



Hawaii Safer Care:  
Improving Surgical Care and Recovery  
ISCR Collaborative

# WELCOME!

Hawaii Coaching Call

Agenda:

**Upcoming calendar of calls**

**Making a Mark in Perioperative Care Guest Faculty: Ed Mariano**

February 10 , 2021





Burning Questions?

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# Perioperative Multimodal Analgesia Best Practices

**Edward R. Mariano, M.D., M.A.S.**

Professor of Anesthesiology, Perioperative & Pain Medicine  
Stanford University School of Medicine  
Chief, Anesthesiology and Perioperative Care  
Veterans Affairs Palo Alto Health Care System



# Financial Disclosures

- None

# Objectives

- Define multimodal analgesia and its components
- Identify quality measures related to pain management
- Discuss ways to develop a multimodal analgesic protocol that balances resources and benefits

# What Is Multimodal Analgesia?

## SPECIAL ARTICLES

### **Practice Guidelines for Acute Pain Management in the Perioperative Setting**

*An Updated Report by the American Society of Anesthesiologists Task Force on Acute Pain Management*

#### ***V. Multimodal Techniques for Pain Management***

Multimodal techniques for pain management include the administration of two or more drugs that act by different mechanisms for providing analgesia. These drugs may be administered *via* the same route or by different routes.

# What Is Multimodal Analgesia?

## *V. Multimodal Techniques for Pain Management*

- Whenever possible, anesthesiologists should use multimodal pain management therapy.
  - Unless contraindicated, patients should receive an around-the-clock regimen of NSAIDs, COXIBs, or acetaminophen.
  - Regional blockade with local anesthetics should be considered.
- Dosing regimens should be administered to optimize efficacy while minimizing the risk of adverse events.
- The choice of medication, dose, route, and duration of therapy should be individualized.

# 7 Principles of Perioperative Pain Management

1. Conduct a **preoperative evaluation** including assessment of medical and psychological conditions, concomitant medications, history of chronic pain, substance abuse disorder, and previous postoperative treatment regimens and responses, to guide the perioperative pain management plan.
2. Use a **validated pain assessment tool** to track responses to postoperative pain treatments and adjust treatment plans accordingly.
3. **Offer multimodal analgesia**, or the use of a variety of analgesic medications and techniques combined with nonpharmacological interventions, for the treatment of postoperative pain in adults.
4. Provide patient and family-centered, individually **tailored education** to the patient (and/or responsible caregiver), including information on treatment options for managing postoperative pain, and document the plan and goals for postoperative pain management.
5. Provide education to all patients (adult) and primary caregivers on the pain treatment plan, including **proper storage and disposal of opioids** and tapering of analgesics after hospital discharge.
6. **Adjust the pain management plan** based on adequacy of pain relief and presence of adverse events.
7. Have access to **consultation with a pain specialist** for patients who have inadequately controlled postoperative pain or at high risk of inadequately controlled postoperative pain at their facilities (e.g., long-term opioid therapy, history of substance use disorder).

*2021 ASA-hosted Pain Summit involving 13 other surgical and medical organizations*





# Start with a Plan

Class	Mechanism of Action	Options	Frequency	Considerations
Nonpharmacologic	Variable	Patient Education Compression Cryotherapy Acupuncture Electrical Stimulation	Routine	No clear guidelines
NSAIDs	Nonselective COX-1,2 inhibition  Selective COX-2 inhibition	Ketorolac Ibuprofen  Celecoxib	Routine	Renal insufficiency, gastric ulcers, platelet dysfunction, cardiovascular disease
Acetaminophen	Central prostaglandin synthesis inhibition	Acetaminophen (Paracetamol)	Routine	Hepatic dysfunction
Gabapentinoids	Binding to alpha-2-delta subunits of voltage-dependent calcium channels	Gabapentin Pregabalin	If indicated	Renal impairment
NMDA Antagonists	N-methyl-D-aspartate blockade	Ketamine Magnesium	If indicated	Severe psychiatric disorders, raised intracranial or intraocular pressure (ketamine only)
Local and Regional Analgesia	Sodium channel blockade	Spinal/Epidural Lumbar Plexus ± Sacral Plexus Femoral Nerve ± Sciatic Nerve Femoral Nerve ± LIA Adductor Canal ± LIA Adductor Canal ± IPACK LIA Only	Routine	Allergy to local anesthetic, site infection, available resources and training level of staff

NSAIDs = nonsteroidal anti-inflammatory drugs; NMDA = N-methyl-D-aspartate; LIA = local infiltration analgesia; IPACK = infiltration between the popliteal artery and capsule of the knee

# What Regional Anesthesia Does

- Mitigates maximal pain intensity after surgery<sup>1</sup> and can be titratable
- Decreases opioid consumption<sup>2</sup> (maybe less opioid-induced hyperalgesia)
- Facilitates early mobility<sup>3</sup>
- Avoids immobility which can produce hyperalgesia and persistent pain<sup>4,5</sup>

1. Ilfeld BM. *A&A* 2011;113(4):904

2. Richman JM, et al. *A&A* 2006;102:248

3. Ilfeld & Mariano, et al. *Pain* 2010;150:477

4. Ohmichi Y, et al. *Eur J Pain* 2012;16:338

5. Guo TZ, et al. *J Pain* 2014;15:1033



SCIENTIFIC REVIEW

## Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS<sup>®</sup>) Society Recommendations: 2018

U. O. Gustafsson<sup>1</sup> · M. J. Scott<sup>2,3</sup> · M. Hubner<sup>4</sup> · J. Nygren<sup>5</sup> · N. Demartines<sup>4</sup> · N. Francis<sup>6,7</sup> · T. A. Rockall<sup>8</sup> · T. M. Young-Fadok<sup>9</sup> · A. G. Hill<sup>10</sup> · M. Soop<sup>11</sup> · H. D. de Boer<sup>12</sup> · R. D. Urman<sup>13</sup> · G. J. Chang<sup>14</sup> · A. Fichera<sup>15</sup> · H. Kessler<sup>16</sup> · F. Grass<sup>4</sup> · E. E. Whang<sup>17</sup> · W. J. Fawcett<sup>18</sup> · F. Carli<sup>19</sup> · D. N. Lobo<sup>20</sup> · K. E. Rollins<sup>20</sup> · A. Balfour<sup>21</sup> · G. Baldini<sup>19</sup> · B. Riedel<sup>22</sup> · O. Ljungqvist<sup>23</sup>

Thoracic epidural analgesia (TEA) (T7-T10) remains the gold standard in patients undergoing open colorectal surgery. Several RCTs and meta-analysis have demonstrated superior analgesia compared with patients receiving systemic opioids [217, 218].

