Postoperative Nausea and Vomiting Prophylaxis in Women Undergoing Laparoscopic Surgery: A Retrospective Study Comparing the Efficacy of Droperidol and Haloperidol

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BACKGROUND

Postoperative nausea and vomiting (PONV) is a common adverse event following general anesthesia.

Many drugs are available to prevent PONV, including the anti-dopaminergic drug droperidol.

Due to rising costs and drug shortages, many facilities and individual anesthesia professionals have elected to replace droperidol with haloperidol to prevent and treat PONV.

OBJECTIVES

- This project aims to compare the efficacy of haloperidol as a replacement for droperidol in preventing and treating PONV throughout the immediate postoperative period.

METHODS

Setting

- Retrospective study from 1/1/2019 and 7/1/2022 at a large, academic tertiary care institution
- IRB-exempt by the Mayo Clinic, Rochester MN, Institutional Review Board

Inclusion Criteria

- Female patients that received haloperidol or droperidol
- 18 years of age or greater
- Undergoing laparoscopic procedures

Exclusion Criteria

- Total Intravenous Anesthesia (TIVA)
- Preoperative aprepitant
- Current pregnancy
- Regional blocks
- Age < 18
- Converted to open
- No Post Anesthesia Care Unit (PACU) admission

Study design

- Demographics and outcomes were compared between droperidol and haloperidol groups using Pearson's Chi-square test for categorical variables and Kruskal-Wallis rank sum test, or 2-sample t-test for continuous variables.
- PONV was analyzed using a Multivariable Logistic Regression model with antiemetic (droperidol vs haloperidol) as the explanatory variable of interest.
- Analysis of PONV was adjusted for age, BMI, ASA-PS, smoking, history of PONV, number of additional antiemetics, length of surgery, type of anesthetic, and total opioids.

Outcomes

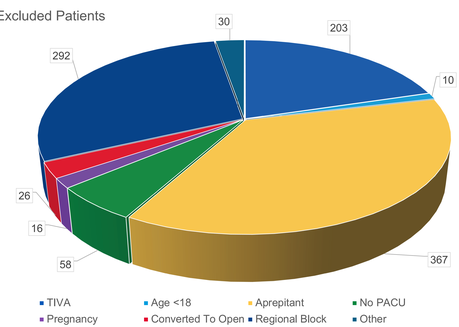
- PONV is defined as any patient receiving a rescue antiemetic in the PACU.
- Secondary outcomes included RASS, pain scores, total IV morphine milligram equivalents, and length of stay in the PACU.

PATIENT DEMOGRAPHICS

Variable	Droperidol (N=1140)	Haloperidol (N=539)	*P* value
Age (years)			
Mean (SD)	49.38 (15.41)	46.54 (15.11)	< 0.001
BMI (kg/m^2)			
Mean (SD)	30.23 (7.82)	30.47 (8.35)	0.808
ASA Physical Status			0.829
I	128 (11.3%)	62 (11.5%)	
II	643 (56.8%)	306 (57.0%)	
III	353 (31.2%)	167 (31.1%)	
IV	9 (0.8%)	2 (0.4%)	
Current Smoker	58 (5.1%)	44 (8.2%)	0.012
History of PONV	194 (17.0%)	103 (19.1%)	0.309
Additional Antiemetics			0.008
0	9 (0.8%)	1 (0.2%)	
1	131 (11.5%)	53 (9.8%)	
2	782 (68.6%)	347 (64.4%)	
3	218 (19.1%)	138 (25.6%)	
Length of Surgery (minutes)			
Mean (SD)	134.69 (101.76)	144.48 (97.15)	0.001
Anesthetic			0.907
N2O + Propofol	51 (4.5%)	23 (4.3%)	
Iso, Sevo, Des	1089 (95.5%)	516 (95.7%)	
Total Opioids (IV MME)			
Mean (SD)	22.92 (10.19)	22.86 (9.21)	0.835

Missing data were BMI (n = 4), ASA-PS (n = 9)
Abbreviations: BMI, Body Mass Index; ASA, American Society of Anesthesiologists; PONV, Postoperative Nausea and Vomiting; N20, Nitrous Oxide; Iso, Isoflurane; Sevo, Sevoflurane; Des, Desflurane; IV MME, Intravenous Milligram Morphine Equivalents; SD (standard deviation)
Additional Antiemetics: Number of preoperative or intraoperative antiemetic medications administered in addition to droperidol or haloperidol

Excluded Patients



RESULTS

Primary Outcomes

- Of the 1,679 patients included in this sample, 1140 (68.0%) patients received droperidol, and 539 (32.0%) received haloperidol.
- Rates of PONV were higher in the haloperidol group compared to the droperidol group (11.5% to 7.4% p=.008).
- From Multivariable Logistic Regression analysis, the administration of haloperidol compared to droperidol increased the odds of experiencing PONV by 61% (Odds Ratio 1.61, 95% CI 1.13 to 2.28 p=.008).

