

### Learning Outcomes

- Discuss the differences between various types of pain and what tools are used to assess pain
- Identify management strategies for acute postsurgical pain and chronic pain
- Describe indications and management of epidural catheters vs patient controlled analgesia



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### Case #1

- 6yo male 20kg with a PMHx of Crohn's disease presenting for a laparotomy and bowel resection
- PE: CV – RRR, Resp – CTAB, Back – no lesions, rashes
- Labs: WNL
- Pain management plan?



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### Case #2

- 17yo female presents to the ED with left arm, low back, right hip pain. Pain poorly controlled with oral pain medications. Rates pain 10/10. VSS.
- PMHx: Sickle cell disease, GERD
- CXR: no new infiltrates
- Pain management plan?



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## Pediatric Pain

- In comparison to adults, children do not receive adequate analgesia
- Pain occurs across a spectrum of conditions including acute injuries and medical events, recurrent or chronic pain
- Accumulating research - untreated pain may have long term negative and permanent repercussions on pain sensitivity, immune functioning, neurophysiology, attitudes, and health care behavior



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## Pediatric Pain Management

- Exaggerated fear, anxiety, difference in coping style, lack of social support
- Nonverbal or developmental disabilities



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## Pediatric chronic pain

- Approximately 30% of children and adolescents experience pain that lasts for 3 months or longer
- Migraine, recurrent abdominal pain, general musculoskeletal pain
- Often associated with a functional disability
- Multidisciplinary teams and chronic pain programs typically emphasize functional restoration

Odell S, Logan D. Pediatric pain management: the multidisciplinary approach. Journal of Pain Research 2013;6:785-790



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## Pediatric Chronic Pain Syndromes

- Headaches
- Chronic/functional abdominal pain
- Myofascial pain, Ehlers Danlos syndrome
- Neuropathic pain: CRPS, chemotherapy/radiation-related neuropathy
- Chronic pain related to underlying medical condition



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## Different types of pain

- **Visceral** – activation of nociceptors of the thoracic, pelvic, or abdominal viscera. Visceral structures are highly sensitive to distension, ischemia, inflammation. Often described as pressure-like, deep squeezing, dull or diffuse
- **Somatic** – activation of pain receptors in either the body surface or musculoskeletal tissues
- **Neuropathic** – caused by injury to spinal cord or peripheral nerves. Burning, tingling, shooting, stinging, "pins and needles" sensation



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## Pain Services

- **Acute** – postsurgical pain
- **Medical** – chronic pain
- **Palliative** – goal to improve end of life care for children, assist families with difficult decision making. Manage pain meds for home care and hospice services



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## Acute Assessment

- Key points:
  - Previous pain medication history  
tolerance, basal requirements, side effect history
  - Renal, hepatic, metabolic issues  
issues with NSAIDS, narcotic metabolite build up
  - Bleeding disorders, neurologic deficits  
implications for regional anesthesia
  - Baseline anxiety score



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## Pain History

- P Q R S T
- P – provocative vs palliative
- Q – quantitative vs qualitative
- R – radiation
- S – site and symptoms
- T – temporal and treatment



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## CCHMC Pain Scales

- Building blocks for pain management

NIPS	Neonates – 1yr
OUCHER	5-10yrs
VAS	>8yrs
FLACC	Birth-adulthood
COMFORT	Intubated/sedated



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## Developmental Delay

- No scale has been formally adopted at CCHMC but often use FLACC score
- Family input is very important
  - How does the patient usually show pain



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## Neonatal Infant Pain Scale (NIPS) NICU

- Behavioral scale
- Birth to 1 year
- Range 0-7

	0	1	2
<b>FACIAL EXPRESSION</b>	Relaxed muscles Neutral Expression	Furrowed brows, chin, jaw	
<b>CRY</b>	Cries not crying	Mild moaning intermittent cry	Loud scream, strong scream continuous. Prolonged cry (moaning) as evidenced by facial expression
<b>BREATHING PATTERNS</b>	Relaxed	Changes in breathing irregular, faster than usual, gagging, breath holding	
<b>ARMS</b>	Relaxed No Muscular Rigidity	Flexion/extension Tense, straight arm rigid and/or rapid extension/flexion	
<b>LEGS</b>	Relaxed No Muscular Rigidity	Flexion/extension Tense, straight leg rigid, and/or rapid extension/flexion	
<b>STATE OF AROUSAL</b>	Alert, peaceful, sleeping or alert and settled	Disturbed Alert, restless and blewling	



