Perioperative Pain Management and Current Evidence

Roberto Blanco, M.D
Assistant Professor, University of Minnesota

Justification

- 80% patients experiment postoperative pain
- 57% rate this pain as moderate, severe, or extreme
Pain

- Impact
  - Life quality
  - Function
  - Functional recovery
  - Post surgical complications
  - Persistent post surgical pain

Guidelines

- American pain society (APS) Commissioned
- American Society of Anesthesiologist (ASA) Input
- American Society of Regional Anesthesia (ASRA) Reviewed

- Optimal management begins in the preoperative period
- 32 Recommendations

Methods

- Panel of 23 members of experts in different fields, directed by three co chairs
  - One selected by APS, One by ASA
Audience and Scope
- All clinicians who manage postoperative pain
- Provide evidence based recommendations on management of postoperative pain

Evidence Review
- Oregon Evidence-Based Practice Center
  - Key questions developed, scope, inclusion criteria to guide the review
  - Literature Review November 2012 with updated searches until December 2015
  - Multiple electronic databases
  - Reference list of relevant articles
  - Suggestions from expert reviewers
  - 5556 Abstracts reviewed
  - 107 Systematic reviews and 858 Primary studies (not included before) were included in the evidence report

- 32 Recommendations
  - 4 High quality evidence
  - 11 Low quality evidence

Grading of the Evidence and Recommendations
- Grading of Recommendations Assessment, Development, and Evaluation Working Group
  - Strength of recommendation
    - Strong: Benefit >> Risk
    - Weak: Benefit > Risk
  - Quality of evidence
    - High, moderate or poor
    - Studies: Type, number, size, quality

* Chest 120:174-181, 2006
Guidelines Development

- Panel meets
  - 2009 (Scope and questions)
  - 2011 (potential recommendations)
- Recommendations (Second meeting and additional)
  - Multistage Delphi process
    - Each recommendation ranked and revised
    - 86% ranked: Became approved (Unanimous for most of them)
    - Lowest ranked: Eliminated
  - People with conflict of interest did not vote.
- Panel Subgroups
  - Recommendations written
  - Feedback from panel
  - External peer reviewers (>20)
- Second review
- ASC approval April 2015
- ASRA approval August 2015
- ASA approval October 2015
- Guidelines update planning for 2021, or earlier if new evidence available

Areas of Recommendation
Areas of Recommendation

- Preoperative education and perioperative pain management planning
- Methods of Assessment
- General Principles Regarding the Use of Multimodal Therapies
- Physical Modalities
- Local and/or Topical Pharmacological Therapies
- Peripheral Regional Anesthesia
- Neuraxial Therapies
- Organizational Structure, Policies, and Procedures
- Transitioning to Outpatient Care

1. Individual tailored education, treatment options, plan and goals
2. Instruction on specific children’s pain evaluation by caregivers
3. Education to all patients and caregivers on pain treatment plan, including tapering after hospital discharge.

Preoperative education and perioperative pain management planning

<table>
<thead>
<tr>
<th>Individual tailored education, treatment options, plan and goals</th>
<th>STRONG RECOMMENDATION</th>
<th>LOW QUALITY</th>
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</table>

1. Thorough medical history: Medical, surgical, psychiatric, pain, medications
2. Pain treatment: Pain Control vs Side effects
3. Validated tool to assess pain
4. Multimodal analgesia, pharmacological and non-pharmacological
5. Transcutaneous Nerve Stimulation (TENS)
6. Consider acupuncture, massage, Cold
7. Cognitive-Behavioral Therapy in adults
8. Opioids per mouth if patient is able.
9. Avoid Intra muscular route for analgesics
10. Opioids PCA if oral route is not an alternative
11. If PCA, avoid basal Infusions in Opioid naïve adults
12. Acetaminophen and/or NSAIDS if not contraindication to all patients
13. Preoperative Celecoxib if not contraindicated
14. Consider Preoperative Gabapentin or Pregabalin
15. Consider IV Ketamine in adults
16. Consider IV Lidocaine infusion in adults for laparoscopic or open abdominal surgery
17. Surgical site-specific local anesthetic infiltration according to procedure
18. Topical Local anesthetics and blocks for circumcision
19. NO Local anesthetics applied directly in the pleural space
20. Peripheral regional anesthetic techniques in adults and children according to procedure
21. Continuous Local anesthetic peripheral regional infusions to extend duration
22. Clonidine as adjuvant, to extend single injection peripheral blocks
23. Neuraxial analgesia for major thoracic and abdominal procedures
24. Appropriate monitoring for patient receiving neuraxial interventions
25. Organizational structure with policies and processes for safe and effective post operative pain control
26. Surgical facilities should have access to pain specialist for patients with, or at risk of inadequate post operative pain control
27. Organizational structure with policies and processes for safe and effective post operative pain control