Major abdominal surgery  
patients who get an  
epidural

- 15% colectomy
- 19% distal pancreatectomy
- 23% pancreaticoduodenectomy

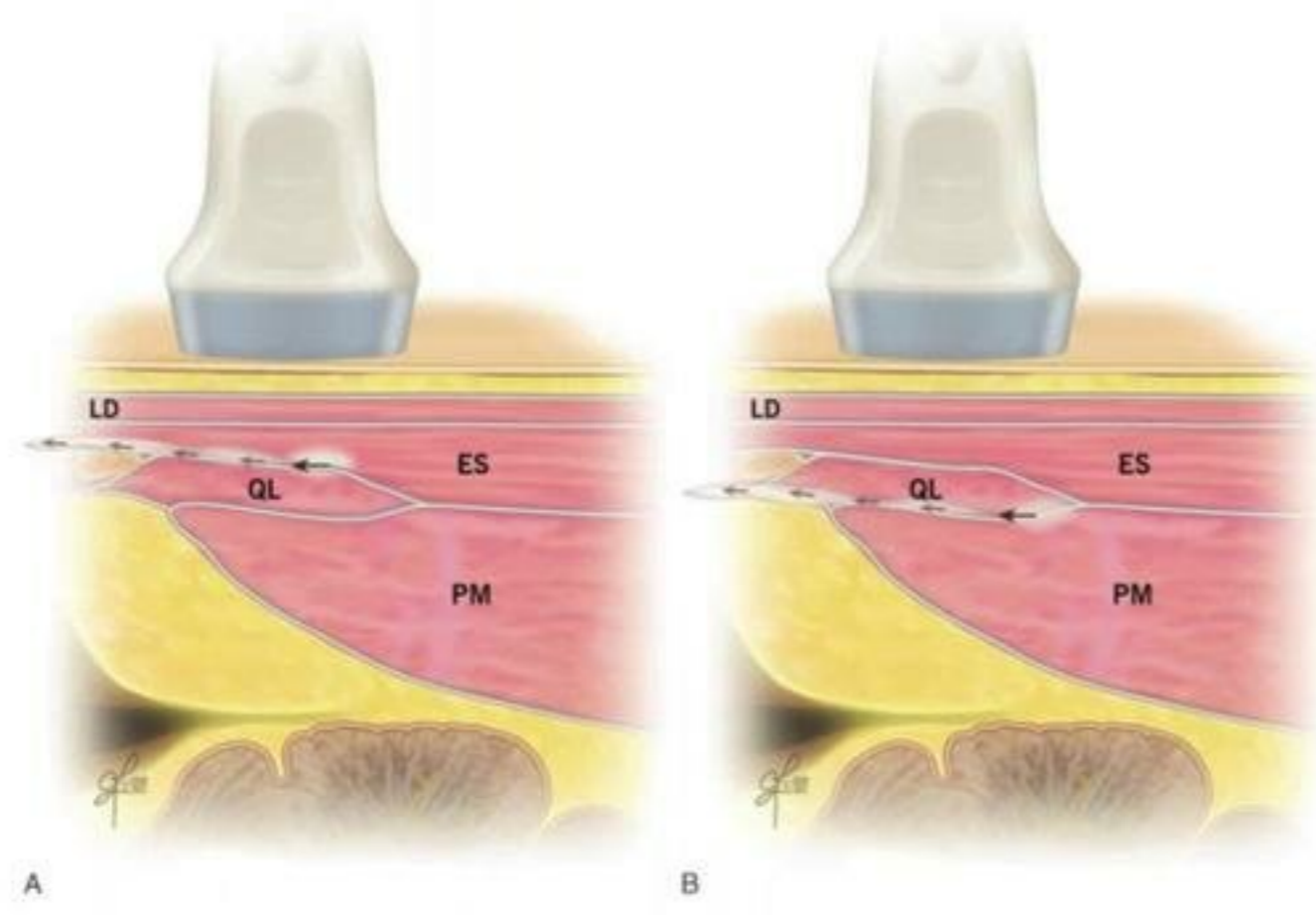
Major abdominal surgery  
patients who DON'T get an  
epidural

REGIONAL ANESTHESIA AND ACUTE PAIN

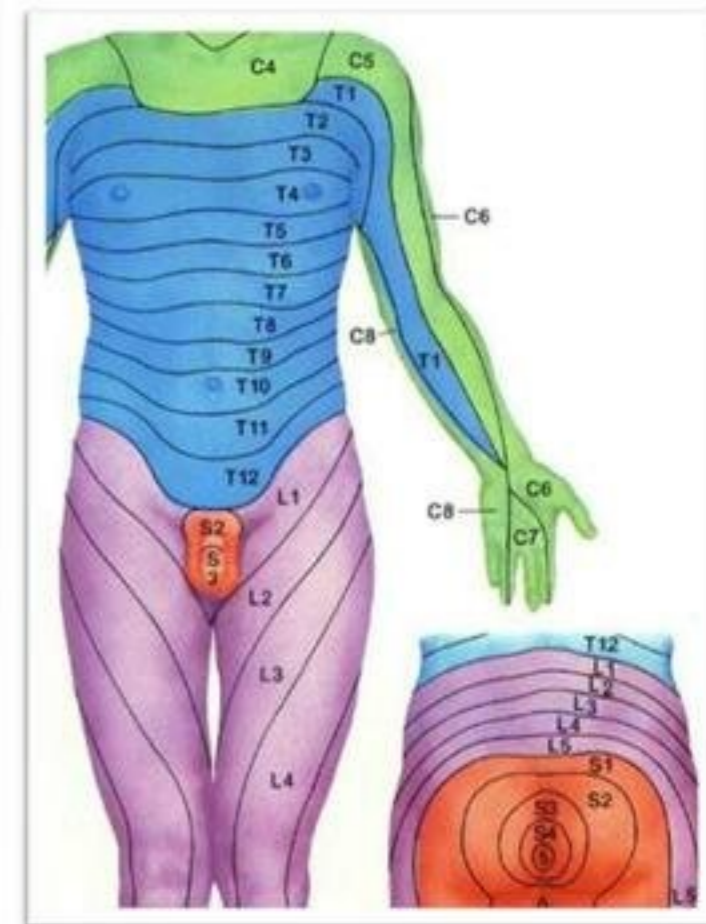
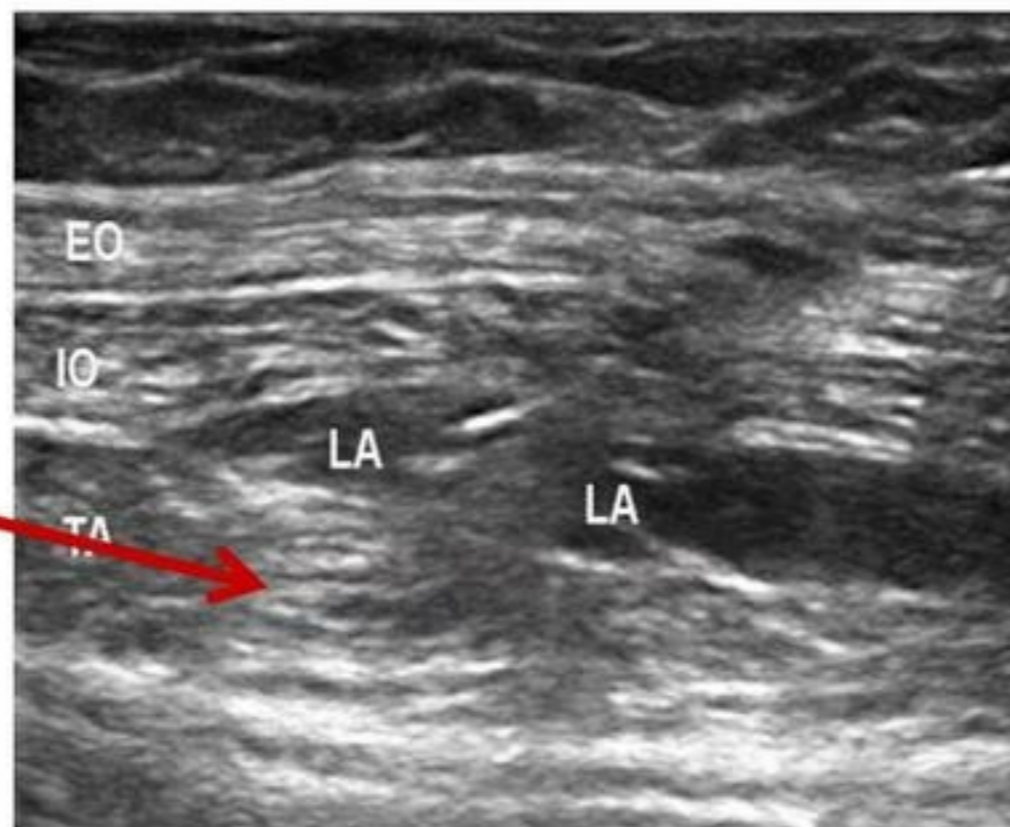
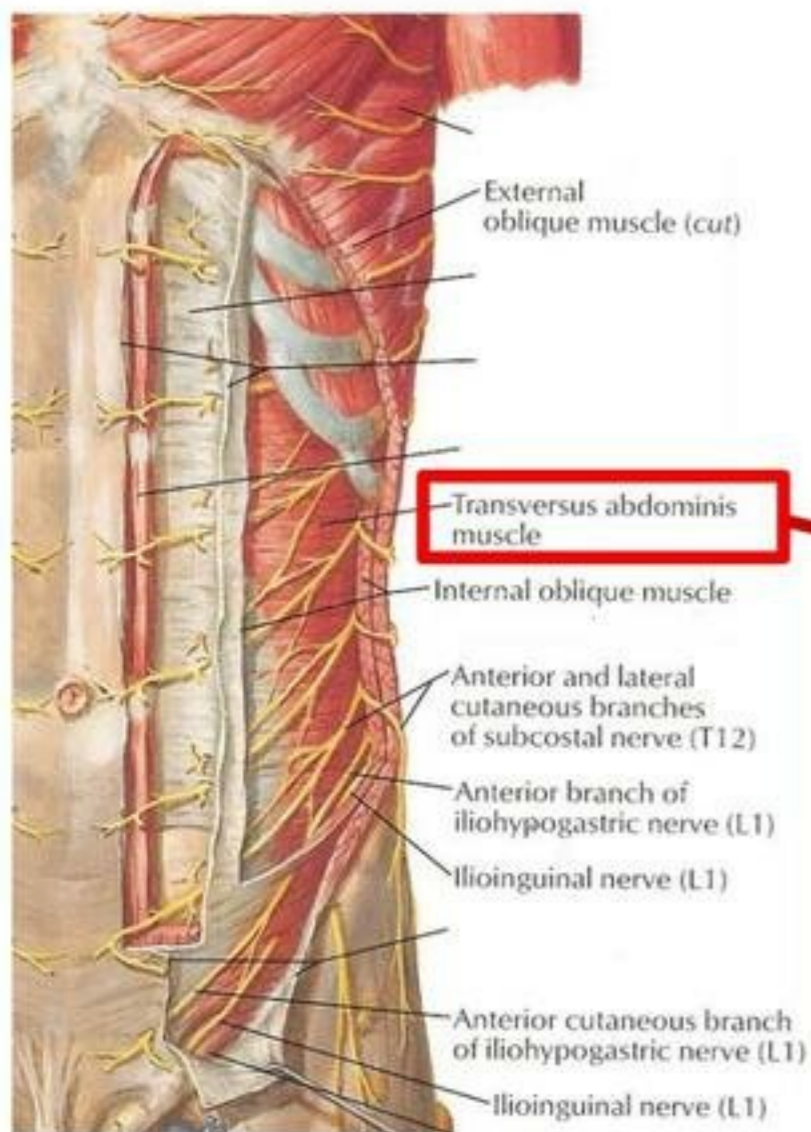
DARING DISCOURSE

