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

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?

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?
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

Pediatric Pain Management

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

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

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

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

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
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

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

CCHMC Pain Scales

• Building blocks for pain management

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIPS</td>
<td>Neonates – 1yr</td>
</tr>
<tr>
<td>OUCHER</td>
<td>5-10yrs</td>
</tr>
<tr>
<td>VAS</td>
<td>&gt;10yrs</td>
</tr>
<tr>
<td>FLACC</td>
<td>Birth-adulthood</td>
</tr>
<tr>
<td>COMFORT</td>
<td>Intubated/sedated</td>
</tr>
</tbody>
</table>
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

Neonatal Infant Pain Scale (NIPS) NICU

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

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
Visual Analog Scale (VAS)

- Self Report Scale
- Ages 8 – adult
- Describe scale
- What is acceptable?

0 1 2 3 4 5 6 7 8 9 10

FLACC

- Ages birth to adulthood
- For nonspastic/nonparalyzed individuals of all developmental levels
- Range 0-10

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Complains, restlessness, or cry</td>
<td>Restlessness, restlessness, or cry</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position, or normal position</td>
<td>Normal position, or normal position</td>
</tr>
<tr>
<td>Activity</td>
<td>Legacy, activity, activity, activity</td>
<td>Legacy, activity, activity, activity</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry, or no cry</td>
<td>No cry, or no cry</td>
</tr>
<tr>
<td>Consistancy</td>
<td>Comfort, released</td>
<td>Comfort, released</td>
</tr>
</tbody>
</table>

Score range from 8-40

Comfort

- Measures psychologic and physiologic distress behaviors in mechanical ventilated infants, children and adolescents. Not designed for premature infants
- Score is derived as the total of the scores of 8 specific dimensions
- Score range from 8-40
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

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

Sedation Assessment
Why is anxiety important?

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

How can we look at it’s effect?

- We can see how it affects patients after surgery.

  - How?

    - By looking at IV Opioid consumption

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
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

We can measure it!

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

Problems

• We are bombarded with scales and inventories
• Has to be simple
• Has to be relevant
Anxiety Score

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
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/sciatric, TAP blocks)
- Transition to PO meds (oxycodone vs dilaudid)
- IV Tylenol (LFTs)
- Valium (muscle spasms vs narcotics for incisional pain)
- Methadone
- Gabapentin, lyrica

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

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?
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?)

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
Oral Narcotics

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

Side effects

- Ileus
- Pruritus
- Emesis
- Nausea
- Hallucinations

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
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

Fentanyl PCA

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

Nonopioid analgesics

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


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

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
Gabapentin/Pregabalin

• Anti-epileptics
  • Anti-allodynic, anti-hyperalgesic, anxiolytic effects
• Structurally similar to GABA
• α2-δ subunit of voltage gated Ca^{++} channels in CNS
• Minimal metabolism
  • Renal excretion

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

IV. Lidocaine – Poor Man’s Epidural
Intravenous Lidocaine Speeds the Return of Bowel Function, Decreases Postoperative Pain, and Shortens Hospital Stay in Patients Undergoing Radical Retropubic Prostatectomy

Scott B. Groudine, M.D., Hugh A. C. Fisher, M.D., Ronald P. Kaufman, Jr., M.D., Mang K. Patel, M.D., Lance J. Wilkins, M.D., Sudha A. Mutha, M.D., and Philip D. Lamb, M.D.

Departments of Anesthesiology and Urology, Albany Medical College, Albany, New York.

In a study of 200 patients who underwent radical retropubic prostatectomy, 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 to anesthetic management.


Intravenous Lidocaine Infusion Facilitates Acute Rehabilitation after Laparoscopic Colectomy

Abdulrahalam Kaba, M.D., * Daniel M. Laurant, M.D., † Barry J. O'Dowd, M.D. ‡ Daniel J. Seacat, M.D. ‡

Background: Intravenous lidocaine administration decreases postoperative pain and speeds the return of bowel function after laparoscopic colectomy. The authors therefore used this hypothesis that intravenous lidocaine infusion facilitates acute rehabilitation following laparoscopic colorectal surgery.

Methods: Intravenous lidocaine was given to patients undergoing laparoscopic colectomy. The authors assessed whether patients undergoing laparoscopic colectomy received significant benefits from the use of intravenous lidocaine.

Results: Intravenous lidocaine infusion was associated with significantly reduced hospital stay and decreased pain after laparoscopic colectomy.

Conclusions: Intravenous lidocaine infusion facilitates acute rehabilitation following laparoscopic colectomy.

Can Intravenous Lidocaine decrease postsurgical ileus and shorten hospital stay in elective bowel surgery? A pilot study and literature review

Ribeiro P. M. Riou, M.D., † James J. Adyou, M.D., ‡ Ruyce Ito, M.D., ‡

Department of Surgery, St. Joseph Mercy Hospital, Ann Arbor, MI, USA

Conclusions: Patients in the lidocaine group had bowel movements > 24 hours earlier than those in the placebo group and were discharged earlier.
The Effect of Perioperative Intravenous Lidocaine on Postoperative Pain and Immune Function

RESULTS Patients in the lidocaine group experienced less severe postoperative pain in the first 4 and 8 h after surgery (visual analog scale 4.37 at rest and 5.35 during coughing versus 4.57/4.42 and 6.1/5.3, respectively, in the placebo group). There was significantly less in vitro production of IL-1α 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 perioperative and intravenous IV lidocaine improves immediate postoperative pain management and reduces surgery-induced immune alterations.

(Brit. J. Anaesth. 2001;87:164-8)

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 colorectal surgery

Results. Both TDA and IV groups had better pain relief. The total consumption using patient-controlled epidural analgesia were 81 (5.5), 58 (3.3) and 43 (1.8%) ml (P>0.05) and duration of analgesia were 852 (19), 453 (18) and 77 (15) h in TDA and control groups, respectively. The TDA group exhibited the least 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 TDA lidocaine had better pain relief, lower opisthotonus, fewer nausea and vomiting, better function and lower production of cytokines than IV lidocaine during TDA after colorectal surgery. IV group was better than the control group.

(Brit. J. Anaesth. 2006;97:440-6)

Systemic Lidocaine Shortens Length of Hospital Stay After Colorectal Surgery

A Double-Blinded, Randomized, Placebo-controlled Trial

Conclusions: Perioperative intravenous lidocaine not only improved cardiovascular mobility 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.

Questions