Pain Management in Individuals with Developmental Disabilities

Irene Zamora, MSN, RN, CNS
Certified Pain Management Nurse
RN Educator at UNMH
Online A/GNP Student at UMass/Boston

Objectives

- Discuss the best approach for assessment of pain in individuals with intellectual disabilities
- Differentiate between acute and chronic pain
- Analyze the characteristics of opioids vs. nonopioids
- Clarify terminology surrounding drug abuse and addiction
- Identify at least two strategies for optimum pain management in this patient population

Prevalence of pain in Individuals with ID

- Valkenburg, et al. state that up to 50% of children and adults with Intellectual Disabilities experience gastroesophageal reflux disease
  - Significant pain and discomfort
- Assessment in this special population can be challenging when there is no self report
  - Then what?
- Things to consider….

DEVELOPMENTAL DISABILITIES RESEARCH REVIEWS 16: 248 – 257 (2010)

During Assessment

- Consider biases
  - Age
  - Gender
  - Attractiveness
  - Intellectual and physical abilities

Assessment in the Cognitively Impaired

- Direct observation or history from caregivers
  - Assessment by proxy—nursing assistants or family members or regular caregivers
- Observe during movement (walking, morning care, transfers
- Unusual behavior should trigger assessment of pain

Pain Indicator for Communicatively Impaired Children (PICIC)

Most common cues identified by 67 parents:

- **Screwed up or distressed looking face**
- **Crying with or without tears**
- **Screaming, yelling, groaning, moaning**
- **Stiff or tense body**
- **Difficult to comfort or console**
- **Flinches or moves away if touched**

Ref: Stallard P, et al: Pain 98(1-2):145-149, 2002.

Common Pain Behaviors in Cognitively Impaired Elderly Persons

- Facial expressions
- Verbalizations, vocalizations
- Body movements
- Changes in interpersonal interactions
- Changes in activity patterns or routines
- Mental status changes

CNPI—at rest and with movement

Vocal complaints: Non-verbal (Expression of pain, not in words, moans, groans, grunts, cries, gasps, sighs)

Facial Grimaces/Winces (Furrowed brow, narrowed eyes, tightened lip jaw drop, clenched teeth, distorted expressions).

Bracing (Clutching or holding onto side rails, bed, tray table, or affected area during movement)

Restlessness (Constant or intermittent shifting of position, rocking, intermittent or constant hand motions, inability to keep still)

Rubbing: (Massaging affected area)

(In addition, record Verbal complaints).

Vocal complaints: Verbal (Words expressing discomfort or pain, "ouch“ "that hurts"; cursing during movement, or exclamations of protest “stop”; “that’s enough”)

Feldt, K. S. (1996). Treatment of pain in cognitively impaired versus cognitively intact post hip fractured elders. (Doctoral dissertation, University of Minnesota, 1996). Dissertation Abstracts International, 57-09B, 5574.

Feldt, K.S. (2000). Checklist of Nonverbal Pain Indicators. Pain Management Nursing, 1 (1), 13-21.

Other Assessment Scales for Cognitively Impaired

- Pain Indicator for Communicatively Impaired Children
  - 10-49 yrs; non-verbal; indicators—facial, activity, vocal, consolability, physiological, individual indicators (0-24 point scale)
- Non-communicating Children's Pain Checklist—postoperative version
  - 3-19 years; postop pain; indicators—facial, activity, vocal, social, physiological (27 items on a 0-81 point scale—11/81: mod to severe pain)
- Paediatric Pain Profile—postoperative pain
  - 1-18 years; indicators—facial, activity, vocal, social, consolability, physiological (20 items with 0-60 point 14/60: mod or worse pain

More scales

- Checklist Pain Behavior—postoperative pain
  - 3–19 years; indicators—facial, activity, vocal, physiological; (10 point scale)
- FLACC (Revised Face, Legs, Activity, Cry, Consolability)—postoperative pain
  - 4–19 years; indicators—facial, activity, vocal, social, consolability, physiological and individual indicators; (5 items with 0–10 point scale—4/10: mod pain

During Assessment also consider that….

