

Postoperative Nausea and Vomiting with Low-Dose Propofol Infusions in Patients Undergoing Gynecological Surgeries with Volatile Anesthetics at Providence Sacred Heart Medical Center and Providence Holy Family Hospital

Adrianna Silva, BSN, RN, CCRN; Braden Hemingway, DNAP, CRNA, ARNP; Kenn B. Daratha, PhD
Providence Sacred Heart Medical Center & Gonzaga University School of Anesthesia

Postoperative nausea and vomiting (PONV) is a common complication following surgery. It remains the most important determinant of length of stay and leading cause of dissatisfaction in anesthesia.⁴ Females undergoing gynecological laparoscopic surgery have the highest rates.⁸ Apfel's baseline risk factors for PONV include female gender, history of motion sickness and/or PONV, non-smoking status and administration of postoperative opioids.¹ Propofol has antiemetic properties and Gan's evidence supports the use of an intraoperative low-dose infusion to reduce baseline risk factors for PONV.⁶ This project aims to describe the proportion of intraoperative low-dose propofol infusions (LDPI) in patients undergoing gynecological surgery and baseline characteristics associated with its use.

Methods

- A retrospective, observational evidence-based practice project was conducted at Providence Sacred Heart Medical Center (PSHMC) and Providence Holy Family Hospital (PHFH) in Spokane, WA.
- CIRC approval was obtained by the facility and IRB exemption granted. All patient data was securely extracted by a Providence sponsor and stored in a HIPAA compliant REDCap database. Patient data was fully de-identified.
- Inclusion criteria consisted of adult patients ≥ 18 to 90 years of age undergoing general anesthesia with volatile anesthetics in gynecological surgeries that were hospitalized for at least 24 hours and no more than 14 days at PSHMC and PHFH from January 2014 to December 2019. Patients receiving intraoperative LDPI of ≤ 25 mcg/kg/min were identified.
- Exclusion criteria consisted of patients < 18 and > 90 years of age, infusions > 25 mcg/kg/min, and any patient hospitalized for < 24 hours and > 14 days.
- 24-hour PONV outcome was determined by PACU nurse assessment of PONV in EPIC or administration of antiemetic medication in the EMR.
- Statistical data analysis was conducted and stratified by the number of Apfel risk factors.
- Univariate and bivariate analysis were conducted on categorical and continuous data.
- Multivariable analysis was conducted through binary logistic regression controlling for variables that contributed to the use of a propofol infusion.

Findings

Table 1. Patient Demographics & Clinical Characteristics (N=499)

Variable	Value	Mean	Stdev*
Age	Years	57	14
Body Mass Index	Kg/m2	36	11
Case Duration	Minutes	169	58
Sex	Female	499	100%
ASA*	1	28	6%
	2	242	48%
	3	187	37%
	4	14	3%
Smoking Status		76	15%
History of PONV		106	21%
Post-op Opioids		377	76%
Case Type	Elective	480	96%
	Urgent	16	3%
	Emergent	2	0.4%
Surgical Procedure			
	Robotic Assisted Hysterectomy	196	40%
	Hysterectomy Abdominal	68	14%
	Robotic Assisted Hysterectomy w/ Staging	41	8%
	Robotic Assisted Hysterectomy w/ BSO	19	4%
	Hysterectomy Vaginal	17	3%
	Robotic Assisted Sacrocolpexy	17	3%

Table 2. Variables Associated with Low-Dose Propofol Infusion Use

	No Infusion (n=454)		Infusion (n=45)		P-value
	Mean	Stdev	Mean	Stdev	
Age	56.95	13.82	55.93	13.87	0.64
Body Mass Index	35.62	11.37	35.55	12.53	0.97
Case Duration	168.66	57.34	170.38	60.9	0.85
	n	%	n	%	P-value
Smoking Status	69	15%	7	16%	0.95
History of PONV	91	20%	15	33%	0.04
Post-op Opioid	340	75%	37	82%	0.27
	(n=429)	%	(n=42)	%	P-value
ASA 3 & 4	187	44%	14	33%	0.20

Figure 1. Low-Dose Propofol Infusion Use (N=499)

