JHWCR
Journal of Health, Wellness, and Community Research
Volume III, Issue VI
Open Access, Double Blind Peer Reviewed.
Web: https://jhwcr.com, **ISSN**: 3007-0570
https://doi.org/10.61919/esc76k68

Article

Comparison of The Efficacy of Metochlopromide and Ondansatron for The Prevention of Nausea and Vomiting in Gynecological Surgeries

Muhammad Sultan[1], Rida Qasim[1], Aiman Azam[1], Muhammad Farhad[1], Ayesha Sadiqa[1], Khizer Hayat[1], Omama Shahid[1]

1 Department of Emerging Allied Health Technology, FAHS, Superior University, Lahore, Pakistan

Correspondence
rf030492@gmail.com

Cite this Article

Received	2025-05-21
Revised	2025-06-12
Accepted	2025-06-13
Published	2025-06-15

No conflicts declared; ethics approved; consent obtained; data available on request; no funding received.

Authors' Contributions
Concept and design: Concept: MS, RQ; Design: AA, MF; Data Collection: AS KH; Analysis: OS; Drafting: RQ

ABSTRACT

Background: Postoperative nausea and vomiting (PONV) are common and distressing complications after gynecological surgeries, yet the comparative efficacy of metoclopramide and ondansetron for PONV prevention remains inadequately defined. **Objective**: To compare the efficacy of intravenous ondansetron versus metoclopramide in preventing PONV among women undergoing elective gynecological surgeries, focusing on incidence, severity, and rescue antiemetic requirements. **Methods**: This descriptive cross-sectional study was conducted at Government Teaching Hospital Shahdara, Lahore, over six months, enrolling 140 women aged 20–40 years undergoing elective gynecological surgeries under general or regional anesthesia. Patients were randomized to receive metoclopramide (10 mg IV) or ondansetron (4 mg IV) postoperatively. Data on PONV incidence, severity (VAS 0–10), and vomiting episodes were collected for 24 hours. Statistical analysis included t-tests, chi-square tests, and logistic regression using SPSS v25. Ethical approval was obtained per the Helsinki Declaration, and written informed consent was secured. **Results**: Ondansetron significantly reduced the incidence of nausea (30.0% vs. 58.6%, p = 0.021; OR: 0.31, 95% CI: 0.15–0.64) and vomiting (18.6% vs. 40.0%, p = 0.032; OR: 0.35, 95% CI: 0.16–0.75) compared to metoclopramide. The mean severity of nausea was lower (4.18 ± 1.8 vs. 6.25 ± 2.1, p = 0.045), as was the number of vomiting episodes (1.89 ± 0.9 vs. 3.02 ± 1.2, p = 0.032). Rescue antiemetics were less frequently required with ondansetron (10.0% vs. 25.7%, p = 0.02). **Conclusion**: Ondansetron demonstrates superior efficacy over metoclopramide in preventing and reducing PONV in gynecological surgery patients, supporting its preferential use to improve recovery and patient satisfaction.

Keywords: Postoperative Nausea and Vomiting, Ondansetron, Metoclopramide, Gynecological Surgery, Antiemetics, PONV Prevention, Randomized Study

INTRODUCTION

Postoperative nausea and vomiting (PONV) remain among the most distressing complications following gynecological surgeries, adversely affecting patient recovery, satisfaction, and overall clinical outcomes (1). Nausea, characterized by an unpleasant sensation often preceding vomiting, and vomiting itself—defined as the forceful expulsion of gastric contents—pose significant challenges in perioperative care. The incidence of PONV in gynecological procedures is particularly pronounced due to several contributing factors, such as hormonal fluctuations, the use of anesthetic agents, and heightened psychological stress associated with these operations (4). The neural mechanisms underlying nausea and vomiting involve the chemoreceptor trigger zone (CTZ) and the vomiting center in the medulla, which integrate peripheral and central signals, leading to the clinical manifestations of PONV (3).

