

Analgesic Therapy: Safe and Effective Pain Management

**Prepared by:
CKHS Pain Committee**

Date: January 2011

- **OBJECTIVES:**

- * **CALCULATE OPIATE DOSING EQUIVALENCE AMONG DIFFERENT ANALGESICS AND ADMINISTRATION**

- **ROUTES**

- * **IDENTIFY APPROPRIATE DOSING REGIMENTS FOR MILD, MODERATE AND SEVERE PAIN**

- * **IDENTIFY ADVERSE EFFECTS OF OPIOID ANALGESICS AND MONITORING STRATEGIES**

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1. **View the PDF version of Analgesic Therapy: Safe and Effective Management (Requires Adobe Acrobat Reader).**

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3. **CME credit is not awarded to non-physicians for "Analgesic Therapy: Safe and Effective Management**

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The Creators of this powerpoint have no conflict of interest or financial relationship to disclose with the exception of Dr. Fosnocht's whose wife is employed by Johnson and Johnson.

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PLEASE CLICK ON THE PAIN MANAGMENT TUTORIAL BELOW TO BEGIN.

Link for Adobe Acrobat Reader: <http://get.adobe.com/reader/>

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FINANCIAL RELATIONSHIP AND COMMERCIAL SUPPORT INFORMATION

The Creators (Kevin Fosnocht, M.D., Lucinda Scheuren, PharmD, and Rich Pacitti, PharmD) of this presentation have no conflict of interest or financial relationship to disclose with the exception of Dr. Fosnocht whose wife is employed by Johnson and Johnson.

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OBJECTIVES

- **Relate opiate dosing equivalence among different analgesics and administration routes**
- **Identify appropriate dosing regimens for mild, moderate and severe pain**
- **Recognize adverse effects of opioid analgesics and monitoring strategies**

PLEASE NOTE BY DOUBLE CLICKING ON THE ORANGE TEXT BALLOON YOU WILL BE ABLE TO VIEW THE PRESENTERS NOTES



Acute vs Chronic Pain



Acute Pain

- Relatively brief duration (hours to weeks)
- Post-surgical pain, trauma, disease process



Chronic Pain

- Longer in duration (months to years)
- Usually accompanies a disease process or injury
- Rheumatoid arthritis, osteoarthritis, lower back pain, shoulder pain, pain associated with malignancy

Goals of Pain Management

Acute Pain

- Remove the cause
- Provide rapid onset of analgesia
- Provide sufficient magnitude and duration of analgesia
- Provide patient satisfaction and comfort

Chronic Pain

- Reduce pain
- Improve functionality, sleep, and mood
- Maintain or improve joint mobility (in musculoskeletal conditions)
- Recondition

Minimize harm associated with prescribing pain medication



Joint Commission Pain Management Standards

Demonstrate improving organization performance

- Pain management is patient right
- Safe medication prescribing
- Education for patients and families

Vital Signs

1. Temperature
2. Blood pressure
3. Pulse
4. Respiratory rate

Pain: The Fifth Vital Sign



Patient's Perception of Pain Control: HCAHPS Questions

Discharged patients are surveyed about their experience of care.

These results are reported publicly and will soon be linked to reimbursement from Medicare.

Managing patient expectations about pain control is a responsibility shared by all clinicians on the patient care team.



HCAHPS Patient Survey Pain Questions

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

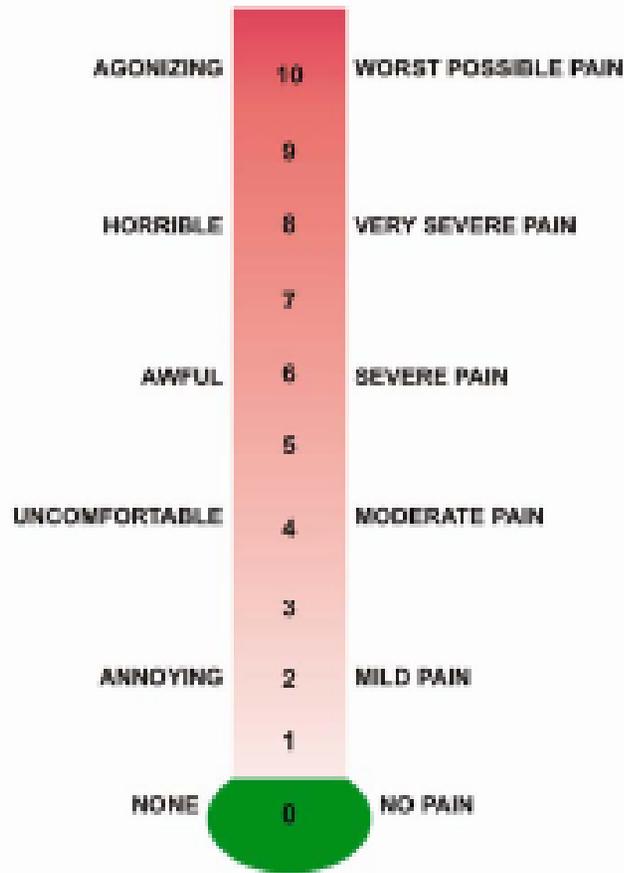
- **Never**
- **Sometimes**
- **Usually**
- **Always**

