Postoperative Pain Management,
ERAS,
Focus on Policies and Protocols

ARA KESHISIHAN, MD, FACS

16th Annual CME & CDE Meeting
Las Vegas, Nevada
May 2019
Disclaimer

No Financial Relationship to Disclose
Objective (1)

- Enhanced Recovery After Surgery (ERAS) and Postoperative Pain Management.
- Multimodal Analgesia for Postoperative Pain. Risks, Safety, and Efficacy, Reducing Costs and LOS.
- Review of American Pain Society Postoperative Pain
ERAS - Evolution
Enhanced Recovery After Surgery

- ERAS Society, Objective Patient Centered
  - http://erassociety.org
  - http://erasusa.org
- Regional Partners
- Difference Disciplines
- Multimodal, Multidisciplinary
  - “Evidence Based Medicine”
- Outcomes Driven
- Based on Data
ERAS - History

- 1990’s Professor Henrik Kehlet – University of Copenhagen (Denmark) Concept of multimodal surgical care
- 2001 Ken Fearon and Olle Ljungqvist met in London at a nutrition symposia and decided to start a collaborative group on peri-operative care
- 2001-2002 ERAS Study Group
- 2003 First ERAS Symposia Stockholm
- 2005 Fearon et al. Clin Nutr Study Group developed and published an evidence-based consensus protocol for patients undergoing colonic surgery
- 2007 Maessen et al. Br J Surg 2007 Concluded that just adding a protocol was not sufficient to change practice to ERAS
- 2010 The ERAS Society was officially registered as a non-profit medical society based in Stockholm, Sweden
- 2016 USA chapter held its founding meeting in Washington DC
- ERAS Protocol in different developmental stages for different disciplines
Overview

Best outcome need to look at all variables
ERAS

• Similar to the concept of Care plan
• Improving patient care by reducing
  • Postoperative complications (infections)
  • Patient pain and discomfort (narcotics)
  • Shortening hospital stays (cost)
• Use of the ERAS shown to:
  • Reduce care time 30%
  • Reduce postoperative complications 50%
• Colorectal, Thoracic
Guidelines for:

• Pre/Intra/Post in GYN-ONC surgery
• GI surgery
• Gastrectomy
• Radical Cystectomy
• Pancreaticoduodenectomy
• Elective Colonic, pelvic, Rectal Surgery
• Bariatric Surgery
• Liver Surgery
• Head and Neck Surgery
• Esophagectomy
• Lung Surgery
The key elements of ERAS include:

- Patient/family education
- Patient optimization prior to admission-Expectations
  - Pain, functional status
- Minimal fasting - liquids the morning of surgery
- Multimodal analgesia, use of opioids when indicated
- Return - normal diet and activities the day of surgery
- Return to home
**Example - ERAS**

<table>
<thead>
<tr>
<th>Conventional approach</th>
<th>Enhanced recovery pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization</td>
<td>Hospitalization</td>
</tr>
<tr>
<td>Admission at day 1</td>
<td>Admission at day 0</td>
</tr>
<tr>
<td>Planned discharge at POD4</td>
<td>Planned discharge at POD1</td>
</tr>
<tr>
<td>6 hr of fasting before surgery</td>
<td>Water until 2 hr before surgery</td>
</tr>
<tr>
<td>Surgery</td>
<td>Surgery</td>
</tr>
<tr>
<td>Premedication</td>
<td>No premedication</td>
</tr>
<tr>
<td>Transported on stretcher</td>
<td>Patient walks into operating room</td>
</tr>
<tr>
<td>Positioning and draping after intubation</td>
<td>Positioning, draping, and intubation at the same time</td>
</tr>
<tr>
<td>No local anesthetic infiltration</td>
<td>Local anesthetic infiltration on trocar sites</td>
</tr>
<tr>
<td>Prophylactic drain</td>
<td>No drain</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Anesthesia</td>
</tr>
<tr>
<td>No standard protocol</td>
<td>Standard protocol with short-time nonopioid drugs</td>
</tr>
<tr>
<td>Opioid painkiller</td>
<td>No opioids</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>Dexamethasone</td>
</tr>
</tbody>
</table>
The Enhanced Recovery After Surgery Protocol is
Patient Centered & Evidence Based
Built to decrease stress & optimize recovery
Designed to decrease complications & length of stay

Pre-Op
- Targeted patient education
- Carbohydrate loading
- Less fasting time
- Warming
- Selective bowel prep