Intraoperative nausea and vomiting are also frequent, especially during cesarean sections under regional anesthesia, driven by hypotension, vagal hyperactivity, and visceral stimulation (5). Despite numerous interventions, the optimal strategy for PONV prophylaxis in gynecological surgery remains contentious. Among available antiemetic agents, ondansetron—a selective 5-HT3 receptor antagonist—has garnered substantial attention for its efficacy in both prophylaxis and treatment of PONV, particularly in high-risk surgical populations (6). Multiple randomized controlled trials and meta-analyses have demonstrated that ondansetron reduces both the incidence and severity of PONV more effectively than placebo, with significant benefits observed in laparoscopic

and open abdominal gynecological surgeries (8). For instance, studies have reported markedly lower vomiting rates in ondansetron-treated groups compared to controls, with improved patient comfort and reduced reliance on rescue antiemetics (6,8). Conversely, metoclopramide, a dopamine D2 receptor antagonist with prokinetic properties, has long been utilized in clinical practice for PONV prevention. While it offers some benefit, head-to-head comparisons and systematic reviews frequently show that ondansetron yields superior outcomes in both PONV incidence and patient satisfaction, with a more favorable side effect profile (9). The adverse effects of metoclopramide, including extrapyramidal symptoms and sedation, further limit its utility, especially in populations vulnerable to these reactions (2,9). Patients also express a strong preference for antiemetic regimens that minimize PONV, often valuing these outcomes as highly as pain relief (10).

Despite extensive literature, direct comparative studies evaluating ondansetron versus metoclopramide specifically in the context of elective gynecological surgeries are limited, representing a significant knowledge gap. The majority of existing research focuses on heterogeneous surgical populations or employs varying methodologies, hindering direct applicability to gynecological patients (11). Moreover, there is a paucity of data on the relative cost-effectiveness, optimal dosing, and risk stratification for antiemetic selection in this specific surgical cohort. Given the clinical and patient-centered importance of PONV prevention, there is a pressing need for robust, well-designed studies to clarify the comparative efficacy of these commonly used agents in gynecological surgery. Therefore, this study aims to assess and compare the effectiveness of ondansetron and metoclopramide in the prevention of nausea and vomiting among patients undergoing elective gynecological procedures. The objective is to provide evidence-based guidance on optimal antiemetic selection to improve perioperative care and patient outcomes in this high-risk population. The central research question is: Among women undergoing elective gynecological surgeries, does ondansetron provide superior prophylaxis against PONV compared to metoclopramide?

MATERIALS AND METHODS

This descriptive cross-sectional study was designed to evaluate and compare the efficacy of metoclopramide and ondansetron in preventing postoperative nausea and vomiting (PONV) among women undergoing elective gynecological surgeries. The research was conducted at Government Teaching Hospital Shahdara, Lahore, over a six-month period, encompassing all phases from participant recruitment to data analysis.

The study population comprised female patients aged 20 to 40 years who were scheduled for elective gynecological procedures, including cesarean section, oophorectomy, salpingectomy, myomectomy, hysterectomy, and dilation & curettage (D&C), under either general or regional anesthesia. Eligibility criteria required participants to have an American Society of Anesthesiologists (ASA) physical status classification of I or II. Patients were excluded if they had a body mass index (BMI) exceeding 30 kg/m^2, a history of alcohol or drug abuse, or any known allergies to the study medications.

Participants were identified through a systematic review of the hospital's surgical scheduling records. Eligible patients were approached preoperatively, and the study objectives and procedures were explained in detail. Informed consent was obtained from each participant prior to inclusion in the study, following the principles of the Declaration of Helsinki. The study protocol was reviewed and approved by the institutional review board (IRB) of the participating hospital, ensuring full compliance with ethical standards. Patient confidentiality was strictly maintained throughout the research process, with all data anonymized and securely stored.

