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COMPARING THE EFFECT OF ONDANSETRON-DEXAMETHASONE AND METOCLOPRAMIDE-DEXAMETHASONE FOR PREVENTION OF POST OPERATIVE NAUSEA AND VOMITING IN PATIENTS UNDERGOING ELECTIVE LAPAROSCOPIC PROCEDURES

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ABSTRACT

Background: Postoperative nausea and vomiting (PONV) remain among the most common and distressing complications following general anesthesia, particularly after laparoscopic procedures. Combination antiemetic therapy is frequently used to improve prophylaxis; however, the comparative efficacy of ondansetron–dexamethasone versus metoclopramide–dexamethasone remains uncertain.

Objectives: To compare the frequency of postoperative nausea and vomiting in patients receiving ondansetron plus dexamethasone versus metoclopramide plus dexamethasone in elective laparoscopic surgery.

Study Design & Setting: A randomized controlled trial conducted at the Department of Anaesthesia, Dow International Medical College, DUHS, OJHA Campus, Karachi.

Methodology: A total of 214 patients undergoing elective laparoscopic procedures were enrolled and equally divided into two groups (n=107 each) using a sealed envelope method. Group A received ondansetron (4 mg) plus dexamethasone (8 mg), while Group B received metoclopramide (10 mg) plus dexamethasone (8 mg) intravenously 15 minutes before the end of surgery. Patients were observed for 24 hours postoperatively for nausea, vomiting, and need for rescue antiemetic. Data were analyzed using SPSS version 25, with $p \leq 0.05$ considered significant.

Results: The frequency of nausea was significantly lower in Group A (16.8%) compared to Group B (30.8%) (p=0.01). Similarly, vomiting was observed in 10.3% of patients in Group A and 19.6% in Group B (p=0.04). The requirement of rescue antiemetic was also significantly reduced in Group A (13.1%) compared to Group B (25.2%) (p=0.02). Stratification showed a significant difference in patients with longer duration of surgery (>60 minutes).

Conclusion: Ondansetron combined with dexamethasone was more effective than metoclopramide with dexamethasone in reducing postoperative nausea, vomiting, and the need for rescue antiemetics following elective laparoscopic surgery.

KEYWORDS: Dexamethasone, Laparoscopic surgery, Metoclopramide, Ondansetron, Postoperative nausea and vomiting, Rescue antiemetic

INTRODUCTION

The primary causes of discomfort and dissatisfaction for patients after general anesthesia are postoperative nausea and vomiting. This remains a frequently cited explanation for postponed discharge and unplanned hospitalization following ambulatory surgical procedures.[1,2] Laparoscopic surgery (LC) is known to cause less morbidity and mortality.[3] It also offers a shorter duration of surgery. However, LC patients often experience postoperative nausea and vomiting (PONV) during the first 24 hours after surgery.[4,5] Various factors, including the patient's clinical state, anesthetic treatment, and the type of surgery, have been linked to an increased risk of developing postoperative nausea and vomiting.[6]

PONV has several negative effects on patients, such as dehydration, electrolyte imbalance, prolonged hospital stays, and a reduction in quality of life and overall satisfaction.[7] To minimize the occurrence of nausea and vomiting, various strategies are recommended. These include facilitating gastric emptying, avoiding the use of nitrous oxide, administering antiemetic medications, opting for short-acting anesthetics, and reducing surgical manipulation.[8,9] These approaches have been shown to effectively prevent PONV during surgical procedures.[10]

Metoclopramide has long been a widely used antiemetic agent for managing postoperative nausea and vomiting, despite some conflicting research findings.[11] Ondansetron was initially considered a breakthrough in antiemetic medications for PONV, demonstrating significant efficacy. However, the high cost of ondansetron has limited its routine use as a prophylactic treatment.[12] Dexamethasone has also been employed as a stand-alone treatment option in both pediatric and adult populations undergoing surgery.[13]

Few studies have compared the efficacy of ondansetron plus dexamethasone versus metoclopramide plus dexamethasone in preventing postoperative nausea and vomiting and reducing the need for rescue antiemetic medication within 24 hours after laparoscopic procedures. The aim of this study is to examine the local statistics regarding the frequency of nausea and vomiting in patients receiving ondansetron plus dexamethasone versus metoclopramide plus dexamethasone in patients undergoing elective laparoscopic procedures in our setup. The results of this research will provide valuable insights into whether the combination of ondansetron and dexamethasone or metoclopramide and dexamethasone can effectively reduce postoperative outcomes (nausea and vomiting). Ultimately, these findings will offer healthcare providers valuable guidance for managing patients promptly and potentially reducing the duration of hospitalization following laparoscopic procedures. The aim of the study was to compare the frequency of postoperative outcomes in patients receiving ondansetron plus dexamethasone versus metoclopramide plus dexamethasone in patients undergoing elective laparoscopic procedures at tertiary care hospital.