Interfascial Plane Blocks  
*Back to Basics*

*Hesham Elsharkawy, MD, MBA, MSc,\* Amit Pawa, MBBS(Hons), FRCA, †† and Edward R. Mariano, MD, MAS§*



# Anatomy of the TAP Block





Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

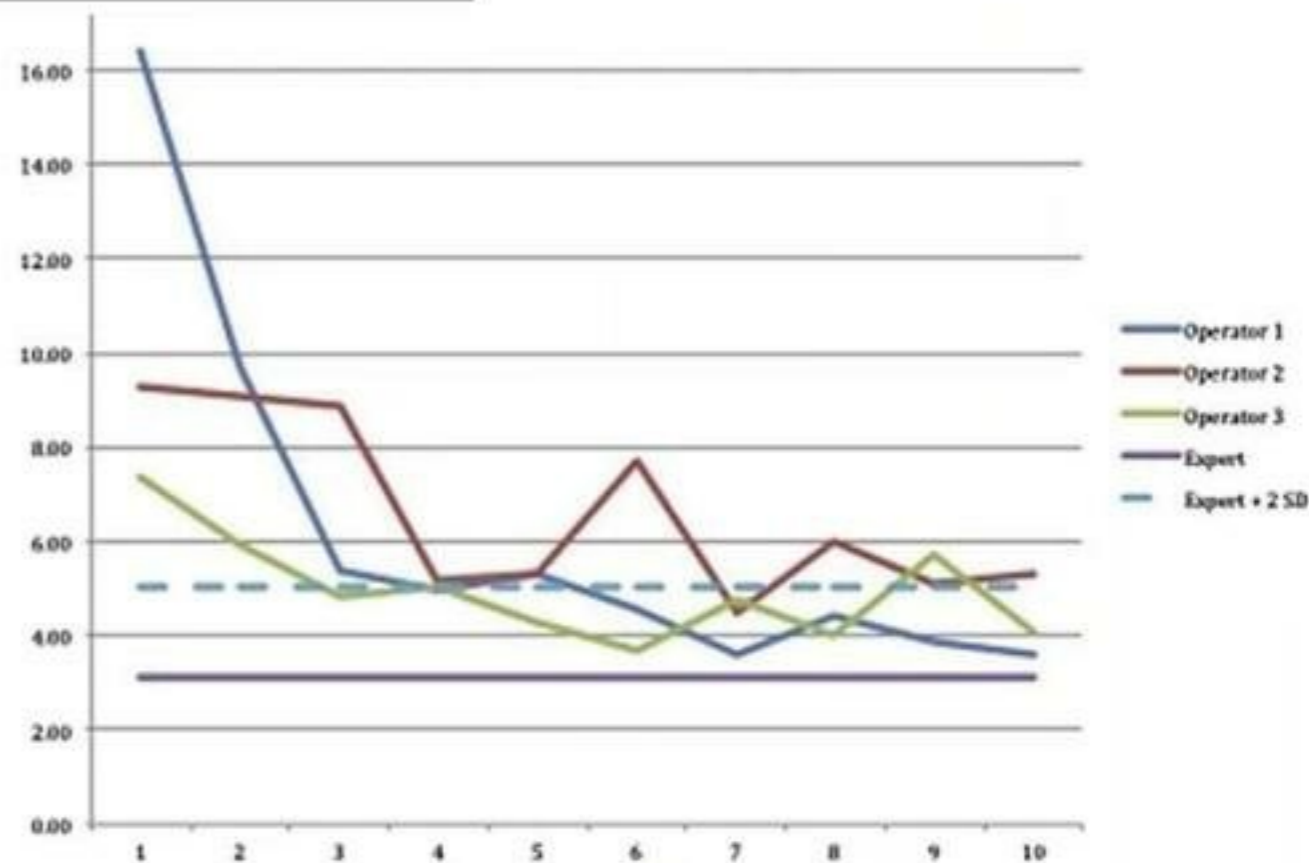
journal homepage: [www.JournalofSurgicalResearch.com](http://www.JournalofSurgicalResearch.com)



## Transversus abdominis plane blocks: pilot of feasibility and the learning curve

Deborah S. Keller, MS, MD,<sup>a,b,\*</sup> Nisreen Madhoun, DO,<sup>a</sup>  
Oscar I. Ponte-Moreno, MD,<sup>a</sup> Sergio Ibarra, MD,<sup>a</sup>  
and Eric M. Haas, MD, FACS, FASCRS<sup>a,b,c</sup>

- Learn in **4 attempts**
- Set-up + bilateral blocks = **6 min or less!**





Meta-Analysis

## Transversus abdominis plane (TAP) block in laparoscopic colorectal surgery improves postoperative pain management: a meta-analysis

E. Hain, L. Maggiori, J. Prost à la Denise, Y. Panis 

**RESULTS:** A total of 13 studies, including 7 randomized controlled trials, were included, comprising a total of 600 patients who underwent laparoscopic colorectal surgery with **TAP block**, compared with 762 patients without **TAP block**. **Meta-analysis** of these studies showed that **TAP block** was associated with a significantly reduced postoperative opioid consumption on the first day after surgery [weighted mean difference (WMD) -14.54 (-25.14; -3.94);  $P = 0.007$ ] and a significantly shorter time to first bowel movement [WMD -0.53 (-0.61; -0.44);  $P < 0.001$ ] but failed to show any impact on length of hospital stay [WMD -0.32 (-0.83; 0.20);  $P = 0.23$ ] although no study considered length of stay as its primary outcome. Finally, **TAP block** was not associated with a significant increase in the postoperative overall complication rate [OR = 0.84 (0.62-1.14);  $P = 0.27$ ].