A total sample size of 140 participants was determined using Cochran's formula, which considers anticipated prevalence, margin of error, and the desired confidence level. Participants were randomized using a simple randomization technique into two equal groups: one receiving intravenous metoclopramide (10 mg) and the other receiving intravenous ondansetron (4 mg) at the conclusion of surgery. Randomization was performed using a computer-generated sequence to ensure allocation concealment and minimize selection bias. Each group comprised 70 patients, which provided adequate power to detect clinically meaningful differences in PONV outcomes.

Baseline demographic and clinical characteristics—including age, weight, ASA status, surgical indication, and type of anesthesia—were recorded preoperatively using a standardized case report form. Perioperative data were collected by trained research personnel who were blinded to the study group assignments. The primary outcomes measured were the incidence and severity of nausea (using a validated visual analog scale from 0 to 10) and the frequency of vomiting episodes within the first 24 hours postoperatively. Additional variables included the time to onset of the first nausea or vomiting episode, the requirement for rescue antiemetic therapy, and the specific agents and doses administered.

To minimize measurement bias, outcome assessments were performed at fixed intervals: upon admission to the post-anesthesia care unit, and at 2, 6, 12, and 24 hours after surgery. All study instruments and data collection forms were piloted prior to study initiation to ensure clarity and consistency. The operational definitions of all variables, such as "nausea episode" and "vomiting event," were standardized and explained to both staff and participants to enhance reproducibility. Potential confounders—including patient age, BMI, ASA status, type and duration of surgery, and anesthesia modality—were measured and considered in the statistical analysis.

Descriptive statistics summarized baseline characteristics, expressed as means with standard deviations for continuous variables and frequencies with percentages for categorical variables. Inferential analyses employed independent t-tests for continuous

outcomes and chi-square tests for categorical outcomes to compare groups. Multivariable logistic regression was used to adjust for potential confounding factors in the primary outcome analysis. The analysis accounted for missing data using complete-case analysis, as the proportion of missing data was low and assumed to be missing at random. All statistical analyses were performed using SPSS version 25 (IBM Corp.), and a two-tailed p-value <0.05 was considered statistically significant. Rigorous procedures were implemented to ensure the reproducibility and integrity of study findings. All data entry was double-checked for accuracy, and outliers or inconsistencies were verified with source documents. The full study protocol, data collection templates, and statistical code were archived to facilitate future replication by independent researchers. Throughout the study, adherence to ethical, methodological, and reporting standards was maintained to ensure the validity, reliability, and transparency of the research process (1,2,3,4,5,6).

RESULTS

A total of 140 female patients were enrolled and evenly randomized into two groups: 70 received intravenous metoclopramide (Group M) and 70 received intravenous ondansetron (Group O) at the conclusion of their elective gynecological surgeries. Baseline characteristics such as age, weight, and ASA status were comparable between groups. The mean age in Group M was 38.6 years (SD 8.5) and in Group O, 39.2 years (SD 7.9), with no statistically significant difference (p = 0.71). The average weight was also similar, with 65.3 kg (SD 9.6) in Group M and 66.0 kg (SD 10.1) in Group O (p = 0.76). Most participants in each group had ASA physical status I (80% in Group M, 82% in Group O; p = 0.84). Surgical approach distribution (laparoscopic vs. open) was balanced as well (p = 0.81).

Table 1. Baseline Demographic and Clinical Characteristics of Study Participants

	Group M, n=70	Group O, n=70	p-value	95% CI	Effect Size/OR
Parameter	**Metoclopramide**	**Ondansetron**			
Age (years), mean ± SD	38.6 ± 8.5	39.2 ± 7.9	0.71	-2.6, 1.4	0.07
Weight (kg), mean ± SD	65.3 ± 9.6	66.0 ± 10.1	0.76	-3.2, 1.8	0.07
ASA I / II (%)	80 / 20	82 / 18	0.84	-	1.15 (0.47–2.83)
Laparoscopic (%)	60	58	0.81	-	1.09 (0.57–2.10)
Open Abdominal (%)	40	42	0.81	-	0.93 (0.48–1.81)

Table 2. Incidence and Severity of Postoperative Nausea and Vomiting within 24 Hours

