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Rates of Ondansetron Administration Prior to Spinal Anesthesia: Evaluating the Practice of Prophylactic Attenuation of Spinal-Induced Hypotension and Bradycardia

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Background

Hypotension and bradycardia are common complications of spinal anesthesia. Intraoperative hypotension and bradycardia may lead to complications that require additional treatment and increase cost. The literature identifies intervention strategies to attenuate spinal-induced hypotension (SIH) and bradycardia.¹ Prophylactic administration of ondansetron, a serotonin 5-hydroxytryptamine receptor antagonist, prior to spinal anesthesia is associated with reduced SIH and bradycardia.^{1,2,3,4,6}

The objective of this scholarly project was to report the practice of ondansetron prophylaxis for SIH and bradycardia and the rate of rescue interventions in patients who received ondansetron prior to spinal anesthesia.

Methods

- Retrospective, multi-center observational evidence-based practice project conducted at Providence Sacred Heart Medical Center (PSHMC) and Providence Holy Family Hospital (PHFH)
- Approved by the PSHMC Clinical Innovation and Research Council, and deemed exempt by Providence Health Care Institutional Review Board
- Data was retrospectively extracted, de-identified, encrypted, and stored in a HIPAA-compliant REDCap database
- Eligibility inclusion criteria: obstetric and orthopedic surgery undergoing spinal anesthesia from January 2018 to December 2019, age 18-90 years old, ondansetron administered prior to spinal anesthesia, spinal anesthesia with bupivacaine 0.5% and bupivacaine 0.75%
- Exclusion criteria: general anesthesia with ETT/LMA, spinal anesthesia medications other than bupivacaine, other surgical services
- Univariate and bivariate analyses to report baseline group comparability and prophylactic ondansetron relationships
- Multivariable analysis to report independent risk factors
- Multivariate analysis to report descriptive time series

Findings

Table 1. Comparison of Baseline Demographics and Characteristics (N=3153)

Variable	Providence Sacred Heart Medical Center				Providence Holy Family Hospital				
	Obstetrics (n=1245)		Orthopedics (n=1169)		Obstetrics (n=200)		Orthopedics (n=578)		
Male	0	0	533	46	0	0	259	48	
Female	1245	100	636	54	200	100	280	52	
ASA*	I	12	1	24	2	11	6	5	1
	II	863	69	686	59	137	69	247	46
	III	331	27	389	33	30	15	229	42
	IV	4	0	21	2	0	0	9	2
Variable	Mean	SD*	Mean	SD	Mean	SD	Mean	SD	
Age (years)	31	6	67	11	31	5	66	11	
BMI (kg/m ²)	34	8	29	5	35	7	31	6	
Case Duration (min)	Median	IQR*	Median	IQR	Median	IQR	Median	IQR	
	90	81-101	129	116-147	80	72-90	147	111-172	

*ASA=American Society of Anesthesiologist Physical Status Classification System; SD=standard deviation; IQR=interquartile range (25th-75th)

Figure 2. Descriptive Time Series of Ondansetron Administration for SIH and Bradycardia Prophylaxis

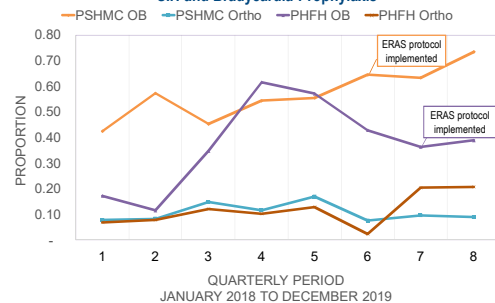


Figure 1. Flow Diagram of Patient Selection

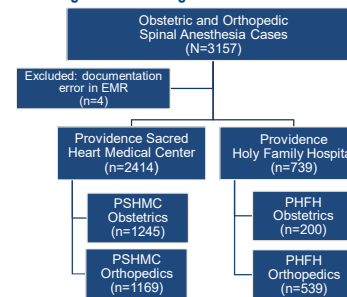


Table 2. Proportion of Patients Treated with Rescue Medications after Ondansetron Prophylaxis

Rescue Treatment	Ondansetron Prophylaxis	n	%	RR	95% CI	P-value	
Phenylephrine (100 mcg IVB)	Obstetric	Yes	337	48%	1.06	0.95-1.19	0.27
		No	229	35%	0.94	0.84-1.05	0.28
	Orthopedic	Yes	105	58%	1.10	0.96-1.25	0.20
		No	803	53%	0.91	0.80-1.04	0.18
Ephedrine (10 mg IVB)	Obstetric	Yes	109	14%	1.01	0.78-1.30	0.94
		No	91	14%	1.09	0.84-1.42	0.49
	Orthopedic	Yes	70	38%	1.13	0.82-1.12	0.25
		No	521	34%	0.89	0.73-1.08	0.23
Glycopyrrolate (0.1 mg IVB)	Obstetric	Yes	113	14%	0.92	0.72-1.18	0.53
		No	103	16%	1.08	0.85-1.38	0.53
	Orthopedic	Yes	14	8%	0.57	0.34-0.97	0.03
		No	156	13%	1.64	0.99-2.70	0.05

*IVB=Intravenous Bolus

Discussion

This retrospective EBP project demonstrated a gap in practice with the administration of prophylactic ondansetron to attenuate SIH and bradycardia across service lines and facilities.

Rates of prophylactic ondansetron administration prior to spinal anesthesia were 42-73% among obstetric surgery. Rates of prophylactic ondansetron were 2-12% among orthopedic surgery.

This project is retrospective and observational in nature, which cannot account for confounding factors that may affect the results. Limitations of this project include the inability to differentiate the use of ondansetron for prophylactic SIH or post-operative nausea and vomiting. Other SIH and bradycardia prevention strategies may have also been performed but not described in this project (such as fluid pre-loading or co-loading, prophylactic low dose phenylephrine infusion, or prophylactic vasopressor prior to spinal anesthesia). This project suggests EBP improvements for the utilization of ondansetron to attenuate SIH and bradycardia.

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