References:
Preoperative education and perioperative pain management planning

- Instruction on specific children's pain evaluation by caregiver

STRONG recommendation LOW quality

Hany-Baker VAS® Pain Rating Scale


Areas of Recommendation

- Preoperative Education and Perioperative Pain Management Planning
- Methods of Assessment
- General Principles Regarding the Use of Multimodal Therapies
- Physical Modalities
- Cognitive-Behavioral Modalities
- Systemic Pharmacological Therapies
- Local and/or Topical  Pharmacological Therapies
- Peripheral Regional Anesthesia
- Neuraxial Therapies
- Organizational Structure, Policies, and Procedures
- Transitioning to Outpatient Care

Office of Policy and Clinical Practices
Preoperative Education and Perioperative Pain Management Planning

- Thorough medical history: Medical, surgical, psychiatric, pain, medications, substance abuse, previous postoperative treatment.
  
  "STRONG Recommendation LOW quality


- Pain treatment: Pain Control vs Side effects
  
  "STRONG Recommendation LOW quality


- Pain treatment: Pain Control vs Side effects
  
  "STRONG Recommendation LOW quality

Methods of Assessment

**Validated tool to assess pain**

STRONG Recommendation  LOW quality


Methods of Assessment

Universal Pain Assessment Tool

Methods of Assessment

<table>
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<tr>
<th>Table 1. Examples of Validated Pain Intensity Assessment Scales</th>
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<tr>
<td><strong>Rating Scale</strong></td>
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<tr>
<td>NRS</td>
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<tr>
<td>VAS</td>
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<tr>
<td>FAS</td>
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<td>SAPS</td>
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<td>VRS</td>
</tr>
</tbody>
</table>

Identifiers:
- NRS, Numeric Rating Scale
- VAS, Visual Analog Scale
- FAS, Face Analogue Scale
- SAPS, Subjective Analogue Scale
- VRS, Verbal Rating Scale

4/22/16
Methods of Assessment

Table 1. Suggested Elements of Postoperative Pain Assessment

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>1. Cause and pattern</td>
<td>1</td>
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<tr>
<td>2. Location</td>
<td>1</td>
</tr>
<tr>
<td>3. Quality of pain</td>
<td>1</td>
</tr>
<tr>
<td>4. Intensity</td>
<td>1</td>
</tr>
<tr>
<td>5. Aggravating and relieving</td>
<td>1</td>
</tr>
<tr>
<td>6. Onset of improvement</td>
<td>1</td>
</tr>
<tr>
<td>7. Effect</td>
<td>1</td>
</tr>
<tr>
<td>8. Barrier to pain assessment</td>
<td>1</td>
</tr>
</tbody>
</table>


Organizational Structure, Policies, and Procedures

- 29 Organizational structure with policies and processes for safe and effective post operative pain control
- 30 Surgical facilities should have access to pain specialist for patients with, or at risk of inadequate post operative pain
- 31 Qualified personal, as well as established policies and procedures when Neurosurgical and Continuous peripheral nerve blocks are performed
Organizational Structure, Policies, and Procedures

- Surgical facilities should have access to pain specialist for patients with, or at risk of inadequate post operative pain