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

- **Never**
- **Sometimes**
- **Usually**
- **Always**

Measuring Pain Unidimensional Scales

LET'S WORK TOGETHER TO RELIEVE YOUR PAIN
CHOOSE A NUMBER FROM 0-10 THAT BEST DESCRIBES YOUR PAIN



Wong-Baker "Faces" Pain Rating Scale



From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: Wong's Essentials of Pediatric Nursing, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

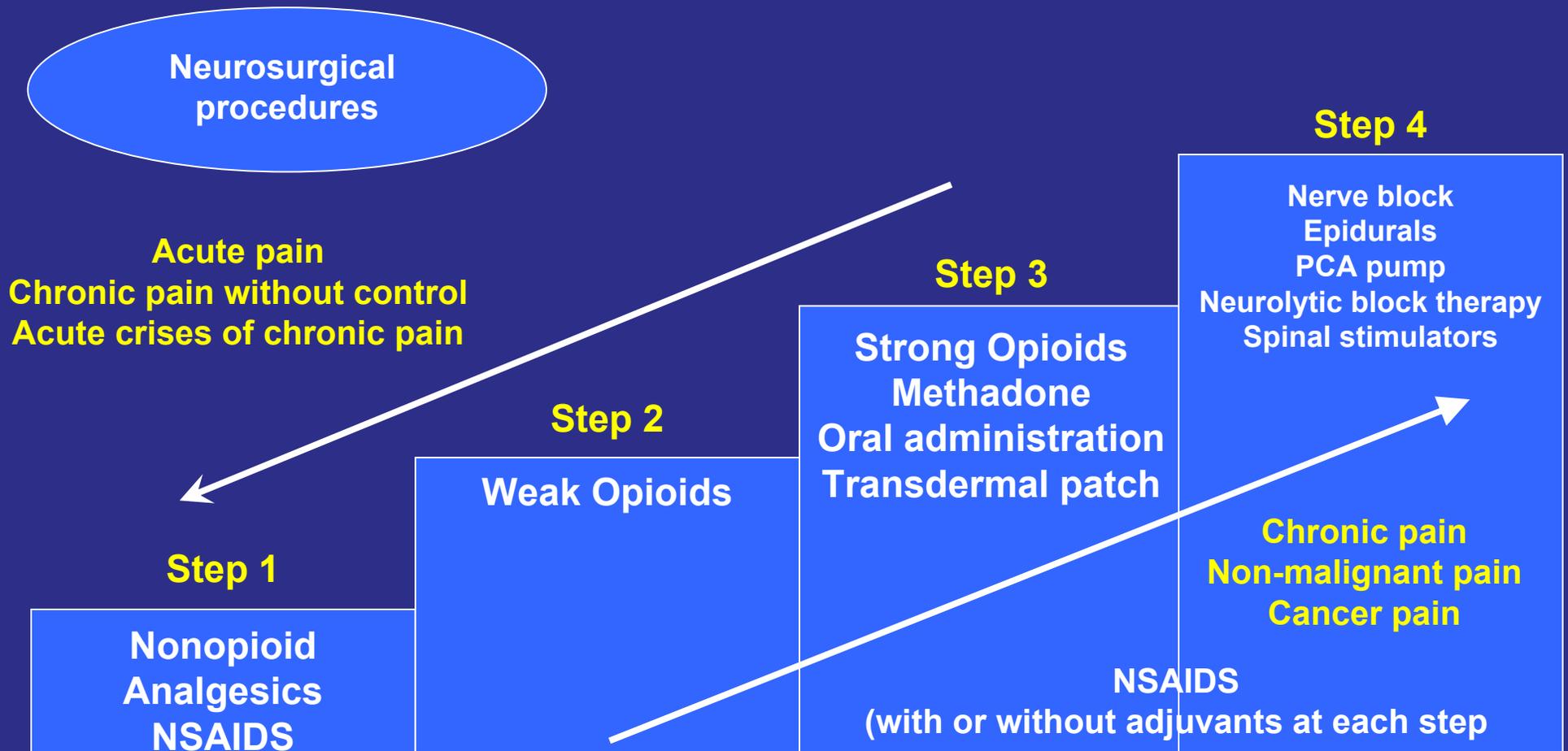
Nonverbal Pain Scale (NPS) “modified FLACC”

