

IS PREGNANCY A RISK FACTOR TO DEVELOPING POSTOPERATIVE NAUSEA AND VOMITING?



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INTRODUCTION

- Postoperative nausea and vomiting (PONV) is a common and unpleasant complication of general anesthesia.
- Incidences in the general and high-risk populations have been documented to range from 30 to 80%, respectively and create a negative impact on patient satisfaction, prolongs hospital stays and increases healthcare costs.¹⁻⁵
- Current guidelines identify numerous risk factors that can increase a patient's likelihood of developing PONV.^{5, 6}
- Nausea and vomiting during pregnancy (NVP) are also common with prevalences ranging from 50 to 80%.⁷
- However, following the discovery of the teratogenic effects of thalidomide, physicians have become more cautious in prescribing antiemetics for pregnant women.⁷
- Safety concerns for maternal and fetal wellbeing may prevent postoperative utilization of effective antiemetic medications in pregnant women.
- While studies exist that explore the incidence of PONV in gravid and non-gravid patients separately, limited studies exist to compare the two cohorts to identify (1) if pregnancy can be an individual risk factor in PONV development and (2) if gravid status alters utilization of perioperative antiemetics.

METHODS

Design and Setting: This is a retrospective case-control cohort study with 1:2 matching conducted at an academic medical center with a high-volume surgical practice.

Patient Selection: Electronic search from 2010 to 2020 to identify adult patients who were pregnant at the time of non-obstetric, non-cardiac procedures requiring general anesthesia. Each gravid patient was matched with two non-gravid controls based on age, year of surgery, and exact surgical procedure.

Data Abstraction: The electronic medical and perioperative records of subjects were abstracted for demographic information and characteristics which could predispose towards PONV. The PACU records were reviewed for any documentation indicating PONV or the use of rescue antiemetics. The duration of PACU stay and length of hospitalization was determined. The obstetric course of gravid patients were reviewed for the incidence of maternal and fetal complications.

Statistical Methods: In all cases, two-sided tests were performed with p-values <0.05 considered statistically significant.

RESULTS

- 237 gravid women underwent non-obstetric procedures under general anesthesia and were compared with 474 matched, non-gravid women
- Gravid patients (**Table 1**):
 - Shorter procedural course
 - More intraoperative fluids
 - More postoperative opioids
 - Less intraoperative propofol infusion
 - Less nitrous oxide
- Less prophylactic antiemetics administered to gravid (2 [1, 2]) vs non-gravid (3 [2, 3]), P<0.001 (**Table 1, 2, Figure 1**)
- Gravid status was not associated with increased PONV risk (adjusted odds ratio 1.35), P=0.222 (**Table 3**)
- Gravid women had longer hospital stays, P<0.001 (**Table 3**)

Table 1. Baseline patient and procedural characteristics

Variable	Non-gravid (N=474)	Gravid (N=237)	p-value
Patient Characteristics			
Age, years	30 (26, 33)	29 (25, 33)	0.15
Body mass index, kg/m ²	27.9 (22.8, 33.5)	28.4 (24.3, 33.8)	0.10
History of anxiety, n (%)	213 (45%)	114 (48%)	0.42
History of migraine, n (%)	146 (31%)	73 (31%)	1.00
History of PONV, n (%)	161 (34%)	89 (38%)	0.35
Smoking, n (%)	57 (12%)	36 (15%)	0.24
Procedural Characteristics			
Surgery type, n (%)			1.00
<i>General</i>	284 (60%)	142 (60%)	
<i>Gynecologic/urologic</i>	86 (18%)	43 (18%)	
<i>Otolaryngological</i>	26 (5%)	13 (5%)	
<i>Neurosurgical</i>	32 (7%)	16 (7%)	
<i>Orthopedics/plastics</i>	46 (10%)	23 (10%)	
<i>Emergent operation, n (%)</i>	75 (16%)	48 (20%)	0.14
Anesthetic characteristics			
<i>Propofol infusion, n (%)</i>	192 (41%)	75 (32%)	0.021
<i>Anesthetic gas, n (%)</i>	448 (95%)	224 (95%)	1.00
<i>Nitrous oxide, n (%)</i>	138 (29%)	52 (22%)	0.040
<i>Number of antiemetics, count</i>	3 (2, 3)	2 (1, 2)	<.001
<i>Anesthesia duration, min</i>	74 (50, 112)	67 (46, 95)	0.015
<i>Perioperative opioids, IVME mg</i>	28 (20, 38)	31 (21, 43)	0.002
<i>Crystalloids, mL</i>	900 (650, 1302)	1001 (800, 1500)	<.001