**STRONG recommendation**  **LOW quality**

- Pain specialist: Diagnosis, Interventional treatment, comorbidities management

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**Table 4. Management of Postoperative Pain in Patients Receiving Long Term Opioid Therapy**

- Conduct preoperative evaluation to determine preoperative opioid use and doses
- Provide education regarding use of opioids before surgery
- Recognize that postoperative opioid requirements will typically be greater and that pain might be more difficult to control
- Consider pain speciality consultation for cases where behavioral and/or addiction consultation is part of the care plan
- Administer multimodal analgesia protocols such as regional anesthetics
- Consider use of nonpharmacologic interventions
- Consider use of psychological therapies
- Consider use of cognitive-behavioral therapy
- Consider use of physical therapy
- Consider use of acupuncture
- Consider use of relaxation techniques
- Consider use of transcutaneous electrical nerve stimulation
- Consider PCA with basal infusion of opioids for patients with appropriate monitoring
- Provide education and instruction on tapering opioids to target dose after discharge

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Organizational Structure, Policies, and Procedures

- Qualified personnel, as well as established policies and procedures when Neuroaxial and Continuous peripheral nerve blocks are performed

**STRONG recommendation**  **LOW quality**

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Areas of Recommendation

- Preoperative Education and Perioperative Pain Management Planning
- Methods of Assessment
- General Principles Regarding the Use of Multimodal Therapies
- Pharmacological and non-pharmacological
- Physical Modalities
- Counseling for Pain Management
- Systemic Pharmacological Therapies
- Local Anesthetic Block Techniques
- Peripheral Regional Anesthesia
- Neuromuscular Therapies
- Organizational Structure, Policies, and Procedures
- Transitioning to Outpatient Care

Physical Modalities

- Transcutaneous Nerve Stimulation (TENS)
  WEAK recommendation MODERATE evidence
- Acupuncture
- Massage
- Cold Therapy
- Localized heat
- Continuous passive motion
- Immovilization or Bracing
Physical Modalities

- Transcutaneous TENS
  - Activate endogenous descending inhibitory pathways activating opioid receptors to produce reduced central excitability
  - 25% less post operative analgesic use compared to no TENS
  - Optimal regimen

- Acupuncture
  - Grabow L: Controlled study of the analgetic effectivity of acupuncture. Arzneimittelforschung 44:554-558, 1994

- Acupressure
Physical Modalities

- Auricular Acupuncture


Physical Modalities

- Electroacupuncture


Use Of Cognitive-Behavioral Modalities

- Cognitive-Behavioral Therapy in adults

  WEAK recommendation
  GUIDED imagery
  RELAXATION Methods
  Hypnosis
  INTRAOPERATIVE Suggestions
  Music
Use Of Cognitive-Behavioral Modalities

- Cognitive-Behavioral Therapy in adults
  - Some positive effect in postoperative pain, analgesic use and anxiety
  - Unclear effect on hospitalization stay
  - Some required patient engagement and preoperative training

Areas of Recommendation

- Preoperative Education and Perioperative Pain Management Planning
- Methods of Assessment
  
  General Principles Regarding the Use of Multimodal Therapies
  
  Systemic Immunomodulatory Therapies
  
  Local or Systemic Pharmacological Therapies
  
  Patient Regional Anesthesia

- Physical Modalities
- Cognitive-Behavioral Modalities
- Systemic Pharmacological Therapies
- Local and/or Topical Pharmacological Therapies
- Peripheral Regional Anesthesia
- Neuraxial Therapies
- Organizational Structure, Policies, and Procedures

1. Individual patient education, treatment options, plan and goals
2. Preoperative regional analgesia in pain management
3. Postoperative analgesia
4. 24-hour pain evaluation
5. Preoperative education
6. Pain specific education
7. Evaluation of patient’s response to education
8. Avoidance of routine use of antidepressants
9. Individualized care plan
10. Evaluation of effectiveness of multimodal therapy
1. Individual tailored education, treatment options, pain and goals
2. Thorough medical history: Medical, surgical, psychiatric, pain, medications
3. Post-treatment: focus on side effects
4. Cognitive-Behavioral Therapy in adults

