Idaho Society of Health-System Pharmacists

Acute Pain Management

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Disclosures

- Neither presenter has **ANY** disclosures or conflicts of interest to disclose

Learning Objectives

1. Recognize and explain different types of pain
2. Identify approaches to pain management
3. Discuss non-pharmacologic and pharmacologic pain management options

Introduction to Pain and Pain Management

What is Pain?

- American Society of Pain
  - Acute pain is a complex multidimensional experience that usually occurs in response to tissue trauma
  - Acute pain is more difficult to manage if permitted to become severe
- International Association for the Study of Pain (IASP)
  - Unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage

American Society Pain. 2017. Available at http://americanpainsociety.org/uploads/education/section_4.pdf
Critical Care Nurse. 2015;35(3):33-43
National Pharmaceutical Council. 2001; 10-12.

Type of Pain?

Emotional?

Physical?

Neuropathic?

Nociceptive ?

Visceral?

Acute?
Chronic?
Both?

Critical Care Nurse. 2015;35(3):33-43.

Nociceptive Pain

- Nerve stimulation from tissue injury (activation of pain receptors)
- Descriptive phrases: sharp, dull, aching, cramping, pressure-like
- Typically a good response to conventional analgesics

Somatic	Visceral
Bones	Heart
Joints	Liver
Connective tissues	Pancreas
Muscles	Gut

J Clin Invest. 2010;120(11):3742-3644.

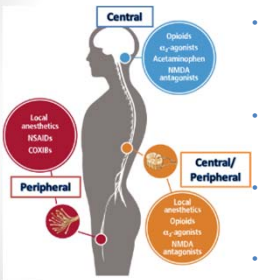
Neuropathic Pain

- Damage to the nerve itself causes typical pain symptoms
  - Nerve function impairment, compression, drug-related
- Descriptive phrases: numb, burning, tingling, crawling, stabbing, electric shock-like
- Typically a poor response to conventional analgesics

Peripheral	Central
Post-herpetic neuralgia	Post-stroke pain
Diabetic neuropathy	Multiple sclerosis
	Spinal cord injury
	Phantom limb pain

J Clin Invest. 2010;120(11):3742-3644.
Mayo Clin Proc. 2015;90(4):532-545.

Sites of Action



- Depending on the type of pain, different types of medications can be used to relieve pain
- Centrally acting agents can be useful in nociceptive pain
- Peripherally acting agents can be useful in neuropathic pain
- Non-pharmacologic methods can be used in either central or peripheral

J Clin Invest. 2010;120(11):3742-3644.
Multimodal pain management: step therapy. Ofirmev.com.

Assessment Question #1

What type of pain typically has a good response to conventional analgesics?

A. Nociceptive pain
B. Neuropathic pain
C. Somatic pain
D. A & C

Answer: D

Pain Management

Adequate Pain Management	Inadequate Pain Management
Increased productivity	Lost productivity
Decreased length of stay	Needless suffering
Lower readmission rates	Poorer outcomes
Earlier overall recovery	Sleep deprivation
Improved quality of life	
Reduce distress, decrease anxiety and depression	Increased thoughts and risk of suicide
Decreased costs for patients and the health care system	Excessive healthcare expenditures
Increased patient satisfaction	Decreased patient satisfaction

Providing pain education to patients leads to significant improvement in patients' outcomes

Critical Care Nurse. 2015;35(3):33-43
Anesthesiology. 2012;116(2):248-273.

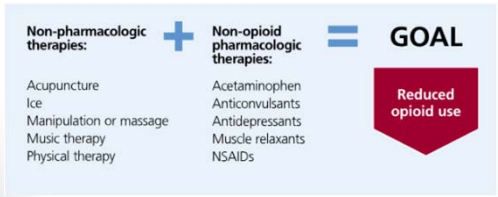
Undertreated Severe Pain

Adverse effects of undertreated severe acute pain	
Cardiovascular	Tachycardia, hypertension, increased peripheral vascular resistance, deep-vein thrombosis (DVT), pulmonary embolism
Respiratory	Decreased lung volumes, atelectasis, decreased cough, sputum retention, infection, hypoxemia
Gastrointestinal	Decreased gastric and bowel motility
Genitourinary	Urinary retention
Neuroendocrine/metabolic	Increased catabolic hormones, reduced anabolic hormones; these factors may impair wound healing and promote muscle wasting
Musculoskeletal	Muscle spasm, immobility (increasing DVT risk), muscle wasting leading to prolonged recovery
Central nervous system	Chronic or persistent pain due to central sensitization
Psychological	Anxiety, fear, helplessness, sleep deprivation

Critical Care Nurse. 2015;35(3):33-43
Anesthesiology. 2012;116(2):248-273.

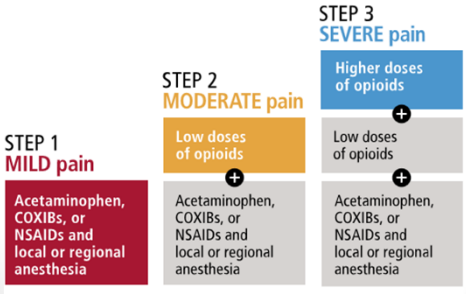
Multimodal Pain Management

The Joint Commission recommends combining non-pharmacologic and non-opioid pharmacologic approaches for effective pain management



Curr Opin Anesthesiol. 2010. 23:697-703.
Multimodal pain management: step therapy. Ofirmev.com.