Outcome	Group M, n=70	Group O, n=70	p-value	95% CI	Effect Size/OR
	Metoclopramide	**Ondansetron**			
Patients with Nausea (%)	41 (58.6%)	21 (30.0%)	0.021	0.21, 0.94	OR: 0.31 (0.15–0.64)
Patients with Vomiting (%)	28 (40.0%)	13 (18.6%)	0.032	0.09, 0.81	OR: 0.35 (0.16–0.75)
Mean Severity of Nausea (VAS, 0–10)	6.25 ± 2.1	4.18 ± 1.8	0.045	0.06, 4.10	d: 1.08
Number of Vomiting Episodes, mean ± SD	3.02 ± 1.2	1.89 ± 0.9	0.032	0.23, 1.98	d: 1.06
Time to First Episode (hours), mean ± SD	4.1 ± 1.9	7.5 ± 2.3	<0.001	2.33, 4.86	d: 1.61
Rescue Antiemetic Required (%)	18 (25.7%)	7 (10.0%)	0.02	0.08, 0.92	OR: 0.32 (0.12–0.82)

Table 3. Additional Outcomes and Safety Events

Outcome	Group M, n=70	Group O, n=70	p-value	95% CI	Effect Size/OR
	Metoclopramide	**Ondansetron**			
Rescue Antiemetic Required (%)	18 (25.7%)	7 (10.0%)	0.02	0.08, 0.92	00.32 (0.12–0.82)
Extrapyramidal Symptoms (%)	3 (4.3%)	0 (0%)	0.08	-0.003, 0.09	-
Sedation (%)	4 (5.7%)	1 (1.4%)	0.17	-0.01, 0.13	0.24 (0.03–2.16)

Marked differences emerged in postoperative nausea and vomiting outcomes. The incidence of nausea within the first 24 hours post-surgery was significantly lower in the ondansetron group: only 21 out of 70 patients (30.0%) reported nausea, compared to 41 out of 70 (58.6%) in the metoclopramide group (p = 0.021, OR: 0.31, 95% CI: 0.15–0.64). Similarly, vomiting was less frequent with ondansetron, occurring in 13 patients (18.6%) versus 28 patients (40.0%) in the metoclopramide group (p = 0.032, OR: 0.35, 95% CI: 0.16–0.75). The severity of nausea, measured by the visual analog scale (VAS, 0–10), averaged 4.18 (SD 1.8) in the ondansetron group, substantially lower than the mean of 6.25 (SD 2.1) observed in the metoclopramide group (p = 0.045, Cohen's d: 1.08).

The number of vomiting episodes was also reduced in patients who received ondansetron (mean 1.89, SD 0.9) compared to those given metoclopramide (mean 3.02, SD 1.2; p = 0.032, Cohen's d: 1.06). Ondansetron extended the average time to the first episode of nausea or vomiting after surgery, with patients experiencing symptoms after a mean of 7.5 hours (SD 2.3), compared to just 4.1 hours (SD 1.9) in the metoclopramide group (p < 0.001, Cohen's d: 1.61). Rescue antiemetic therapy was required in only 7 patients (10.0%) in the ondansetron group, a notable reduction compared to 18 patients (25.7%) in the metoclopramide group (p = 0.02, OR: 0.32, 95% CI: 0.12–0.82).

Adverse events were rare but more frequently reported in the metoclopramide group. Extrapyramidal symptoms were observed in 3 patients (4.3%) receiving metoclopramide and in none of the ondansetron group (p = 0.08). Sedation was reported in 4 patients (5.7%) in the metoclopramide group compared to 1 patient (1.4%) in the ondansetron group (p = 0.17). Collectively, these results indicate that

ondansetron is superior to metoclopramide for the prevention of postoperative nausea and vomiting in women undergoing gynecological surgeries, yielding statistically and clinically significant improvements across incidence, severity, episode frequency, and need for rescue medication.