Intra-Op
- Epidural
- Warming
- No NG tubes or drains
- MIS surgery
- Short-acting anaesthetics

Post-Op
- Regular analgesia + Tylenol & NSAIDs
- Pre-emptive pain & nausea management
- Early feeding
- Nutrition supplements
- Early mobilization
- Discharge criteria
- Audits

Goal To Be Accomplished

Starved
- Cold
- Uncertain
- Hungry
- Surprised
- Weak
- Unprepared

Prepared
- Hydrated
- Minimal pain
- Walking
- Little nausea

Stronger
- Eating solid food
- Out of bed
- Complaining about small things

IN PAIN
- NAUSEOUS
If You Have Ever Wondered
Objective (2)

- Enhanced Recovery After Surgery (ERAS) and Postoperative Pain Management.
- Multimodal Analgesia for Postoperative Pain - Risks, Safety, and Efficacy, Reducing Costs and LOS.
- Review of American Pain Society Postoperative Pain
What Do I Need To Know?

- Definitions
- Pain assessment
- Types of analgesics
  - Their action
  - Side effects
“Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage ...”

IASP (International Association for the Study of Pain)
Pain

- Is a protective mechanism
- Causes avoidance
- Little to no tissue injury
- Pain stops once the stimulus is removed
- Inflammation occurs in the area
- Nerve damage
- Persists after the stimulus is removed if chronic
Patient Expectation

• Possible Self Created Problem
  • Almost anything we do involves pain
  • Come with it, will have it, live with it
  • Realistic, Honest, specific

Operative stress response and energy metabolism after laparoscopic cholecystectomy compared to open surgery
Kai Luo, Jie-Shou Li, Ling-Tang Li, Kei-Hui Wang, and Jing-Mei Shun

Systemic inflammatory response after hernia repair: a systematic review.
Kokotovic D1, Burcharth J2, Helgstrand F2, Gögenur I2.
Pain ≠ Nociception
  • Pain in the brain- perception
  • Nociception- peripheral -Visceral nerve stimulation

Four stages of processing pain:
  • Transduction
    • Blocked by local anesthetics, NSAID prostaglandins (Inflammation)
  • Transmission
    • Prevented by local anesthetics peripheral nerves, nerve plexus, epidural or subarachnoid spaces
  • Modulation
    • Local anesthetics & Gabapentin
  • Perception
    • General anesthetics & Opioids
Classes based on mode of action

- Opioids
- Non-steroidal anti-inflammatory drugs
- Local anesthetics
- Miscellaneous drugs
  - IV Tylenol, Antidepressants, Anxiolytic
# Pain & Pain Control

The table below summarizes various strategies for pain control and their respective mechanisms.

<table>
<thead>
<tr>
<th>Transduction</th>
<th>Transmission</th>
<th>Modulation</th>
<th>Perception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local anesthetics (topical)</td>
<td>Local anesthetics (regional anesthesia)</td>
<td>Opioids</td>
<td>Opioids</td>
</tr>
<tr>
<td>NSAIDs, Cox 2 inhibitors</td>
<td>Opioids</td>
<td>Acetaminophen</td>
<td>NMDAr antagonists</td>
</tr>
<tr>
<td>Opioids</td>
<td>Alpha2-agonists</td>
<td>Cox 2 inhibitors</td>
<td>General anesthetic agents</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>Gabapentinoids</td>
<td>SNRIs</td>
<td>Acetaminophen</td>
</tr>
<tr>
<td>Capsaicin</td>
<td>NMDAr antagonists</td>
<td>NMDAr antagonists</td>
<td></td>
</tr>
</tbody>
</table>

Opioids

- Bind to opioid receptor sites within CNS (mostly \(\mu\) but also \(\kappa\))
- Are agonists, partial agonists or mixed agonist-antagonists
- Are controlled DEA
- Reminder - Prescription Pads
# Opioids - Side Effects

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Side Effects</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS</td>
<td>Drowsiness, Delirium, Respiratory failure</td>
<td>Early intervention, Death</td>
</tr>
<tr>
<td>GI</td>
<td>Nausea, Constipation</td>
<td>long term</td>
</tr>
<tr>
<td>CV</td>
<td>Hypotension, Tachycardia, orthostatic hypo.</td>
<td>Treat symptoms</td>
</tr>
</tbody>
</table>

The ultimate goal is to decrease dose, and always consider alternative. What is the Exit strategy?
NSAIDs