Use for non-verbal adult patients

Criteria	Score = 0	Score = 1	Score = 2
Face	No particular expression or smile	Occasional grimace, tearing, frown, or wrinkled forehead	Frequent grimace, tearing, frown or wrinkled forehead
Activity	Lying quietly, normal position	Seeking attention through movement or slow cautious movements	Restless activity and/or withdrawal reflexes
Guarding	Lying quietly, normal positioning of hands over areas of body	Splinting areas of the body, tense	Rigid, stiff
Physiologic I (vital signs)	Stable vital signs, no change in past 4 hours	Change over past 4 hours in any of the following: SBP > 20; HR > 20; RR > 10	Change over past 4 hours in any of the following: SBP > 30; HR > 25; RR > 20
Physiologic II	Warm, dry skin	Dilated pupils, perspiring, flushing	Diaphoretic, pallor

Validated for use in critical care adults
Score range 0 to 10, with verbal descriptive scale

Adaptation of WHO Analgesic Ladder



NSAID=Nonsteroidal anti-inflammatory drug
PCA=Patient controlled analgesia

Vargas-Schaffer. Can Fam Physician. 2010;56:514-7.

Analgesics for Mild Pain (Pain Score 1-3)

Drug	Usual Dose & Frequency	Daily Max Dose
Acetaminophen (PO or rectally) (Tylenol)	650 mg q4 hours PRN	4000 mg
Ibuprofen (PO)* (Motrin)	400 mg three times a day PRN 600 mg three times a day PRN	3200 mg
Naproxen (PO)* (Naprosyn)	500 mg two times a day PRN	1250 mg
Ketorolac (IV/IM)* (Toradol)	15 mg IV q6 hours PRN 30 mg IV q6 hours PRN 5 day limit	120 mg

Cautions: Combination products; OTC availability

***NSAID Side Effects:** Edema, GI irritation, abdominal distress, tinnitus

DO NOT EXCEED ACETAMINOPHEN 4 GRAMS TOTAL PER DAY

Analgesics for Moderate Pain (Pain Score 4-7)

Drug	Usual Dose & Frequency	Daily Maximum
Codeine 30 mg / Acetaminophen 300 mg (PO) (<i>Tylenol No.3</i>)	1 tablet q4 hours PRN 2 tablets q4 hours PRN	Acetaminophen 4 grams 13 tablets
Hydrocodone 5mg / Acetaminophen 500 mg (PO) (<i>Vicodin</i>)	1 tablet q6 hours PRN	Acetaminophen 4 grams 8 tablets
Oxycodone 5 mg / Acetaminophen 325 mg (PO) (<i>Percocet</i>)	1 tablet q4 hours PRN 2 tablets q4 hours PRN	Acetaminophen 4 grams 12 tablets
Oxycodone (PO)	Immediate release: 5 mg q4 hours PRN	
Morphine (IV/IM)	1 mg (up to 5 mg) IV/IM q2 hours PRN	
Tramadol (PO) (<i>Ultram</i>)	50 mg q4 hours PRN	400 mg 8 tablets

Cautions: Combination products

Side Effects: Nausea, vomiting, dysphoria, urinary retention, constipation, hypotension

DO NOT EXCEED ACETAMINOPHEN 4 GRAMS TOTAL PER DAY

Analgesics for Severe Pain (Pain Score 8-10)

