Multimodal Analgesia for Colorectal Surgery:
A Retrospective Evaluation of an Enhanced Recovery Protocol

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Introduction and Background

Traditional Colorectal Surgery
- Large abdominal incisions
- High rates of adverse outcomes
  - PONV
  - Increased pain
  - Decreased mobility
  - Delayed gastric motility
  - Urinary dysfunction
  - 78% increase in LOS
  - Readmission rates as high as 35.4%

Laparoscopic Surgery
- Reduced complications
- Significantly shortened LOS
- Decreased readmission rates

Continued Challenges
- Opioids used as primary analgesic modality
- Troublesome side effects:
  - PONV, respiratory depression, sedation, constipation, addiction

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Significance

- **The Opioid Epidemic**
  - 99% of adult surgical patients receive an opioid
  - 6-10% of opioid-naïve patients have continued dependence
    - **14.4% of colorectal surgical patients report chronic use pattern postoperatively**
  - **Anesthetic Pain Management**
    - Aim to limit opioids
    - Adopt alternative approaches
    - Provide effective analgesia while promoting optimal patient outcomes

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Purpose and Objectives

- **Project Purpose**

  Evaluate the perioperative care improvement initiative implemented at Christiana Care by the Department of Anesthesia which aimed to improve the quality of recovery from colorectal surgery through the utilization of multimodal analgesia.

- **Determine if multimodal analgesia, as compared to traditional anesthesia care, reduced:**
  - Pain scores
  - Opioid consumption
  - PONV
  - Hospital LOS
  - 30-Day Readmission Rate

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Enhanced Recovery After Surgery (ERAS)

- **Perioperative care protocol**
  - Patient-centered
  - Evidence-based
  - Multidisciplinary
- **Aims**
  - Optimize baseline physiological function
  - Reduce or block the surgical stress response
  - Expedite surgical recovery

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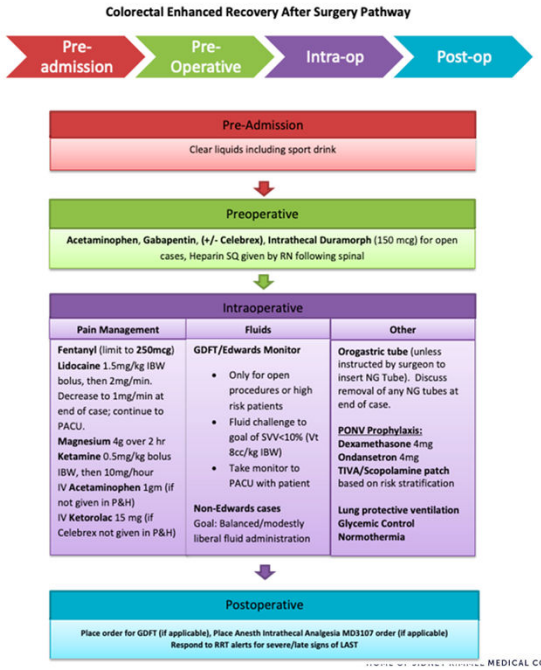
Christiana Care: Colorectal ERAS Pathway



ASPA. (2019). Colorectal enhanced recovery after surgery pathway. [Digital graph].

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Multimodal Analgesia

- **Utilization of multiple non-opioid analgesic adjuncts**
  - Target distinctive pain pathways
    - Synergistic analgesic effect
  - Reduces opioid consumption
- **Mitigates adverse effects of excessive opioids**
  - Decreases PONV
  - Minimizes sedation
  - Increases activity
  - Speeds recovery of bowel function
  - Improves dietary tolerance

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Literature Review: Multimodal Analgesia, Pain, Opioids

- **Multimodal Analgesia**
  - Synergistic
  - Independently effective
  - Polomano et al., 2017; Gustafsson et al., 2017
- **Postoperative Pain**
  - Decreased pain scores
  - Better outcomes
  - Aryaie et al., 2018; Helander et al., 2017; Sun et al., 2012; Kaba et al., 2017
- **Opioid Consumption**
  - Decreased opioid consumption
    - Intraop, postop
  - Decreased side effects
  - Wick, Grant, & Wu, 2017; Joshi, Bonnet, & Kehlet, 2012; Mujukian et al., 2019; Sarin et al., 2016