Secondary Outcomes:

- Mean PACU RASS scores were lower in the droperidol group compared to the haloperidol group (-1.55 vs -1.35 p=<.001).
- Average PACU pain scores were lower in the droperidol group compared to the haloperidol group (4.6 vs 5 p=0.034).
- Incidence of PACU severe pain did not differ significantly between droperidol and haloperidol groups (30.5% to 32.8% p=.359).
- Mean total opioids administered in PACU were lower in the droperidol group compared to the haloperidol group (7.66 vs 9.07 IV MME, p=0.012).
- Mean length of stay in the PACU was lower in the droperidol group compared to the haloperidol group (95.5 vs 109.8 minutes, p=<0.001).

PACU OUTCOMES

	Droperidol (N=1140)	Haloperidol (N=539)	*P* value
PONV	84 (7.4%)	62 (11.5%)	0.003
RASS			
Mean (SD)	-1.55 (1.04)	-1.35 (0.91)	< 0.001
Pain Score (0-10)			
Mean (SD)	4.60 (3.05)	5.00 (2.92)	0.034
≥ 7	347 (30.5%)	176 (32.8%)	0.359
Total Opioids (IV MME)			
Mean (SD)	7.66 (9.65)	9.07 (10.4)	0.012
Length of stay (minutes)			
Mean (SD)	95.54(71.8)	109.8 (79.5)	< 0.001

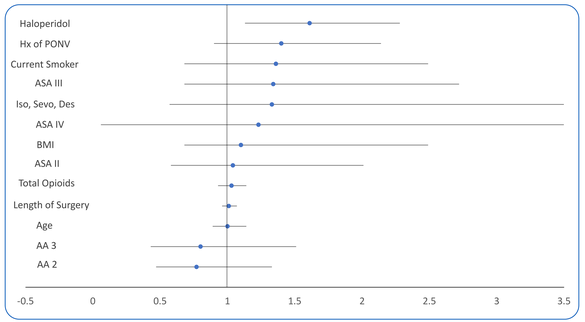
Missing data were RASS (n=31), Pain Score (n=3)
Abbreviations: PONV, Postoperative Nausea and Vomiting; RASS, Richmond Agitation Sedation Scale; PACU, Postanesthesia Care Unit; IV MME, Intravenous Milligram Morphine Equivalents; SD, standard deviation.
Pain Score (0-10): Maximum pain score in PACU

ADJUSTED MULTIVARIABLE LOGISTIC REGRESSIONAL ANALYSIS

Variable	Odds ratio (95% CI)	*P* value
Haloperidol	1.61 (1.13, 2.28)	0.008
Age (per 10-year increase)	1.00 (0.89, 1.14)	0.941
BMI (kg/m^2)	1.10 (0.98, 1.02)	0.924
ASA Physical Status		0.569
I	ref	
II	1.04 (0.58, 2.01)	0.891
III	1.34 (0.68, 2.72)	0.416
IV	1.23 (0.06, 7.44)	0.852
Current Smoker	1.36 (0.68, 2.49)	0.344
History of PONV	1.40 (0.90, 2.14)	0.120
Additional Antiemetics		0.650
0 and 1	ref	
2	0.77 (0.47, 1.33)	0.334
3	0.80 (0.43, 1.51)	0.485
Length of Surgery (per 30-minute increase)	1.01 (0.96, 1.07)	0.663
Anesthetic		
N2O + Propofol	ref	
Iso, Sevo, Des	1.33 (0.57, 3.87)	0.552
Total Opioids (per 5 IV MME increase)	1.03 (0.93, 1.14)	0.490

Missing data were BMI (n = 4), ASA (n = 9)
Abbreviations: BMI, Body Mass Index; ASA, American Society of Anesthesiologists; PONV, Postoperative Nausea and Vomiting; N20, Nitrous Oxide; Iso, Isoflurane; Sevo, Sevoflurane; Des, Desflurane; IV MME, Intravenous Milligram Morphine Equivalents; SD (standard deviation) Additional Antiemetics: Number of preoperative or intraoperative antiemetic medications administered in addition to droperidol or haloperidol. The referent group combines administration of the zero and one additional antiemetics as there were an insufficient number of subjects receiving zero additional antiemetics to allow for meaningful analysis of this variable.

ODDS RATIOS



DISCUSSION

Retrospective multivariable analysis of 1,679 female patients undergoing laparoscopic surgery indicated a statistically significant increase in the incidence of PONV with the prophylactic administration of haloperidol compared to droperidol.

Higher rates of coadministration of two or three antiemetics in the haloperidol group (90.3% vs 83.4%) did not reduce rates of PONV between groups (11.5% vs 7.4%).

In addition to the increased PONV rates, haloperidol patients also experienced more pain and were, subsequently, administered more opioids in the PACU. Haloperidol patients also had a longer PACU stay.

Limitations of our study include the retrospective nature, disproportional sample sizes, and the potential of unmeasured confounders.

CONCLUSIONS

- Our retrospective study was designed to identify differences in PONV outcomes between patients who received prophylactic droperidol and haloperidol.
- This is one of the largest studies performed to date comparing the two drugs.
- This is a step towards better understanding the efficacy of different anti-dopaminergic drugs for PONV prevention and treatment.
- Inherent limitations associated with retrospective studies warrant future research in the form of prospective randomized clinical trials that would be beneficial in confirming the findings of this study.

ABSTRACT & REFERENCES