Drug	Usual Starting Dose
Morphine	1 mg (up to 5 mg) IV/IM q2 hours PRN <u>Immediate release</u> : 10 mg PO q4 hours PRN <u>Controlled release</u> : 15 mg PO q12 hours ATC
Oxycodone	<u>Immediate release</u> : 10 mg PO q6 hours PRN <u>Controlled release</u> : 10 mg PO q12 hours (straight order)
Hydromorphone (Dilaudid)	2 mg (up to 4 mg) PO q2 hours PRN 0.5 mg (up to 2 mg) IV/IM q2 hours PRN
Fentanyl	25 mcg (up to 100 mcg) IV q2 hours PRN

Potency: Morphine < Oxycodone < Hydromorphone (Dilaudid) < Fentanyl

Note: Hydromorphone (Dilaudid) IV 1 mg ≈ Morphine IV 6.5 mg

Opiate Adverse Effects

System	Adverse Effect
CNS	Dysphoria, sedation
Pulmonary	Respiratory depression
Cardiovascular	Hypotension, Decreases myocardial oxygen demand
GI/GU	Nausea, vomiting, constipation, urinary retention
Systemic	Histamine release → pruritis Decrease cough reflex → bronchoconstriction

CNS Effects: Sedation

Sedation occurs with all opioids. Symptoms may include:

- Dizziness
- Visual disturbances
- Mental clouding
- Dysphoria
- Weakness
- Delirium

Sedation effects can be exacerbated by concurrent use of other medications, in particular:

- **Benzodiazepines** (eg, alprazolam (Xanax), diazepam (Valium))
- **Sleep medications** (eg, zolpidem (Ambien))
- **Muscle relaxants** (eg, carisoprodol (Soma), cyclobenzaprine (Flexeril))
- **Antihistamines** (eg, diphenhydramine (Benadryl))

Preventing Over-Sedation: Principles of Prescribing

- **Review all current medications before prescribing/ordering opioids.**
 - Consider sedating effects of other medications.
 - Consider discontinuing these medications when prescribing opioids.



Preventing Over-sedation: Monitor Sedation with Opioid Use

Pasero-McCaffery Opioid-Induced Sedation Scale

S	Sleep, easy to arouse
1	Awake and alert
2	Slightly drowsy, easily aroused
3	Frequently drowsy, arousable, drifts off to sleep during conversation
4	Somnolent, minimal or no response to physical stimulation

**Call prescriber if Pasero Sedation Scale greater than 2 or respiratory rate less than 10
Pasero Sedation Score of 3 requires dose adjustment, and 4 emergent intervention**



Respiratory Depression

Most likely to occur in patients who:

- **Elderly**
- **Obese**
- **Opiate naïve: receiving opioids for < 7 days**
- **Have sleep disorders: sleep apnea**
- **Have respiratory disorders: e.g., COPD**

Prevention

- **Appropriate patient, medication, dose, and route selection**
- **Gradual dose titration**
- **Careful monitoring, especially for over sedation and respiratory depression.**

Respiratory Depression: Treatment

- **Naloxone – opioid antagonist**
 - 0.1 mg IV every 2 minutes PRN opiate reversal to a maximum of 10 mg
- **Administer when**
 - Pasero Sedation Scale Score of 4
 - Unresponsive to physical or verbal stimulation
 - Shallow respirations or RR < 7
 - Pinpoint pupils
- **Caution in patients with opioid dependence**
 - Return of uncontrollable pain and withdrawal symptoms may occur



Constipation

- Occurs in $> 50\%$ of patients
- Immediate and dose dependent
- Prevention is the best treatment
 - Nonpharmacologic
 - Increasing dietary fiber and fluid intake
 - Exercise and ambulation
 - Pharmacologic
 - Stool softener: docusate (Colace) 100 mg two times a day
 - Stimulant: senna 1-2 tablets 2-4 times per day
 - Goal: bowel movement every 1-2 days

Opiate Dosing Equivalence

Analgesic	Equianalgesic Oral Dose	Equianalgesic Parenteral Dose
Codeine	200 mg	N/A
Hydrocodone (Vicodin)	30 mg	
Oxycodone	20 mg	N/A
Morphine	30 mg	10 mg
Hydromorphone (Dilaudid)	7.5 mg	1.5 mg
Fentanyl	N/A	0.1 mg
Methadone	20 mg	10 mg

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Conversion: morphine 10 mg parenteral = morphine 30mg oral

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Conversion: morphine 30 mg oral = hydromorphone (Dilaudid) 1.5 mg parenteral

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Conversion: morphine 10 mg parenteral = oxycodone 20 mg oral