- Painful is a variant of pain
- Qualified personnel, as well established polices and procedures when Neuraxial and Continuous peripheral nerve

- Surgical facilities should have access to pain specialist for patients with, or at risk of inadequate post operative pain control

- Organizational structure with policies and processes for safe and effective post operative pain control

- Appropriate monitoring for patients receiving neuraxial interventions

- Neuraxial analgesia for major thoracic and abdominal procedures

- Continuous Local anesthetic peripheral regional infusions to extend duration

- Peripheral regional anesthetic techniques in adults and children according to procedure

- NO Local anesthetics applied directly in the pleural space

- Surgical site-specific local anesthetic infiltration according to procedure

- Consider IV Lidocaine infusion in adults for laparoscopic or open abdominal surgery

- Consider IV Ketamine in adults

- Consider Preoperative Gabapentin or Pregabalin

- Preoperative Celecoxib if not contraindicated

- Acetaminophen and/or NSAIDS if not contraindicated to all patients

- Opioids Post Operative: Monitor accordingly (Respiratory)

- If PCA, avoid basal infusions in Opioid naive adults

- Opioids PCA if oral route is not an alternative

- Opioids per mouth if patient is able to.

- Cognitive-Behavioral Therapy in adults

- Consider acupuncture, massage, Cold

- Transcutaneous Nerve Stimulation (TENS)

- Multimodal analgesia, pharmacological and non pharmacological

- Validated tool to assess pain

- Pain treatment: Pain control vs side effects

- Thorough medical history: Medical, surgical, psychiatric, pain, medications

- Individual tailored education, treatment options, pain and goals

- Instruction on specific children’s pain evaluation by caregivers

- Painful is a variant of pain
Use Of Systemic Pharmacological Therapies

- 8 Multimodal analgesia, pharmacological
- 10 Opioid per month if patient is able to.
- 11 Avoid intra muscular route for analgesics
- 12 Opioids PCA if oral route is not an alternative
- 15 Non narcotic analgesics (NSAIDs) if not contraindicated
- 16 Intravenous Ketamine in adults
- 16 Consid IV Lidocaine infusion in adults for laparoscopic or open abdominal surgery

STRONG Recommendation HIGH quality

General Principles Regarding the Use of Multimodal Therapies

- Multimodal analgesia, pharmacological and non-pharmacological
- One or more medications through different techniques
- Non pharmacological techniques

STRONG Recommendation HIGH quality

Around the clock non opioid analgesics and non-pharmacological therapies

Opioids not always needed


General Principles Regarding the Use of Multimodal Therapies

- Several medications at different receptors
- One or more medications through different techniques
- Non pharmacological techniques

General Principles Regarding the Use of Multimodal Therapies

- **Preemptive analgesia:**
  - Interventions prior to surgical incision
  - Controversial
- **Preventive analgesia:**
  - Intervention any time during the perioperative period

Use Of Systemic Pharmacological Therapies

- Opioids per mouth if patient is able to.
  - STRONG recommendation
  - MODERATE quality evidence
  - IV no superior
  - Short acting
  - No preoperative indication
Use Of Systemic Pharmacological Therapies

- Avoid intramuscular route for analgesics
  STRONG recommendation  MODERATE quality
  - Painful
  - Variable absorption
  - No superior


Use Of Systemic Pharmacological Therapies

- Opioids PCA if oral route is not an alternative
  STRONG recommendation  MODERATE quality
  - Required analgesia for several hours
  - Adequate cognitive function
  - Greater effectiveness and satisfaction over Health care provider-initiated intermittent bolus
  - By proxy administration
  - IV boluses


Use Of Systemic Pharmacological Therapies

- If PCA, avoid basal infusions in Opioid naïve adults
  STRONG recommendation  MODERATE quality
  - Quality of analgesia
  - Increase risk of nausea, vomiting, and respiratory depression
  - Opioid tolerant patients
  - Children


