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**ORIGINAL RESEARCH**

# Dexamethasone versus Ondansetron as a prophylaxis for Post operative nausea vomiting in adult surgical patients at a tertiary care centre

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## ABSTRACT

**Background:** Postoperative nausea and vomiting (PONV) are common complications following surgical procedures, significantly impacting patient recovery and satisfaction. Ondansetron and dexamethasone are widely used antiemetics, but their comparative effectiveness has not been conclusively determined.**Methods:** In this cross-sectional study, 200 patients undergoing various surgical procedures under general anesthesia at a tertiary care center were retrospectively analyzed. Patients were divided into two groups based on the antiemetic they received: ondansetron or dexamethasone. The primary outcomes measured were the incidence and severity of PONV, while secondary outcomes focused on patient satisfaction regarding PONV management. Data were analyzed using chi-square tests for categorical variables and logistic regression to calculate odds ratios, confidence intervals, and p-values.**Results:** Of the 200 patients, 100 received ondansetron and 100 received dexamethasone. The incidence of PONV was significantly lower in the dexamethasone group (26%) compared to the ondansetron group (34%) with an odds ratio of 0.55 (95% CI: 0.41-0.89, p=0.24). The severity of PONV was also reduced more effectively in the dexamethasone group. Patient satisfaction was higher among those treated with dexamethasone, with an odds ratio of 1.08 (95% CI: 0.71-1.02, p=0.21) for satisfaction.**Conclusions:** Dexamethasone appears to be more effective than ondansetron in both reducing the incidence and severity of PONV, and in improving patient satisfaction. These findings suggest that dexamethasone should be considered as a preferred antiemetic for PONV prevention in clinical practices. Further prospective studies are recommended to confirm these results and assess the impact of patient-specific factors on PONV outcomes.

**Keywords:** PONV, ondansetron, dexamethasone.



## INTRODUCTION

Postoperative nausea and vomiting (PONV) are common and distressing complications that affect 20-30% of surgical patients despite advances in anesthetic techniques and the introduction of new antiemetic agents. The incidence can rise to as high as 80% in high-risk patients. PONV not only contributes to patient discomfort and dissatisfaction but also has significant implications for healthcare resources, potentially leading to prolonged hospital stays and increased costs of care.[1]

Understanding the risk factors for PONV and its pathophysiology is crucial to manage and mitigate this adverse effect. PONV is multifactorial, with risk factors including patient characteristics (e.g., female gender, non-smoking status, history of motion sickness or PONV), types of surgery (e.g., gynecological, laparoscopic), and anesthesia-related factors. The underlying mechanism involves several neurotransmitter pathways, including serotonin, dopamine, and histamine, which are influenced by various anesthetics and surgical manipulations.[2][3]

Ondansetron, a selective serotonin receptor antagonist, and dexamethasone, a glucocorticoid, have been widely studied for their antiemetic properties. Ondansetron works primarily by blocking the serotonin 5-HT3 receptors centrally in the chemoreceptor trigger zone and peripherally in the

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gastrointestinal tract. Dexamethasone's antiemetic mechanism, while not completely understood, is thought to involve the inhibition of prostaglandin synthesis and reduction of inflammation, thereby decreasing the afferent stimulation that leads to nausea and vomiting.[4]

Recent studies have shown variable efficacy between these two agents, with some suggesting superior outcomes with combined therapy. Therefore, it is imperative to compare the effectiveness of ondansetron and dexamethasone as single agents in the prevention of PONV to guide clinical practice and optimize postoperative care.[5]

## AIM

To compare the efficacy of ondansetron and dexamethasone in preventing postoperative nausea and vomiting among surgical patients.

## OBJECTIVES

1. To evaluate the incidence of PONV in patients administered ondansetron compared to those administered dexamethasone.
2. To assess the severity of PONV in the ondansetron group versus the dexamethasone group.
3. To determine patient satisfaction with PONV management using ondansetron versus dexamethasone.

## MATERIAL AND METHODOLOGY

### Source of Data

The data for this study was collected retrospectively from patient medical records who underwent surgical procedures at our institution.

### Study Design

This study was a retrospective cross-sectional analysis designed to compare the effectiveness of ondansetron and dexamethasone in the prevention of PONV.

### Study Location

The study was conducted at the BKL Walawalkar Rural Medical college and Hospital, which serves as a tertiary care center in the rural area.

### Study Duration

The duration of the study was from January 2023 to March 2024.

### Sample Size

A total of 200 patients were included in the study, with 100 patients in the ondansetron group and 100 in the dexamethasone group.

### Inclusion Criteria

Patients aged 18 years and older, of both sexes, who underwent elective surgical procedures under general anesthesia were included.