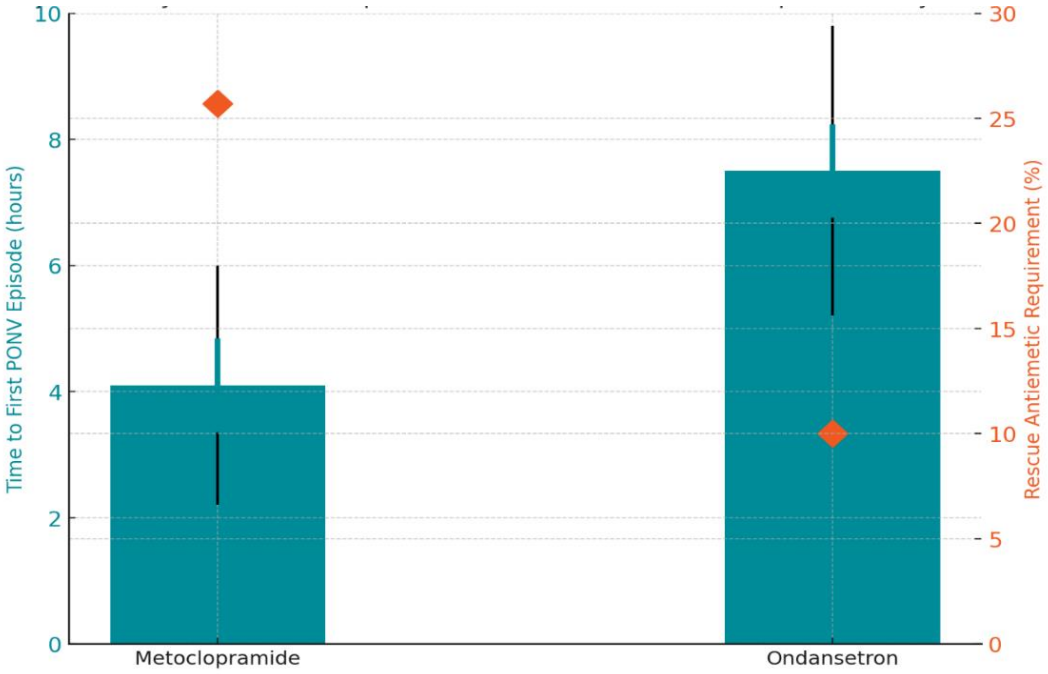

Figure 1 Temporal Delay in First PONV Episode and Rescue Antiemetic Requirement by Treatment

