids

- **Adverse Reactions**
  - Nausea/Vomiting
  - Itching
  - CNS Depression
  - Hypotension
  - Bradycardia
  - Respiratory Depression
  - Constipation

- **Opioid Allergies**
  - Commonly "reported"
  - Often due to adverse effects
  - True allergies are rare
    - Avoid hydromorphone if true allergy to morphine
    - Fentanyl is appropriate if true allergy

Barr. *Crit Care Med*. 2013
Patanwala. *Ann Pharm*.2010

Naloxone (Narcan)

- Reversal agent for all opioids
- Route of administration:
  - IV,IM,Intranasal,SubQ
- Half-life of naloxone is shorter then half-life of opioids
- Dose:
  - 0.01-0.1 mg/kg/dose
    - Typical doses: 0.04-0.4 mg
  - Naloxone drip

Alternative Agents/Routes

Topical Lidocaine

- Consider use prior to non-emergent procedures on intact skin
    - IV line placement or venipuncture
    - Lumbar puncture
    - Abscess drainage
    - Joint aspiration
- Will not provided complete pain relief
- Contraindications

Topical Analgesics

- LET (Lidocaine (4 %), Epinephrine (0.1 %), Tetracaine (0.5%))
  - Dose: 1-3 ml applied 20-30 minutes prior to procedure
  - Do not use on digits, nose, ears or penis, contaminated wounds
- EMLA (Lidocaine (2.5%), Prilocaine (2.5%))
  - Dose: Apply to affected area 45-60 minutes prior to procedure
  - Use on intact skin prior to procedure
  - Do not use in children with glucose-6-phosphate dehydrogenase deficiency
- Lidocaine 4% cream

Ketamine

- MOA
  - Non-barbiturate, phencyclidine derivate
  - NMDA receptor antagonist
- Dose:
  - Conscious Sedation:
    - IV push: 1-2 mg/kg
    - IM: 2-4 mg/kg
  - Sub-dissociative doses:
    - IV push: 0.25-0.5 mg/kg
- Onset:
  - IV: 30 sec-1 min
  - IM: 2-4 min
- Duration
  - IV: 5-10 min
  - IM: 12-25 min

Cromhout A. *Emerg Med*.2003
Duchanne J. *Emerg Med Pract*.2000
Green S. *Am Emerg Med*.2011
Hampton J. *Am J Health-Syst Pharm*.2011
Malchow R. *Crit Care Med*.2011

Ketamine Effects

Pros	Cons
▸ Potent amnestic	▸ Increase HR, BP, cardiac stress
▸ Provides analgesia	▸ Emergence reactions
▸ Bronchodilator	▸ Hypersalivation
▸ Maintains normal pharngeal-laryngeal reflexes	▸ Increases intraocular pressure
	▸ Laryngospasms

Cromhout A. *Emerg Med.*2003
Duchanne J. *Emerg Med Pract.*2000
Green S. *Am Emerg Med.*2011
Hampton J. *Am J Health-Syst Pharm.*2011
Malchow R. *Crit Care Med.*2011
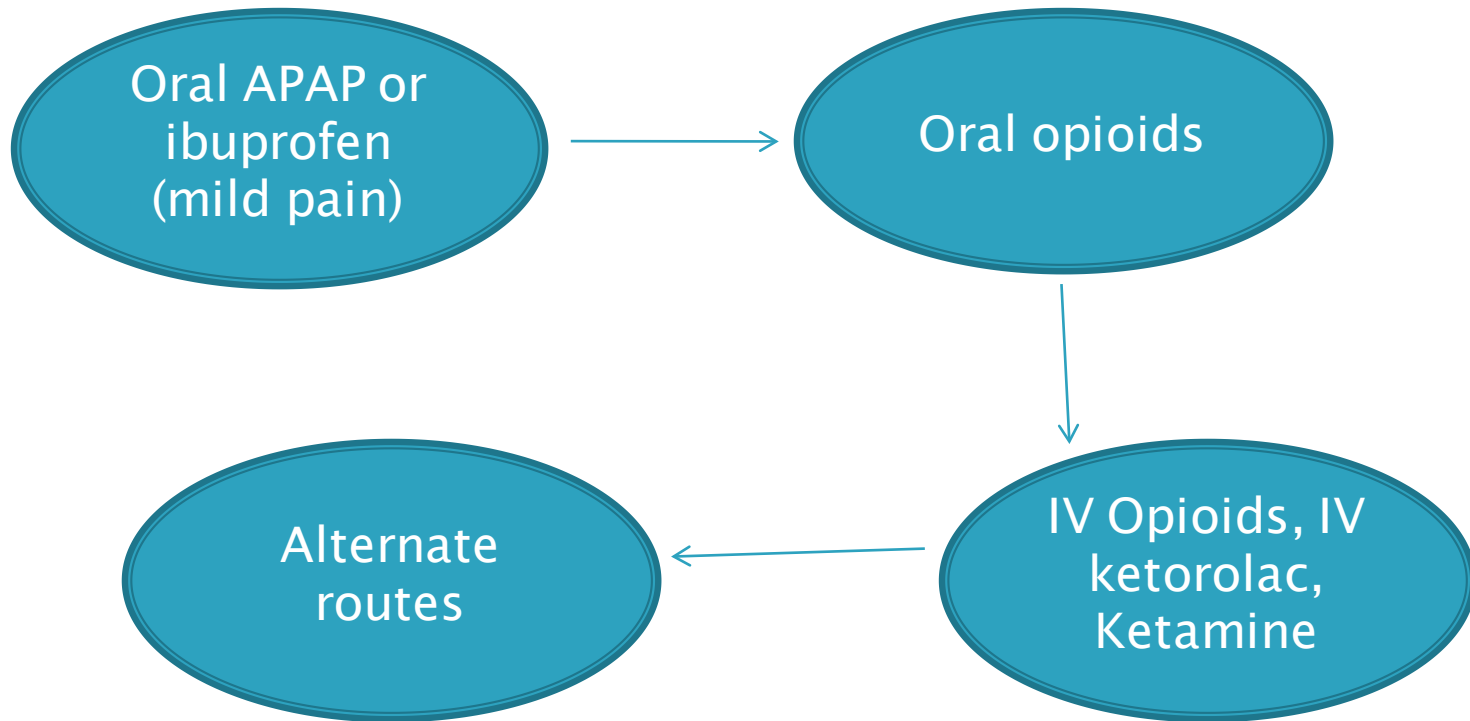
Ketamine

