Multi-Modal Innovative Approach to Post-Op Pain Control in the Obstetric Population

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Disclaimer

Information contained below is intended for educational purposes only. Every effort has been made to ensure the information is correct and in accordance with current recommendations. However, the practicing clinician should independently verify the information before utilizing it in clinical practice.

Objectives

Upon completion of this presentation, participants should be able to:

- Discuss the definition of pain
- Discuss the definition of multi-modal analgesia
- Describe the different types of anesthetic choices for a cesarean delivery
- Describe the benefits of multi-modal therapy
- Describe common medications used for multi-modal analgesia following cesarean delivery

Pain

"An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." – International Association for the Study of Pain

(Morgan, GE and Mikhail, MS (2006). Clinical anesthesiology (4th ed.). New York: Mcgraw-Hill)

Pain

- Common types:
  - Nociceptive: stimulation of peripheral nerve receptors in response to thermal, mechanical or chemical injury
    - Ex. Mechanical trauma from surgery (bone, muscle,visceral)
  - Neuropathic: caused by disease or injury to any part of the somatosensory system
    - Ex. Pins and needles associated with diabetic neuropathic pain (burning, tingling sensation)
- Other types include:
  - Phantom, psychogenic, breakthrough, and incident

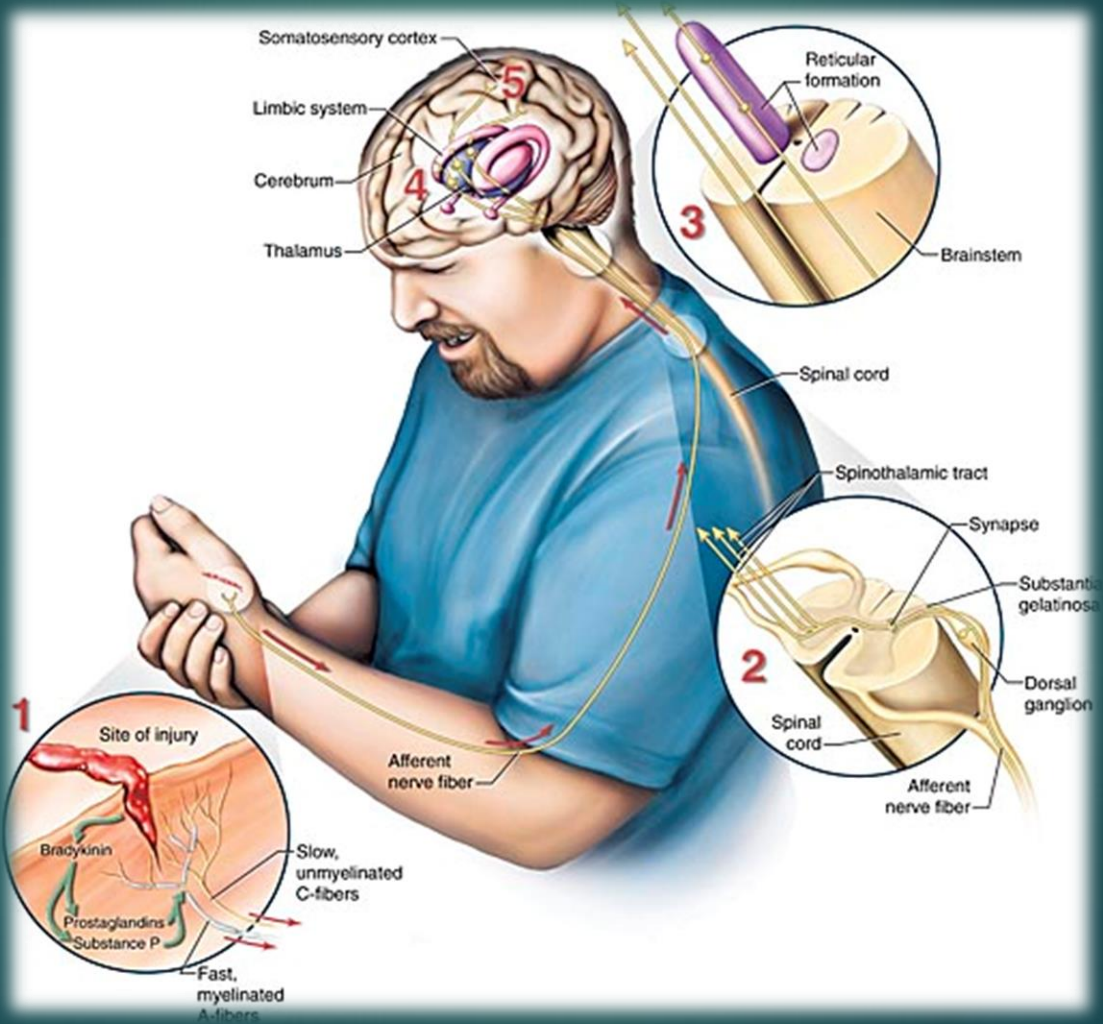
(Webb, L. "Pain management" Lecture series. Houston, Texas; 2012.)

