Pain Management in the Postsurgical Patient

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Faculty Disclosure

This presentation may include the discussion of unapproved uses of pharmaceuticals and devices.

Research Grants:

SkyePharma/Endo, OrthoMcNeil, Progenics, Adolor, Bristol-Myers Squibb, Pfizer

Consultant:

Adolor, Endo, Ortho McNeil

Speaker's Bureau:

Endo

JCAHO Pain Management Standards

- Recognizes patient's right to pain management
- Requires regular pain assessment with follow-up
- Requires staff competence
- Examines policies and procedures for effective pain control
- Necessitates patient education

Perioperative Pain Management 2004 ASA Guidelines

- Adequate postoperative pain control
  - Avoid analgesic gaps
  - Pain score < 4
- Education
  - Clinician education, training, experience
  - Patient and family
- Institutional commitment
  - Institutional policies and procedures to establish an interdisciplinary approach

ASA Task Force on Acute Pain Management. *Anesthesiology.* 2004;100:1573-1581.

Statistics in Post-Surgical Pain

- >80% of patients reported pain after surgery
  - 4 out of 5 of whom reported moderate to severe pain[1]
- Approximately 50% of surgical patients felt their pain relief was inadequate[2]

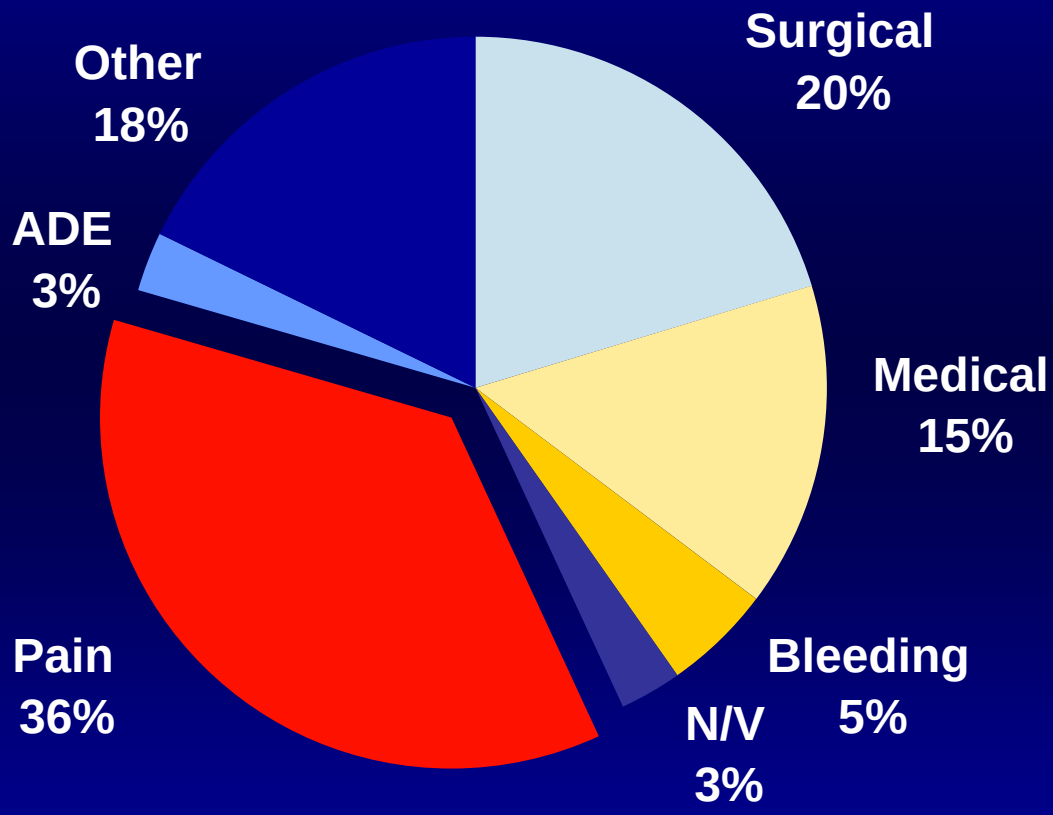
1. Shang AB, et al. Drugs. 2003;63(9):855-867.
2. National Center for Health Statistics. Available at: www.ohsuhealth.com. Accessed April 2, 2004.