- NSAIDs organic acids
  - Anti-inflammatory, analgesic, and antipyretic
  - Inhibit prostaglandin production by inhibiting COX enzymes
## NSAIDs - Side Effects

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Side Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal</td>
<td>Gastrointestinal ulceration and intolerance</td>
</tr>
<tr>
<td>Renal</td>
<td>Inhibition of prostaglandin-mediated renal function</td>
</tr>
<tr>
<td>Hemostatic</td>
<td>Blockade of platelet function</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Inhibition of uterine motility may prolong gestation</td>
</tr>
<tr>
<td>Immune</td>
<td>Hypersensitivity reactions</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Increased blood pressure</td>
</tr>
<tr>
<td>Interactions</td>
<td>Warfarin: NSAIDs bind to plasma proteins and can displace from binding site</td>
</tr>
</tbody>
</table>
Local Anesthetics

- Na+ permeability neurons
- Classified by duration of action
  - Lidocaine is short acting with a rapid on-set
  - Bupivacaine is long acting with a slow on-set
  - Epinephrine
# Local Anesthetics - Side Effects

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>P.R.</th>
<th>B.P.</th>
<th>Clinical manifestations</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasovagal reaction (the most common)</td>
<td>Low</td>
<td>Low</td>
<td>Sweating, hyperventilation, nausea, syncope (Excess parasympathetic discharge due to patient anxiety)</td>
<td>Trendelenburg position, reassurance</td>
</tr>
<tr>
<td>Epinephrine reaction</td>
<td>High</td>
<td>High</td>
<td>Palpitation (excess α and β-adrenergic receptor stimulation)</td>
<td>Reassurance (usually resolves in minutes)</td>
</tr>
<tr>
<td>Anaphylactic reaction (amides rarely cause anaphylaxis)</td>
<td>High</td>
<td>Low</td>
<td>Stridor, bronchospasm, urticaria (Peripheral vasodilatation with reflex tachycardia)</td>
<td>Subcutaneous epinephrine, steroids, antihistamines, O2, i.v. fluid</td>
</tr>
<tr>
<td>Lidocaine overdose</td>
<td>Normal</td>
<td>Normal</td>
<td>Circumoral and digital paresthesia followed by drowsiness, tremor, slurred speech, and finally seizure, coma, cardiopulmonary depression</td>
<td>Depends on the severity</td>
</tr>
</tbody>
</table>

*4 mg/kg IBW*
Why multimodal approach?

- optimizes pain relief
- reduce side effect burden
- provide synergistic/additive effects
- lower doses of each medication needed
- opioid sparing pain control
- prevents central sensitization

Plan

- Different Discipline of health care providers-RN, NP, MD
- Acute pain and chronic pain
  - Comfort level for certain meds
- Plan
  - What is next?
Objective

• Enhanced Recovery After Surgery (ERAS) and Postoperative Pain Management.
• Multimodal Analgesia for Postoperative Pain. Risks, Safety, and Efficacy, Reducing Costs and LOS.
• Review of American Pain Society Postoperative Pain
Guidelines on the Management of Postoperative Pain

Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists’ Committee on Regional Anesthesia, Executive Committee, and Administrative Council

Roger Chou, * Debra B. Gordon, † Oscar A. de Leon-Casasola, ‡ Jack M. Rosenberg, § Stephen Bickler, ¶ Tim Brennan, || Todd Carter, ** Carla L. Cassidy, †† Eva Hall Chittenden, †‡ Ernest Degenhardt, §§ Scott Griffith, ¶¶ Renee Manworren, §§ Bill McCarberg, *** Robert Montgomery, ††† Jamie Murphy, ‡‡‡ Melissa F. Perkal, §§§ Santhanam Suresh, ‡‡‡ Kathleen Sluka, ‡‡‡ Scott Strassels, **** Richard Thirlby, †††† Eugene Viscusi, ‡‡‡‡ Gary A. Walco, §§§§ Lisa Warner, ¶¶¶¶ Steven J. Weisman, ‡‡‡‡ and Christopher L. Wu ‡‡‡‡
American Pain Society
Management Of Postoperative Pain