Pain Pathways

- Nociceptor input from chemoreceptors, mechanoreceptors, or thermal receptors
- First order neurons in the peripheral nervous system
- Second order neurons in the spinal cord
- Spinothalamic tract
  - To thalamus and then sensory cortex
- Spinoreticular tract
  - To reticular formation in brainstem and then cerebral cortex

(Morgan, GE and Mikhail, MS (2006). Clinical anesthesiology (4th ed.). New York: Mcgraw-Hill)

Pain



(http://classicalosteopathyontario.wordpress.com/2012/04/16/pain-is-it-all-in-your-head/)

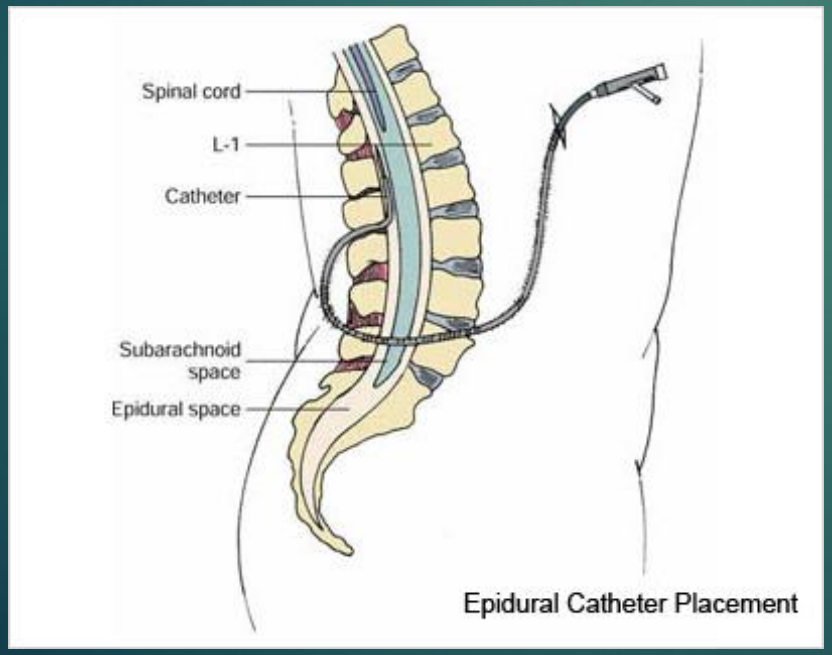
Cesarean Delivery

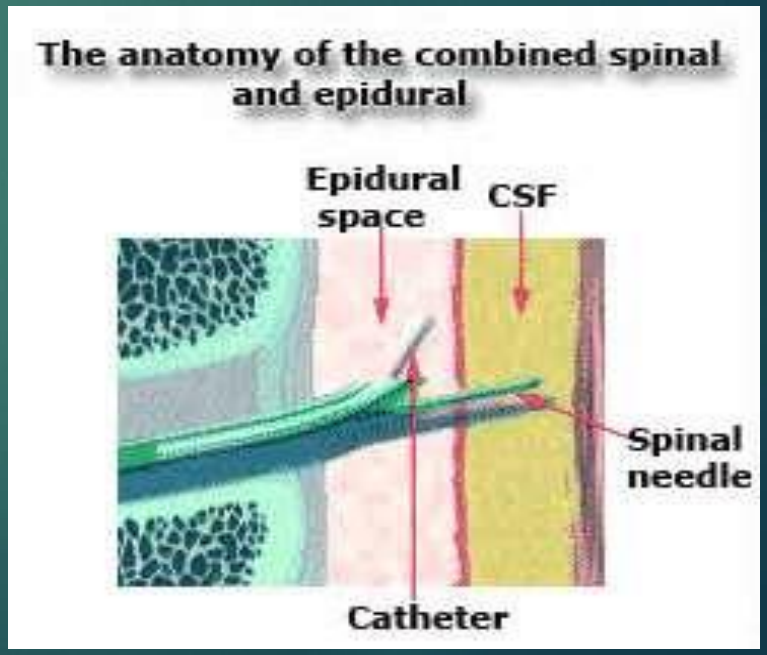
- Most common indications include:
  - Failure to progress
  - Non-reassuring fetal status
  - Cephalopelvic disproportion
  - Malpresentation
  - Previous C-section
- Type of anesthesia depends on:
  - Urgency of the procedure
  - Condition of mother and fetus

(Barash, PG, Cullen, BF and Stoelting, RK (2006). Clinical anesthesia (5th ed.). Philadelphia: Lippincott Williams & Wilkins.)

