Use of Skeletal Muscle Relaxers to Reduce Postoperative Opioid Use in Major Abdominal Surgeries

Elizabeth E. Neiman, PharmD Candidate; Janaya Mott, PharmD Candidate; Kayla R. Joyner, PharmD, BCPS
Bernard J. Dunn School of Pharmacy, Shenandoah University, Winchester, Virginia; Winchester Medical Center, Winchester, Virginia

INTRODUCTION

- Recent pushes in opioid stewardship from multiple organizations to combat the overuse of these potentially addictive and harmful medications, the exploration of other pharmaceutical methods for pain management is essential.[1,2]
- Evidence suggest that skeletal muscle relaxers (SMR) are effective in managing postoperative pain outside of major abdominal surgeries.
- Limited research exists surrounding the use of SMR for postoperative pain management in major abdominal surgeries.
- SMRs used in practice for these patients who are at a high risk for postoperative pain and those who do not achieve adequate pain relief from acetaminophen, NSAIDs or COX-2 inhibitors combined with dexamethasone and local/regional analgesia.[3]

OBJECTIVE

- Compare postoperative opioid use in patients undergoing major abdominal surgery who received perioperative SMRs to those who did not receive perioperative SMRs

METHODS

- **Study design:** Retrospective cohort study
- **Study site:** Single center, 495-bed community hospital
- **Patients**

Key Inclusion Criteria	Key Exclusion Criteria
• 18 years old or older • Admitted for at least 48 hrs • Classified as ASA Class I-III • Major abdominal surgery during hospitalization	• Opioid use in the past 12 months • Active cancer • Taking SMR prior to admission • Pregnancy • Dementia

- **Intervention:** Two groups those that received at least one dose of SMR versus those who did not
- **Primary outcome O**pioid consumption in MME 48-hours postoperatively.
- **Secondary Outcomes**
  - Opioid consumption in MME 24-hours and 72-hours postoperatively
  - Average 24-hour, 48-hour, and 72-hour postoperative pain
  - Hospital length of stay,
  - Discharge opioid MME.
- **Statistical Analysis:** Dichotomous outcomes were evaluated using chi-squared or Fisher's exact test and continuous outcomes using the Mann-Whitney U Test. Power was set at 80%, assuming a one-third reduction in the primary outcome and a 2-sided alpha of 0.05 a sample size of 90 patients were collected

RESULTS

- Between November 3, 2023 to April 30, 2024 there were 96 patients who underwent a 109 major abdominal surgery
- Sixty-six patients met all inclusion and exclusion criteria with 28 patients in the SMR group and 38 patients in the non-SMR group

Table 1. Baseline characteristics of participants in the study.

Baseline Characteristics	SMR (n=28)	No SMR (n=38)
Age in years, mean (SD)	55.2 (16.3)	61.0 (21.4
Race, n (%)		
White or Caucasian	24 (85.7)	34 (89.4)
Black or African American	4 (14)	0 (0.0)
Another Race	0 (0.0)	4 (10.5)
Length of stay in days, mean (SD)	11.0 (4.90)	12.0 (8.08)
Female, n (%)	12 (42.8)	22 (57.9)
Benzodiazepine during hospitalization, n (%)	22 (78.6)	30 (78.9)
TCA Antidepressant during hospitalization, n (%)	1 (3.5)	0 (0.0)
Number of SMR, n (%)		
1	22 (78.8)	
2	6 (21.4)	
SMR Administered, n (%)		
Methocarbamol	18 (64.3)	
Cyclobenzaprine HCl	11 (39.2)	
Tizanidine	2 (7.14)	
Baclofen	2 (7.14)	
Orphenadrine Citrate	1 (3.56)	

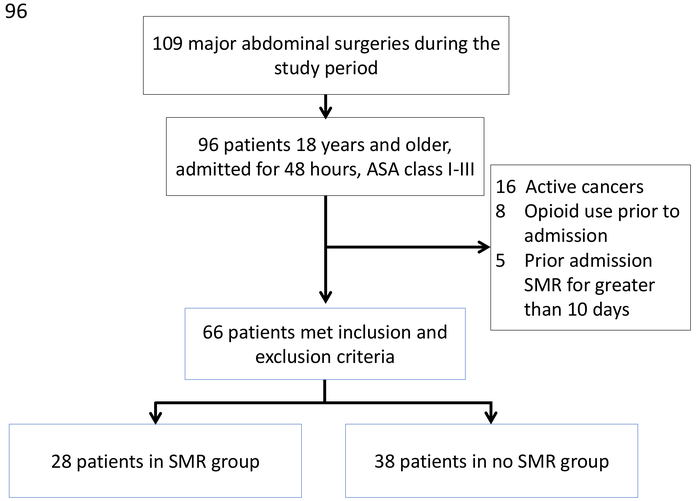

Figure 1. Patient disposition, Abbreviations: ASA=American Society of Anesthesiologists, SMR= skeletal muscle relaxers