Multimodal Approaches



J Clin Invest. 2010;120(11):3742-3644.
Multimodal pain management: step therapy. Ofirmev.com.

Assessment Question #2

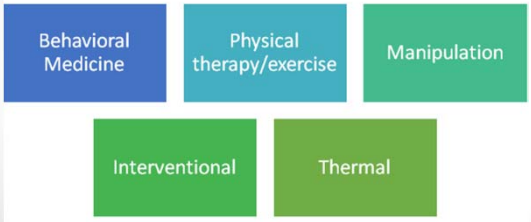
In the Multimodal Pain Management model, when would low-dose opioids be initiated?

A. Mild pain
B. Moderate pain
C. Severe pain
D. Never

Answer: B

Non-pharmacologic and Non-opioid Pain Management

Non-Pharmacologic Methods



Am J Med. 1996;101(1A):33S-39S.

Effectiveness of nonopioids

Effect of a Single Dose of Oral Opioid and Nonopioid Analgesics on Acute Extremity Pain in the Emergency Department

Chang AK, Bijur PE, Esses D, et al. *JAMA* 2017;318(17):1661-1667

Sasha K. Kaiser
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March 6, 2018

Effect of Opioid vs Nonopioid Medications on Pain-Related Function in Patients With Chronic Back Pain or Hip or Knee Osteoarthritis Pain
The SPACE Randomized Clinical Trial

Erin E. Krebs, MD, MPH[1,2]; Amy Gravely, MA[1]; Sean Nugent, BA[1]; et al

JAMA 2017;318(17):1661–1667
JAMA. 2018;319(9):872–882.

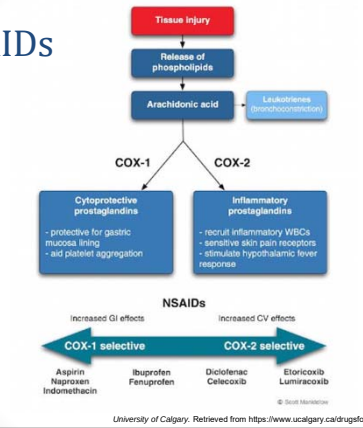
Acetaminophen (Tylenol™)

- Generally recommended as first line for mild to moderate pain. Also, used in conjunction to opioids to decrease opioid use.
- MOA: Not fully understood. Thought to be related to inhibitory serotonin pathways in CNS
  - **NO** anti-inflammatory properties
- Clinical Pearls:
  - Typically well tolerated
  - Safe in pregnancy
  - Few drug-drug Interactions

Am Fam Physician. 2013;87(11):766-772.

University of Utah. How a common drug can harm you. 2015 Feb Retrieved from https://healthcare.utah.edu/healthfeed/postings/2015/02/022315_factoid-acetaminophen-overdose.php.

NSAIDs



University of Calgary. Retrieved from https://www.ucalgary.ca/drugsformedstudents/node/6

NSAIDs

- Recommended as first line for mild to moderate pain. Good for pain involved with inflammation.
  - Symbiotic with opioids, potentially decreasing opioid use
- Clinical Pearls:
  - Most NSAIDs are though to have equivalent effectiveness. Choices are made based on factors such as cost, dosing schedule, and adverse events.
  - Warning with bleed risk (COX-1), kidney dysfunction (both), and cardiac dysfunction (COX-2)

Am Fam Physician. 2013;87(11):766-772.

Topical Agents

- Provides local pain relief with less or minimal systemic effects than oral options
- Various agents available over the counter and as prescriptions.

J Pain Res. 2011;4:11–24.

Common Topical Agents

- *Capsaicin Cream*
  - Derived from hot chili peppers
  - MOA: Decreases substance P and decreasing the number and functionality of pain nerve fibers
  - Examples of use: neuropathic pain
- *NSAIDs (example; diclofenac gel)*
  - MOA: same as oral NSAIDs
  - Examples of use: osteoarthritis
  - Caution with patients using oral and topical
- *Lidocaine*
  - MOA: Blocks the conduction of nerve impulses
  - Examples of Use: localized or neuropathic pain
  - Most common is the patch; up to 3 patches for 12 hours

J Pain Res. 2011;4:11–24.

Assessment Question #3

What is the risk behind exceeding 4000mg of Acetaminophen a day?

A. Kidney failure
B. Liver failure
C. Cardiac dysfunction
D. There is no harm!

Answer: B

Opioid and Opioid-Like Agents

Opioids

- Bind to opiate receptors in the CNS, causing inhibition of ascending pain pathways, altering the perception of and response to pain
- Produces generalized CNS depression

Parenteral Opioids	Oral Opioids
Fentanyl (Sublimaze)	Codeine
Hydromorphone (Dilaudid)	Hydromorphone (Dilaudid)
Morphine (Infumorph, Others)	Hydrocodone (Norco)
	Morphine
	Oxycodone (Oxy-IR, Roxicodone)
	Oxymorphone (Opana)
	Opioid-like = Tramadol (Ultram)

The Journal of Pain. 2009;10(2):113-130.