Regional Anesthesia for Cesarean Delivery

- Spinal anesthesia
- Epidural anesthesia
- Combined spinal / epidural anesthesia (Coaxial)



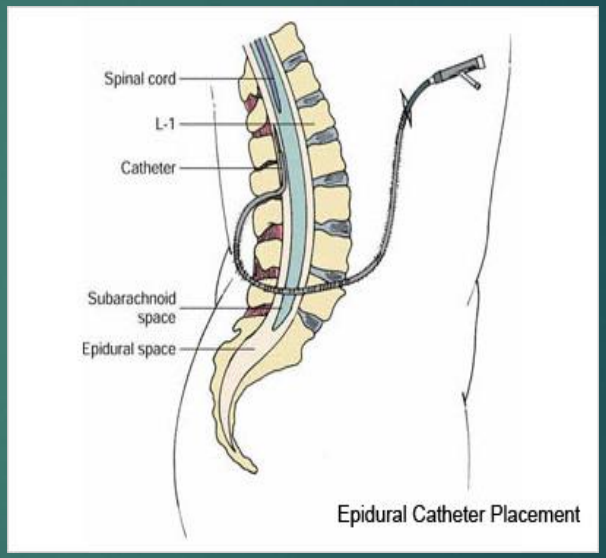


http://www.universitypaincenters.com/Dev2/index.php/patient-info/treatment-options?id=104

http://www.frca.co.uk/article.aspx?articleid=100132

Regional Anesthesia

- Spinal anesthetics block nerve roots within the subarachnoid space
  - "All or nothing" block
  - More profound motor blockade
- Epidural anesthetics
  - Catheter placed in epidural space between ligamentum flavum and dura mater
  - Allows for intermittent boluses and continuous infusions
  - Motor blockade can range from complete to none
    - Depends on choice of local anesthetic, concentration, dosage and level of injection



(Morgan, GE and Mikhail, MS (2006). Clinical anesthesiology (4th ed.). New York: Mcgraw-Hill)

TRANSVERSUS ABDOMINIS PLANE BLOCK (TAP BLOCK)

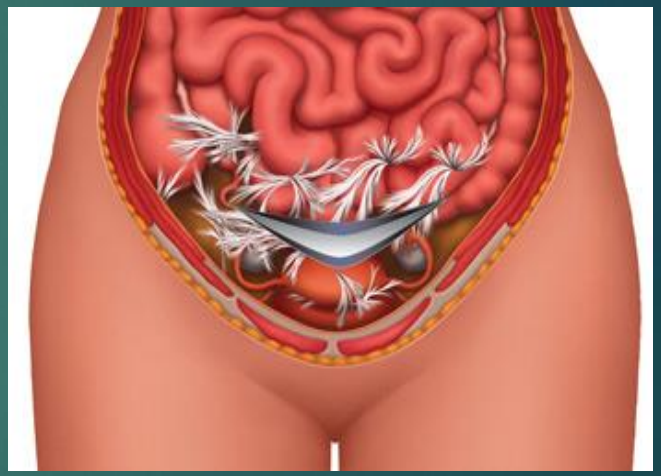
- The transversus abdominis plane (TAP) is the location of this regional anesthestic technique
- Local anesthetic is placed in the lateral abdominal wall in a plane between the internal oblique and the transversus abdominis muscles with the use of an ultrasound
- TAP block provides sensory blockade of the abdominal wall, making it an ideal mode of post operative analgesia for patients undergoing cesarean delivery and gynecologic surgery

TAP BLOCK

TAP Block Candidates

CSE Patients

Any open abdominal procedures



Non-Candidates

Labor epidural patients converted to cesarean delivery

(risk for local anesthetic toxicity)

Multimodal Technique for Perioperative Pain Management

- Multimodal analgesia combines two or more analgesic agents or techniques that act by different mechanisms to provide analgesia

- American Society of Anesthesiologists (ASA) Task Force recommendations:
  - Unless contraindicated, all patients should receive an around-the-clock regimen of a non-opioid agent
    - Non-steroidal anti-inflammatory drugs (NSAIDs)
    - Cyclooxyhenase-2 specific drugs (COXIBs)
    - Acetaminophen
  - Consider supplemental regional anesthesia techniques

(American Society of Anesthesiologists (ASA) Task Force. Anesthesiology;2012; 116:248-273)

Multimodal Approach to Acute Pain Management

Step 3 – Severe Post-Operative Pain

Step 1 and Step 2 Strategies
AND
Local Anesthetic Peripheral Neural Blockade
AND
Use of Sustained Release Opioid Analgesics