- Indications:
  - Severe pain not controlled with IV opioids
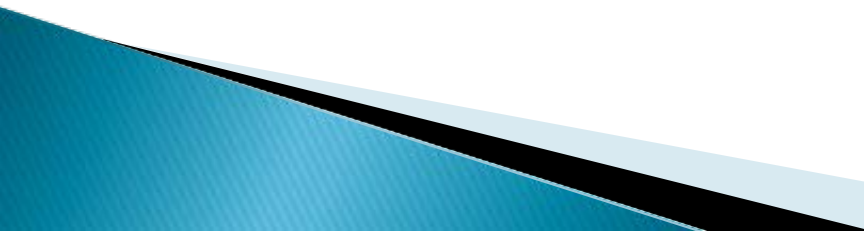 - Use as last resort
- Contraindications
  - Head injuries (area of debate)
  - Major vessel dissection
  - Ischemic heart disease
  - Uncontrolled hypertension
  - Glaucoma, Acute globe injury
  - History of schizophrenia
  - Age < 3 months
  - Porphyria, thyroid disorders

Cromhout A. *Emerg Med*.2003
Duchanne J. *Emerg Med Pract*.2000
Green S. *Am Emerg Med*.2011
Hampton J. *Am J Health-Syst Pharm*.2011
Malchow R. *Crit Care Med*.2011

Pain Medication Progession

- What type of pain, level of pain

Oral APAP or ibuprofen (mild pain) → Oral opioids → IV Opioids, IV ketorolac, Ketamine → Alternate routes

Conclusions

- Pain relief is a priority
  - Goal is timeliness and effectiveness
  - Reassess often
- Multiple medications/routes available for pain management
  - Choose pain regimens that are patient specific
  - Use appropriate starting doses
- Avoid codeine and tramadol in all pediatric patients

Patient Case I

8 yo male (31 kg) arrives to the ED with an obvious deformity to right wrist following a fall at the playground. Pt is complaining of discomfort during triage assessment.

What Next?

A. Start IV and give weight–based morphine

B. Give 310 mg oral ibuprofen liquid

C. Give ketorolac 15 mg IM

D. Distract pt from pain with toys and candy

Patient Case I

8 yo male (31 kg) arrives to the ED with an obvious deformity to right wrist following a fall at the playground. Pt has been given an appropriate dose of ibuprofen. Now IV morphine is ordered for pain control, but IV access is unable to be obtained following three attempts. Pt will not allow positioning of arm for xray due to pain.

◦ What Next?
  • A. Wait for peds to come down and start the IV
  • B. Give a second dose of Ibuprofen liquid, 310 mg
  • C. Fentanyl 30 mcg IN in each nostril
  • D. Tylenol/Codeine (120 mg/12 mg/5 ml) suspension – 10 ml PO now.

Patient Case I

8 yo male (31 kg) arrives to the ED with an obvious deformity to right wrist following a fall at the playground. Pt has now been given IN fentanyl and xray has been completed. Pts arm is splinted, and pt is to be discharged with ortho follow up. Which is the most appropriate prescription for discharge?

- A. Hydrocodone/Acetaminophen solution (7.5 mg/325 mg/15 ml) – 10 ml PO Q4 hours as needed
- B. Tramadol 50 mg PO Q4 hours as needed
- C. Ibuprofen 10 mg/kg PO Q6 hours as needed
- D. Tylenol/Codeine (120 mg/12 mg/5 ml) suspension – 10 ml PO Q6 hours as needed

Patient Case II

- 56 year old female patient presents with right flank pain, and history of fibromyalgia.
- Vital signs stable
- Pertinent Home medications:
  - Acetaminophen 650 mg q 4 hr PRN
  - Lyrica 100 mg po TID
  - Asprin 81 mg daily
  - Lidoderm 5% patch daily
- Allergies:
  - Morphine: rash, Eggs: hives

Patient Case II

- Pain scores: 8/10
- What patient specific factors should be considered during initial pain medication selection
  - A: Renal function
  - B: Home medications
  - C: Allergies
  - D: Level of pain
  - E: All of the above

Patient Case II

- Which of the following pain medications is the most appropriate for initial pain management?
  - A. Morphine 10 mg IM
  - B. Fentanyl 50 mcg IV
  - C: Hydrocodone/acetaminophen 5/325 mg tablet
  - D. All of the above

Patient Case II

▸ The patient continues to rate pain at 6/10 after 50 mcg fentanyl. Which of the following medications should be given for pain control?

◦ A. Morphine 1 mg IV
◦ B. Ketorolac 30 mg IV
◦ C. Oxycodone 10 mg PO
◦ D. Hydromorphone 0.2 mg IV

Patient Case II

▸ The patient is now getting ready to discharge home. In regards to discharge prescribing, which of the following variables have been associated with increased risk of opiate addiction?

◦ A. Increased duration of first CS prescription
◦ B. Increased CS fills during initiation month
◦ C. Prescription for a long acting CS
◦ D. All of the above

Questions?