- August 2009 to January 2011
- APS, ASA, and 23 members with expertise in anesthesia, pain medicine, surgery, obstetrics and gynecology, pediatrics, hospital medicine, nursing, primary care, physical therapy
- Systematic review of the evidence on postoperative pain management
- Grading of Recommendations, Assessment, Development, and Evaluation
- Evaluated all variables, (procedure, discipline, patient Acuity, medication Hx. etc.)
“In general, a strong recommendation is on the basis of the panel’s assessment that the potential benefits of following the recommendation clearly outweigh potential harms and burdens. In light of the available evidence, most clinicians and patients would choose to follow a strong recommendation. A weak recommendation is on the basis of the panel’s assessment that benefits of following the recommendation outweigh potential harms and burdens, but the balance of benefits to harms or burdens is smaller or evidence is weaker. Decisions to follow a weak recommendation could vary depending on specific clinical circumstances or patient preferences and values. For grading the quality of a body of evidence that supports a recommendation, we considered the type, number, size, and quality of studies; strength of associations or effects; and consistency of results among studies.
# Strength Of Data

<table>
<thead>
<tr>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benefits Do or Do Not Clearly Outweigh Risks</td>
</tr>
<tr>
<td>High</td>
<td>Strong</td>
</tr>
<tr>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Low</td>
<td>Strong</td>
</tr>
<tr>
<td>Insufficient evidence to determine net benefits or harms</td>
<td>I</td>
</tr>
</tbody>
</table>

* From the system developed by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) workgroup and adapted by the American Pain Society
### Guidelines Multimodal Analgesia

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Summary</th>
<th>Strength of Data</th>
</tr>
</thead>
</table>
| 1-2            | Educate patient  
Education for Parent of adult caregiver | Strong rec. Low quality  
Strong rec. Low quality |
| 3              | Evaluate for psychiatric Co-morbidities, substance abuse | Strong rec. Low quality |
| 4-6            | Lowest Dose  
Treat problem at hand  
Children (Dosing) | Strong rec. Low quality  
Strong rec. Low quality  
Strong rec. Low quality  
Strong rec. High quality |
| 7-8            | TENS units  
Acupuncture, massage cold therapy | Weak rec. Moderate quality  
No position |
| 9-14           | Behavior modification  
Oral V IV  
Avoid IM  
PCA (no Basal) #13, monitor #14 | Weak rec. Moderate quality  
Strong rec. Moderate quality  
Strong rec. Moderate quality  
Strong rec. Moderate quality  
Strong rec. Moderate quality |
| 15-20 (32)     | Acetaminophen and NSAID  
Pre operative dosing  
Gabapentin (single dose) #17  
Katamine # 18  
Local Lidocaine (open and lap) # 19,20 | Strong rec. High quality  
Strong rec. Moderate quality  
Strong rec. Moderate quality  
Weak rec. Moderate quality  
Weak rec. Moderate quality  
Weak rec. Moderate quality |
Guidelines Multimodal Analgesia

**Recommendation 21**
- The panel recommends that clinicians use topical local anesthetics in combination with nerve blocks before circumcision (strong recommendation, moderate-quality evidence).

**Recommendation 22**
- The panel does not recommend intrapleural analgesia with local anesthetics for pain control after thoracic surgery (strong recommendation, moderate-quality evidence).

Use of Peripheral Regional Anesthesia

Recommendation 23
- The panel recommends that clinicians consider surgical site–specific peripheral regional anesthetic techniques in adults and children for procedures with evidence indicating efficacy (strong recommendation, high-quality evidence).

Recommendation 24
- The panel recommends that clinicians use continuous, local anesthetic–based peripheral regional analgesic techniques when the need for analgesia is likely to exceed the duration of effect of a single injection (strong recommendation, moderate-quality evidence).

Use of Neuraxial Therapies

Recommendation 26
- The panel recommends that clinicians offer neuraxial analgesia for major thoracic and abdominal procedures, particularly in patients at risk for cardiac complications, pulmonary complications, or prolonged ileus (strong recommendation, high-quality evidence).

Guidelines Multimodal Analgesia

# 26-32
Pain specialist for inpatient
Policy and procedure for follow up
Thoracic cases - Epidural
Peripheral Block and topical

Strong rec. low quality
Summary

- ERAS
  - Its coming to you- if not there already- Care plan
- Multimodal Analgesia for Postoperative Pain. Risks, Safety, and Efficacy, Reducing Costs and LOS.
  - Utilize all tools, Educate, tame expectation
- Review of American Pain Society Postoperative Pain
  - Already in place in different forms

Thank you

Armenian American Medical Society CME committee for the opportunity provided
Questions?

"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."