- Pain can impact
  - communication
  - Socialization
  - Cognitive function
  - Combined with fear cognitive function may even be effected more
- Greater pain caused greater dysfunction across domains
- Pain had a greater impact on individuals with more severe ID

L.M. Breau et al. 2007. Journal of Intellectual Disability Research. Vol. 51 pp.125-134.

Less-obvious Pain Indicators

- May be attributed to psychosis or dementia
  - Aggressive behavior
  - Fidgeting
  - Noisy breathing
  - Rapid blinking
  - Rigid, tense body posture
- Untreated pain can increase confusion
  - Patients on opioids at risk for dose being cut

Assume Pain is Present

- Assume Pain is Present
- Is there a painful stimulus
  - Surgical incision
  - Fracture
  - Painful procedure
  - Any tissue damage
- If so, treat
  - Observe

Types of Pain

- Nociceptive vs Neuropathic
- Physiologic vs pathophysiologic
- Acute vs chronic
- Malignant vs nonmalignant
- Pain syndromes

Nociceptive Pain (Acute Pain/ Physiologic Pain)

Pain resulting from activation of primary afferent nociceptors by mechanical, thermal or chemical stimuli

Pain Mechanisms: The "Pain Process"

- The neural mechanisms by which pain is perceived involve a process that involves four major steps:

1. Transduction

2. Transmission

3. Modulation

4. Perception

Neuropathic pain
Pathophysiologic Pain

- Pain resulting from damage to peripheral nervous or central nervous system tissue or from altered processing of pain in the central nervous system

Neuropathic—Pathophysiologic Pain

- Results in cellular changes that occur in peripheral and central nervous systems
  - Results in sensitization to the transmission of pain signals
- Neuroplasticity—ability of neurons to change their structure and function
- Peripheral and central sensitization—response to stimuli is increased

Result of Central and Peripheral Changes

- Hyperalgesia
  - Primary hyperalgesia
  - Secondary hyperalgesia
- Allodynia
- 'wind-up' of C fibers (a phenomenon of progressively increased neural response to repeated noxious stimuli)

Chronic Pain—Subtypes

- Inflammatory
  - OA (27 million) and RA (1.5 million)
- Neuropathic
  - DN; PHN
- LBP—59 million
- Non-inflammatory, non-neuropathic pain
  - Fibromyalgia—5 million
  - CRPS

RSD/CRPS

- Reflex Sympathetic Disorder/Complex Regional Pain Syndrome
- An extreme example of chronic severe pain
- Can occur after any type of injury-small or large; surgery; burn
- Pain is as severe as the initial injury
- Effects the nervous system and can have swelling, discoloration, sweating to the effected area
- Allodynia is a major symptom