## Transversus abdominal plane block for postoperative analgesia: a systematic review and meta-analysis of randomized-controlled trials

### Le bloc dans le plan du muscle transverse de l'abdomen pour réaliser une analgésie postopératoire: revue systématique et méta-analyse des études randomisées contrôlées

Etrusca Brogi, MD · Roy Kazan, MD · Shantale Cyr, PhD · Francesco Giunta, MD · Thomas M. Hemmerling, MD

**PRINCIPAL FINDINGS:** In the 51 trials identified, compared with placebo, **TAP block** reduced the VAS for pain at six hours by 1.4 (95% confidence interval [CI], -1.9 to -0.8;  $P < 0.001$ ), at 12 hr by 2.0 (95% CI, -2.7 to -1.4;  $P < 0.001$ ), and at 24 hr by 1.2 (95% CI, -1.6 to -0.8;  $P < 0.001$ ). Similarly, compared with placebo, **TAP block** reduced morphine consumption at 24 hr after surgery (mean difference, -14.7 mg; 95% CI, -18.4 to -11.0;  $P < 0.001$ ). We observed this reduction in pain scores and morphine consumption in the **TAP block** group after gynecological surgery, appendectomy, inguinal surgery, bariatric surgery, and urological surgery. Nevertheless, separate analysis of the studies comparing ITM with **TAP block** revealed that ITM seemed to have a greater analgesic efficacy.

## The analgesic efficacy compared ultrasound-guided continuous transverse abdominis plane block with epidural analgesia following abdominal surgery: a systematic review and meta-analysis of randomized controlled trials

**Results:** Eight trials including 453 patients (TAP block:224 patients; EA: 229 patients) ultimately met the inclusion criteria and seven trials were included in the meta-analysis. Dynamic pain scores after 24 h were equivalent between TAP block and EA groups (WMD:0.44; 95% CI: 0.1 to 0.99;  $I^2 = 91%$ ;  $p = 0.11$ ). The analysis showed a significant difference between the subgroups according to regularly administering (4 trials; WMD:-0.11; 95% CI: -0.32 to 0.09;  $I^2 = 0%$ ;  $p = 0.28$ ) non-steroidal anti-inflammatory drugs (NSAIDs) or not (3 trials; WMD:1.02; 95% CI: 0.09 to 1.96;  $I^2 = 94%$ ;  $p = 0.03$ ) for adjuvant analgesics postoperatively. The measured time of the urinary catheter removal in the TAP group was significantly shorter (3 trials, WMD:-18.95, 95% CI:-25.22 to -12.71;  $I^2 = 0%$ ;  $p < 0.01$ ), as was time to first ambulation postoperatively (4 trials, WMD:-6.61, 95% CI: -13.03 to -0.19;  $I^2 = 67%$ ;  $p < 0.05$ ).

**Conclusion:** Continuous TAP block, combined with NSAIDs, can provide non-inferior dynamic analgesia efficacy compared with EA in postoperative pain management after abdominal surgery. In addition, continuous TAP block is associated with fewer postoperative side effects.



## A little better is still better: using marginal gains to enhance 'enhanced recovery' after surgery

Jody C Leng,<sup>1,2</sup> Edward R Mariano  <sup>1,2</sup>

the 9% to 11% improvement in opioid reduction reported in the study is frankly remarkable. This Rush enhanced recovery protocol is already the 'business class' version of multimodal analgesia, so we understand that the authors may not appreciate the significance of marginal gains. However, multimodal analgesia in most practices is still 'economy' or maybe 'economy plus,' so the measured benefits of TAP blocks may be more significant in proportion.

Leng & Mariano. RAPM 2020

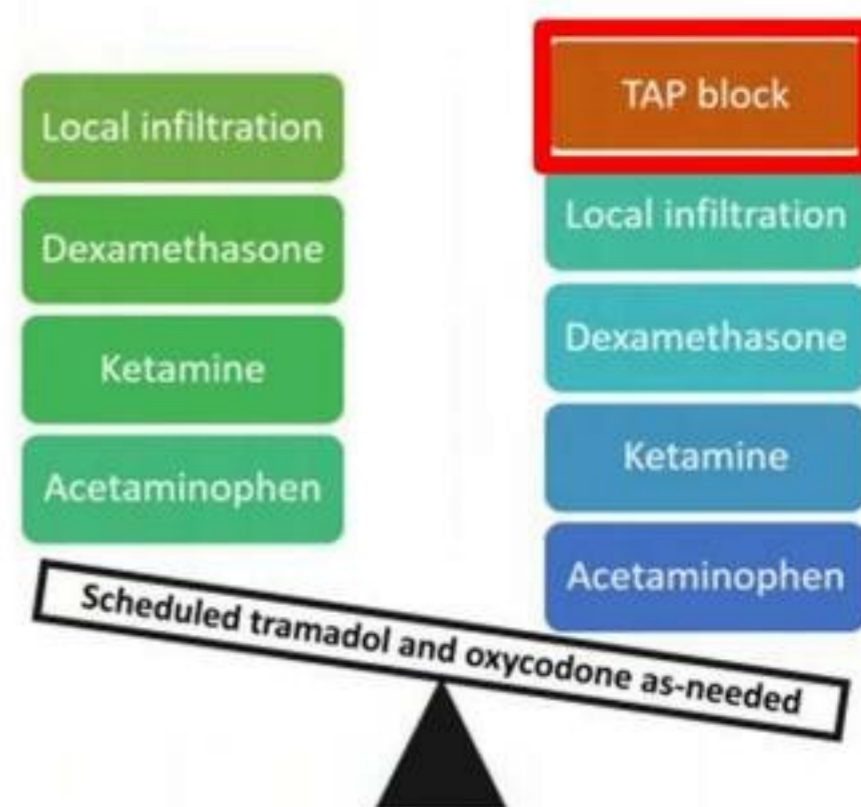


Figure 1 Graphic representing the multimodal analgesic elements of the Rush University enhanced recovery protocol before and after addition of the transversus abdominis plane (TAP) block.

# Thinking Beyond Blocks



Short communication

Patient education and engagement in postoperative pain management decreases opioid use following knee replacement surgery

Meghana Yajnik<sup>a</sup>, Jonay N. Hill<sup>a,b</sup>, Oluwatobi O. Hunter<sup>b</sup>, Steven K. Howard<sup>a,b</sup>,  
T. Edward Kim<sup>a,b</sup>, T. Kyle Harrison<sup>a,b</sup>, Edward R. Mariano<sup>a,b,\*</sup>

<sup>a</sup> Department of Anesthesiology, Perioperative and Pain Medicine, MC 5640, 300 Pasteur Drive, Room H2580, Stanford, CA, 94305, USA

<sup>b</sup> Anesthesiology and Perioperative Care Service, MC 112A, 3801 Miranda Avenue, Veterans Affairs Palo Alto Health Care System, Palo Alto, CA, 94304, USA