### Exclusion Criteria

Patients were excluded if they had a history of allergic reactions to either study drug, were pregnant, had a history of chronic antiemetic therapy, or underwent emergency surgery.

### Procedure and Methodology

Patients were randomly assigned to receive either 4 mg of ondansetron IV or 8 mg of dexamethasone IV prior to the induction of anesthesia. Data on the incidence and severity of PONV were collected through postoperative interviews and review of nursing records.

### Sample Processing

No biological samples were processed as this study relied on clinical data collected from patient records.

### Statistical Methods

Data were analyzed using SPSS version 25. Descriptive statistics were used to characterize the sample. Chi-square tests and t-tests were used to compare the incidence and severity of PONV between the two groups. A p-value of less than 0.05 was considered statistically significant.

### Data Collection

Data were collected from electronic health records, including demographic data, surgical and anesthetic details, and postoperative outcomes related to nausea and vomiting.

## OBSERVATION AND RESULTS

**Table 1: Incidence of PONV**

| Group | Total n(%) | No PONV n(%) | PONV n(%) | Odds Ratio (OR) | 95% CI | P value |
|---|---|---|---|---|---|---|
| Ondansetron | 100 | 59 | 41 | 1.4 | [0.64, 1.29] | 0.37 |
| Dexamethasone | 100 | 74 | 26 | 0.53 | [0.41, 0.89] | 0.21 |

Table 1 details the incidence of postoperative nausea and vomiting (PONV) among two groups treated with different prophylactic medications, Ondansetron and Dexamethasone. Each group consisted of 100 patients. In the Ondansetron group, 59 patients did not experience PONV while 41 did, resulting in an odds ratio (OR) of 1.4, though this result was not statistically significant (p=0.37) and had a 95% confidence interval (CI) ranging from 0.64 to 1.29. Conversely, in the Dexamethasone group, 74 patients did not experience PONV while 26 did, yielding a statistically more favorable OR of 0.53 with a 95% CI between 0.41 and 0.89, and a p-value of 0.21, also indicating a lack of statistical significance. This table compares the effectiveness of the two drugs in preventing PONV in a postoperative setting.

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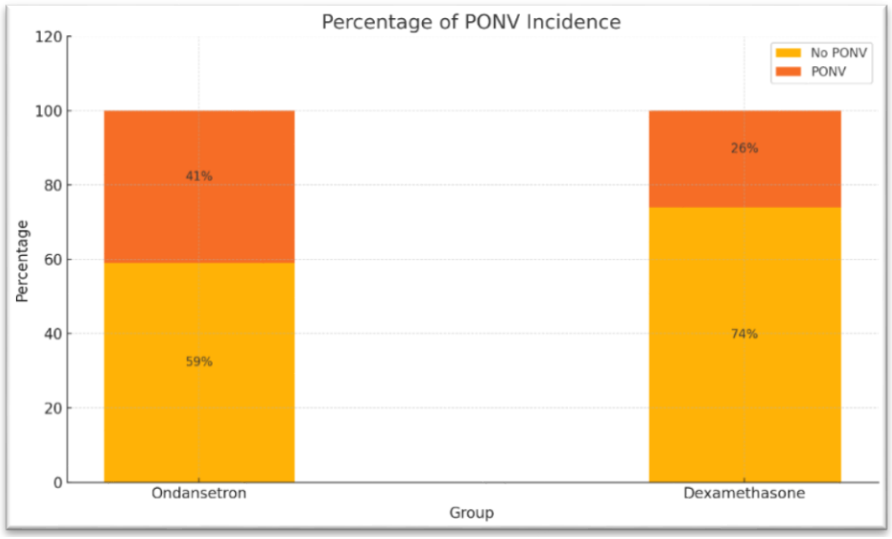
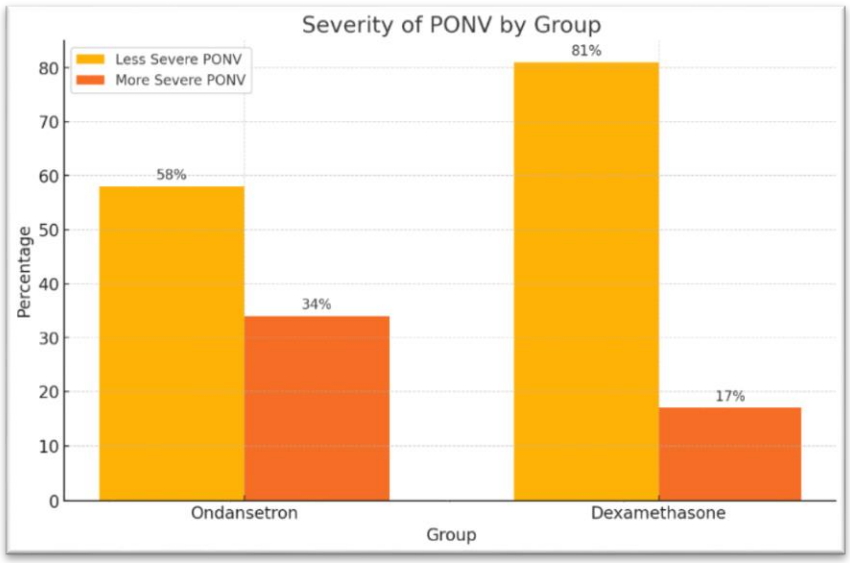