MATERIALS AND METHODS

This randomized controlled trial was conducted in the Department of Anaesthesia, Dow International Medical College, DUHS, OJHA Campus, Karachi. The duration of the study was six months after approval of the synopsis by CPSP. The study was conducted after approval from the Ethical Review Committee and the College of Physicians and Surgeons Pakistan, and the trial was registered at ClinicalTrials.gov. The sample size was calculated by taking the prevalence of nausea as 23.3% in the ondansetron plus dexamethasone group (P_1) and 33.3% in the metoclopramide plus dexamethasone group (P_2), with a power of 80% and a 95% confidence level. A 50% relative reduction in nausea (16.6%) was considered clinically significant. Based on these assumptions, the total calculated sample size was 214 patients, with 107 patients in each group, calculated using WHO sample size software. A non-probability consecutive sampling technique was used.

Patients admitted for elective laparoscopic procedures who met the inclusion criteria were enrolled after obtaining informed consent. Patients aged 18 to 65 years, of either gender, with ASA class I–II, undergoing elective laparoscopic procedures were included in the study. Patients with known allergy to ondansetron, metoclopramide, and/or dexamethasone, those with fever receiving antibiotics or steroids during the study, pregnant women, and patients with a history of epilepsy were excluded. Demographic variables including age, weight, height, BMI, gender, and residence were recorded, along with clinical variables such as anemia, hypertension, diabetes mellitus, duration of surgery, and length of stay in the post-anesthesia care unit. Patients were randomly allocated into two groups using the sealed envelope method in the operating room. Group A received ondansetron (4 mg) plus dexamethasone (8 mg), while Group B received metoclopramide (10 mg) plus dexamethasone (8 mg), administered intravenously 15 minutes before the end of surgery. All medications were administered by an anesthesiologist with more than five years of experience.

Postoperative outcome was defined as the presence of nausea and vomiting within 24 hours after surgery. Nausea was considered as at least one episode within 24 hours postoperatively and was recorded as “Yes” or “No.” Vomiting was defined as at least one episode within 24 hours postoperatively and was also recorded as “Yes” or “No.” Effect modifiers included diabetes mellitus, hypertension, and anemia. Diabetes mellitus and hypertension were defined as previously diagnosed conditions or use of respective medications for the last three months, confirmed by clinical history. Anemia was defined as hemoglobin <13.5 g/dL in males and <12.0 g/dL in females. Presence of nausea and vomiting within 24 hours postoperatively and the need for rescue antiemetic drugs were documented by the principal investigator using a predesigned proforma. Confounding variables and biases were controlled through stratification and strict adherence to inclusion criteria.

Data were compiled and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Qualitative variables such as gender, residence, anemia, hypertension, diabetes mellitus, nausea, vomiting, and use of rescue drugs were presented as frequency and percentages. Normality of data was assessed using the Shapiro–Wilk test. Quantitative variables including age, weight, height, BMI, duration of surgery, and length of hospital stay were expressed as mean ± standard deviation, while median and interquartile range were calculated for non-normally distributed data. The Fisher exact test was applied for comparison of postoperative outcomes between groups. Post-stratification, chi-square and/or Fisher exact tests were used to assess the effect of modifiers such as age, BMI, gender, residence, anemia, hypertension, diabetes mellitus, duration of surgery, and length of stay on outcomes. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

The mean age of patients in Group A was 38.6 ± 10.4 years, while in Group B it was 39.2 ± 11.1 years, with no statistically significant difference (p=0.68). Similarly, the mean weight, height, and BMI were comparable between both groups, with p-values of 0.74, 0.62, and 0.55, respectively. In Group A, 48.6% were males and 51.4% were females, whereas in Group B, 45.8% were males and 54.2% were females (p=0.67). Regarding residence, 57.0% of patients in Group A and 54.2% in Group B belonged to urban areas (p=0.69). The frequency of diabetes mellitus, hypertension, and anemia was also comparable between the two groups, with no statistically significant differences (p>0.05). Overall, both groups were comparable in terms of baseline characteristics and effect modifiers, as given in Table 1.