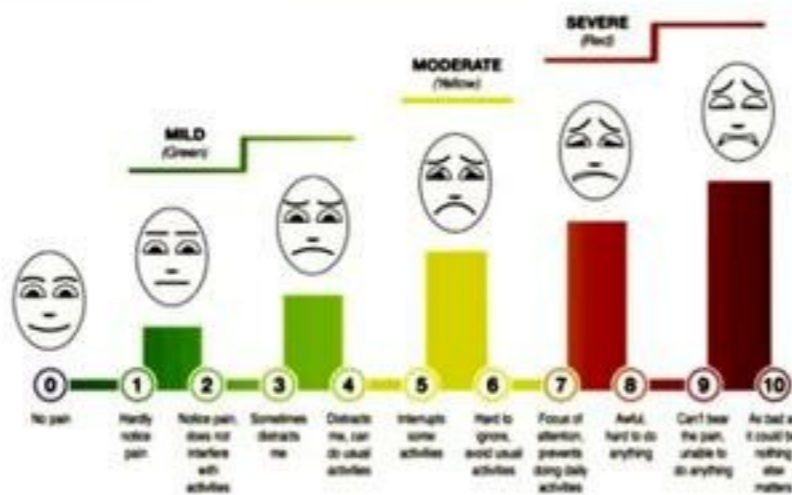
### A My Pain Medication Card

Name: \_\_\_\_\_ Date: \_\_\_\_\_

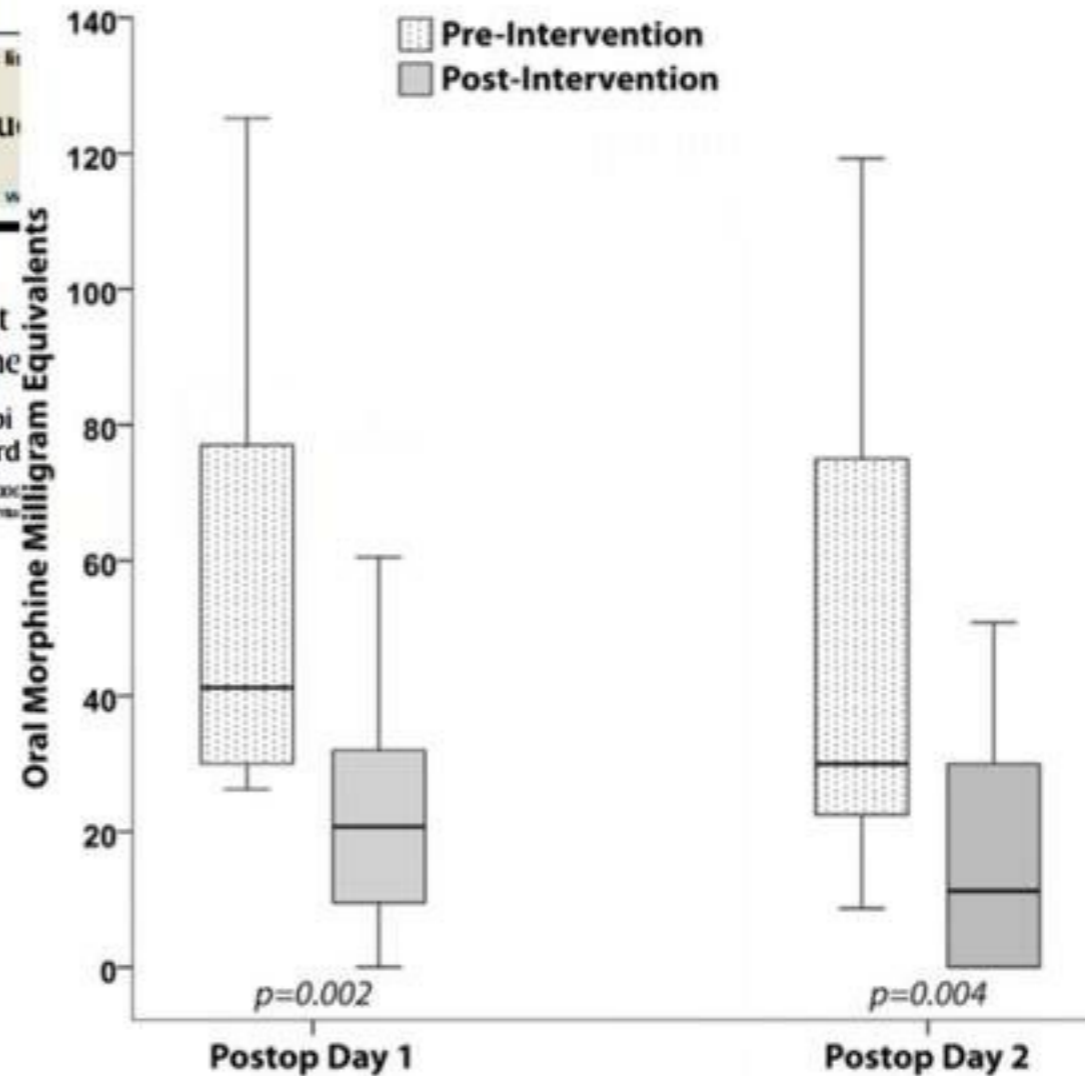
Drug Name	Use	Timing	How to Get It	Tips
<input type="checkbox"/> Ropivacaine • Local anesthetic + numbing medication (non-addictive)	Nerve block	Continuous	Automatic	Can push button every 30 minutes for extra dose
<input type="checkbox"/> Oxycodone • Oral opioid/narcotic pain medication	Moderate-severe pain	Every 4 hours	<input type="checkbox"/> Automatic <input type="checkbox"/> Ask	Consider taking before physical therapy
<input type="checkbox"/> Percocet • Oxycodone + Tylenol	Moderate-severe pain	Every 4 hours	Automatic	
<input type="checkbox"/> Dilaudid (hydromorphone) • IV opioid/narcotic pain medication	Severe pain	Every 4 hours	Ask	Start sitting Try pain pills first
<input type="checkbox"/> Tylenol (acetaminophen) • Pain and fever reducer	Mild-moderate pain	Every 6 hours	<input type="checkbox"/> Automatic <input type="checkbox"/> Ask	
<input type="checkbox"/> Diclofenac • Anti-inflammatory pain reducer	Mild-moderate pain	Twice a day	<input type="checkbox"/> Automatic <input type="checkbox"/> Ask	
<input type="checkbox"/> Neurontin (gabapentin) • Nerve pain reducer	Nerve pain	1-3 times per day	Automatic	May cause drowsiness
<input type="checkbox"/> Flexeril (cyclobenzaprine) • Muscle relaxant	Muscle spasm	3 times per day	<input type="checkbox"/> Automatic <input type="checkbox"/> Ask	

*See Reverse Side for Pain Scale*

### B Pain Rating Scale



# Beyond Blocks



# Collaboration between Anaesthesia & Surgery

## Modules for Physicians and Patients



Plan for the Alleviation of Pain  
After Surgery >

*Prepare patients for discomfort and  
recovery*



Optimize the Safe and Effective  
Alleviation of Pain >

*Implement routine screening and  
improve outcomes*



Help Patients Get Comfortable  
After Injury or Surgery >

*Remind patients that pain is normal*



Implement a Practice-wide  
Strategy for Safe, Effective Pain  
Alleviation >

*Tips and strategies for your practice*



Safe Use, Storage and Disposal of  
Opioid Medications >

*Limit diversion of unused opioids*



Physician  
Resources >

*Download resources, including slides  
and scripts*



Patient  
Resources >

*Helpful videos and pain management  
plan*

# Non-Opioid Systemic Analgesics



Review Article

pISSN 2005-6419 · eISSN 2005-7563




## Designing the ideal perioperative pain management plan starts with multimodal analgesia

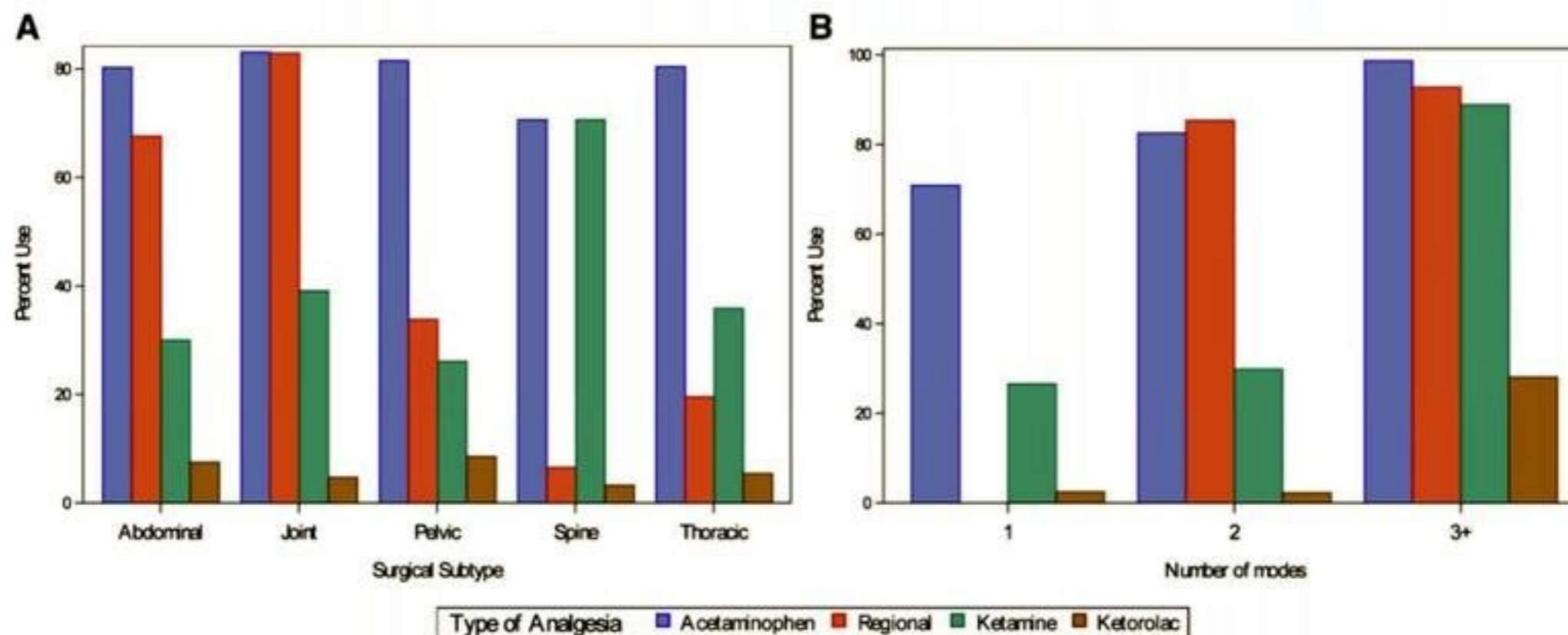
**Table 1.** Commonly Used Perioperative Systemic Non-opioid Multimodal Analgesics in Adults