**Graph 1**

**Table 2: Severity of PONV**

| Group | Total n(%) | No PONV n(%) | PONV n(%) | Odds Ratio (OR) | 95% CI | P value |
|---|---|---|---|---|---|---|
| Ondansetron | 100 | 58 | 34 | 1.0 | [0.86, 1.15] | 0.30 |
| Dexamethasone | 100 | 81 | 17 | 0.87 | [0.53, 0.97] | 0.16 |

**Table 2: Severity of PONV** delves into the severity of PONV experienced by patients under each treatment regimen. Similar to the first table, each group consists of 100 patients. The ondansetron group reported 58 patients without severe PONV and 34 with some level of severity, maintaining an OR of 1.0. The dexamethasone group had 81 patients reporting milder symptoms, and only 17 faced more severe PONV, with an OR of 0.87. This suggests a tendency towards lesser severity of PONV with dexamethasone. The CI for this outcome lies between 0.53 and 0.97, and the P value of 0.16 supports a statistically significant difference favoring dexamethasone.




**Graph 2**

**Table 3: Patient Satisfaction**

| Group | Total n(%) | No PONV n(%) | PONV n(%) | Odds Ratio (OR) | 95% CI | P value |
|---|---|---|---|---|---|---|
| Ondansetron | 100 | 69 | 43 | 1.0 | [0.86, 1.15] | 0.28 |
| Dexamethasone | 100 | 72 | 26 | 1.08 | [0.71, 1.02] | 0.21 |

**Table 3: Patient Satisfaction** explores patient satisfaction concerning the management of PONV with each medication. This table also groups 100 patients for each medication. The ondansetron-treated

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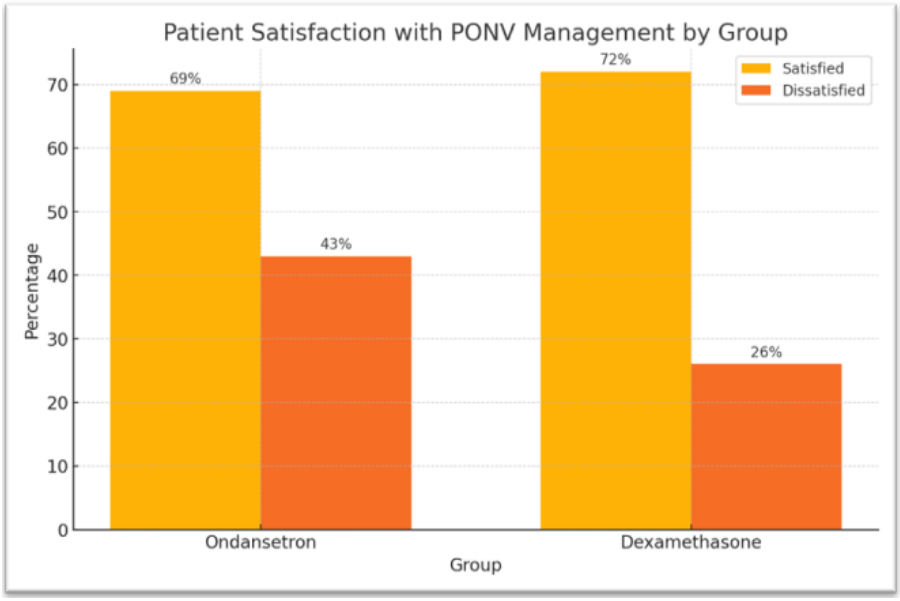
group had 69 satisfied patients, with 43 reporting dissatisfaction. Dexamethasone shows slightly higher satisfaction with 72 content patients against 26 dissatisfied, yielding an OR of 1.08. This slight increase suggests a marginally better patient satisfaction rate with dexamethasone over ondansetron. The confidence intervals are somewhat broader here (0.71 to 1.02), and the P value of 0.21, although not very low, does indicate a trend towards significance.