Postoperative Pain Statistics

- Pain is inadequately treated in approximately 50% of all surgical procedures
- More than 80% of patients experience any postoperative pain
  - 71% experience moderate to severe pain
- Postoperative pain is the primary concern prior to surgery (59%)
- 75% believe it is “necessary” to feel pain following surgery
  - 8% postpone surgery because of concerns associated regarding pain

Apfelbaum JL, et al. *Anesth Analg.* 2003;97:534-540.
Gottschalk A, Smith DS. *Am Fam Physician.* 2001;63:1979-1984.

Readmissions From Same-Day Surgeries: Pain Is Most Common Reason (US)



ADE = adverse drug event; N/V = nausea/vomiting.

Coley KC, et al. *J Clin Anesth.* 2002;14:349-353.

Pain Assessment

- Pain at rest
- Pain with activity
- Sleep disturbance
- Avoidance of analgesic “Gaps”

Constant postoperative pain

Requires

Uninterrupted pain relief

Analgesic Gaps

- Specific time period during pain therapy when pain is unrelieved
  - PRN
  - Transitions
  - Technology failures

Carr DB, et al: Reg Anesth Pain Med 2005;30:286-291.

Acute Pain

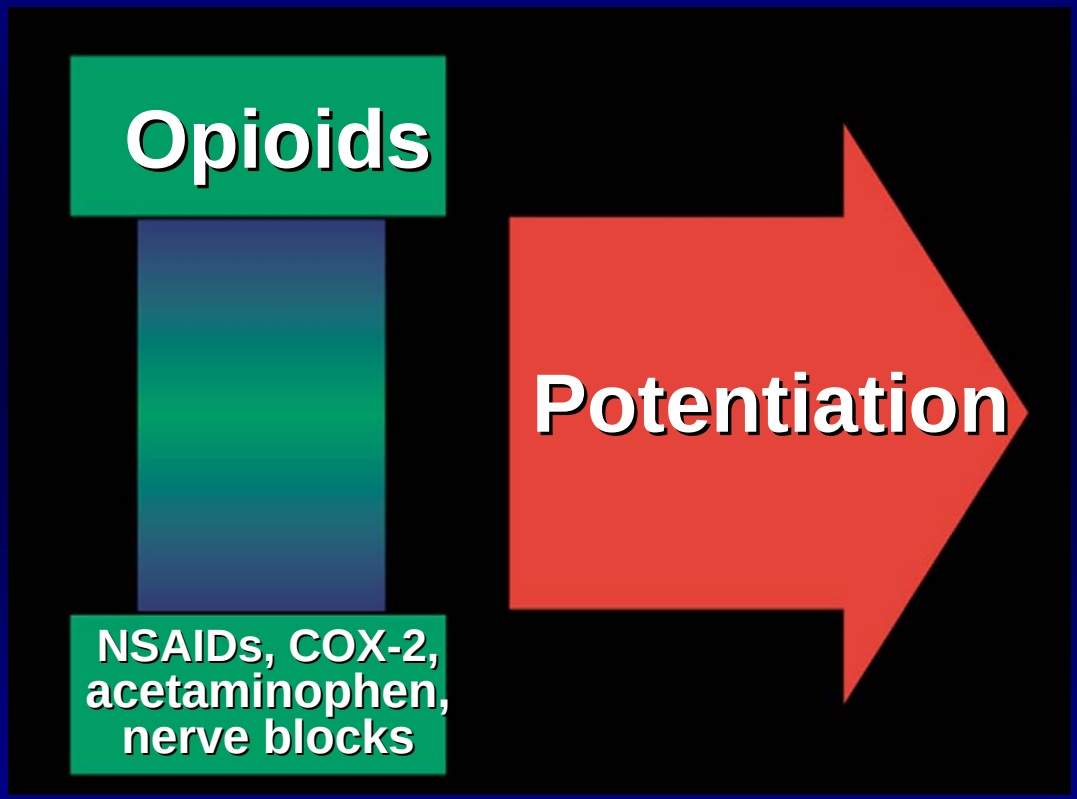
- Mechanisms[1]
  - Activation of nociceptors (C, A-delta nociceptors)
- Characteristics[1]
  - Localized, aching, gnawing
- Common examples[2]
  - Postoperative pain
  - Traumatic injury-related pain
  - Musculoskeletal pain