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## Oucher

- Self Report Scale
  - Ages 5-10 years (some as young as 3 years)
  - 3 cultures (all male)
  - Avoid happy/sad, use age appropriate words
  - Range 0-10
  - Similar scale known as FACES not used here

10 —

9 —

8 —

7 —

6 —

5 —


4 —


3 —

2 —

1 —

0 —





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## Pediatric Pain Scales

- Some patients will have their own scale. Use it consistently as you are mainly looking at the trend
- Others will exceed the standard limits
  - A cry for help, follow the trend, pain, anxiety




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## Pain Assessment

- Ask about pain regularly, assess systemically
- Believe the patient and their family in their pain reports
- Choose pain control options appropriate for the patient
- Deliver interventions in a timely, logical, coordinated manner
- Empower patients and their families and Enable them to control their course to the greatest extent possible




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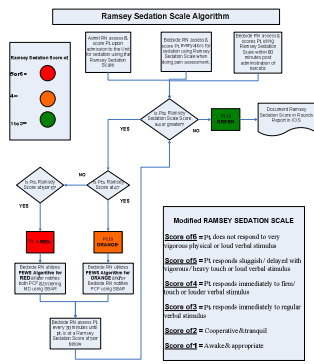
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## Sedation Assessment




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**Why is anxiety important?**

- Predictor of Post op Pain
- Predictor of Chronic Pain
- Might explain *some* of the variation of post-op pain

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**How can we look at it's effect?**

- We can see how it affects patients after surgery.
- How?
- By looking at IV Opioid consumption

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**Example**

- 14yo TPIAT pt – on **POD#3** – PS 7-10; Asking for more pain meds
- MER at **34.98** (Doesn't include her Methadone)
- **Started Ativan**
- **POD#4** – PS 7; Very sedated; MER **26.4**
- **POD#5** – PS 4-5; MER **13.6** – stopped methadone and decreased PCA dose

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### Results for Anxiety

- Anxiety increases pain scores and IV opioid consumption
- Pain needs may last longer than non-anxious patient
- Patient satisfaction would go down if they feel that their expectations are not being met



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### We can measure it!

- mY-PAS
- State –Trait Anxiety Inventory
- Pain Catastrophizing Scale
- NRS - Anxiety



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### Problems

- We are bombarded with scales and inventories
- Has to be simple
- Has to be relevant



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## Anxiety Score

Time taken: 1525 | 8/10/2016

Values By:

**Anxiety**

Anxiety Score (0-10)

Are you always anxious?

Do you take any medications for anxiety?

Do you see a professional for your anxiety?

044 Restore  Close F9  Cancel



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## Anxiety Score

Time taken: 1525 | 8/10/2016

Values By:

**Anxiety**

Anxiety Score (0-10)

Are you always anxious?

Do you take any medications for anxiety?

What medications do you take for anxiety?

Do you see a professional for your anxiety?



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## Use

- Preop – Could use to determine need for Sedation/GA/Need for regional
- Preop – Could use to figure need for PO/IV Versed
- Intraop – Need for Dexmedetomidine
- Postop – Use of Versed/Valium/Ativan for pain; Or addition of Dexmed



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## Postoperative Pain Options

- Epidural – open vs lap surgery, relevant labwork
- PCA – dilaudid, fentanyl, morphine, continuous vs not, transition to IV intermittent and PO
- Regional (fem/sciatic, TAP blocks)
- Transition to PO meds (oxycodone vs dilaudid)
- IV Tylenol (LFTs)
- Valium (muscle spasms vs narcotics for incisional pain)
- Methadone
- Gabapentin, Lyrica



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## Epidural

- Location of the epidural catheter is critical for optimal effect
- Neurologic deficits
- Fever - 5 day limit due to infection, check insertion site
- To assess epidural: older kids can report a level. Younger/delayed kids – press over and around incision
- May need to re-bolus



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## Pain and the WORKING epidural

- Anxiety and being told it isn't working makes pain worse
- Look for other sources – spasm (bladder, muscle). Treat with valium, robaxin
- NG tube (sore throat)
- Is the foley draining?