CRPS

http://www.abc.net.au/catalyst/stories/2621515.htm

Multiple Dimensions of Pain

The ABCs of Pain

Affective Dimension

Behavioral Dimension

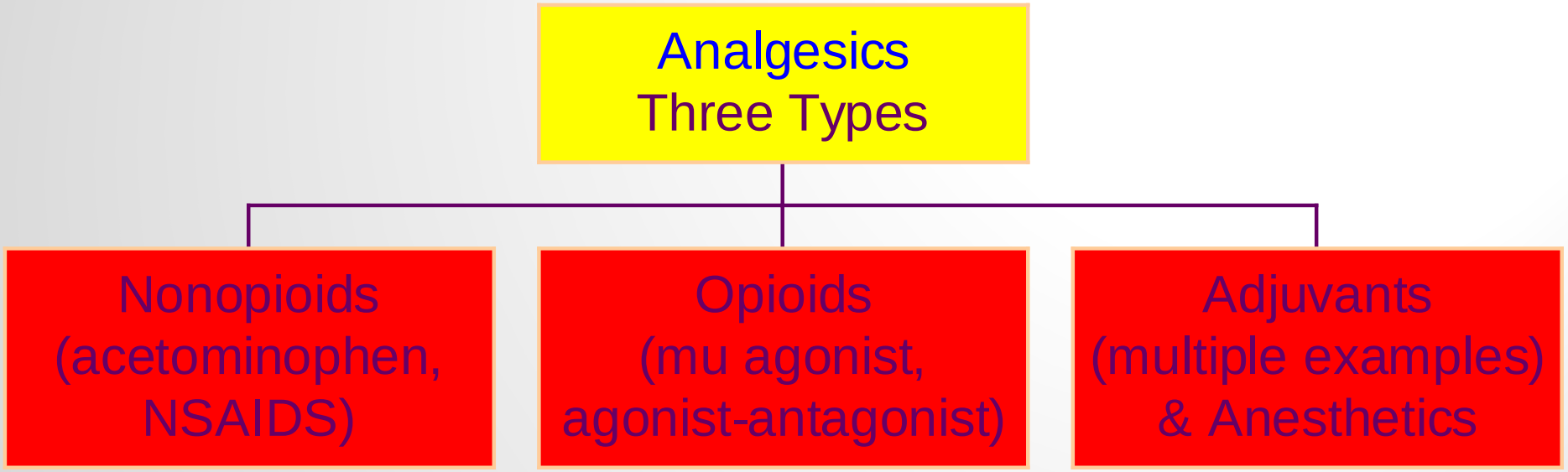
Cognitive Dimension

Physiological-Sensory Dimension

Definition of Pain

"Unpleasant sensory and emotional experience arising from actual or potential tissue damage or described in terms of such damage (IASP)