Oral Administration

- Easiest and most convenient
- Absorption is usually complete but rate varies
- Peak effect in 30 to 60 minutes
- Unsuitable for patients with severe pain because of the slow onset of action

Analgesic	Onset (minutes)	Duration (hours)
Codeine	30 to 60	4 to 6
Hydrocodone (<i>Vicodin</i>)	No data available	4 to 8
Hydromorphone (<i>Dilaudid</i>)	15 to 30	4 to 6
Morphine	15 to 60	3 to 6
Oxycodone	10 to 15	4 to 6

Pain Question

Hydromorphone (Dilaudid) 1.5 mg IV is equivalent to morphine _____ IV.

- a. 1 mg
- b. 2 mg
- c. 6.5 mg
- d. 10 mg

Pain Question

Hydromorphone (Dilaudid) 1.5 mg IV is equivalent to morphine _____ IV.

- a. 1 mg
- b. 2 mg
- c. 6.5 mg
- d. 10 mg**

Patient Case

SS is a 52 year old male admitted for a knee replacement. He has a history of hypertension and his wife complains of him snoring at night.

- **Prior to admission his pain had been well controlled with Percocet 5/325 1 tablet every 4 hours which he took regularly for the last 4 months.**
 - He is NPO post-op.
- **Now reporting pain VAS 10/10 post op**
- **Vital signs: T 99.8° F, HR 128, BP 160/85, RR 35**

What do you do?

Patient Case

Questions to Consider

- Opiate history: Naïve or Tolerant?
 - Patient Vital Signs: Current respiratory rate, hemodynamic stability?
 - Organ Function: normal liver and renal function?
 - Allergy?
 - Other sedatives?
 - At risk for respiratory depression?
- Medication Option: Morphine Patient Controlled Analgesia
 - How to pick an appropriate dose?
 - Current opioids (pre-op):
 - Percocet 5/325 6 tablets daily = Oxycodone 30 mg/daily

Equianalgesic Dosing

$$\frac{30 \text{ mg PO oxycodone}}{\text{???? mg IV morphine}} = \frac{20 \text{ mg PO oxycodone}}{10 \text{ mg IV morphine}}$$

From CKHS Pain Drug Conversion Table

↓
15 mg IV morphine minimum total daily requirement

↓
 $15 \text{ mg} \times 75\% = 11 \text{ mg IV morphine Daily}$

Start at 75% of calculated dosage to minimize overdosage and potential adverse effects

PLUS

$$15 \text{ mg} \times 10\text{-}20\% = 1.5\text{-}3 \text{ mg IV morphine for breakthrough pain}$$

Breakthrough dosage should be calculated as 10% to 20% of total daily dose

Equianalgesic Dosing

Morphine 11 mg IV minimum total daily requirement

PLUS

Morphine 1.5-3 mg IV as needed for breakthrough pain



Complete PCA order sheet

Morphine 0.5 mg/hour IV continuous infusion

PCA Bolus Dose 2 mg with a lockout interval of 10 minutes

Patient Case: Equianalgesic

SS pain level has reached a tolerable level and is otherwise stable on his other issues. Discharge planning for the patient includes changing the pain regimen from the morphine drip.

Current Pain Medication Profile:

- Morphine 3 mg/hr continuous IV infusion**
- Morphine 2 mg IV q2 hours PRN for pain greater than VAS 3**

Equianalgesic Dosing

Morphine drip 3 mg/hr + (6 x 2 mg PRN morphine)
3 mg x 24hrs

Calculate total daily morphine requirement



72 mg morphine drip
+ 12 mg PRN morphine
= 84 mg morphine IV daily

→ Oxycodone PO

Select oral opioid analgesic

Equianalgesic Dosing

$$\frac{84 \text{ mg IV morphine}}{???? \text{ mg PO oxycodone}} = \frac{10 \text{ mg IV morphine}}{20 \text{ mg PO oxycodone}}$$

From CKHS Pain Drug Conversion Table

168mg PO oxycodone total daily requirement

$$168 \text{ mg} \times 75\% = 126 \text{ mg PO oxycodone Daily (ATC)}$$

Start at 75% of calculated dosage to minimize overdosage and potential adverse effects

$$126 \text{ mg} \times 10\text{-}20\% = 12\text{-}25 \text{ mg PO oxycodone for breakthrough pain}$$