Step 2 – Moderate Post-Operative Pain

Step 1 Strategy
AND
Intermittent Doses of Opioid Analgesics

Step 1 – Most Post-Operative Pain

Non opioid analgesic: Acetaminophen, NSAIDs, or COX-2 Selective Inhibitors
AND
Local Anesthetic Infiltration

Benefits of Multi-Modal Therapy

- Reduced doses of analgesics in the treatment plan [1,2]
- Opioid dose-reducing effects [1,2]
- Better pain relief is possible with a single analgesic, secondary to synergistic or additive effects of the various agents in the treatment plan [1,2]
- Fewer "analgesic gaps" [1,2]
- Less pain during rest and activity [3]
- Improved functional outcomes [1,2]
- Reduced LOS [4]
- Improved patient satisfaction [5]

Pain is complex and multifactorial; thus appropriate management requires a "balanced" therapeutic approach [5]

Treatment Considerations for Implementing Multimodal Analgesia

- Base multimodal analgesia decision on:
  - Efficacy
  - Patient Characteristics
    - Age
    - Co-morbidities
    - Gastric motility
    - Organ dysfunction
    - Tolerability
  - Ease of use (around-the-clock vs. as-needed)

Multiple Organizations Recommend a Non-Opioid Foundation to Multi-Modal Analgesia

Society Recommendations

- American Society of Anesthesiologists (ASA)
- American Society of Pain Management Nursing (ASPMN)
- American Society of PeriAnesthesia Nurses (ASPAN)
- American Geriatrics Society (AGS)
- Society of Critical Care Medicine (SCCM)

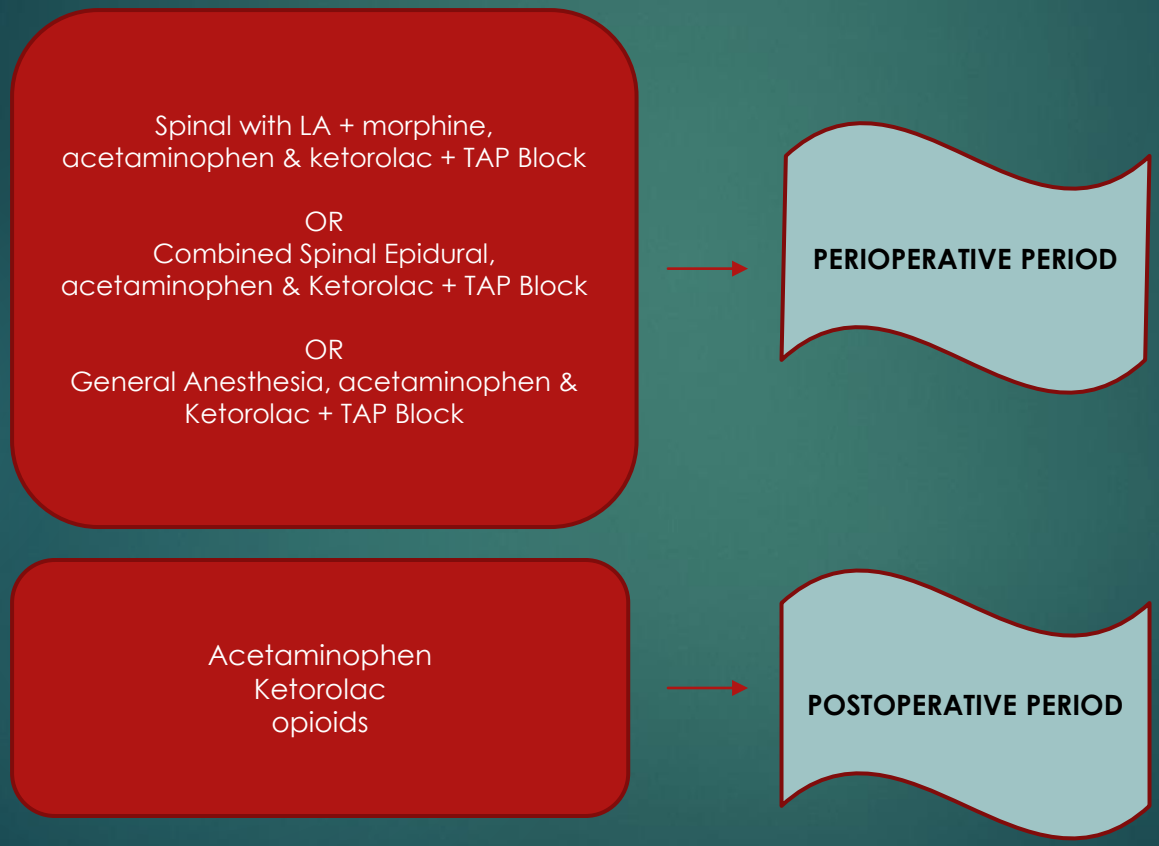
Accrediting and Quality Organizations

- The Joint Commission (TJC)
- Agency for Healthcare Research and Quality (AHRQ)