Medication Management--Analgesics



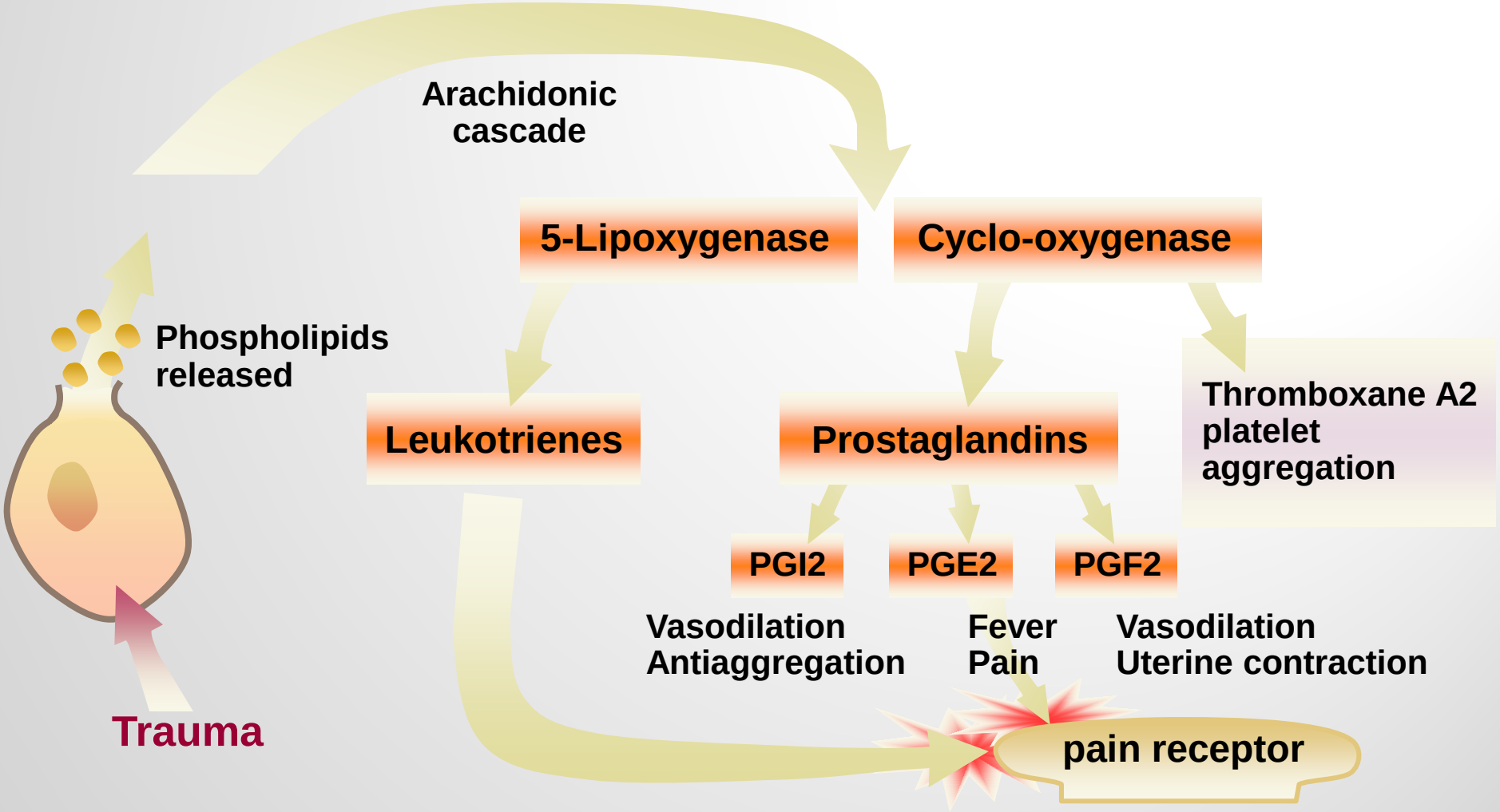
Acetaminophen

- Mechanism of action is not certain
- Probably centrally acting—?cox-3 inhibitor
- Acetaminophen toxicity
  - Hepatotoxity
    - Toxic metabolite (NAPQI)
    - Several other mechanisms lead to hepatotoxicty
    - Mechanism not completely understood
  - Nephrotoxicity >4g/day for long periods
    - Uncertain cause
    - May be caused by activity of NAPQI in renal microsomes
    - Increase frequence to 6-8 hrs in renal failure

NSAIDS

- NSAIDS—Antiinflammatory, antipyretic, analgesic
- Mechanism of action—prostaglandin inhibition by way of COX-1
  - Prostaglandins
    - important in maintaining integrity of GI and duodenal mucosa
    - Important in modulating renal plasma flow
- NSAIDs inhibit formation of thromboxane—effecting platelet aggregation
- Use with caution in pts. with history of asthma
  - Inhibits prostaglandin E—responsible for bronchodialation

Transduction: Nociceptive Chemical Stimuli



Class	Generic name	UAD	Brand name
Proprionic acids	Naproxen	500 mg initially-followed by 250mg q6-8h	Naprosyn, Anaprox, Alleve
	Flurbiprofen		Ansaid
	Oxaprozin		Daypro
	Ibuprofen	400-800mgQ6-8h	Motrin
	Ketoprofen	25-75 mg Q6-8h Max 120mg/d (parenteral)	Orudis, Oruvail
	Ketorolac		Toradol
Indoleacetic acids	Sulindac	200mg Q12h	Clinoril
	Indomethacin	25-50mg q8h	Indocin
	Etodolac	200-40mg q6-8h	Lodine

Class	Generic name	UAD	Brand name
Phenylacetic acids	Diclofenac	50 mg/q8h	Cataflam, Voltaren
Salicylic acids (nanacetylated)	Salsalate Choline magnesium trisalicylate	1000-1500 mg/q12h 1000-1500 mg/q12h	Disalcid Trilisate
Naphthylalkanone	Nabumetone	1000-2000 mg/day	Relafen
oxicam	Piroxicam		Feldene

COX-2 Inhibitors

- May have fewer GI effects than COX-1 inhibitors
- Should be avoided in patients with creatinine clearance <30ml/min
  - Carry same risk as traditional NSAIDs
- Celecoxib—Celebrex
  - UAD=100-200 mg q12h max=400 mg/d

CLARIFYING TERMINOLOGY

ADDICTION—WHAT IS IT??

- Is it a moral deficit in which the person freely chooses…
- a criminal offense…
- or is it a physiologic disease?

Prevalence of Addiction

- 6-10% of the general population has an addiction to illicit drugs, prescribed opioids and alcohol
- In chronic pain populations—6-10%
  - Those with a history of previous addiction
- Chronic pain alone does not add to the risk of addiction
- Rate of addiction in patients without a previous history of addiction when taking opioids for pain remains to be ~1%

Clarifying Definitions (AAPM, APS, ASAM 2001)

- Physical Dependence: Adaptation that is manifested by a drug class specific withdrawal syndrome that can be produced by abrupt cessation, rapid dose reduction, decreasing blood level of drug and/or administration of an antagonist
- “Dependence” is used by addiction specialists referring to addiction

Definitions

- Tolerance: A state of adaptation in which exposure to a drug induces changes that result in a diminution of one or more of the drug's effects over time