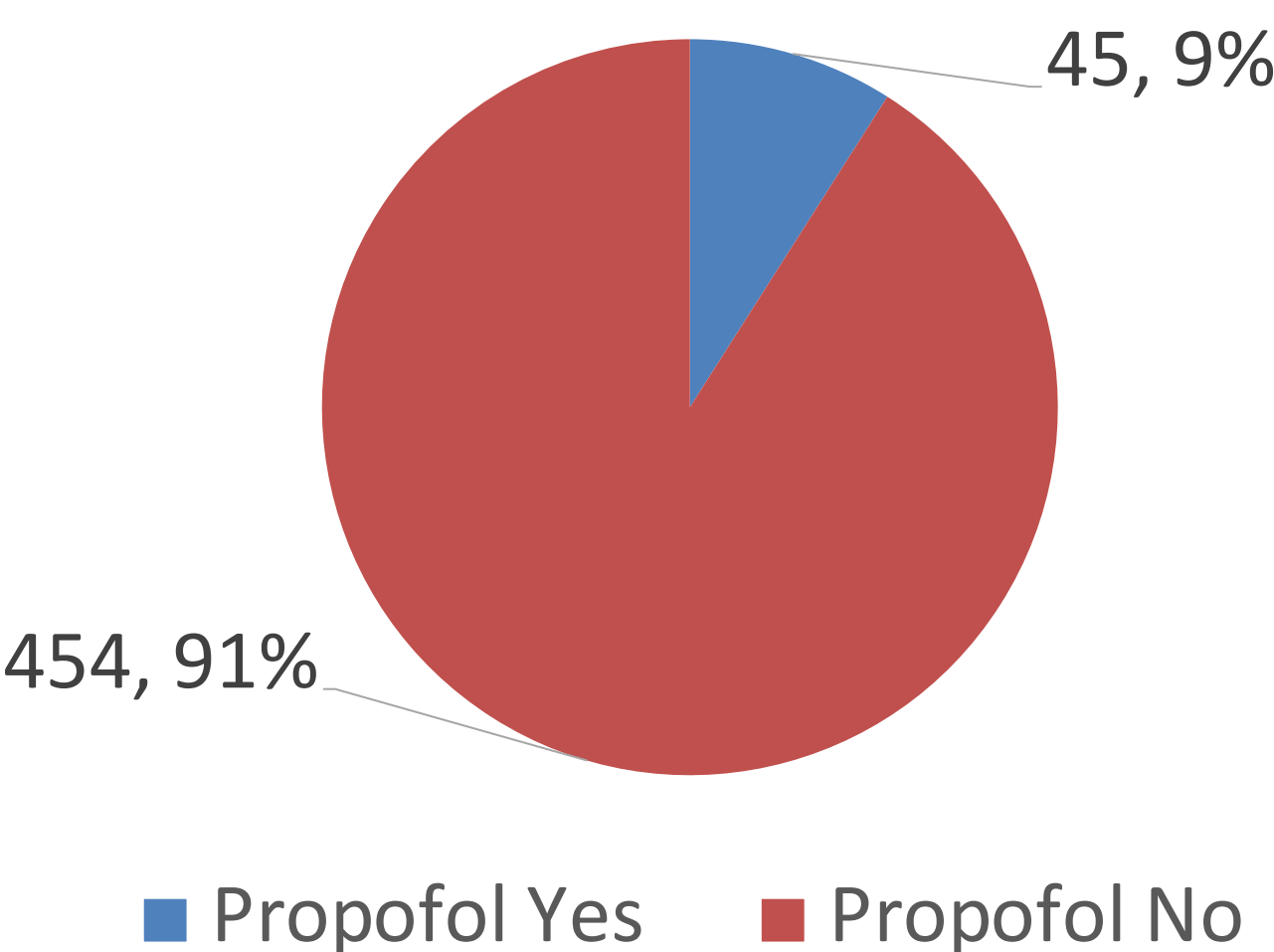


Figure 2. 24-Hour Proportion of PONV (N=499)