Types of Non-Opioids Used in Multi-Modal Treatment Plans

Acetaminophen	Alpha-2 agonists	Gabapentinoids
acetaminophen	clonodine	gabapentin
	dexmetetomadine	pregabalin
Local Anesthetics	**NMDA Receptor Antagonist**	**NSAIDs**
bupivacaine	ketamine	celecoxib
lidocaine		ibuprofen
liposomal bupivacaine		ketorolac

Example of Multi-Modal Approach Pain Regimen for an Elective Cesarean Delivery



Common medications used for multi-modal analgesia following cesarean delivery

(Mikhail Tchkheidze/iStockphoto/Thinkstock Canadian Nurse, 2014.)

Acetaminophen
(Ofirmev)

- Treatment of mild to moderate pain
- Reduction of adjunctive opioid analgesics for moderate to severe pain
- Mechanism of action:
  - Inhibits the synthesis of prostaglandins in the CNS
  - Blocks pain impulse generation peripherally
- IV infusion should be administered within 15 min
- May cause severe hepatotoxicity with overdose
- Minimal anti-inflammatory effects
- Fewer GI side effects than NSAIDS
- Patients not to exceed 4 grams/day

(Lexicomp 2013; Texas Children's Hospital Formulary)

Toradol
(Ketorolac)

- Nonsteroidal Anti-inflammatory Drug (NSAID)
- Short term management of moderate to severe pain
- Mechanism of action:
  - Inhibits COX-1 and COX-2
    - Decreased formation of prostaglandin precursors
  - Inhibits chemotaxis -> decreases proinflammatory cytokine levels
- Primary reasons for withholding Toradol:
    - Incomplete hemostasis / high risk of bleeding
    - Renal impairment related to PIH or hypovolemia

(Lexicomp 2013; Texas Chidrens Hospital Formulary)

Nubain
(Nalbuphine)

- Opioid partial agonist, analgesic
- Relief of moderate to severe pain; prevention or treatment of opioid-induced pruritus
- Mechanism of action:
  - Kappa opiate receptor agonist
  - Mu opiate receptor partial antagonist
  - Inhibits ascending pain pathways
  - Alters the perception of and response to pain
- Primary side effect: Sedation

(Lexicomp 2013; Texas Children's Hospital Formulary)