- Physical dependence, tolerance and addiction are separate phenomena but may co-exist

Addiction

- Addiction is defined as a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences
  - National Institute of Health 2010

Pseudoaddiction

- Behaviors that mimic drug abuse
  - Drug seeking
  - Clock watching
  - Anticipate the next dose
  - Demand more pain meds
- Due to the undertreatment of pain
  - Patients may become deceptive
  - May even resort to the purchase of illicit drugs
- Distinguished from addiction – analgesia demonstrates improved function and use the med as prescribed not for sedation or euphoria

Clarification of Terms

- Substance misuse
  - Use other than intended purpose
- Substance abuse
  - Use that is unlawful or detrimental
- Diversion
  - given, sold, or traded to someone other than the patient for whom it was intended
- Nonmedical use
  - Taking the drug for the feeling it gives

"Opiophobia"

- Fear that opioids will cause addiction
  - Up to 90% of the US population above age 12 has experimented with illicit drugs or alcohol
  - Very small percentage go on to develop substance-abuse
  - Treating pts with a hx of addiction will cause relapse
    - In reality, pain is more likely to cause relapse

DSM-IV describes "Substance Dependence" as

- A maladaptive pattern of substance use manifested by at least 3 of the following occurring any time over a 12-month period
  - Tolerance
  - Withdrawal
  - Taking larger amounts over a longer period than was intended
  - Unsuccessful efforts to cut down
  - A lot of time spent in efforts to obtain the substance
  - Important activities given up because of use
  - Continuation of substance despite knowing that is causing problems

Characteristics of Opioids

- No ceiling effect
- Usually no end organ damage with chronic use
- Metabolized by the liver
  - Metabolite toxicity
    - **Avoid using meperedine and propoxyphene**
- Excreted by the kidney
- Cause tolerance and physical dependence
- Reversible with an antagonist
- Bind to opiate receptors—μ, κ, δ
- Tolerance to side effects except constipation

Pharmacokinetics

- Absorption
  - Drug solubility—lipophilic vs hydrophilic
- Bioavailability
- First pass Effect
- Solubility
- Metabolism ⇨ metabolites, active or inactive
  - Prodrugs, e.g. codeine metabolized by CYP450 enzyme CYP2D6
- Half-life, clearance, steady state and accumulation

Pharmacodynamics

- Opioid responsiveness
  - Efficacy—extent to which a drug "works" (as compared to others)
  - Potency—the dose of a drug required to produce a specified effect, e.g. hydromorphone > potency than morphine
  - Opioid responsiveness—affected by age, organ dysfunction
- Tolerance—rule out disease progression; compliance to tx
  - OIH—rare
  - Incomplete Cross-tolerance—due to receptor subtypes—reduce new opioid 25% - 50% calculated equianalgesic dose (methadone dec. by as much as 90% then titrate as needed
- Physical dependence

PRN

- What does “PRN” mean?
- If pain is ongoing give opioids ATC
- Half-life
- Steady state
- Time to peak effect

Opioids
Mu-agonists

Bind to mu opiate receptors blocking transmission of pain

- Morphine
- Fentanyl
- hydromorphone
- oxycodone
- hydrocodone
- Codeine
- *Methadone
- *meperedine
- *tramadol

Morphine

- Hydrophilic—delayed onset and longer duration
- Two metabolites but only one active at opioid receptor—morphine-6-glucuronide (M6G)—analgesic
- Patients with renal impairment should start at ¼ dose and titrate as needed
  - Accumulation results in neurologic side effects as well
  - Removed with dialysis

Hydromorphone (Dilaudid)

- Hydrophyllic—similar to morphine
  - IV—1.5 mg:10 mg morphine/PO—7.5 mg:30 mg morphine
    - Onset 5 min; peak in 8-20 min. duration ~ 4 hrs
  - Oral
    - 60% bioavailable; onset 30 min. duration 3-4 hrs
  - Metabolized in the liver
  - Several metabolites
- Use decreased amounts in renal impairment due to possible sensitivity to hydromorphone-3-glucuronide→possible neuroexcitation
  - there is no 6-glucuronide so may have fewer SEs
- May be safer than morphine in renal insufficiency