Table 2. Comparison of key secondary outcomes in patient's receiving at least one dose of skeletal muscle relaxers (SMR) compared to those who did not receive SMR.

Outcomes	SMR (n=28)	No SMR (n=38)	p-value
Hospital Length of stay in days, mean (SD)	11.0 (4.6)	12.03 (8.08)	0.746
Opioids prescribed a discharge, n(%)	9 (32.1)	21 (55.3)	0.064
MME of opioids on discharge, n(%)	137 (331.8)	50.7 (67.0)	0.081
MME per day of opioids on discharge, mean (SD)	19.6 (47.0)	7.0 (9.52)	0.062

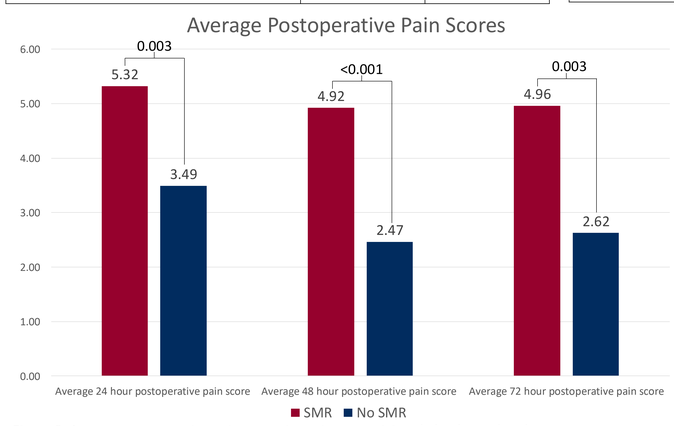

Figure 2. Average postoperative pain scores in patients receiving skeletal muscle relaxers

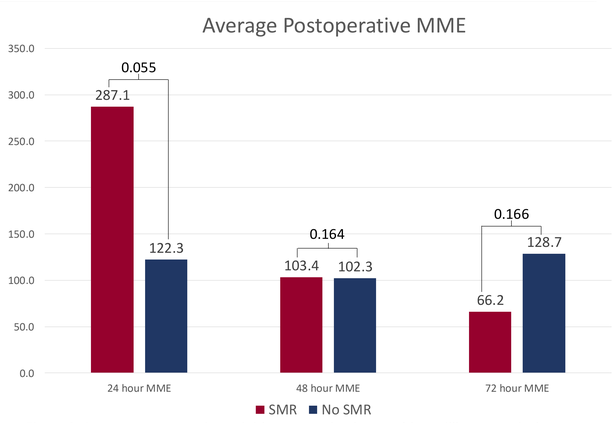

Figure 3. Average postoperative opioid consumption in morphine milligram equivalence (MME) in patients receiving skeletal muscle relaxers perioperatively

DISCUSSION

- Perioperative SMR use did not reduce opioid consumption and was associated with higher postoperative pain scores. These findings suggest that SMR may not be beneficial in managing pain following major abdominal surgeries, but previous trials show evidence that contradicts these findings.[4,5,6]
- This research continues to be essential in combatting the overuse of opioids
- Limitations
  - Our patient pool was limited to one hospital in a predominantly rural area; therefore, these findings may not be applicable to other areas that do not have patients admitted from similar demographics
  - Decision to start SMR was provider driven. Patients who had more pain may have been selected to receive SMR
  - Patients in the SMR could have received a SMR any time during their admission.
  - Our study did not meet power because we had less than 45 patients in each study group, therefore we may not be able to make valid conclusions on the data that was collected

FUTURE DIRECTIONS

- Data collection will continue to ensure the study meets power
- Post hoc analysis of individual SMR
- Authors will present findings in the following venues
  - Valley Health Winchester Medical Center Pharmacy and Therapeutics Meeting
  - National Poster Presentation
  - Manuscript development

DISCLOSURES

- The investigators have no potential conflicts of interest to disclose at this time

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