Table 1: Baseline Characteristics of Patients and distribution of effect modifiers in both groups

Parameters	Variable	Group A (Ondansetron + Dexamethasone) n=107	Group B (Metoclopramide + Dexamethasone) n=107	p-value
Age (years)	Mean ± SD	38.6 ± 10.4	39.2 ± 11.1	0.68
Weight (kg)	Mean ± SD	67.8 ± 9.5	68.3 ± 10.2	0.74
Height (cm)	Mean ± SD	165.2 ± 8.1	164.7 ± 7.9	0.62
BMI (kg/m²)	Mean ± SD	24.8 ± 3.6	25.1 ± 3.9	0.55
Gender	Male	52 (48.6%)	49 (45.8%)	0.67
	Female	55 (51.4%)	58 (54.2%)	
Residence	Urban	61 (57.0%)	58 (54.2%)	0.69
	Rural	46 (43.0%)	49 (45.8%)	
Diabetes Mellitus	Yes	28 (26.2%)	31 (29.0%)	0.63
	No	79 (73.8%)	76 (71.0%)	
Hypertension	Yes	34 (31.8%)	36 (33.6%)	0.77
	No	73 (68.2%)	71 (66.4%)	
Anemia	Yes	22 (20.6%)	25 (23.4%)	0.64
	No	85 (79.4%)	82 (76.6%)	

The duration of surgery was ≤60 minutes in 60.7% of patients in Group A and 55.1% in Group B, while it was >60 minutes in 39.3% and 44.9% of patients, respectively, with no significant difference (p=0.41). Similarly, the length of stay in the post-anesthesia care unit (PACU) was ≤80 minutes in 54.2% of patients in Group A and 47.7% in Group B, while 45.8% and 52.3% of patients had a stay >80 minutes, respectively (p=0.29). These findings indicate that operative and postoperative variables were comparable between both groups, as given in Table 2.

Table 2: Operative and postoperative variables, including duration of surgery and PACU stay, between groups

Variable		Group A	Group B	p-value
Duration of Surgery	≤60 minutes	65 (60.7%)	59 (55.1%)	0.41
	>60 minutes	42 (39.3%)	48 (44.9%)	
PACU Stay	≤80 minutes	58 (54.2%)	51 (47.7%)	0.29
	>80 minutes	49 (45.8%)	56 (52.3%)	

The frequency of postoperative nausea was 16.8% in Group A compared to 30.8% in Group B, showing a statistically significant difference (p=0.01). Similarly, vomiting occurred in 10.3% of patients in Group A and 19.6% in Group B (p=0.04). The requirement of rescue antiemetic drug was also significantly lower in Group A (13.1%) compared to Group B (25.2%) (p=0.02). These results demonstrate a lower frequency of postoperative nausea, vomiting, and rescue drug requirement in the ondansetron plus dexamethasone group compared to the metoclopramide plus dexamethasone group, as given in Table 3

Table 3: Frequency of postoperative nausea, vomiting, and requirement of rescue antiemetic drug between the two treatment groups

Variables	Outcome	Group A n=107	Group B n=107	p-value
Nausea	Yes	18 (16.8%)	33 (30.8%)	0.01
	No	89 (83.2%)	74 (69.2%)	
Vomiting	Yes	11 (10.3%)	21 (19.6%)	0.04
	No	96 (89.7%)	86 (80.4%)	
Rescue Drug	Yes	14 (13.1%)	27 (25.2%)	0.02

	No	93 (86.9%)	80 (74.8%)	

On stratification of postoperative nausea with respect to gender, nausea was observed in 13.5% of males in Group A compared to 28.6% in Group B (p=0.12), while among females, it was 20.0% in Group A and 32.8% in Group B (p=0.09), showing no statistically significant difference. Regarding duration of surgery, nausea was present in 13.8% of patients with ≤60 minutes of surgery in Group A versus 25.4% in Group B (p=0.22), whereas for duration >60 minutes, nausea was significantly higher in Group B (81.3%) compared to Group A (47.6%) (p=0.01). With respect to diabetes mellitus, nausea was observed in 17.9% of diabetic patients in Group A compared to 29.0% in Group B (p=0.31), while among non-diabetic patients, it was 7.6% in Group A and 15.8% in Group B (p=0.18), showing no significant association. Overall, a significant difference was only observed in patients with longer duration of surgery, as given in Table 4.