Fentanyl

- Lipophillic→Short half-life, short duration of action
  - UNLESS given regularly—then half-life is extended
- No active metabolites
- Safer in renal and liver failure
- Fewer side effects
- Half-life extends with continuous use
- Multiple formulations
  - transdermal, oral transmucosal, buccal

oxycodone

- Available in combination or single-entity
  - Short and Long-acting
- More potent than morphine
- Metabolized in the liver by cytochrome CYP2D6
  - Multiple metabolites
- Binds at μ and κ receptors—may be better in chronic pain states
  - Half-life and bioavailability slightly longer than MS
  - One active metabolite—oxymorphone
  - Women may have a greater effect
  - Excretion impaired in uremic patients and
    - Elimination half-life is severely impaired in these patients
  - May cause CNS toxicity and sedation in renal failure

Hydrocodone (Vicodin)

- Only available in combination with acetaminophen, ibuprofen, aspirin
  - Onset 20 min. peak by 60 min; half-life 3.8 hrs
- Metabolized in the liver
  - Several metabolites
- Significant renal excretion of active forms
- Should be avoided in patients with renal failure
- Adverse effect –hearing loss

Demerol (meperedine)

- Half-life is 2-3 hrs (parenterally)
- Bioavailability from p.o. is ¼ that of parenteral
- Onset 10 minutes; peak effect 30 min. duration up to 4 hrs
- More likely than other opioid drugs to cause delirium in postop pts of all ages
  - More nausea and vomiting
- Limit use to 600 mg/d and no more than 48 hours due to metabolite—normeperedine
- Observe for signs of neuroexcitation—restlessness, shakiness, tremors, twitching and jerking
- Misconception—produces less biliary spasm than other opioids—all opioids can produce this

Normeperidine

- Normeperedine—only active metabolite of meperedine
  - toxic metabolite
  - half-life 15-20 hrs
  - causes neuroexcitation—hyperreflexia, myoclonus, agitation and grand mal seizures
  - half analgesic potency but twice the toxicity
  - Is not reversed with naloxone and may increase risk of seizures if naloxone given
- Use extreme caution in patients with seizure disorder
- Use caution in patients with renal insufficiency
- Contraindicated with MAOI (monoamine oxidase inhibitors)—can cause serotonin syndrome or death

Codeine

- 60mg = 600 mg of aspirin
- Not appropriate for moderate to severe pain
- Usually more constipating
- Has more psychotomimetic effects
- Metabolized in the liver to morphine
  - Several metabolites
  - Metabolism is necessary for analgesia
  - Poor metabolizers may show absence of analgesia
- Reduced renal clearance in advanced renal failure
  - Reports of serious adverse effects in renal failure

Methadone—good news

- Inexpensive
- Adverse effects similar to other opioids
- Rapid onset—30-60 minutes; duration 4-6 hrs; peak effect 2.5 hrs
- ~ 80% bioavailability
- No active metabolites
- Long duration with continued use
- No ceiling dose other than side effects
- Has some SSRI and NMDA antagonist activity
- For opioid naïve patients→start at 2.5mg Q8H
- Excreted in feces—considered safe in renal insufficiency

Methadone—not so good news

- Long half-life—15-60 hours-
  - Unpredictable
  - difficult to titrate
  - Difficult to convert from other opioids to methadone
- Duration initially is 3-6 hrs→8-12 hr with repeated dosing
- Varied inter-individual effects
- Efficacy is greater with repeated dosing
- Multiple drug-drug interactions that can induce or inhibit effect by other drug or be effected
  - Close observation is required

Propoxyphene (Darvocet)

- REMOVED FROM THE MARKET IN 2011—YAY!
  - Was removed from the market in the UK many years ago

Dual-mechanism Analgesics

- Tramadol—for mod to moderately severe pain
  - Weak mu-agonist and norepeniphrine and serotonin reuptake inhibitory activity similar to TCAs
  - Peak effect in ~ 2 hrs of 100mg dose
  - Potency equivalent to codeine and five times less potent than morphine
  - Ceiling effect
  - Max dose is 400mg/24h
  - Use with caution in pts w seizures or on SSRIs
- Tapentadol – Nucynta
  - Agonist at mu and blocks reuptake of norepinephrine
  - Schedule II drug
  - Indicated for mod-severe pain
  - Avoid combining with SSRIs