Epidural Duramorph

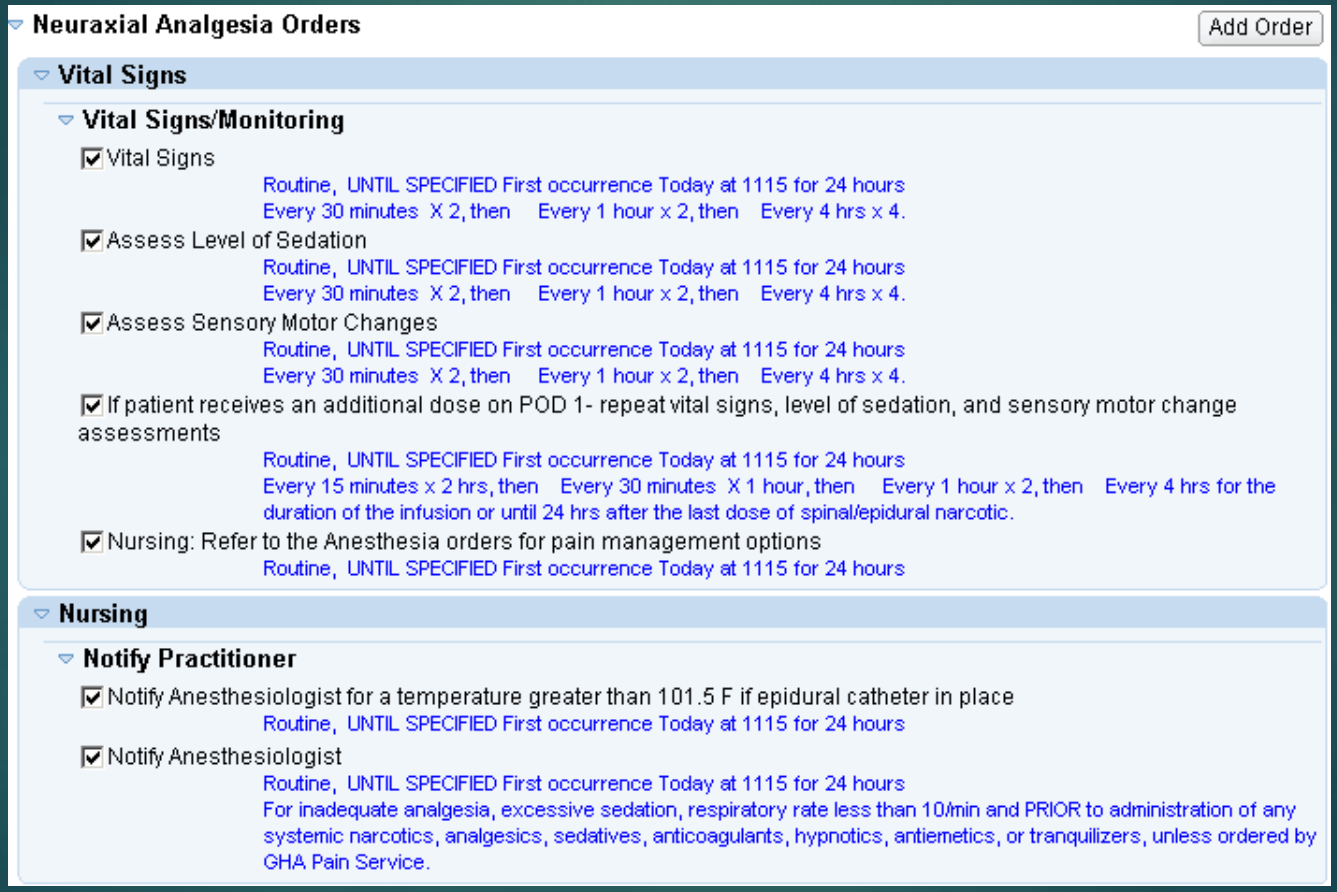
- Excellent method for postop pain management following abdominal surgeries
  - Preserved pulmonary function
  - Earlier ambulation → Lower risk for DVTs
- Redose: 2mg / Onset: 5-10 min / Peak: 20-30 min / Duration: 16 - 20 hours
- Nursing Consideration: Vital Signs post redose (30 mins x2, Q1H x2, Q4H x4
- Side effect:
  - Serious: Dose-dependent, delayed respiratory depression
  - Common: Pruritis (itching), nausea, vomiting, dizziness