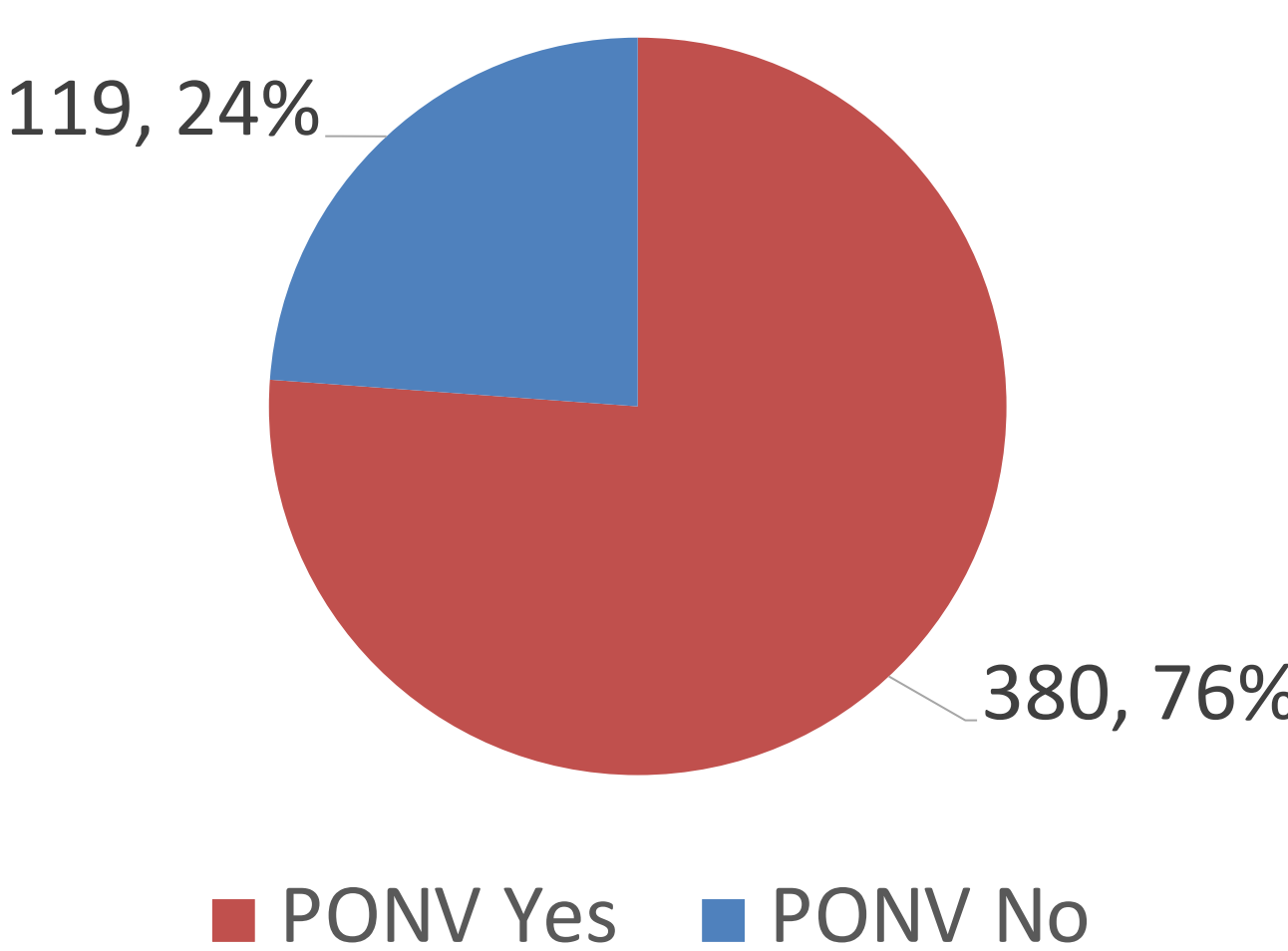


Table 3. Independent Risk Factors Associated with Low-Dose Propofol Infusion Use

Variable	Odds Ratio	95% CI*	P-value
Age	0.98	0.97-1.02	0.82
Smoking Status	1.06	0.45-2.48	0.90
History of PONV	1.94	1.00-3.77	0.05
Post-op Opioids	1.46	0.65-3.28	0.35

*ASA: American Society of Anesthesiologists Physical Status Classification; *Stdev: Standard Deviation; *CI: Confidence Interval

This multi-year, evidence-based practice project examined 499 cases and found that the proportion of intraoperative LDPI was 9% (45/499). Current research literature supports the utilization of LDPI for patients at high-risk of developing PONV.^{3,6,7}

Age, BMI, case duration, ASA Physical Classification, smoking status and post-op opioids did not influence whether a patient received an intraoperative LDPI. Bivariate analysis only showed a statistical significance with history of PONV (P=0.04). Similar findings were demonstrated in a multivariable model.

This project focused on a clinically vulnerable population with LDPI and PONV. Though research evidence would predict the proportion of PONV to be significantly less in the patients that received a LDPI, this project did not yield this expected finding.^{3,7} Of the patients receiving a LDPI, 84% (38/45) had PONV. Of the patients that did not receive a LDPI, 75% (342/454) had PONV. Treatment by indication bias is a common finding to note in observational studies.

Overall, results from this project identify areas for care improvement and CRNA education.

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