1. Lema J et al: Practical Management of Pain. Mosby Inc; 2000.
2. Crews JC. Practical Management of Pain. Mosby Inc; 2000.

Multimodal Approach

A multimodal approach to pain management takes into account our understanding of the molecular mechanisms of nociceptive pain signaling and peripheral and central sensitization.

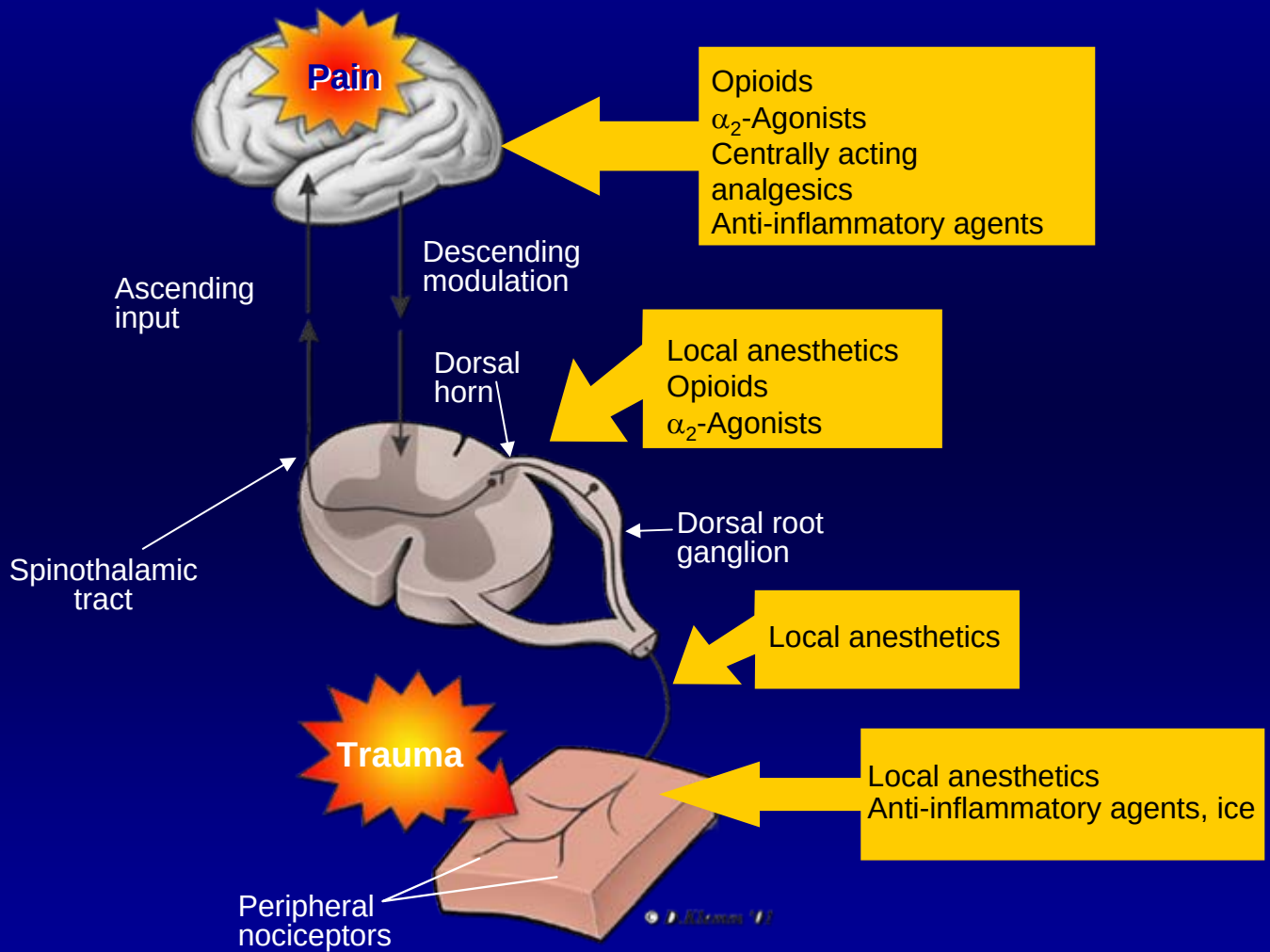
Multimodal Analgesia



- Reduced doses of each analgesic
- Improved pain relief due to synergistic / additive effects
- May reduce severity of side effects of each drug

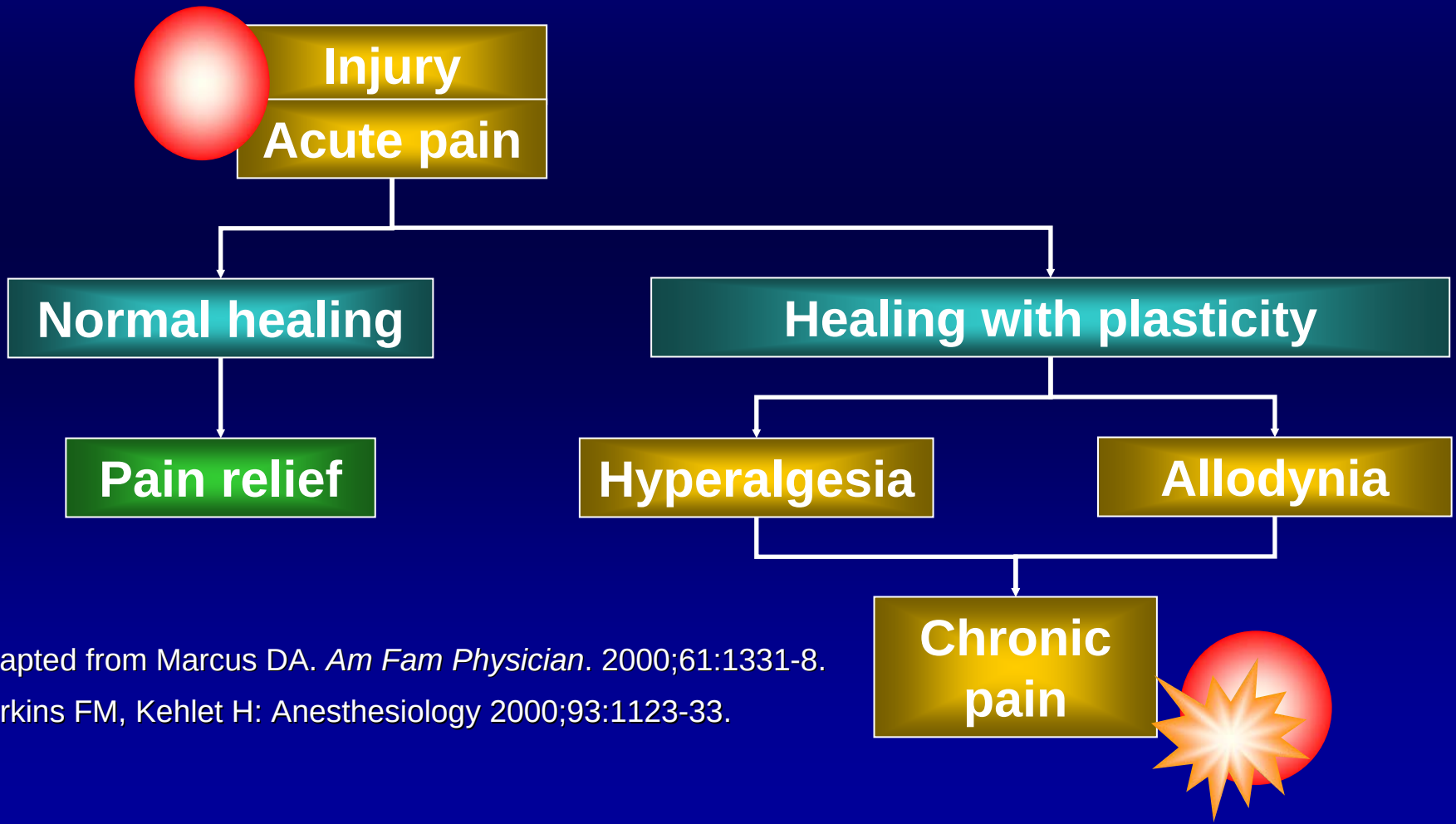
Kehlet H, Dahl JB. *Anesth Analg*. 1993;77:1048–1056.