Use Of Systemic Pharmacological Therapies

- Acetaminophen and/or NSAIDS if not contraindication to all patients
- Decrease pain and/or need for Opioids

STRONG recommendation HIGH quality

- NSAIDS and Acetaminophen: Different Mechanisms of action
- Combination more effective than either drug alone

- No clear difference between I.V versus Oral administration
- I.V Faster onset
### Use Of Systemic Pharmacological Therapies

<table>
<thead>
<tr>
<th><strong>Side effects</strong></th>
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<tr>
<td><strong>NSAIDS</strong></td>
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<tr>
<td><strong>COX2</strong></td>
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<tr>
<td><strong>All NSAIDS:</strong></td>
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<tr>
<td>- Orthopedic surgery: Bone not union: No high quality evidence</td>
</tr>
<tr>
<td>- High NSAIDS doses and non union in spinal fusion: Not statistically significant nor seen in children</td>
</tr>
<tr>
<td>- Colorectal surgery: Anastomotic leak: Insufficient evidence</td>
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</table>

*Acetaminophen*

- Decrease opioid use.
- 600-1200 mgs Gabapentin

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**Use Of Systemic Pharmacological Therapies**

- Preoperative Celecoxib in adults if not contraindicated

**STRONG recommendation**  **MODERATE quality**

- 200-400mg, 30 min - 1 hour before surgery
- Decrease pain, Opioid use

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**Use Of Systemic Pharmacological Therapies**

- Consider Preoperative Gabapentin or Pregabalin

**STRONG recommendation**  **MODERATE quality**

- Decrease opioid use.
- Decrease post-operative pain
- 800-1200 mgs Gabapentin
- 150-300 mgs Pregabalin

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**Use Of Systemic Pharmacological Therapies**

- Consider Preoperative Gabapentin or Pregabalin

**STRONG recommendation**  **MODERATE quality**

- Decrease opioid use.
- Decrease post-operative pain
- 800-1200 mgs Gabapentin
- 150-300 mgs Pregabalin
Use Of Systemic Pharmacological Therapies

- Consider Preoperative Gabapentin or Pregabalin
  - Sedation
  - Dizziness
  - Dose change in renal impairment
  - Children?


Use Of Systemic Pharmacological Therapies

- Consider IV Ketamine in adults
  - WEAK recommendation MODERATE quality
  - Decrease in pain medication use
  - Decrease in pain scores
  - Decrease risk persistent surgical pain


Use Of Systemic Pharmacological Therapies

- Consider IV Lidocaine infusion in adults for laparoscopic or open abdominal surgery

**WEAK recommendation MODERATE quality**

- Shorter duration of ileus
- Better analgesia

**References:**


**Doses:**

- **Bolus:** 100-150 mgs or 1.5-2.0 mg/kg
- **Infusion:** 2-3 mg/kg/hr

**Recommendation**

- **Bolus:** 1.5 mg/kg
- **Infusion:** 2 mg/kg/hr

**References:**


**Additional Considerations:**

- 1. Individual patient evaluation, treatment options, plan and goals
- 2. Inclusion in individual treatment plan (pathology, surgery, anesthesia, medications)
- 3. Treatment plan for postoperative pain control
- 4. Pain treatment trial in children or older adults
- 5. Nonpharmacological and nonpharmacological interventions
- 6. Comparison of continuous infusion technique
- 7. Continuous infusion vs. patient-controlled analgesia
- 8. Options for patient-controlled analgesia
- 9. Pain treatment options, including opioids
- 10. Pain treatment strategies
- 11. Pain treatment protocols
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**References:**

Use Of Local and/or Topical Pharmacological Therapies

- **Surgical site-specific local anesthetic infiltration according to procedure**
  
  WEAK recommendation  MODERATE quality

- **Knee, C/S, Laparotomy, hemorrhoid**
  
  Mixed evidence, Alternative methods

- **Panel does NOT recommend routine local anesthetic infiltration, RATHER infiltration that show benefit for the specific procedure**

- **Avoid intrarticular local anesthetic infusions**

  - Recommendations vary based on volume and duration of infusion, level of anesthesia, and patient factors.
  - Use of local anesthetics in the pleural space can cause toxicity, especially with large volumes.