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## Epidural troubleshooting

- Look at site, kinked?, alarm on pump going off?, ice glove test to check level
- Are they able to sit up with minimal help
- No foley needed for thoracic epidural
- Give bolus through epidural first
- Then additional therapies (IV narcotic rescue dose, valium, Tylenol/toradol due?)



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## Postoperative Course

- IV/Epidural pain meds if pain service is involved
- Awaiting return of bowel function
- Transition to oral pain meds when tolerating diet
- Liquid vs pills



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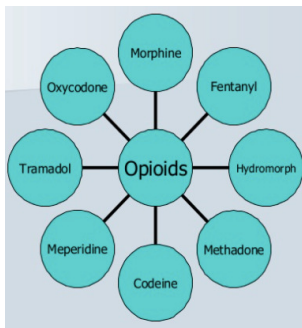
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## Oral Narcotics

- Choices:
  - Oxycodone
  - Oxycontin
  - Oral morphine
  - Oral dilaudid
  - Methadone
  - Tylenol with codeine



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## Side effects

- Ileus
- Pruritus
- Emesis
- Nausea
- Hallucinations



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## Methadone

- Good for neuropathic pain
- Some incidences of respiratory arrest even with tolerance upon conversion to PO
- Rare QT prolongation and Torsades de Pointes
- Long half life – allows for 1-3x/day dosing. If dose is titrated too rapidly can lead to toxicity, respiratory depression
- Potent mu agonist and NMDA antagonist



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### Postoperative PCA

- Why NOT do a continuous infusion?
- What are the benefits and dangers?
- Side effects: hallucinations, pruritus, emesis, nausea, apnea
- When to stop PCA: patient taking solids, severe side effects, parents/patient dissatisfaction, no pain



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### Fentanyl PCA

- Poor and unreliable pain control with bolus fentanyl alone
- Need continuous
- Younger patients



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### Nonopioid analgesics

- Acetaminophen
- Ibuprofen
- Naproxen
- Ketorolac
- Ceiling effect, best used in combination with opioids to decrease their use and side effects



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### Why regional anesthesia?

- RA techniques provide improved analgesia, decreased urinary retention, decreased nausea and vomiting and improved patient oriented outcomes (active participation in physiotherapy, accelerated recovery)

Richman, J et al. Anesthesia and Analgesia. 2006, 102:248-257



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### Multimodal therapies and protocols

- FIRST program (function is most important)
- Integrative care – massages, healing touch, relaxation
- Behavioral medicine – pain coping behaviors, distraction
- APS – spine and pectus protocols



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### Gabapentin

- 3 classes of drugs primarily utilized for the treatment of postoperative pain (anti-inflammatory, local anesthetics, and opioids)
- Gabapentin - treatment of postoperative pain. Unique mechanism of action (anti-hyperalgesic properties)
- Gabapentin works by reducing lesion-induced hyperexcitability of posterior horn neurons, which is responsible for central sensitization



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Gabapentin/Pregabalin

- Anti-epileptics
  - Anti-allodynic, anti-hyperalgesic, anxiolytic effects
- Structurally similar to GABA
- $\alpha 2$ - $\delta$  subunit of voltage gated  $Ca^{++}$  channels in CNS
- Minimal metabolism
  - Renal excretion

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Gabapentin/Pregabalin

- Reduces postoperative opioid consumption
- Decreased pain score
- Very few side effects
- Few drug interactions
- ↓ Nausea/vomiting
- ↓ Pruritus
- Easy administration
  - PO, one time dosing

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IV. Lidocaine – Poor Man’s Epidural

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### Intravenous Lidocaine Speeds the Return of Bowel Function, Decreases Postoperative Pain, and Shortens Hospital Stay in Patients Undergoing Radical Retropubic Prostatectomy

Scott B. Groudine, MD\*, Hugh A. G. Fisher, MD†, Ronald P. Kaufman, Jr., MD†, Manoj K. Patel, BA\*, Lance J. Wilkins, MD†, Sudha A. Mehta, MPH†, and Philip D. Lumb, MBBS\*

Departments of \*Anesthesiology and †Urology, Albany Medical College, Albany, New York

tate surgery. Lidocaine-treated patients had shorter hospital stays, less pain, and faster return of bowel function. In this population, lidocaine infusion can be a useful adjunct in anesthetic management.