Multimodal Approach



Gottschalk A, Smith DS. *Am Fam Physician.* 2001;63:1979-1984.

The Role of Plasticity in Chronic Pain



Adapted from Marcus DA. *Am Fam Physician*. 2000;61:1331-8.

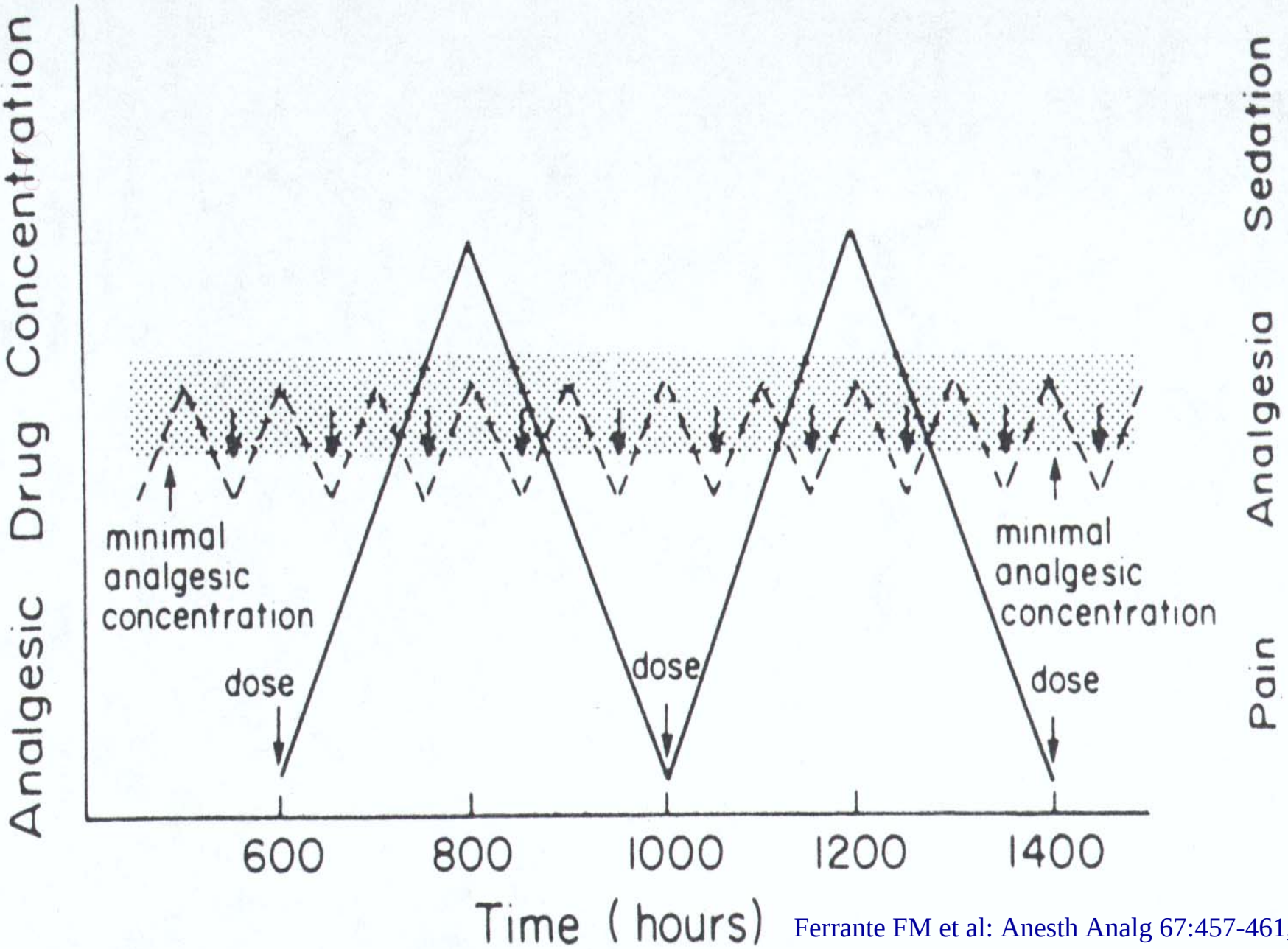
Perkins FM, Kehlet H: Anesthesiology 2000;93:1123-33.