Titration of Opioids

- Based on effect
  - Increase dose 25%-100%
    - Ask patient how much pain was relieved by last dose
- Estimate 24 hr total and change to long-acting formula…for example
  - 2 tabs 5/325 Percocet Q4H→20 mg OxyContin Q8H

Equianalgesic Dosing Guidelines

- Equianalgesic means approximately the same pain relief
- The chart is a guideline. Titrate meds according to pt's response
- Chart is helpful when switching from one drug to another or when switching to another route
- Dosages are not necessarily starting doses
- Consider incomplete cross-tolerance

Drug	Oral Dose	IV Dose	Duration
Morphine	30 mg	10 mg	3-5 hours
Fentanyl	Breakthrough only (OTFC)	100mcg (0.1mg) 100 mcg/h TD ≈ 4 mg/h IV MS; 1mcg/h TD ≈ 2 mg/24 h oral MS	0.5-1 hour
Hydromorphone	7.5 mg	1.5 mg	2-4 hours
Meperidine	300 mg NR	75-100 mg	2-4 hours
Codeine	200 mg NR	130 mg	3-4 hours
Methadone	---	---	---
Oxycodone	20-30 mg	----------	3-4 hours
Hydrocodone	30 mg	----------	3-4 hours
Nalbuphine	----------	10 mg	3-6 hours

Opioid Side Effects— Are all self-limiting except….

- Constipation
- Nausea and vomiting
- Pruritus
- Urinary retention
- Mental status changes
- Sedation
- Respiratory depression

PREDISPOSING FACTORS TO RESPIRATORY DEPRESSION

- Sedation
- Large doses of opioids
- Concomitant use of opioids and CNS depressants
- High-risk patients
  - obese
  - hx of pulmonary disease
  - hx of sleep apnea
  - advanced age (>65 years)
- Rarely seen in chronic pain management

Adjuvant Analgesics

- Medications that are typically used for another purpose
- Two classes
  - Multipurpose – acute and chronic pain
  - For specific types of pain

First-line Drugs in Chronic Pain

- gabapentin (Neurontin)—start w/100-300 mg/day Usual Effective Dose (UED) 300-3600 q8h
- pregabalin (Lyrica)—start with 100-150 mg/day; UED 150-600 q12h
- SNRI
  - Duloxetine (Cymbalta)—start w/ 30 mg/day; UED 60 mg q12h

ADJUVANT ANALGESICS: MAJOR CLASSES

- Anticonvulsants
- Antidepressants
- Psychostimulants
- Muscle relaxants
- Sedatives

Opioid Side Effects

- Nausea and vomiting
- Pruritus
- Urinary retention
- Mental status changes
- Sedation
- Respiratory depression

Opioid Induced Constipation

- The hand that writes the prescription for an opioid and
- Fails to write the order for a laxative should be
- The hand that removes the impaction

Adjuvant Examples

- Antidepressants
  - SSRIs, SSNRIs, TCAs
- Anti-convulsants
- Corticosteroids
- Alpha-2 adrenoceptor agonists
- Anti-histamines
- Anti-spastics
- Muscle Relaxants
- NMDA receptor antagonists

Balanced Analgesia

- Inter-disciplinary approach
  - Medication management
  - Physical activity
  - Maximize nutritional contributions
  - Mental health
  - Support group
  - Spirituality

Non-Pharmacologic Interventions

- Increase activity
- Individualize interventions
  - music
  - artwork
  - humor
- Address constipating effects of opioids

Goal Setting

- Once assessment complete, discuss pain level and related goals with patient & family
- Should be based on functionality
- Decrease suffering
- Be realistic
- Be patient
- Patient and family education—why pain management
  - Minimize risk of complications
  - Myths about addiction

Documentation

- Analgesia
- Adverse effects
- ADLs
- Aberrhant behavior

In Summary

- Treat pain initially aggressively—
  - ***Titrate to Effect
- Adequate analgesia results in:
  - Early participation in activity
  - Prevention of complications
  - Decrease risk of chronic pain
  - Early return to individual level of functioning
- Use assessment tool specific to population
- Always combine modalities— opioids with nonopioids and pharmacologic with non-pharmacologic