(Morgan, GE and Mikhail, MS (2006). Clinical anesthesiology (4th ed.). New York: Mcgraw-Hill)

Anesthesia Order Sets

- Postoperative orders are provided for all patients after a C-section
  - Include previously discussed multimodal pain medications
  - Tailored to each patient depending on comorbidities
  - Reordered after an epidural Duramorph (Morphine) redose

Anesthesia Order Sets



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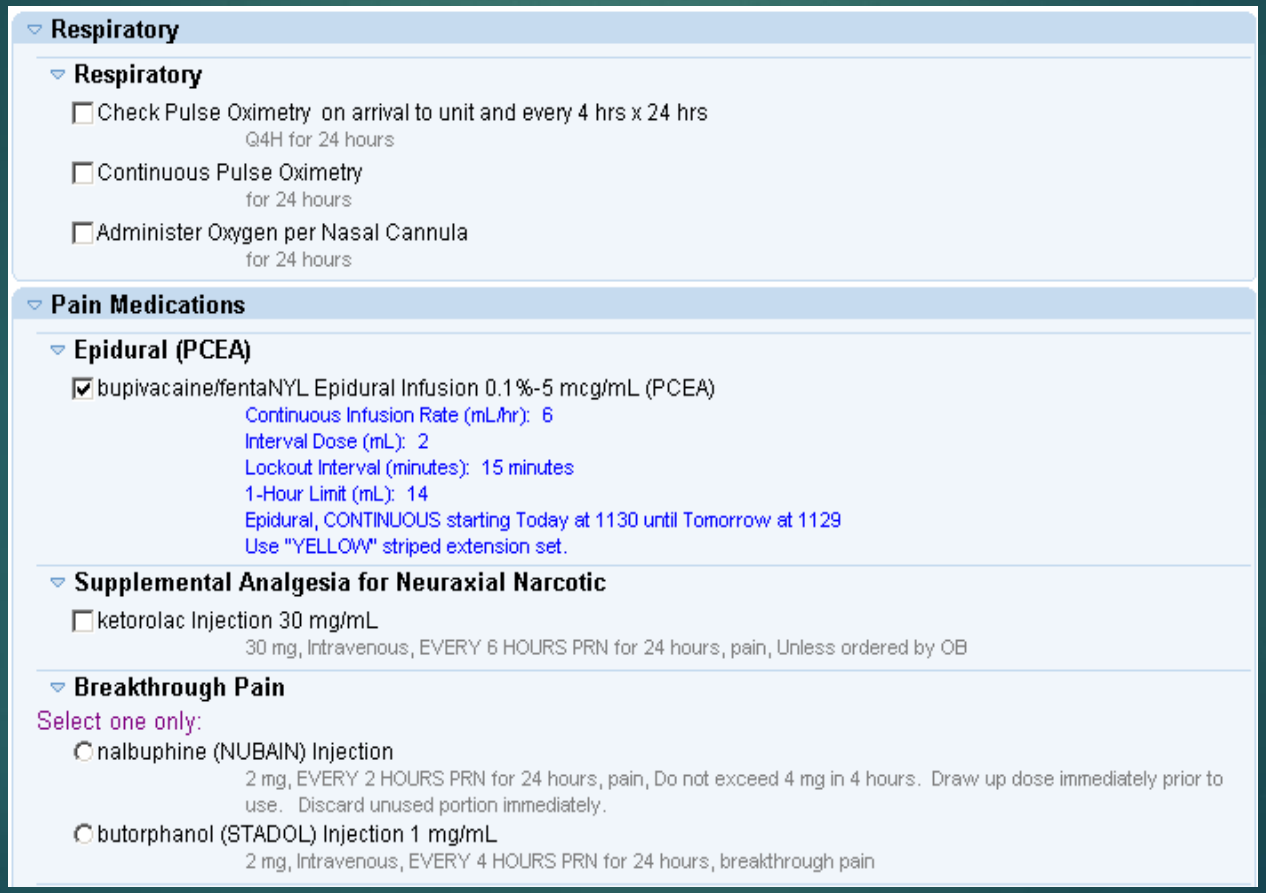