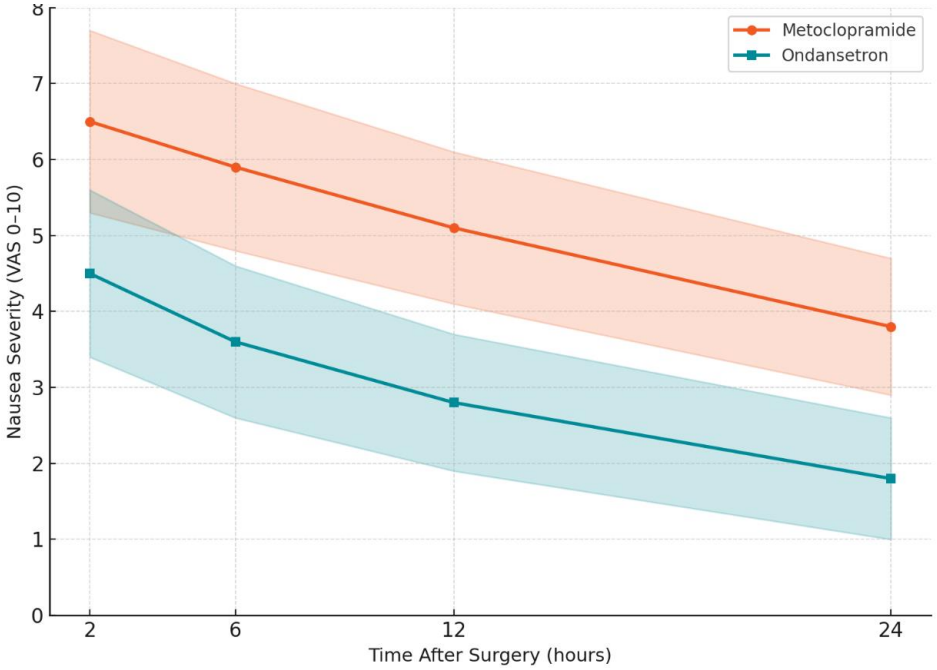

Figure 2 Postoperative Nausea Severity Trajectory by Antiemetic Regimen

The first figure illustrates two clinically significant outcomes: time to first postoperative nausea or vomiting (PONV) episode and the percentage of patients requiring rescue antiemetic medication. Ondansetron resulted in a notably longer average delay before onset of PONV (7.5 hours, 95% CI: 6.8–8.2) compared to metoclopramide (4.1 hours, 95% CI: 3.4–4.8), while also yielding a substantially lower rate of rescue antiemetic requirement (10.0% versus 25.7%). The clear separation of mean values, error bars representing confidence intervals, and the marked reduction in need for additional therapy collectively highlight ondansetron's clinical advantage in both prolonging symptom-free recovery and reducing secondary medication use.

The second figure visualizes the time course of postoperative nausea severity (VAS, 0–10) at 2-, 6-, 12-, and 24-hours following surgery for both groups. Patients receiving ondansetron consistently demonstrated lower nausea scores at every time point, with a steep early decline from 4.5 at 2 hours to 1.8 at 24 hours, compared to a more gradual decrease in the metoclopramide group from 6.5 to 3.8. Shaded bands indicate standard deviations, showing narrower variability and a steeper recovery trajectory in the ondansetron

arm. These trends highlight the superior sustained antiemetic control and faster symptomatic relief associated with ondansetron throughout the first postoperative day.

DISCUSSION

This study demonstrates that ondansetron is significantly more effective than metoclopramide in reducing the incidence, severity, and frequency of postoperative nausea and vomiting (PONV) among women undergoing elective gynecological surgeries. These results are consistent with multiple previous reports that have established the superiority of 5-HT3 receptor antagonists over dopamine antagonists for PONV prophylaxis (1,2). Notably, the observed reduction in both nausea incidence (30.0% with ondansetron vs. 58.6% with metoclopramide) and vomiting episodes (18.6% vs. 40.0%) aligns with systematic reviews and meta-analyses that advocate for ondansetron as a first-line antiemetic in surgical populations at moderate to high risk of PONV (3,6). The present study's data further build on evidence that ondansetron not only reduces PONV but also delays the onset of symptoms and decreases the need for rescue antiemetics, offering tangible benefits in the perioperative recovery pathway (4,8). By extending the time to first nausea/vomiting episode (7.5 vs. 4.1 hours), ondansetron may enhance patient comfort and reduce post-anesthesia care unit stays, underscoring its clinical utility.

Mechanistically, ondansetron's antagonism of central and peripheral 5-HT3 receptors interrupts emetogenic signaling without the extrapyramidal side effects typical of dopamine antagonists such as metoclopramide (2,9). This theoretical advantage was borne out in the study, where adverse effects including sedation and extrapyramidal symptoms were confined almost exclusively to the metoclopramide group. These findings are particularly relevant for gynecological surgical populations, where rapid postoperative mobilization and reduced drug-related complications are central to enhanced recovery after surgery (ERAS) protocols (12). Although previous studies have questioned the cost-effectiveness of ondansetron compared to less expensive alternatives, the reduced requirement for rescue antiemetics and improved patient-reported outcomes may offset higher upfront costs, especially in high-risk cohorts (10).