Opioid Considerations

- Little clinical evidence to support one opioid over another in terms of efficacy or tolerability
- Opioid use for acute pain is associated with increased risk of long-term opioid use
- Common side effect: constipation
- Concerning side effects: unintended sedation and respiratory depression

The Journal of Pain. 2009;10(2):113-130.

Choosing an Opioid

- Dosing is often based on morphine equivalents, which is a conversion between parenteral and oral opioids
- When switching opioids, always convert to morphine first

Drug	Parenteral (mg)	Oral (mg)
Morphine	10	30
Buprenorphine	0.3	0.4
Codeine	100	200
Fentanyl	0.1	N/A
Hydrocodone	N/A	30
Hydromorphone	1.5	7.5
Meperidine	100	300
Oxycodone	10	20
Oxymorphone	1	10
Tramadol	100	120

The Journal of Pain. 2009;10(2):113-130.

Opioid Prescribing Guide

- The CDC has developed the CDC Guideline for Prescribing Opioids for Chronic Pain
- Guideline goals:
  - Dosage recommendations
  - Assessing risks and harms
  - Monitoring and discontinuing
- Prescribing < 7 days (ideally < 3) to reduce chance of unintentional chronic use

Centers for Disease Control and Prevention. 2017.Avaialalbe at https://www.cdc.gov/drugoverdose/prescribing/guideline.html .

Miscellaneous Agents for Pain

Anti-Depressants

- MOA: Inhibit neurotransmitter reuptake which influence descending pain pathways
- One of the recommended first line medications for neuropathic pain
  - Some have shown benefit in diabetic neuropathy, fibromyalgia, etc.
- Patients do not have to have mood disorders for medications to be effective for pain
  - Typically require lower doses than those for mood

Mayo Clin Proc. 2015;90(4):532-545.
Lancet Neurol. 2015;14(2):162-173

Comparing Anti-Depressants

TCA	SNRI	SSRI
Amitriptyline, Nortriptyline	Duloxetine, Venlafaxine	Citalopram, Sertraline, Fluoxetine
NNT: 2-3	NNT: 5	NNT: 7
Dry mouth, sleepiness, increased HR, sweating	BP increase, nausea, headache	Wt gain, sexual dys, insomnia/sleepiness

Mayo Clin Proc. 2015;90(4):532-545.
Lancet Neurol. 2015;14(2):162-173

Gabapentinoids

- MOA: Decrease of neurotransmitters release and reduced nerve excitability
- Available agents: Gabapentin, Pregabalin
- Recommended as one of the first line agents for neuropathic pain and diabetic neuropathy
- Dose dependent dizziness and sedation
  - Start LOW and go SLOW

Mayo Clin Proc. 2015;90(4):532-545.

Anti-Convulsants

- Typically only used for first-line management of trigeminal neuralgia.
  - Sometimes used for other indications such as diabetic neuropathy but not recommended first line
- Various mechanisms and side effects based on the agent used
- Common Agents
  - Carbamazepine
  - Oxcarbazepine
  - Lamotrigine

ISOR Journal of Dental and Medical Sciences. 2013; 12(2):36-39.

Ketamine

- Derived from PCP
- MOA: Affects multiple receptors with affect on glutamate being the most well known
- Newer modality for pain management
- Side effects
  - CNS effects (sedation, hallucinations, delirium, etc)
  - Caution in cardiovascular patients

Br J Clin Pharmacol. 2014;77(2)357-367.

Consensus Guidelines on the Use of Intravenous Ketamine Infusions for Acute Pain Management From the American Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists

Schwenk, Eric S., MD*; Viscusi, Eugene R., MD*; Buvanendran, Asokumar, MD†; Hurley, Robert W., MD, PhD‡; Wasan, Ajay D., MD, MSc§; Narouze, Samer, MD, PhD||; Bhatia, Anuj, MD, MBBS*¶; Davis, Fred N., MD*†; Hooten, William M., MD#; Cohen, Steven P., MD**||

Regional Anesthesia and Pain Medicine: July 2018 - Volume 43 - Issue 5 - p 456–466
doi: 10.1097/AAP.0000000000000806
Regional Anesthesia and Acute Pain: Special Article

Regional Anesthesia and Pain Medicine. 2018; 42(5):456-466.

Cannabis

Ann Intern Med. 2017;167(5):319-331.

Assessment Question #4

True/False: Only patients that have a mood disorder can be prescribed anti-depressants for pain?

A. True
B. False

Answer: B

Summary

- There are many different types of pain and are all subjective/unique to each patient
- Multi-modal pain management is the recommended approach to pain
- There are many non-pharmacologic and pharmacologic options to manage pain
  - Non-opioids (acetaminophen, NSAIDs)
  - Opioids
  - Topical
  - Miscellaneous (ex. anti-depressants and anti-convulsants)

Questions?

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