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Literature Review: PONV

- **Themes**
  - 80% of colorectal surgical patients report PONV
    - High risk patient population
      - Carmichael et al., 2017; Shaikh et al., 2016
  - PONV is associated with adverse consequences
    - Shaikh et al., 2016; Helander et al., 2017
  - Multimodal analgesia reduces PONV by decreasing or eliminating opioid use
    - Gustaffson et al., 2019; Holder-Murray et al. 2019
  - Resolving PONV is a vital aspect of improving recovery from surgery
    - H.S. Smith, E.J. Smith, & B.R. Smith, 2012

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Literature Review: Hospital LOS and Readmission

- **Readmission Rates**
  - Reduction in readmission rates
  - Centers for Medicare and Medicaid, 2019; Sarin et al., 2016
- **Reduction in Hospital Length of Stay**
  - Reduced complications
  - Return of bowel function
  - Improved postoperative pain control
  - Gustafsson et al., 2019; Sarin et al., 2016; Zhang et al., 2019; Ni et al., 2019

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Project Design/Population

- **Retrospective Chart Review:** two patient cohorts underwent colorectal surgery at CC
  - Anesthesia provided by Anesthesia Services, P.A.
- **Cohort 1:** Bowel resection surgery between 1/3/18 and 4/4/19
  - Traditional anesthesia care with general anesthesia
- **Cohort 2:** Bowel resection surgery between 4/19/19 and 2/28/20
  - General anesthesia with multimodal analgesia
    - Patients received all five multimodal agents recommended by the colorectal ERAS pathway
- **Exclusion criteria**
  - Surgery related
  - Patient related

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Procedures

- **N = 129, Cohort 1 N = 75, Cohort 2 N = 55**
- **Data collected on five outcomes**
  - Patient reported pain scores
  - Opioid consumption
  - PONV
  - Hospital LOS
  - 30-day readmission rate
- **Data collected from EMR**
  - Collaborated with ASPA's Director of Quality and Improvement
  - Programs utilized: Powerinsight, Tableau, Microsoft Excel
- **Statistical analysis completed using SPSS and Excel**
  - t-Test: Two-Sample Assuming Unequal Variances
  - Chi-squared Analysis

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Results: Pain Scores and Opioid Consumption

Average Pain Score PACU

Cohort 1	Cohort 2
5.99	5.73

Average Pain Score POD 1

Cohort 1	Cohort 2
3.79	3.99

Average MME Intraop

Cohort 1	Cohort 2
23.7	17.9

Average MME PACU

Cohort 1	Cohort 2
8.39	7.88

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Results: PONV, Length of Stay and 30-day Readmission

PONV

Cohort 1	Cohort 2
29.3% + PONV	18.5% + PONV

Avg LOS

Cohort 1	Cohort 2
4.73 days	4.31 days

30-day Readmission

Cohort 1	Cohort 2
1 readmission	Zero

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Strengths and Limitations

Strengths

- Diverse sample population, consisting of 129 patients, male and female, ranging from 19-95 years old
- Utilization of specific inclusion and exclusion criteria improving homogeneity of both cohorts

Limitations

- Human error with documentation and EMR charting
- Small sample size can lead to over estimated correlations or false-positives
- Opioid supply convenience
  - Opioids supplied in a 250 mg/5 mL vial, potentially leading to excess administration when not clinically warranted

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Impact

Translating findings to practice

- Disseminate findings to colleagues
  - CRNAs, anesthesiologists, surgeons, pain management specialists
- Demonstrate role of anesthesia providers in enhanced recovery
- Promote adherence to standardized opioid-sparing multimodal approaches
- Stakeholders interested in findings
  - Administrators
  - Insurance providers
- Evidence-based strategy to combat the national opioid epidemic
  - Anesthesia providers leading initiatives

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Special Recognition

- Dr. Jacqueline Mainwaring, DNP, MS, CRNA – Project Team Leader
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- Dr. Matthew Powell, M.D., FASA, Vice Chair of Anesthesiology, Medical Director, Clinical Operations, Perioperative Services, CC, Department of Anesthesiology - Clinical Site Preceptor/Mentor
- Kate Moyer, MBA – Anesthesia Services, P.A. Director of Quality and Improvement
- Dr. Mark Schneider, M.D., MBA, Chief Clinical Officer, Chair, Department Of Anesthesiology

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Questions?

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