- **Topical Local anesthetics and blocks for circumcision**
  
  STRONG recommendation  MODERATE quality

  - **Penile block**
  - **EMLA**
  - **Risk of Methemoglobinemia**

  - Lehr VT, Cepeda E, Frattarelli DA, Thomas R, LaMothe J, Aranda JV: Lidocaine 4% cream compared with lidocaine 2.5% and prilocaine 2.5% or dorsal penile block for circumcision. Am J Perinatol 22:231-237, 2005

- **NO Local anesthetics applied directly in the pleural space**
  
  STRONG recommendation  MODERATE quality

  - No clear beneficial effects

  - Potential risk of toxicity

  - Last resource in the setting of multimodal approach
Use Of Peripheral Regional Anesthesia

- Peripheral regional anesthetic techniques in adults and children according to procedure
  STRONG recommendation HIGH quality
- Knowledge of the technique, including ultrasound
- Side effects, precautions (Motor weakness)
- Electrometric pumps

Use Of Peripheral Regional Anesthesia

- Continuous local anesthetic
  peripheral regional infusions to
  extend duration of analgesia

  STRONG recommendation MODERATE quality


Use Of Peripheral Regional Anesthesia

- Clonidine as adjuvant to extend single
  injection peripheral blocks

  WEAK recommendation MODERATE quality

Engelman E, Marsala C: Efficacy of adding clonidine to intrathecal morphine in

27 Neuraxial analgesia for major thoracic and abdominal procedures

- 27 NO Neuraxial magnesium, benzodiazepine, neostigmine,
  tramadol, and ketamine

25
Use Of Neuraxial Therapies

- Neuraxial analgesia for major thoracic and abdominal procedures
  
  **STRONG recommendation**  **HIGH quality**

- Major thoracic and abdominal procedures

- Epidural Vs Spinal

- Local anesthetic and/or Opioids

- Decrease pain scores, less rescue analgesic use

- Risk vs General

- Clonidine??


Use Of Neuraxial Therapies

**Epidural in ERAS**

- Most Recent Meta-analysis
- Examined 125 trials (9044 patients, 4525 EA)
- ↓ Death with EA (3.1% vs. 4.9%; OR=0.60, 95%CI, 0.39-0.93)
- EA significantly ↓ risk of A.Fib, SVT, DVT, respiratory depression, pneumonia, ileus, PONV, ↓ GI recovery
- EA significantly ↓ risk of arterial hypotension, pruritus, urinary retention, and motor blockade
- Technical failures ⇒ 6.1% of patients.

Use Of Neuraxial Therapies

- **NO** Neuraxial magnesium, benzodiazepines, neostigmine, tranioxil, and ketamine

  **STRONG recommendation**  **MODERATE quality**

  - No clear evidence
  - Undetermined safety
Enhanced Recovery Program

Pain Management

NSAIDS:
- Reduce opioid use 30%, no effect on ileus

COX2:
- No increase of anastomosis leak risk, Less ileus

Acetaminophen:
- Serotonergic pathways in the spinal cord through enhancement of the cannabinoid receptors
- IV vs PO 4 fold highest peak plasma concentration compare to PO, 15 min vs 1 hour.
- 1gr PO Before beginning pain: Less pain, decrease PONV (no opioid sedation)

B Blockers:
- Esmolol:
  - Decrease in opioid use.
  - Decrease Pain, PONV, LOS after Laparoscopic cholecystectomy

Conclusions

- Optimal pain management begins in the preoperative period
- Pain tailored to patient, procedure
- Evidence support use of multimodal analgesia
- Most recommendations are currently based on expert input
- Further studies are necessary to establish the weight of the current recommendations. As a result some recommendations will be removed, while other change, and some new will appear in future guidelines
Future Guidelines