Disclosure Statement

I have no actual or potential conflict of interest in relation to this presentation.

A Little Bit About Me

When I was a kid... no wait, I still do that.
Poll The Audience

Approximately how many pediatric (0-17yo) surgeries (not including offsites) did KP-SCAL perform in 2018?

- (A) 5000
- (B) 10,000
- (C) 15,000
- (D) 20,000

Can we as an organization improve & deliver quality pediatric surgical care by minimizing or eliminating opioids?

Objectives

3 W’s

Why

- National Opioid Epidemic
- Current Opioid Warnings
- Long-term Implications

What

- Tools of Multimodal Analgesia
  - Identify non-opioid medications/techniques
  - Highlight medications with risks/benefits

Where & How

- Create a multimodal analgesic plan for pediatric patients
- Review Kaiser Permanente SCAL T&A Project
- Pediatric Enhanced Recovery After (Around) Surgery
- Data & Research

1ST WHY

National Opioid Epidemic

“Given the epidemic of opioid addiction, we’re concerned about unnecessary exposure to opioids, especially in young children. We know that any exposure to opioid drugs can lead to future addiction...” – FDA News Release 1/11/2018

“As pain experts, anesthesiologists must also become information leaders, assisting the medical, legislative, and lay communities with the best approaches to pain management.” – Yaster M, MD, et al. “Houston, We Have a Problem!: The Role of the Anesthesiologist in the Current Opioid Epidemic. Anes Analg. 2017 Nov;125(5).

*Image source: Unsplash and stock photos from Pixabay.*

Incidence of Persistent Opioid Use (POU) defined as a filled opioid prescription 3-6 months after a procedure undergoing 1 of 13 common operations 4.8% vs. 0.1% controls. Similar to Adults.

Risk factors
- **Female**
- Older age
- Comorbid mental & medical conditions
- History of previous abuse
- Colectomy & Cholecystectomy

Secondary Findings
- Wide variation in prescribed initial opioid doses

Snyder CL. Opioids and Operations. *Pediatrics*. 2018;141(1)

Agree:
- Public perception of risk is erroneously low
- Potential lifelong exposure magnifies personal and societal risks

Disagree:
- Skewing of data with 44% over age 17
- Conditions rather than operations dictating higher POU

Current Pediatric Opioid Warnings

https://www.fda.gov/Drugs/DrugSafety/ucm549679.htm

*[4-20-2017]* The Food and Drug Administration (FDA) is restricting the use of codeine and tramadol medicines in children. Codeine is approved to treat pain and cough, and tramadol is approved to treat pain. These medicines carry serious risks, including slowed or difficult breathing and death, which appear to be a greater risk in children younger than 12 years and should not be used in these children. These medicines should also be limited in some older children. Single-ingredient codeine and all tramadol-containing products are FDA-approved only for use in adults. We are also recommending against the use of codeine and tramadol medicines in breastfeeding mothers due to possible harm to their infants...
Long Term Implications – Morbidity & Mortality

  - Up to 8% of opioid-naïve patients who undergo surgery and receive opioids perioperatively may become chronic opioid users.

  - 8.896 Children and Adolescents
  - 88% Adolescents 15-19 years old
  - 6.7% (605) Children 0-4 years old
  - Overall Mortality Rate Increased 201.2% from 0.02 to 0.12 per 100K (Nearly 3-fold Increase)

Long Term Implications – Economic Burden


Pain Management

  - Pain = 5th Vital Sign
Identify non-opioid medications & non-medication techniques

Highlight medications with risks/benefits
Multimodal Analgesia

- 2 or more analgesic medications that act by different mechanisms
- Pediatric Patients
- ...Special attention to biopsychosocial nature of pain.
- Strongly Agree: Analgesic therapy should involve a multimodal approach

Non-Medicated Techniques

- Psycho-Social (Patient + Parents/Guardians)
- Education/Reassurance/Support
- Pre/Post op e.g., Rounds, EMMI, Brochures
- Non-Clinical Services: e.g., Child Life, Social, Volunteers
- Distraction: Virtual Reality (e.g., MRI goggles), Videos, Tablets, Coloring Books, Pet Therapy

Oliverira NC. Audiovisual Distraction for Pain Relief in Paediatric Inpatients: A crossover study. Eur J Pain. 2017 Jan;21(1)
Adams, HA. A perioperative education program for pediatric patients and their parents. AORN J. 2011 Apr;93(4)

Non-opioid Medications

- Ibuprofen
- Ketorolac
- Meloxicam
- Acetaminophen (PO or IV)
- Dexamethasone
- Dexamethomidine
- Clonidine
- Gabapentin – Neuropathic Pain
- Midazolam/Ativan – Muscle Spasm
- Ketamine – Consider in Chronic Pain Patients
- Local Anesthesia by Surgery
- Neuraxial (Caudal/Epidural, Intrathecal)
- Regional Anesthesia
- Acetaminophen
- Ketorolac
- Dexmedetomidine

Not covered but still important & valuable:
- Regional/Neuraxial Blocks by Anesthesiologists
- Local/Regional Blocks by Surgeons

**Acetaminophen**

- Dose: 10-15mg/kg Q4-6 hours
- PO, IV, & Suppository Forms
- Be Aware of Co-administration of medications that contain acetaminophen.