Non-opioid Analgesics: Adjunctive Agents, Considerations

- NSAIDs-generally short acting (platelet, renal, GI)
- COX-2 specific inhibitors –long acting (CV, renal)
- Acetaminophen-short acting (liver)

Opioids

- Morphine, hydromorphone, fentanyl, oxycodone
- Meperidine has limited use
- Can be given PO, IV, IV PCA (IM and transdermal are of limited use in acute pain)
- Side effects: nausea, vomiting, pruritus, sedation, respiratory depression



Ferrante FM et al: Anesth Analg 67:457-461, 1988.

IV-Patient Controlled Analgesia

Does a concurrent opioid infusion (basal) improve pain management?

- There is no evidence that basal infusions improve analgesia in opioid naïve.
- Basal infusions are linked to greater incidence of respiratory depression in opioid naïve patients.
- Basal infusions may be appropriate in the opioid tolerant.

Parker RK, et al: JAMA 266:1947-52,1991

Scope of the Problem

- The Institute of Safe Medication Practice (ISMP) raised concerns over increasing incidents of over-sedation and fatal respiratory depression (2002)
- JCAHO identified 276 medication error related sentinel events (2003)
  - 21 % involved opioids
  - 98% of these resulted in death

Five Drugs Most Commonly Involved in Reported Errors in 2003

Product	Cases	% of total errors*
Insulin	8,813	3.6
Albuterol	6,569	2.7
Morphine	6,348	2.6
Potassium chloride	5,218	2.1
Heparin	4,839	2.0

*Percentage based on 245,783 total errors.

U.S. Pharmacopeia. *MEDMARX 5th Anniversary Data Report: A Chartbook of 2003 Findings and Trends 1999–2003*. Rockville, Md: The United States Pharmacopeial Convention Inc; 2004.

Respiratory Depression: An Adverse Outcome During Patient Controlled Analgesia Therapy

- Drug interactions
- Continuous opioid infusions
- Nurse- or physician-controlled analgesia
- Inappropriate use of PCA by patient

Looi-Lyons L.C. J. Clin. Anesth., vol. 8, March 1996

IV PCA Safety Issues

- IV PCA-related issues are well-known[1,2]
  - Programming errors
  - Patient tampering
  - Device malfunctions
- Approximately 2% of medication errors result in patient harm
  - When PCA pumps are involved, the chance for patient harm increases >3.5-fold[3]

1. Vicente KJ, et al. *Can J Anesth* 2003;50:328-332.
2. Ashburn MA, et al. *Clin J Pain*. 1994;10:52-56.
3. USP Center for the Advancement of Patient Safety. *Patient-Controlled Analgesia Pumps*. Rockville, Md: The United States Pharmacopeial Convention Inc; September 2004. USP Quality Review, No. 81.