Breakthrough dosage should be calculated as 10% to 20% of total daily dose

Equianalgesic Dosing

Oxycodone 126 mg PO daily (ATC)

Oxycodone 12-25 mg PO PRN breakthrough pain



OxyContin 60 mg PO q12 hours ATC

OxyIR 15 mg PO q4 hours PRN breakthrough pain score
goal of less than 7

Transition to Oral Equianalgesic Dosing

- 1) **Calculated equianalgesic dose = Oxycontin**
- 2) **Taper morphine IV continuous infusion**
- 3) **Evaluate pain scale q4 hours until equianalgesic dose becomes efficacious**
- 4) **In 2-4 hours discontinue morphine infusion within starting Oxycontin**

Revised PCA Order Sheet

- **Added**
 - Pasero Opioid Sedation Scale (as above)
 - Evaluation of candidates for **continuous pulse oximetry monitoring**
- **Separate dosing for the opiate naïve and tolerant patient**
- **Reverse page**
 - **STOPBANG evaluation** score (validated screen for obstructive sleep apnea)
 - Equianalgesic table

Continuous Pulse Oximetry Monitoring

2. Continuous Pulse Oximetry Monitoring: **must check one of the shaded boxes for PCA order to be completed.**
- Continuous pulse oximetry monitoring (must check at least one reason below)
 - Age greater than 70
 - BMI greater than 35
 - Known history of obstructive sleep apnea (OSA)
 - Known history of chronic pulmonary disease
 - Immediately post-op from thoracic surgery
 - Immediately post-op from upper abdominal surgery
 - Patient with none of the clinical features listed above.
 - Nurse to obtain the Stop-Bang screening score:
 - If score greater than or equal to 3, then place patient on continuous pulse oximetry monitoring
 - Patient is level of care 4, no indication for pulse oximetry monitoring.

PCA Order Sheet

- **The following should be completed on the order set**
 - Continuous pulse oximetry monitoring evaluation
 - Type of delivery (ex. PCA only, continuous infusion only, or continuous and PCA)
 - Medication selection
 - Loading bolus dose
 - PCA bolus dose
 - Lockout interval
 - Continuous rate (not recommended for opiate naïve)
 - Lockout maximum dose per 4 hours

PCA Order Set

- Any change to one section on the dosing will require an entirely new form completed
 - Example:
 - A hand written order on a regular physician order set to d/c PCA continuous rate is insufficient,
 - To d/c the continuous rate the entire form needs to be completed

Opioid Pseudoallergy vs True Allergy Symptoms

Pseudoallergy	True Allergy
<ul style="list-style-type: none">• Flushing• Itching• Sneezing• Hives• Exacerbation of asthma• Low blood pressure	<ul style="list-style-type: none">• Hives• Maculopapular rash• Erythema multiforme• Pustular rash• Severe hypotension• Bronchospasm• Angioedema

- Many patients report opiate side effects as allergies
- 9 of 10 patients reporting allergies to opioids are not allergic
- True opiate allergies are rare
- Need to differentiate from side effects
 - Pseudoallergic reactions vs. true allergy

Alternatives for Morphine-Allergic Patient

Morphine-Like	Meperidine-Like	Methadone-Like
Codeine Hydrocodone Oxycodone Morphine Hydromorphone	Fentanyl Meperidine	Propoxyphene Methadone

CKHS Meperidine (Demerol) Free-Zone Policy

Exceptions:

- Restricted to Labor and Delivery
- Rigors secondary to amphotericin B or hypothermia protocol
- True morphine allergy (No other alternatives)

Propoxyphene (Darvon) and propoxyphene containing products (Darvocet) have been removed from the market.

Conclusion

- Pain Assessment: use **standardized** tools
- Pain Management Goals
 - Set **realistic expectations** with the patient
 - Decrease pain
 - Minimize harm
- Treat the Pain
 - Remember **empathy** and focus on overall patient comfort are important
 - Tailor analgesic options to the individual patient, including risk of harm
 - Consider **additive CNS effects** of other medications
 - Appropriately monitor for **over-sedation** and **respiratory depression** in patients on opioids.

POST TEST

PLEASE CLICK ON THE LINK BELOW TO ACCESS THE REQUIRED POST TEST ON THE SURVEY MONKEY WEBSITE. (PLEASE NOTE YOU MUST BE CONNECTED TO THE INTERNET TO COMPLETE THE POST TEST)

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