Perioperative Methadone in Pediatric Patients with Severe Obesity Undergoing Bariatric Surgery

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Introduction:

- Severe obesity in children is a growing epidemic
- **Bariatric surgery** is more commonly being used as a treatment
- **Post-operative analgesia is a challenge** as patients with obesity are at higher risk of respiratory complications (1)
- **Methadone** is a strong mu-opioid agonist with additional analgesic activity at other receptors (2)
- Methadone in adult bariatric surgery decreases post-op opioid needs and improves pain scores while not increasing respiratory adverse events (3, 4)
- Our institution began using **methadone in its bariatric surgery** pathway in 2022
- We studied the **outcomes of patients who received methadone versus those who did not**

Methods:

- **Retrospective chart review**
- Pediatric patients who underwent **uncomplicated laparoscopic sleeve gastrectomies** by a single surgeon at a tertiary care pediatric hospital from 1/2022 to 8/2023
- Primary outcome: **respiratory failure** requiring unplanned pediatric intensive care unit (PICU) admission or naloxone
- Secondary outcomes: **pain** scores, **opioid** and **antiemetic** use in the post-anesthesia care unit (**PACU**) and hospital **ward**
- Statistical analysis by appropriate simple T tests or chi squared tests

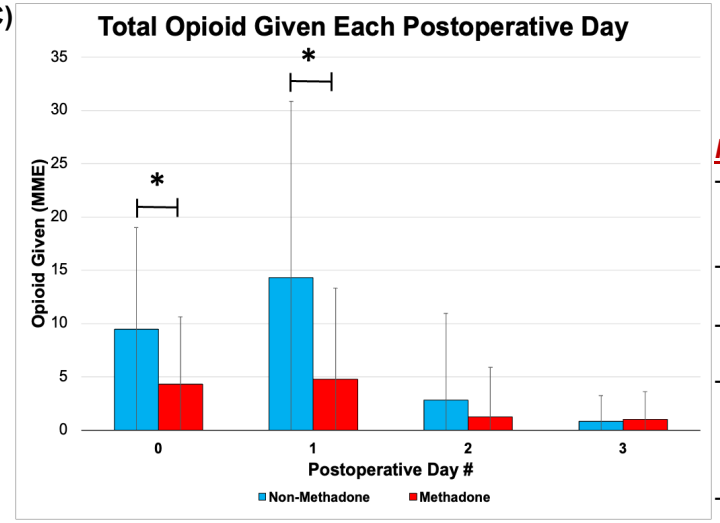
A)

	Total	Non-Methadone	Methadone	*P*	95% CI
# of Patients					
	76	35	41		
Sex					
M	31	14	17	0.9	
F	45	21	24		
Age					
		15.7 ± 2.2	15.6 ± 2.1	0.79	-0.9 to 1.1
Race					
Other	46	20	26		
White	16	8	8		
Black or African American	6	3	3		
Mexican	3	1	2		
American Indian or Alaska Native	1	1	0		
Native Hawaiian or Other Pacific Islander	1	1	0		
Declined to answer	3	1	2		
Ethnicity					
Hispanic/Latino	51	22	28		
Non-Hispanic/Non-Latino	15	10	5		
Mexican	4	1	3		
African American/Black	2	0	2		
American	2	0	2		
American Indian	1	1	0		
Declined to answer	1	0	1		
Primary Language					
English	56	24	32		
Spanish	20	11	9		
Measurements					
Height (cm)		167.0 ± 10.1	167.5 ± 9.8	0.82	-4.1 to 5.1
Bodyweight (kg)		147.7 ± 35.8	130.0 ± 27.8	< 0.05	-32.3 to -3.2
Body-Mass Index (kg/m^2)		52.5 ± 10.1	46.2 ± 9.2	< 0.05	-10.7 to -1.9
Ideal Body Weight (kg)		60.5 ± 10.8	61.07 ± 9.8	0.82	-4.2 to 5.2
Adjusted Body Weight (kg)		95.4 ± 19.1	88.6 ± 14.8	0.09	-14.6 to 1.0

B)

	Non-Methadone	Methadone	*P*	95% CI
Intraoperative Course				
Methadone Absolute Dose (mg)	0	14.17 ± 4.51		
Methadone Weight Based Dose (mg/kg)	0	0.16 ± 0.05		
Intraoperative Opioid Given (MME)	26.33 ± 25.41	44.34 ± 13.30	< 0.05	8.932 to 27.094
Adverse Events				
Unplanned PICU Admissions	0	0		
Naloxone Use	0	0		
PACU Course				
Opioid Given (MME)	18.42 ± 15.74	12.07 ± 14.42	0.07	-13.25 to 0.53
First Conscious Pain Score (#/10)	6.77 ± 2.84	4.80 ± 2.76	< 0.05	-3.25 to -0.68
Max Pain Score (#/10)	7.11 ± 2.7	5.65 ± 2.65	< 0.05	-2.68 to -0.23
Antiemetic Needed (#)	23	31	0.34	
Antiemetic Not Needed (#)	12	10		
Oxygen Needed At Time of Discharge (#)	18	19	0.66	
Floor Course				
Total Opioid Given (MME)	27.02 ± 27.86	10.78 ± 15.25	< 0.05	-26.31 to -6.17
Antiemetic Needed (#)	21	20	0.33	
Antiemetic Not Needed (#)	14	21		
Length of stay (# days)	2.63 ± 0.55	2.51 ± 0.64	0.40	-0.39 to 0.16

C)



Figures:

A) Demographics
B) Outcomes
C) Morphine Milligram Equivalent (MME) of Opioid Given Each Postoperative Day

Results:

- Demographics were similar between groups except bodyweight and BMI were higher in the non-methadone group
- **No unplanned PICU admissions or naloxone administration in either group**
- **Methadone** group **received 18 MME more opioid intraoperatively**
- **Methadone** group had **lower first conscious and max pain scores in the PACU** and received significantly **less opioid on post-op days 0 and 1 and in total** during their hospital stay
- Antiemetic administration frequency and length of stay did not differ

Discussion and Conclusions:

- **First report of methadone** use in **pediatric bariatric surgical** anesthetic care
- In our cohort, **risk of respiratory compromise was no higher** than non-methadone patients in the perioperative period and **intraoperative methadone's analgesic efficacy appears to be superior not only in the PACU but in the postoperative hospital recovery period**
- Limitations of this study include: 1) retrospective design, 2) while there is an anesthetic protocol for these cases, strict enforcement of the intraoperative anesthetic was lacking, 3) the methadone group weighed less/had lower BMIs which may have had an impact on these patients' outcomes
- A future prospective randomized control study with protocolized anesthetic plans could help address some of these limitations
- **Methadone may be safe** for pediatric patients with severe obesity, while also **improving patient experience by decreasing pain and overall opioid requirements**

References:

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