Figure 1. Prophylactic antiemetics administered

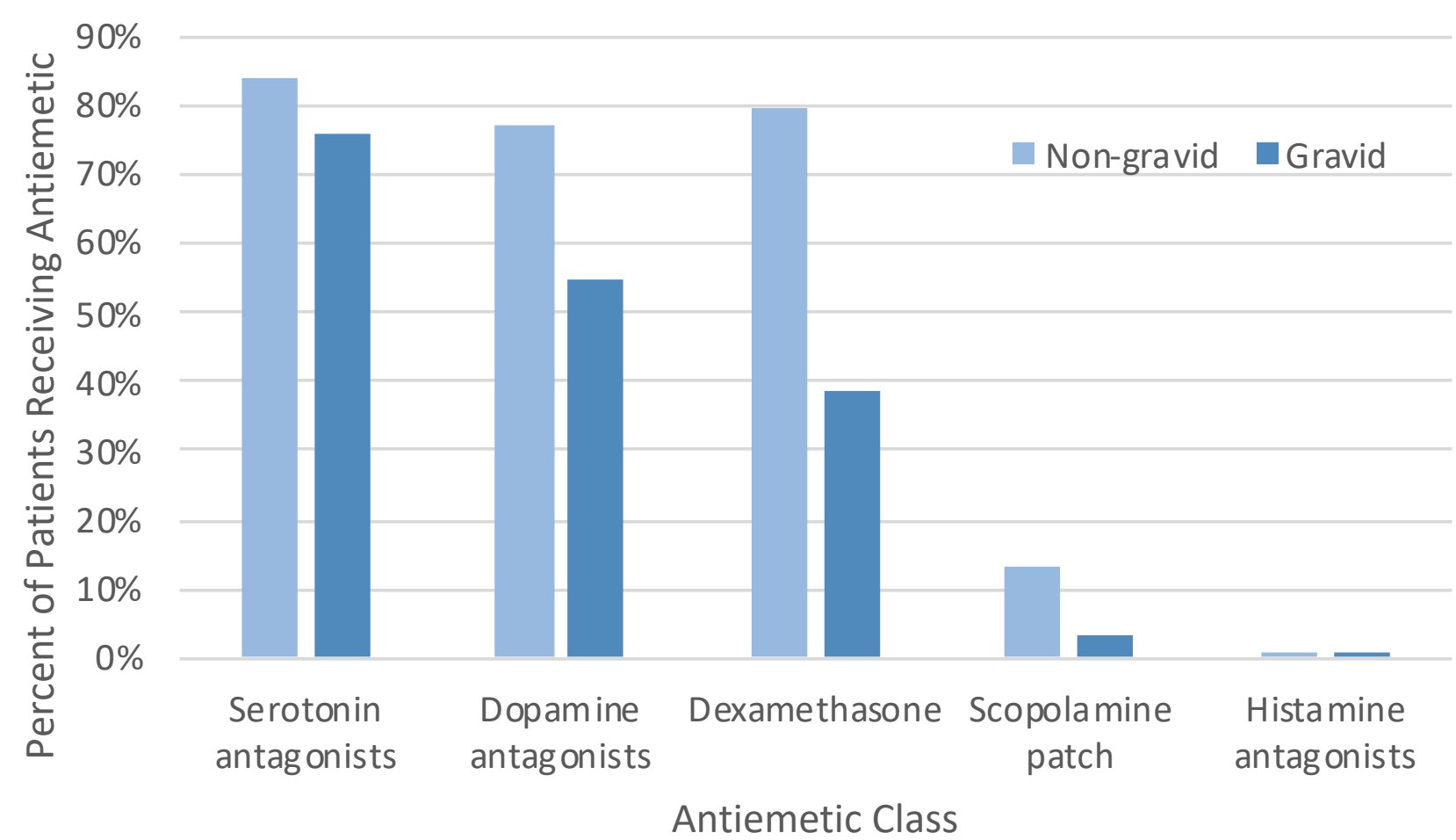


Table 2. Prophylactic antiemetics administered

Variable	Non-gravid (N=474)	Gravid (N=237)	Chi-square p-value
Serotonin (5HT3) antagonists, n (%)	399 (84%)	183 (76%)	0.015
Dopamine antagonists, n (%)	364 (77%)	131 (55%)	<0.001
Histamine antagonists, n (%)	5 (1%)	2 (1%)	1.00 ^a
Dexamethasone, n (%)	378 (80%)	93 (39%)	<0.001
Scopolamine patch, n (%)	60 (13%)	6 (3%)	<0.001

- With the exception of histamine antagonists, significantly less prophylactic antiemetics within each antiemetic class were administered to gravid patients (**Figure 1, Table 2**)

Table 3. Perioperative outcomes

Outcome	Non-gravid (N=474)	Gravid (N=237)	Adjusted odds ratio	
			Est. (95% CI)	p
PONV, n (%)	72 (15%)	51 (22%)	1.35 (0.84, 2.17)	0.222
PACU length of stay, minutes	65.4±39.1	68.9±44.0	2.4 (-4.9, 9.7)	0.522
Hospital length of stay, n (%)				<.001
0 days	248 (52%)	66 (28%)	reference	
1 days	127 (27%)	95 (40%)	2.55 (1.68, 3.87)	
2 days	38 (8%)	39 (16%)	1.41 (0.90, 2.21)	
3 or more days	61 (13%)	37 (16%)	1.15 (0.67, 2.00)	

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DISCUSSION

- Gravid patients have a similar risk for PONV compared to their matched counterparts undergoing the same surgery.**
- Unexpected finding given physiologic predisposition to nausea during pregnancy such as influence of reproductive hormones and changes in gastrointestinal motility
- Anesthesiologists administer fewer prophylactic antiemetics to gravid patients during surgery.**
- Potentially due to provider hesitancy and changes in FDA pregnancy category classifications as listed on antiemetic prescriptions
 - Gravid patients may have declined medications due to fear of potential effects on fetus or dismissal of PONV as NVP
 - Antiemetic administration may be reflexive or practice pattern for an individual nurse, regardless of patient's PONV status

- Limitations of this study are as follows:
 - Retrospective design at an academic medical center
 - Variation in PONV documentation and changes in electronic medical records
 - Rescue antiemetics in PACU may not quantify PONV severity or record declined medications
 - Did not account for post-discharge nausea and vomiting

CONCLUSIONS

- Guidance for PONV prophylaxis among gravid patients is lacking and may contribute to the lower rates of prophylactic antiemetic use
- Rates of PONV are similar in the gravid patients when compared to non-gravid patients, even when adjusted for the more conservative number of antiemetics administered