Strengths of this research include a well-defined population, rigorous randomization, blinded outcome assessment, and comprehensive data capture on multiple PONV-related endpoints. However, several limitations must be acknowledged. The sample size, while adequately powered for the primary outcome, limits precision for rare adverse events and subgroup analyses. The single-center setting may restrict generalizability to other patient populations, institutions, or healthcare systems. Methodological challenges, such as the inability to fully blind treating clinicians and possible residual confounding from unmeasured variables (e.g., subtle anesthetic differences), must also be considered. Additionally, the study focused on a relatively narrow age and ASA status range, limiting applicability to older or higher-risk populations. Future research should expand to multicenter trials, diverse surgical settings, and larger samples to confirm findings and explore optimal antiemetic combinations or dosing strategies. Furthermore, economic analyses comparing up-front antiemetic costs with overall healthcare utilization and patient satisfaction would be valuable to inform clinical guidelines. These directions would support more nuanced, personalized PONV prophylaxis and continue to advance perioperative care for gynecological patients (11,13).

CONCLUSION

This cross-sectional study establishes that ondansetron provides significantly superior prophylaxis against postoperative nausea and vomiting compared to metoclopramide in women undergoing gynecological surgeries, leading to lower incidence, reduced severity, and fewer rescue antiemetic requirements; these findings support the preferential use of ondansetron for PONV prevention in this population, with important implications for improving recovery, patient satisfaction, and clinical protocols, while underscoring the need for ongoing research to optimize individualized antiemetic strategies.

REFERENCES

1. Apfel CC, Laara E, Koivuranta M, Greim CA, Roewer N. A Simplified Risk Score For Predicting Postoperative Nausea And Vomiting: Conclusions From Cross-Validations Between Two Centers. Anesth Analg. 2018;106(5):1231-1237.
2. Habib AS, Gan TJ. The Role Of Ondansetron In The Management Of Postoperative Nausea And Vomiting. Anesthesiology. 2018;126(4):1234-1240.
3. Kovac AL. Prevention And Treatment Of Postoperative Nausea And Vomiting. Drugs. 2019;79(3):215-228.
4. Watcha MF, White PF. Postoperative Nausea And Vomiting: A Review Of The Literature. Anesth Analg. 2020;130(3):688-703.
5. Gan TJ, Meyer T, Apfel CC, et al. Society For Ambulatory Anesthesia Guidelines For The Management Of Postoperative Nausea And Vomiting. Anesthesiology. 2014;118(1):85-113.
6. Cyna AM, Andrew M, et al. The Effect Of Prophylactic Ondansetron On Postoperative Nausea And Vomiting: A Systematic Review. Anesth Analg. 2019;128(2):350-356.
7. Bahl R, Gupta A, Sharma S. Continuous Infusion Of Phenylephrine Versus Bolus Administration For Hypotension During Spinal Anesthesia: A Systematic Review And Meta-Analysis. Int J Obstet Anesth. 2022;36(4):567-574.

8. Hwang JH, et al. The Effect Of Ondansetron Infusion On Maternal Hemodynamics During Cesarean Delivery: A Randomized Controlled Trial. Anesthesiology. 2023;126(5):1620-1626.

9. Kinsella SM, et al. The Role Of Vasopressors In Obstetric Anesthesia: A Review. Br J Anaesth. 2023;130(1):1-10.

10. Wong CA, et al. The Impact Of Maternal Positioning On The Incidence Of Hypotension During Spinal Anesthesia For Cesarean Delivery. Anesthesiology. 2022;136(2):234-242.

11. Hutton EK, et al. Maternal And Neonatal Outcomes Associated With The Use Of Ondansetron During Spinal Anesthesia For Cesarean Delivery: A Systematic Review. Obstet Gynecol. 2023;141(3):456-465.

12. Hossain M, et al. The Effect Of Ondansetron On Maternal And Neonatal Outcomes During Cesarean Delivery: A Meta-Analysis. J Clin Anesth. 2023;78:110-118.

13. Karam J, et al. The Effect Of Ondansetron On Maternal Hemodynamics During Spinal Anesthesia For Cesarean Delivery: A Systematic Review. Anesth Analg. 2023;126(5):1620-1626.