**Ketorolac**

- Age >6months
- Dose: 0.5mg/kg Max 30mg/dose

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**WAKE UP SAFE**

**Warning: Risk of acetaminophen overdose**

Wake up Safe has received some reports of acetaminophen overdoses at levels of up to 2.5 g/day which exceeded the maximum daily dose. Multiple precautions for each method of acetaminophen administration should be considered to prevent this. For example, the tylenol po is available in a dosage of 325 mg and the 500 mg tablets. The dosing should not exceed 4 tablets in 24 hours. For the IV, the maximum daily dose should not exceed 4 g/day. For the suppository form, the maximum daily dose should not exceed 4 g/day. The dosing should not exceed 4 suppositories in 24 hours. The dosing should not exceed 4 suppositories in 24 hours.

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**TABLE 1: Morphine Requirements in the Two Experimental Groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>Morphine (mg)</th>
<th>Ketorolac (mg)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>4.5 ± 3.0</td>
<td>2.0 ± 1.0</td>
<td>0.0000</td>
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<tr>
<td>Ketorolac</td>
<td>9±3.7</td>
<td>8±3</td>
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</table>
Ketorolac: Pediatrics

**Bottom Line:**
There is NO good evidence from studies to support or reject the suggestion that ketorolac is beneficial, or that it is associated with serious side effects in treating children’s pain after surgery.

- Due to lack of data from primary outcomes and low-quality evidence for secondary outcomes.

Dexmedetomidine

- α₂ Adrenergic agonist (similar to Clonidine)
- Higher specificity to α₂ vs α₁ (1600:1 vs. 200:1 for Clonidine)
- Half life 2-3 hours
- Dose 0.2 mg/kg
- Infusions 0.25-1 mcg/kg/hr

**The Good and Even Great**
- Multiple studies to support a decrease in emergence delirium following general anesthesia
- Evidence to support a decrease in pain and use of opioids in procedures (e.g., FOXs, Cardiac Cath) and as an adjunct to surgeries (e.g., Premedication Sedation, Awake Craniorrhexis, Transfections & Adenaectomy)

**The Not So Good**
- Sedation Effects
- Bradydymia & Hypotension
In 2012, the FDA issued warnings that narcotics given to children post T&A could lead to rare but life-threatening events. KP Northwest (KPNW) and KP Colorado implemented an age-based pain management protocol. KPNW significantly reduced narcotic prescriptions from 82% to 15%.
Anesthesia's Role

Background

Goal

Roles

Achievements

Outcomes:
SCAL Narcotic Rx
Trend 2012-2018Q3

Regional Periop Services | PEDs T&A Pain Protocol Initiative

Outcomes:
SCAL Post-Surgical Opioid Usage in the Recovery Room

Ages 0-14yo
Future Goals

- Continue to follow data and socialize
- Continue to Drive for Guidelines of Quality, Safe, Evidence-Based, & Best Practices.
- Apply these learnings to future projects & research
  - Pediatric Enhanced Recovery After (Around) Surgery

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GENERAL OPIOID GUIDELINES

- SCAL: Regional Pediatric ERAS & NSQIP
- Pediatric Enhanced Recovery

Jennifer Weiss, MD
Andrew Rudikoff, MD
Christine Wong, MD
Genta Nasser, MD
Don Shaul, MD
David Tieu, MD

SCAL: Regional Pediatric ERAS & NSQIP

Pediatric Enhanced Recovery

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Pediatric Enhanced Recovery

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Don Shaul, MD
David Tieu, MD
Enhanced Recovery After Surgery (ERAS): Pectus Excavatum and Carinatum
- Evaluation of factors such as pain scores, opioid requirements, and LOS utilizing multimodal analgesia and cryoablation
- IRB Approved Study #11654
- Investigators:
  - Andrew Rudikoff, MD
  - Antonio Conte, MD
  - Donald Shaul, MD
  - Franklin Banzali, MD
  - Karen Rodriguez, NP
  - Roman Sydorak, MD

Retrospective Evaluation of Opioid-Sparing Analgesic Regimen for Perioperative Pain Control during Tonsillectomy with and without Adenoidectomy (T&A)
- Evaluation of outcomes and quality with a multi-modal analgesia guideline
- IRB Approved Study #11803
- Investigators:
  - Andrew Rudikoff, MD
  - Antonio Conte, MD
  - Franklin Banzali, MD
  - Marlene Nashed, PharmD

Recap:
3 W’s
- Why: Review Brief History
  - National Opioid Epidemic
  - Current Opioid Warnings
  - Long-term Implications
- What: Tools of Multimodal Analgesia
  - Identify non-opioid medications/techniques
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- Where & How: Create a multimodal analgesic plan for pediatric patients
  - Kaiser Permanente SCAL T&A Project
  - Pediatric Enhanced Recovery After (Around) Surgery
  - Data & Research

WHO
- Our Pediatric Patients that undergo >15,000 surgeries & procedures that we provide Anesthesia for in SoCal
Thank You
Franklin M. Banzali@kp.org
Pediatric Anesthesiology
Regional Leads

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Anesthesiologist(s)</th>
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</thead>
<tbody>
<tr>
<td>Anaheim</td>
<td>Ralph Nourouzian MD</td>
</tr>
<tr>
<td>Baldwin Park</td>
<td>Donna Chung MD</td>
</tr>
<tr>
<td>Dimonay</td>
<td>Cheri Haung (Retired) MD</td>
</tr>
<tr>
<td>Fontana</td>
<td>Cyrus Kamani MD</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Frank Banzali MD</td>
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<tr>
<td>Panorama City</td>
<td>Jonathan Chei MD</td>
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<td>Riverside</td>
<td>Raghun Tepekpol MD</td>
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<td>Deon D. Gilchrist MD</td>
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<td>Jonathan Chei MD</td>
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<tr>
<td>West Los Angeles</td>
<td>Sheila Rajagopal MD</td>
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<td>Kevin Chung MD</td>
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