Patients at Risk for Respiratory Depression

- Elderly
- Underlying respiratory problems
- Sleep apnea, snoring
- Concomitant sedating medications
- Hypovolemia
- Multiple prescribing physicians
- Co-morbidities: renal failure, hepatic failure, obesity
- Opioid tolerant patients (at analgesic doses)

Epidural Analgesia vs. Parenteral Opioids

- Meta-analysis: 1996-2002
  - 100 articles. Data on a total of 124 comparisons
- Objective: Is epidural analgesia better than parenteral opioids for postoperative pain control
- Variables included in analysis:
  - Postoperative pain day (1 through 4)
  - Catheter incision congruency
  - Analgesia regimen (opioid and/or local anesthetic)
  - Rest versus incident pain

Block BM, et al: JAMA 290:2455-2463, 2003.

Epidural Analgesia vs. Parenteral Opioids

- Epidural was better than parenteral analgesia:
  - At all time points for each day
  - Regardless of catheter – incision congruency
  - Regardless of surgical site
  - Regardless of analgesic technique (opioid and/or local anesthetic)
  - For both rest and incidence pain
    - Exception TEA with opioid only (fentanyl)

Block BM, et al: JAMA 290:2455-2463, 2003.

Meta-Analysis of Epidural Analgesia vs. IV-PCA

- “Epidural analgesia provided superior postoperative analgesia compared with IV-PCA regardless of analgesic agent (opioid or local anesthetic), epidural regimen.
- CEI provided statistically superior pain control to PCEA but a higher incidence of nausea, vomiting and motor block.

Wu C, et al: Anesthesiology 103:1079-1088;2005

Local Anesthetics

- Low Tech
  - Single injection
    - Wound
    - Joint
- High Tech
  - Catheters
    - Wound
    - Joint

Badner NH et al: J Bone Joint Surg Am 1996;78:734-738.

Lumbar Plexus (L2-3-4)

- Upper leg
  - Hip
  - Knee (anterior and medial aspect)
- Applications
  - Hip and knee replacements
  - ACL repair

Chelly JE, et al: Techniques in Regional Anesthesia and Pain Management 8:70-75, 2004
Williams BA, et al: Techniques in Regional Anesthesia and Pain Management 8:76-84,2004

Lumbo-Sacral Plexus L5-S1-2-3

- Lower leg
  - Knee-lateral and posterior aspect
  - Foot and ankle

Ambulatory Continuous Brachial Blockade

- Ropivacaine 0.2% at 10 ml/hr
- Dramatic reduction in pain scores
- 47% reduction in supplemental analgesics

Klein SM, et al: Anesth Analg 91:1473-1478,2000

Opioid Tolerance

- More patients are on opioids
- Identify PRIOR to surgery to plan a multimodal approach
- Utilize regional anesthesia /local anesthetics
- Expect opioid dose escalation
- Consider NMDA receptor antagonists

Opioid Hyperalgesia

- Paradoxical increased pain with opioids
- Diffuse pain

Opioid Hyperalgesia

- Opioid exposure may produce progressive and lasting reductions of nococeptive thresholds.
- Former opioid addicts have lasting increased pain sensitivity that appears worsened by methadone maintenance.
- Evidence argues against opioids as a choice for preemptive analgesia.
- NMDA receptor antagonists (ketamine) may reduce or prevent this from occurring.

Opioid Hyperalgesia

- Opioid induced pain should be more diffuse, less defined in quality and beyond the distribution of preexisting pain. If this occurs with increased opioid dose, it may indicate the presence of opioid induced hyperalgesia
- Opioid dose escalation as standard practice for the treatment of worsening pain may need to be reconsidered.

Delivery Systems

- Continuous is advantageous
- Pills are user friendly

Future of Pain Management

- Ease of use
- Multimodal approaches
- Patient vs equipment focus
- Easy to administer
- Improved side effect profile
- High success rate
- Compatible with clinical practice