Drug	Route (s)	Preoperative dose	Intraoperative dose	Postoperative dose
Acetaminophen	IV/PO	1000 mg (> 50 kg)	1000 mg	1000 mg q6h
Celecoxib	PO	400 mg	N/A	200 mg q12h
Gabapentin	PO	300–1200 mg	N/A	300–800 mg q8h
Ketamine	IV	N/A	0.25–0.5 mg/kg bolus	0.25 mg/kg/h infusion
Ibuprofen	IV/PO	600–800 mg	N/A	600 mg q6h
Pregabalin	PO	75–150 mg	N/A	75 mg q12h

IV: intravenous, N/A: not applicable, PO: by mouth.

## Practice Patterns in Perioperative Nonopioid Analgesic Administration by Anesthesiologists in a Veterans Affairs Hospital

Jereen Z. Kwong, MD, MS,\* Seshadri C. Mudumbai, MD, MAS,\*<sup>†</sup> Tina Hernandez-Boussard , PhD, MPH, MS,<sup>‡,§,¶</sup> Rita A. Papat, PhD, MS,<sup>||</sup> and Edward R. Mariano, MD, MAS\*<sup>†</sup>



tions between the number of modes used and postoperative outcomes. **Results.** Of the 1,087 procedures identified, 33%, 53%, and 14% were managed with one, two, and three or more modes, respectively. Older patients had lower odds of receiving three or more modes (adjusted odds ratio [aOR] = 0.28, 95% confidence interval [CI] = 0.15–0.52), as were patients with more comorbidities (two modes: aOR = 0.87, 95% CI = 0.79–0.96; three or more modes: aOR = 0.81, 95% CI = 0.71–0.94). Utilization varied across surgical subtypes ( $P < 0.0001$ ). Increasing the number of modes, particularly use of regional anesthesia, was associated with shorter length of stay. **Conclusions.** Our study suggests



# Multimodal Analgesia Quality Measure

## Four New Quality Pain Measures Approved for 2018

Jan 13, 2018

ASRA is thrilled to announce that the Centers for Medicare and Medicaid Services (CMS) has approved the Anesthesia Quality Institute (AQI) National Anesthesia Clinical Outcomes Registry (NACOR) as a Qualified Registry and Qualified Clinical Data Registry (QCDR) for 2018 MIPS reporting.

ASRA collaborated with the American Society of Anesthesiologists this past fall to develop pain quality measures for submission to CMS. Four of the measures were accepted and are now part of the QCDR. They are:

- AQI56: Use of Neuraxial Techniques and/or Peripheral Nerve Blocks for Total Knee Arthroplasty (TKA)
- AQI57: Safe Opioid Prescribing Practices
- AQI58: Infection Control Practices for Open Interventional Pain Procedures
- AQI59: Multimodal Pain Management

*2020 Approved as MIPS Quality Measure 477*

# A Commonsense Patient-Centered Approach to Multimodal Analgesia Within Surgical Enhanced Recovery Protocols



## *Processing of Pain:*

- Cognitive-behavioral therapy\*
- Patient education\*
- Acetaminophen\*
- Opioids†, gabapentinoids†, ketamine†