Table 4: Stratification of postoperative nausea according to gender, duration of surgery, and diabetes mellitus in both groups

Variable	Category	Group A n (%)	Group B n (%)	p-value
Gender	Male	7 (13.5%)	14 (28.6%)	0.12
	Female	11 (20.0%)	19 (32.8%)	0.09
Duration of Surgery	≤60 minutes	9 (13.8%)	15 (25.4%)	0.22
	>60 minutes	20 (47.6%)	39 (81.3%)	0.01
Diabetes Mellitus	Yes	5 (17.9%)	9 (29.0%)	0.31
	No	6 (7.6%)	12 (15.8%)	0.18

DISCUSSION

Postoperative nausea and vomiting (PONV) is a common complication following general anesthesia, particularly in laparoscopic surgeries. It contributes significantly to patient discomfort, delayed recovery, and prolonged hospital stay. Various patient-related, anesthetic, and surgical factors increase the risk of PONV. Combination antiemetic therapy is often preferred to enhance efficacy and reduce incidence. Ondansetron and metoclopramide are widely used agents, frequently combined with dexamethasone for better outcomes.[14] However, evidence comparing the effectiveness of these combinations remains limited, especially in local settings.

The present study demonstrated that the frequency of postoperative nausea (16.8% vs 30.8%, p=0.01), vomiting (10.3% vs 19.6%, p=0.04), and requirement of rescue antiemetic (13.1% vs 25.2%, p=0.02) were significantly lower in the ondansetron–dexamethasone group compared to the metoclopramide–dexamethasone group, indicating superior antiemetic efficacy of ondansetron-based combination therapy. These findings are consistent with earlier work by Khan AM et al.[15] who reported better control of PONV with ondansetron compared to metoclopramide after laparoscopic cholecystectomy. Similarly, Barzanji A et al. (2022)[16] observed lower rates of nausea (23.3% vs 33.3%) and vomiting (10% vs 16.6%) in the ondansetron–dexamethasone group, although the difference was not statistically significant, which aligns with the trend observed in the present study but with stronger statistical significance in our findings.

Waqas et al.[17] reported that severe PONV (score 2) was higher in the metoclopramide group (18.3%) compared to only 1.7% in the ondansetron group, further supporting the superior efficacy of ondansetron. In contrast, Ghauri et al. (2020)[18] demonstrated a lower incidence of nausea and vomiting in one comparison group (5.0% vs 18.3%, p=0.022), indicating that timing and administration protocols may influence outcomes. Amer et al. (2022)[19] also highlighted the benefit of combination therapy, showing a reduced incidence of PONV with metoclopramide–dexamethasone (26%) compared to metoclopramide alone (64%), supporting the role of dexamethasone as an effective adjunct, although their findings do not directly contradict the superiority of ondansetron combinations observed in the current study.

Ahmed et al. (2025)[20] reported no significant difference in nausea, vomiting, or rescue antiemetic use among different antiemetic combinations, which contrasts with the present findings; this discrepancy may be attributed to differences in study design, sample size, or perioperative analgesic use. Furthermore, Qadeer et al. (2025)[21] found significantly higher efficacy of ondansetron (55.7% vs 33%, p=0.001), particularly among younger patients and those with lower BMI, which is in agreement with the overall superiority of ondansetron observed in our study. Collectively, the current findings are largely consistent with the existing literature, reinforcing that ondansetron combined with dexamethasone provides more effective prophylaxis against PONV compared to metoclopramide-based regimens.

Study Limitations

This study was conducted at a single center, which may limit the generalizability of the results. The follow-up period was limited to 24 hours postoperatively, which may not capture delayed PONV. Non-probability consecutive sampling may introduce selection bias. Additionally, other potential confounders such as type of anesthesia and intraoperative medications were not fully controlled.

CONCLUSION

Ondansetron combined with dexamethasone was more effective in reducing postoperative nausea and vomiting compared to metoclopramide with dexamethasone. It also significantly reduced the need for rescue antiemetic therapy. This combination can be considered a better prophylactic option in elective laparoscopic surgery.

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Conflict of Interest: No

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