(Anesth Analg 1998;86:235-9)



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Anesthesiology 2007; 106:11-8

Copyright © 2006, the American Society of Anesthesiologists, Inc. Lippincott Williams & Wilkins, Inc.

### Intravenous Lidocaine Infusion Facilitates Acute Rehabilitation after Laparoscopic Colectomy

Abdourahmane Kaba, M.D.,\* Stanislas R. Laurent, M.D.,† Bernard J. Detroz, M.D.,† Daniel I. Sessler, M.D.,‡ Marcel E. Durieux, M.D., Ph.D.,§ Maurice L. Lamy, M.D.,|| Jean L. Joris, M.D., Ph.D.#

Background: Intravenous infusion of lidocaine decreases postoperative pain and speeds the return of bowel function. The authors therefore tested the hypothesis that perioperative lidocaine infusion facilitates acute rehabilitation protocol in patients undergoing laparoscopic colectomy.

Conclusions: Intravenous lidocaine improves postoperative analgesia, fatigue, and bowel function after laparoscopic colectomy. These benefits are associated with a significant reduction in hospital stay.



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The American Journal of Surgery (2000) 190, 231-236

The American Journal of Surgery

Clinical Surgery-American

### Can intravenous lidocaine decrease postsurgical ileus and shorten hospital stay in elective bowel surgery? A pilot study and literature review

Kyle P. Harvey, M.D.\*, James D. Adair, M.D., Mayyas Isho, M.D., Robert Robinson, M.D., F.A.C.S.

Department of Surgery, St. Joseph Mercy Oakland Hospital, Pontiac, MI, USA

CONCLUSIONS: Patients in the lidocaine group had bowel movements >24 hours earlier than those in the placebo group and were discharged earlier.



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Anesthetic Pharmacology  
Preclinical Pharmacology  
Section Editor: Marcel E. Durieux

Clinical Pharmacology  
Section Editor: Tony Gin

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**The Effect of Perioperative Intravenous Lidocaine on Postoperative Pain and Immune Function**

**RESULTS:** Patients in the lidocaine + patient-controlled epidural analgesia group experienced **less severe postoperative pain** in the first 4 and 8 h after surgery (visual analog scale 4/3.7 at rest and 5.3/5 during coughing versus 4.5/4.2 and 6.1/5.3, respectively, in the placebo group). There was **significantly less *ex vivo* production of IL-1ra and IL-6** whereas the lymphocyte proliferation response to phytohemagglutinin-M was better maintained than in the control group.

**CONCLUSION:** The present findings indicate that preoperative and intraoperative **IV lidocaine improves immediate postoperative pain management and reduces surgery-induced immune alterations.**

(Anesth Analg 2009;109:1464-9)

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British Journal of Anaesthesia 97 (5): 640-6 (2006)  
doi:10.1093/bja/aei217 Advance Access publication September 4, 2006

**BJA**


**Comparison of the effects of thoracic epidural analgesia and i.v. infusion with lidocaine on cytokine response, postoperative pain and bowel function in patients undergoing colonic surgery**

**Results.** **Both TEA and IV groups had better pain relief.** The total consumptions using patient-controlled epidural analgesia were 81.6 (6.5), 55.0 (5.3) and 45.6 (3.9) ml ( $P<0.01$ ) and **the times of flatus passage were 50.2 (4.9), 60.2 (5.8) and 71.7 (4.7) h ( $P<0.01$ ) in the TEA, IV and control groups, respectively.** The TEA group exhibited the best postoperative pain relief and the least cytokine surge. The IV group experienced better pain relief and less cytokine release than the control group.

**Conclusions.** **The TEA lidocaine had better pain relief, lower opioid consumption, earlier return of bowel function and lesser production of cytokines than IV lidocaine during 72 h after colonic surgery; IV group was better than the control group.**

Br J Anaesth 2006; 97: 640-6

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Systemic Lidocaine Shortens Length of Hospital Stay After Colorectal Surgery  
A Double-blinded, Randomized, Placebo-controlled Trial

**Conclusions:** **Perioperative intravenous lidocaine not only improved gastrointestinal motility but also shortened length of hospital stay significantly.** Anti-inflammatory activity modulating the surgery-induced stress response may be one potential mechanism. **Systemic lidocaine may thus provide a convenient and inexpensive approach to improve outcome for patients not suitable for epidural anesthesia.**

(Ann Surg 2007;246: 192-200)

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Questions



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