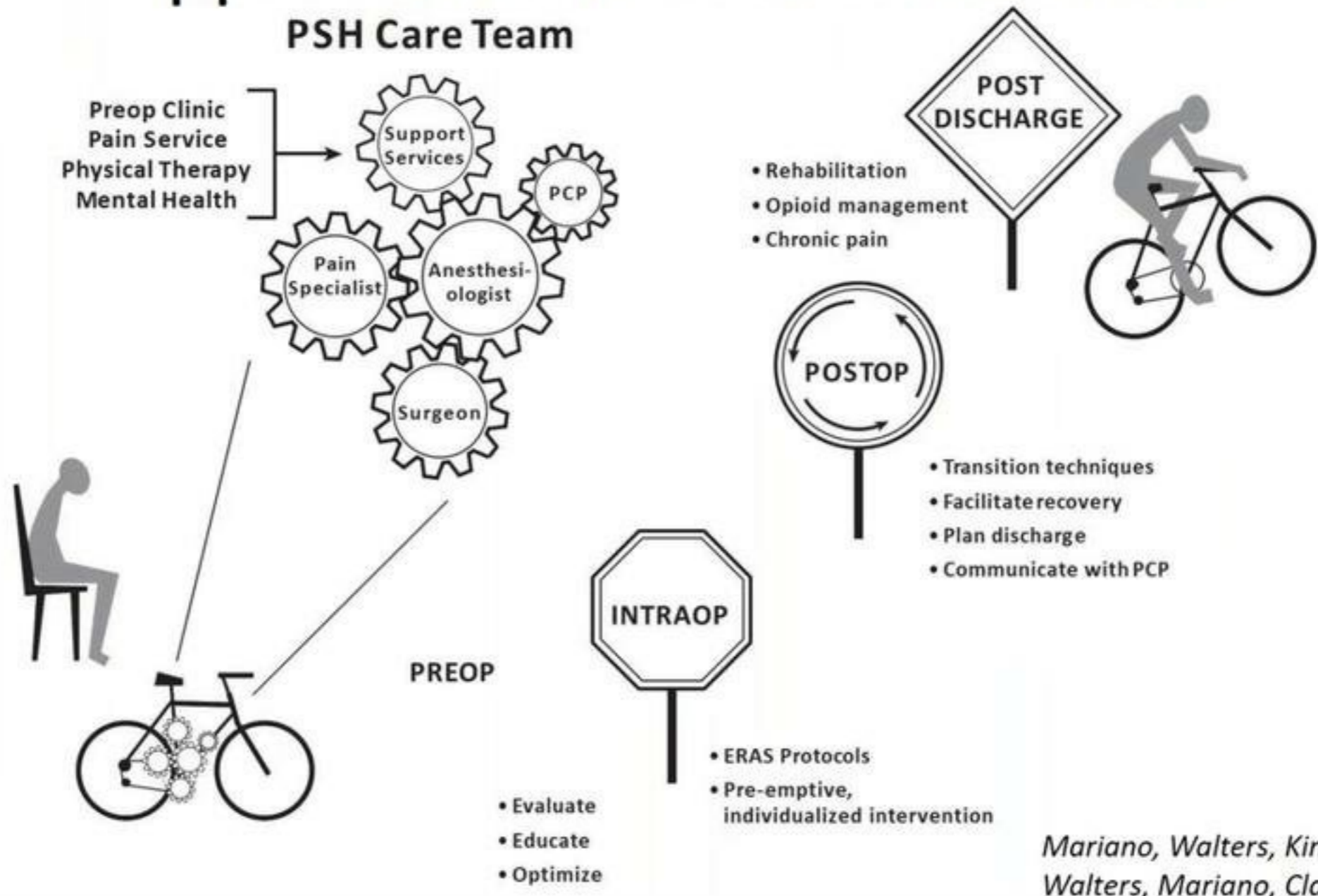
## *Transmission of Pain:*

- Regional analgesia\*
- Opioids†, gabapentinoids†, ketamine†

## *Source of Pain:*

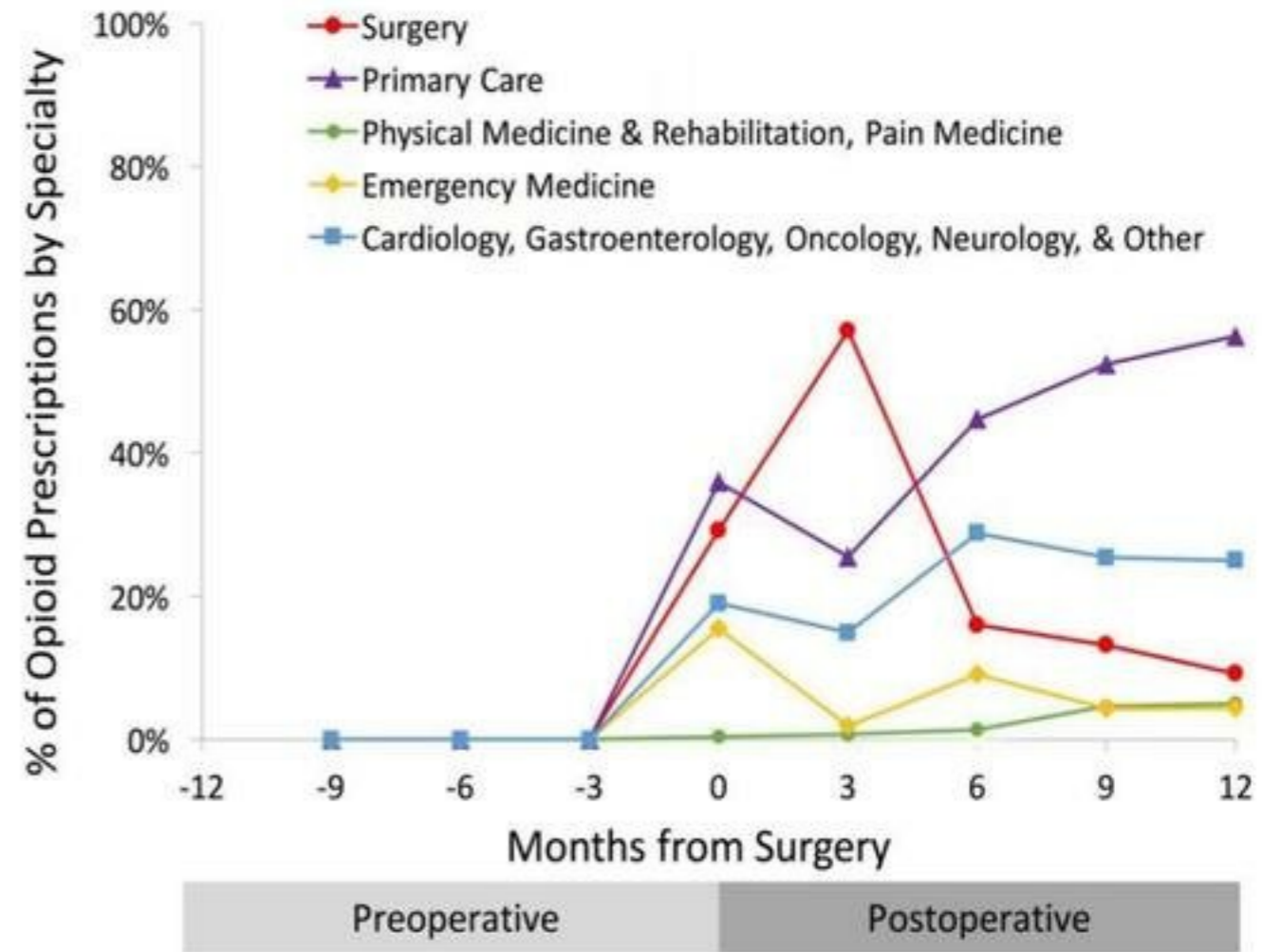
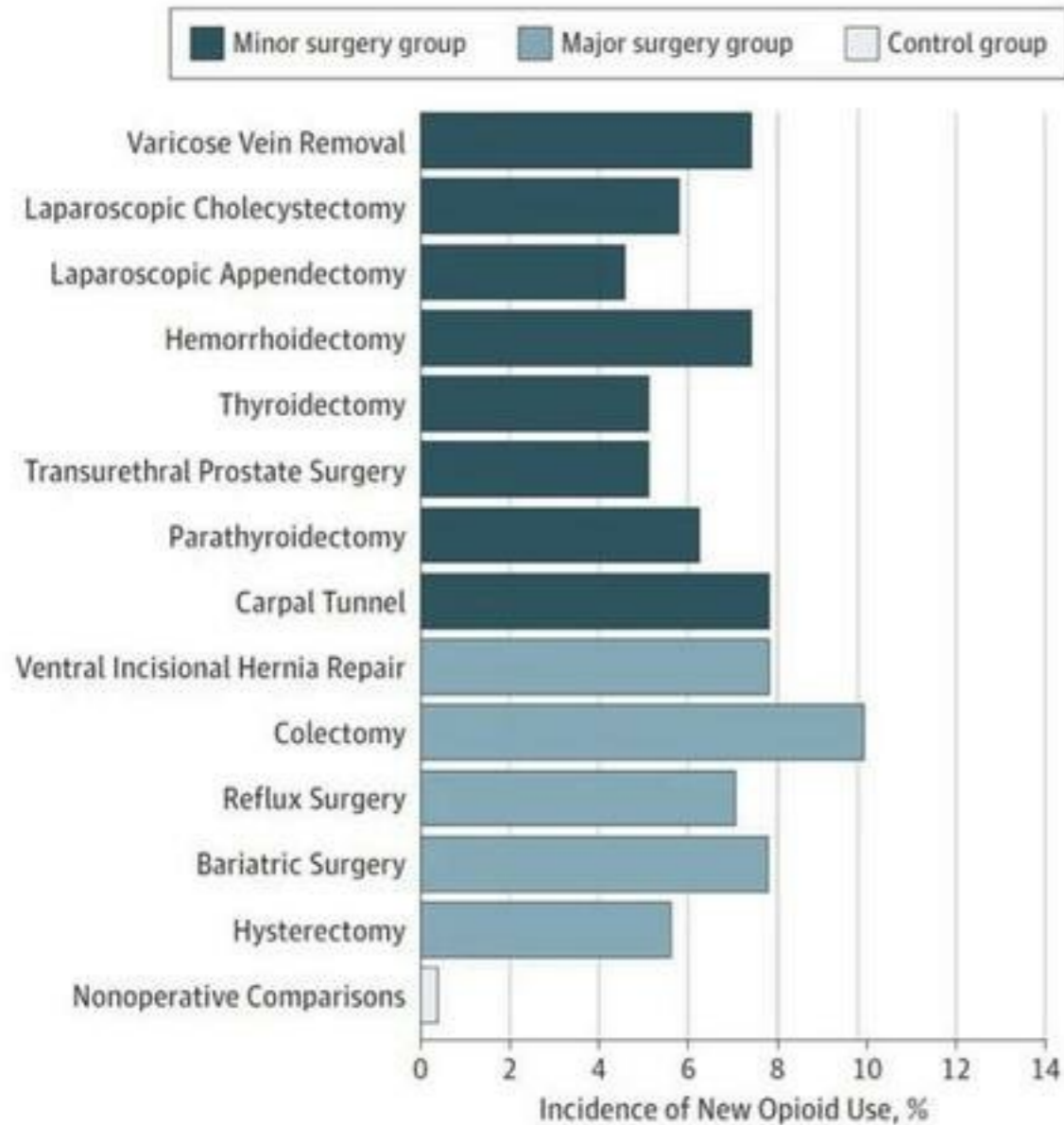
- Compression\*, cryotherapy\*
- Local anesthetics\*
- Non-steroidal anti-inflammatory drugs\*