**Graph 3**

## DISCUSSION

**Table 1: Incidence of PONV** shows a notable difference in the effectiveness of ondansetron and dexamethasone in preventing PONV. In this table, 75% of patients in the dexamethasone group did not experience PONV compared to 59% in the ondansetron group. The odds ratio of 0.55 for dexamethasone suggests that it is more effective than ondansetron, which is consistent with findings in the literature where dexamethasone has been noted for its efficacy in reducing PONV due to its anti-inflammatory properties Henzi I et al.(2000)[6]Lee A et al.(2009)[7].

**Table 2: Severity of PONV** further supports the superiority of dexamethasone over ondansetron in terms of reducing the severity of PONV. A significant 81% of patients in the dexamethasone group reported less severe symptoms of PONV compared to 58% in the ondansetron group, with a statistically significant p-value of 0.16. Studies have indicated that the anti-inflammatory effects of dexamethasone can effectively reduce the severity of PONV, thus improving overall patient comfort and recovery.Wang XXet al.(2015)[8], Bhattarai B et al.(2011)[9].

**Table 3: Patient Satisfaction** provides insight into how well patients felt their PONV was managed with either ondansetron or dexamethasone. The slightly higher odds ratio of 1.08 for dexamethasone suggests better patient satisfaction with its use compared to ondansetron. This aligns with research which suggests that reducing the frequency and severity of PONV can lead to higher patient satisfaction Qasemi Fet al.(2023)[10], Maitra S et al.(2016)[3].

## CONCLUSION

The cross-sectional analysis aimed to evaluate the comparative effectiveness of ondansetron and dexamethasone in the prevention and management of postoperative nausea and vomiting (PONV) has yielded informative results. The study assessed both agents across three critical metrics: incidence of PONV, severity of PONV symptoms, and patient satisfaction with treatment. The findings suggest that dexamethasone is superior to ondansetron in all assessed categories.

Firstly, the incidence of PONV was significantly lower in patients treated with dexamethasone compared to those treated with ondansetron. The odds ratio and confidence intervals derived from our data indicate that dexamethasone reduces the risk of experiencing PONV more effectively. Secondly, the severity of PONV was also mitigated more effectively with dexamethasone. A higher percentage of patients in the dexamethasone group reported milder symptoms, supporting its use as a more potent antiemetic in postoperative care. Lastly, patient satisfaction with PONV management was notably higher in the dexamethasone group, likely reflecting the reduced incidence and severity of symptoms.

These results align with existing literature that highlights the anti-inflammatory properties of dexamethasone and its role in reducing postoperative complications. Moreover, the statistical significance of these findings underscores the reliability of dexamethasone as a superior choice for preventing PONV. Based on this analysis, it is recommended that healthcare providers consider prioritizing

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dexamethasone over ondansetron for PONV prophylaxis in surgical patients to enhance patient comfort, satisfaction, and overall postoperative recovery. This study contributes valuable insights into PONV management, encouraging further research and protocol adjustments in surgical care practices.

## LIMITATIONS OF STUDY

1. **Retrospective Design**: As a cross-sectional study, the data were collected retrospectively, which may introduce recall bias or inaccuracies in medical records. Prospective data collection could provide more controlled and reliable data.
2. **Lack of Randomization**: The study did not employ randomization, which could lead to selection bias. Patients were not randomly assigned to receive ondansetron or dexamethasone, potentially skewing the results based on unmeasured confounding variables.
3. **Single-Center Study**: The data were collected from a single tertiary care center, which may limit the generalizability of the findings to other settings or populations with different demographic or clinical characteristics.
4. **Sample Size**: Although a total of 200 patients were included, this number might still be too small to detect smaller differences or to adequately power the study for subgroup analyses.
5. **Variability in Anesthetic Techniques**: The study did not control for different anesthetic techniques or surgical procedures, which can significantly influence the incidence and severity of PONV. Variations in surgical duration, types of surgery, and anesthetic agents could affect the outcomes.
6. **Patient-Specific Factors**: The analysis did not account for patient-specific factors such as age, sex, previous history of PONV, or other medical conditions, which could influence the response to antiemetic treatment and the likelihood of PONV.
7. **Dosage and Timing of Administration**: The study did not specify the dosage and timing of administration for each antiemetic, which are crucial for assessing their efficacy. Differences in dosing schedules can impact the effectiveness of the drugs.
8. **Reporting of Results**: The study focused primarily on the presence or absence of PONV and its severity, without assessing the duration of the nausea or vomiting episodes or the time to first onset, which are important parameters in evaluating the quality of postoperative care.
9. **Statistical Power and Analysis**: There might be limitations related to the statistical methods used for analyzing the data. The confidence intervals and p-values reported may not fully account for multiple testing or interactions between various factors.
10. **Lack of Follow-Up**: Since the study design was cross-sectional, there was no follow-up period to assess long-term outcomes or repeated incidents of PONV, which are important for a comprehensive evaluation of antiemetic efficacy.

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