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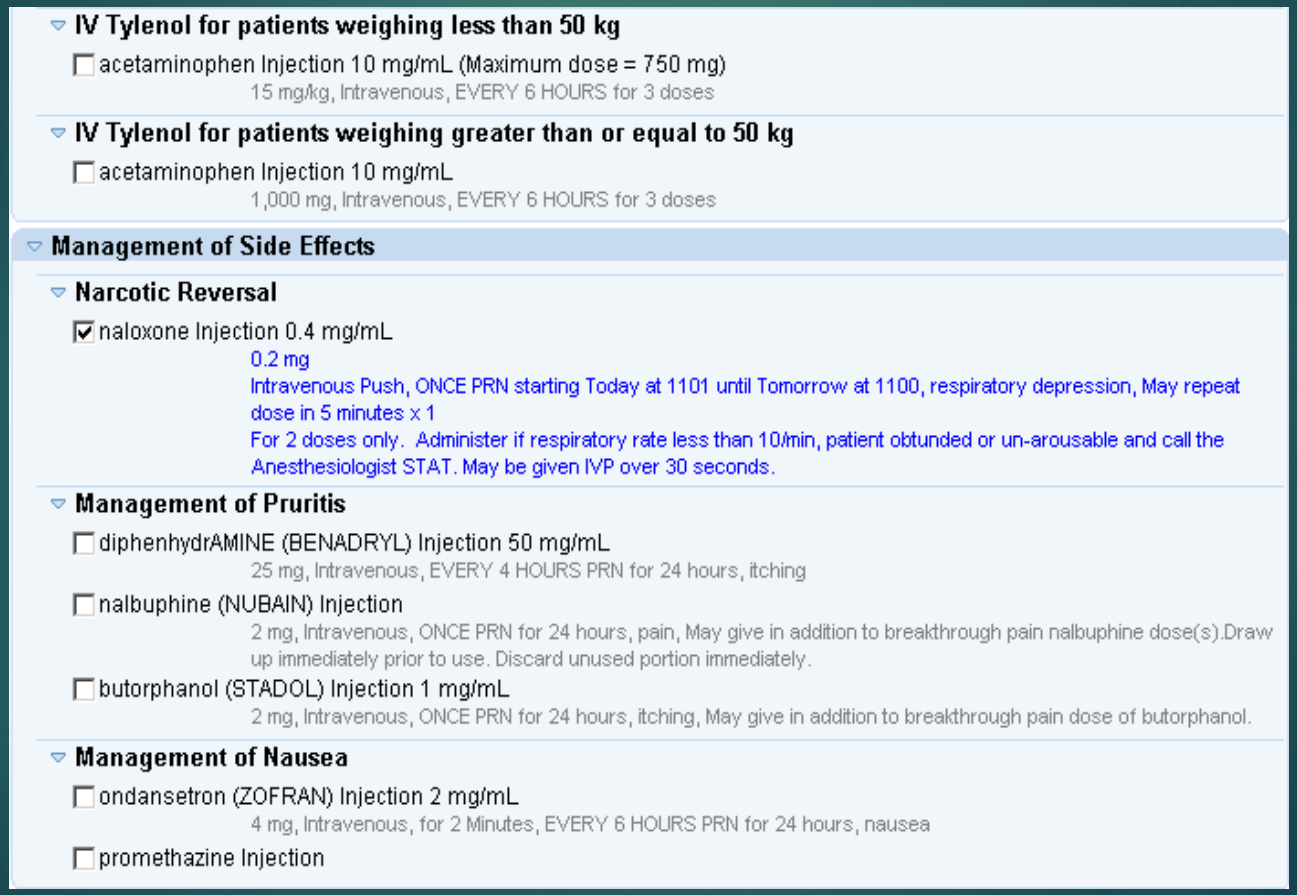
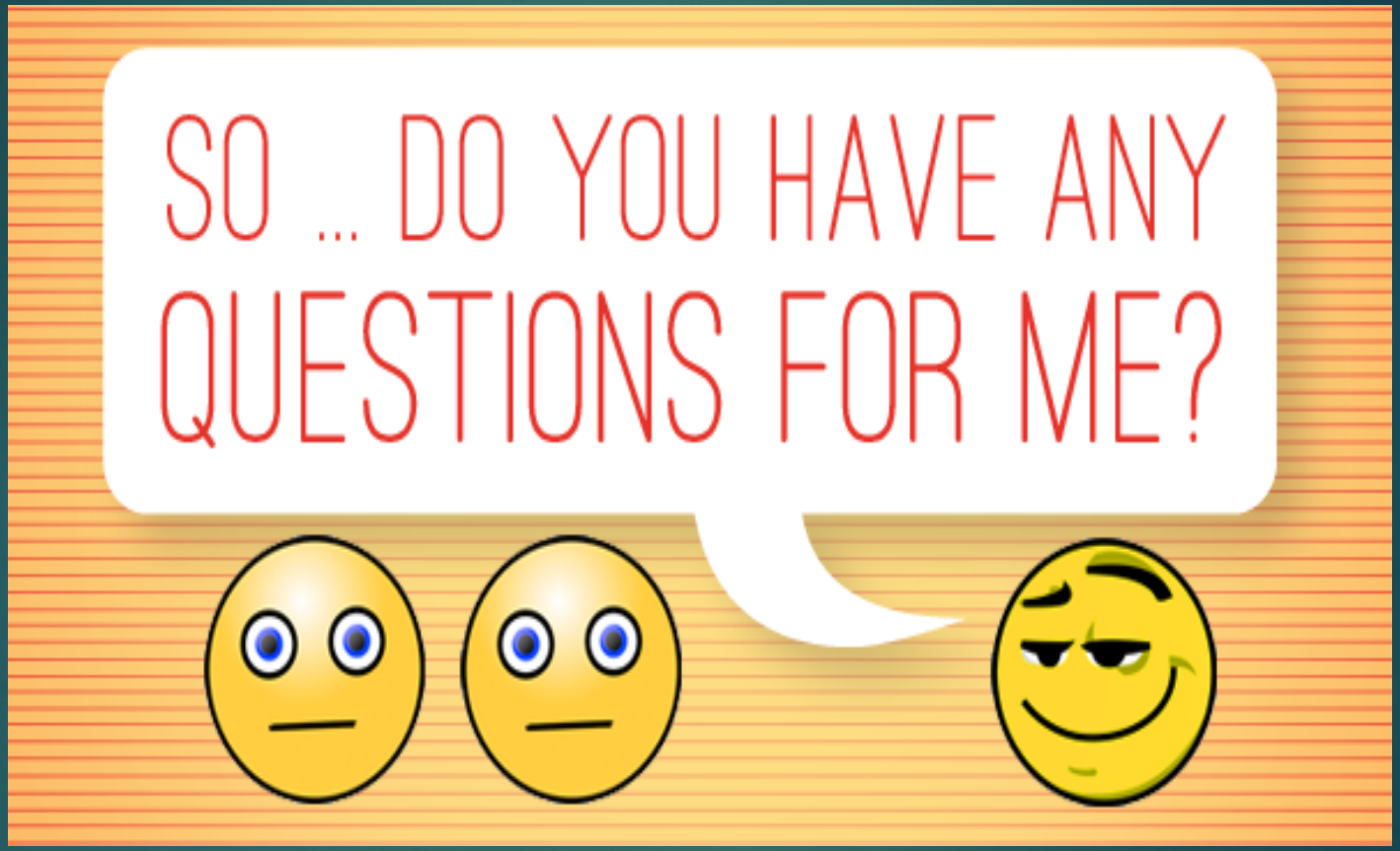


Summary

- Multi-modal postoperative pain regimen is important
- Patient satisfaction is paramount
- We all work as a team
- Anesthesia providers available 24 hours a day to help with questions or unique issues



Thank You!