# Approach Pain as a Continuum



Mariano, Walters, Kim, Kain. A&A 2015  
Walters, Mariano, Clark. Pain Med 2015

Figure 3. Incidence of New Persistent Opioid Use by Surgical Condition



## The Role of Surgery

Brummett, et al. JAMA 2017  
Klueh, et al. JGIM 2018

 @EMARIANOMD



@DrChadB

# Prescribing Recommendations

Procedure	Oxycodone* 5mg Tablets
<a href="#">Dental Extraction</a>	0
<a href="#">Thyroidectomy</a>	0 - 5
<a href="#">Laparoscopic Anti-reflux (Nissen)</a>	0 - 10
<a href="#">Appendectomy – Lap or Open</a>	0 - 10
<a href="#">Laparoscopic Donor Nephrectomy</a>	0 - 10
<a href="#">Hernia Repair – Minor or Major</a>	0 - 10
<a href="#">Sleeve Gastrectomy</a>	0 - 10
<a href="#">Laparoscopic Cholecystectomy</a>	0 - 10
<a href="#">Open Cholecystectomy</a>	0 - 15
<a href="#">Laparoscopic Colectomy</a>	0 - 10
<a href="#">Open Colectomy</a>	0 - 15

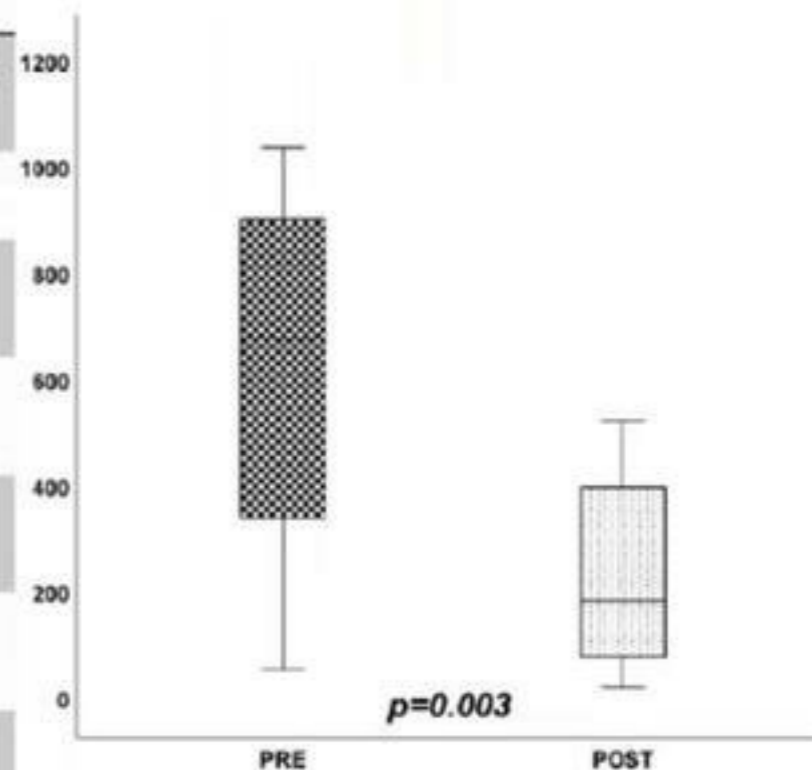


## A Multidisciplinary Patient-Specific Opioid Prescribing and Tapering Protocol Is Associated with a Decrease in Total Opioid Dose Prescribed for Six Weeks After Total Hip Arthroplasty

Mallika Tamboli,<sup>\*,†</sup> Edward R. Mariano, MD, MAS,<sup>\*,†</sup> Kerianne E. Gustafson, PA-C,<sup>‡</sup> Beverly L. Briones, NP,<sup>‡</sup> Oluwatobi O. Hunter, DNP, AG-ACNP,<sup>†</sup> Rachel R. Wang, MD,<sup>\*,†</sup> T. Kyle Harrison, MD,<sup>\*,†</sup> Alex Kou,<sup>\*,†</sup> Seshadri C. Mudumbai, MD, MS,<sup>\*,†</sup> T. Edward Kim, MD,<sup>\*,†</sup> Pier F. Indelli, MD, PhD,<sup>‡,§</sup> and Nicholas J. Giori, MD, PhD<sup>‡,§</sup>

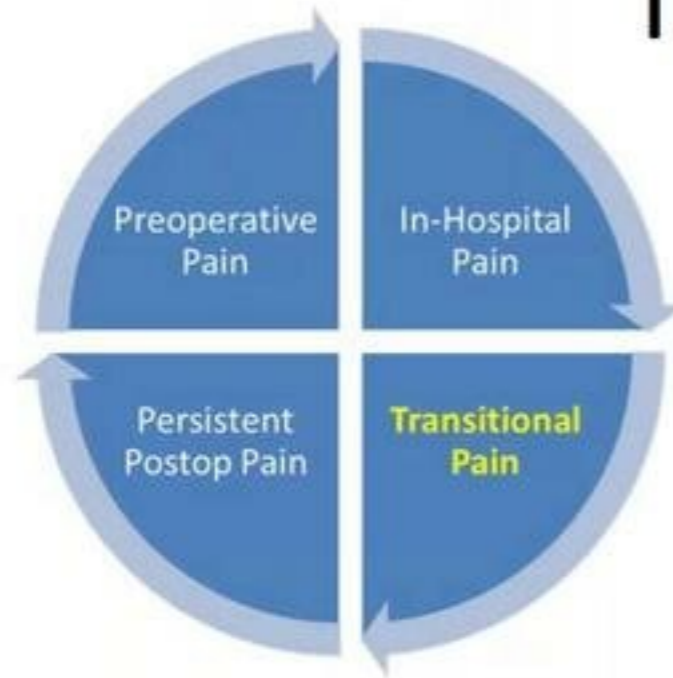
**Tapering Instructions (Prescribed As-Needed)**

Prior 24-hour Oxycodone (mg)	Days 1-2	Days 3-4	Days 5-6	Days 7-8	Days 9-10	Days 11-12	Total Oxycodone 5 mg Tablets Prescribed (n)
10 mg	5 mg twice daily						4
20 mg	5 mg four times daily	5 mg twice daily					12
30 mg	5 mg six times daily	5 mg four times daily	5 mg twice daily				24
40 mg	10 mg four times daily	10 mg three times daily	5 mg four times daily	5 mg twice daily			40
50 mg	10 mg five times daily	10 mg four times daily	10 mg three times daily	5 mg four times daily	5 mg twice daily		60
60 mg	10 mg six times daily	10 mg five times daily	10 mg four times daily	10 mg three times daily	5 mg four times daily	5 mg twice daily	84



Tamboli, Mariano, et al. Pain Med 2019

# Transitional Pain



Journal of Pain Research

 Open Access Full Text Article

The Toronto General Hospital Transitional Pain Service: development and implementation of a multidisciplinary program to prevent chronic postsurgical pain

Dovepress

open access to scientific and medical research

PERSPECTIVES

## RESEARCH ARTICLE

For reprint orders, please contact: [reprints@futuremedicine.com](mailto:reprints@futuremedicine.com)

Chronic postsurgical pain and persistent opioid use following surgery: the need for a transitional pain service

Alexander Huang<sup>1,2</sup>, Abid Azam<sup>1,2,3</sup>, Shira Segal<sup>1</sup>, Kevin Pivovarov<sup>1</sup>, Gali Katznelson<sup>1,2</sup>, Salima SJ Ladak<sup>1,2</sup>, Alex Mu<sup>1,2</sup>, Aliza Weinrib<sup>1,2,3</sup>, Joel Katz<sup>1,2,3,4</sup> & Hance Clarke<sup>5,1,2,4</sup>

## Pain Management



Katz, et al. *J Pain Res* 2015  
Huang, et al. *Pain Manag* 2016

# Summary

- We discussed:
  - The definition of multimodal analgesia and its components;
  - Quality measurement related to pain management; and
  - Ways to develop a multimodal analgesic protocol that balances resources and benefits.





Burning Questions?

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