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A Prospective Evaluation Of Triple-Component Multimodal Antiemetic Prophylaxis In Morbidly Obese Patients Undergoing Laparoscopic Bariatric Surgery

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Abstract

Background:

Postoperative nausea and vomiting (PONV) remains one of the most common complications after general anesthesia, particularly among morbidly obese patients undergoing bariatric surgery (1,2). Despite major progress in anesthetic management, the development of effective prophylactic regimens for this high-risk population remains an ongoing challenge (3,4).

Objective:

To evaluate the clinical efficacy of a rational three-agent prophylactic regimen consisting of dexamethasone, ondansetron, and droperidol in preventing PONV among morbidly obese patients after laparoscopic bariatric surgery.

Methods:

A prospective, single-center clinical study was conducted from May 2024 to March 2025 at Tashkent State Medical University. A total of 120 patients (75 women, 45 men; mean BMI 45.1 ± 6.3 kg/m²) undergoing laparoscopic bariatric surgery were included. All patients received standardized anesthesia. Participants were divided into three groups: triple prophylaxis (dexamethasone 8 mg, ondansetron 4 mg, droperidol 1.25 mg), dual prophylaxis (dexamethasone + ondansetron), and no prophylaxis (TIVA). The incidence and intensity of PONV were recorded for 24 hours.

Results:

The overall PONV incidence was 26%. Women had significantly higher rates (32%) compared to men (15%, $p < 0.05$). The triple prophylaxis group showed a PONV rate of 14.2%, while the dual and control groups demonstrated 42.6% and 38%, respectively ($p = 0.002$). The requirement for rescue antiemetics was lowest in the triple-therapy group (18%) (7,8).

Conclusion:

A rational three-agent regimen (dexamethasone, ondansetron, droperidol) significantly reduces the incidence and severity of PONV in morbidly obese patients after laparoscopic bariatric surgery. Continued research should aim to refine dosing and timing strategies to enhance clinical outcomes.

Keywords: Postoperative nausea and vomiting, bariatric surgery, morbid obesity, multimodal prophylaxis, triple therapy, anesthesia.

Introduction

Postoperative nausea and vomiting (PONV) affects 30–80% of patients receiving general anesthesia (1). It remains a major cause of postoperative discomfort, delayed discharge, and hospital readmission. Bariatric patients, especially those with morbid obesity, are at an even higher risk (2,3). Multiple physiological factors, such as elevated intra-abdominal pressure, altered drug metabolism, and compromised ventilation, exacerbate the likelihood of PONV in this group (4,5).

The Apfel risk score (6) identifies key predictors including female sex, non-smoking status, prior PONV, and opioid use. However, the complexity of obesity-related physiology necessitates multifactorial approaches. Combining agents that act on different receptor pathways—serotonergic, dopaminergic, and corticosteroid—has shown superior outcomes (7,8). The current study evaluates the effectiveness of a rational triple antiemetic regimen tailored for morbid obesity surgery.

Methods

Study design:

Prospective, single-center, open-label clinical trial conducted at Tashkent State Medical University (May 2024 – March 2025). Ethical approval was obtained from the institutional review board, and written informed consent was secured from all participants.

Participants:

120 adults aged 18–65 years with BMI ≥ 40 kg/m² undergoing elective laparoscopic bariatric surgery.

Exclusion criteria:

- History of gastrointestinal disorders
- Known drug allergies to antiemetics
- Neurological or psychiatric comorbidities
- Requirement for postoperative opioids

Anesthetic management:

- Induction: Propofol 2 mg/kg + Rocuronium 0.6 mg/kg
- Maintenance: Isoflurane + oxygen/air mixture; remifentanil as required
- Analgesia: Opioid-free (paracetamol 1 g IV q8h)
- PONV prophylaxis:
  - Dexamethasone 8 mg IV (after induction)
  - Droperidol 1.25 mg IV (immediately post-induction)
  - Ondansetron 4 mg IV (before extubation)

Outcome measures:

- Primary: Incidence of PONV during the first 24 hours post-surgery.
- Secondary: VAS nausea score, rescue antiemetic requirement, duration of ICU and hospital stay.

Statistical analysis:

Data were analyzed with SPSS v26.0. Results are presented as mean ± SD. Student's t-test and χ^2 test were applied; $p < 0.05$ was considered statistically significant.

Results

Baseline characteristics:

Among 120 patients, the mean age was 38.5 ± 10.2 years; 62.5% were female. BMI values and age distributions did not significantly differ by sex ($p > 0.05$).

Incidence of PONV:

PONV occurred in 26% of the cohort, significantly more frequently in women (32%) than in men (15%).

Comparison of prophylactic regimens:

Regimen	PONV Incidence (%)	Rescue Therapy (%)
Triple (Dex + Ond + Dro)	**14.2**	18
Dual (Dex + Ond)	42.6	27
TIVA (no prophylaxis)	38	25

Triple prophylaxis resulted in a 2.9-fold reduction in PONV compared to dual therapy (p = 0.002).

Temporal pattern:

Most vomiting episodes occurred within the first 4 hours postoperatively (24.2%), decreasing to 7.5% by 24 hours.

Discussion

The findings of this study align with international data emphasizing that multimodal prophylaxis reduces PONV incidence by 30–50% compared with single-agent strategies (1,3,5). The inclusion of droperidol provides an additional dopaminergic blockade that complements 5-HT_3 antagonism (7,8). These effects correspond with meta-analyses by White et al. and Habib et al. (4,10).

The residual risk (14.2%) suggests that although triple regimens are effective, continuous refinement of dosage, drug sequence, and timing could further improve prophylactic efficacy (14,15).

Conclusion

Triple-agent multimodal prophylaxis (dexamethasone, ondansetron, droperidol) provides substantial reduction of postoperative nausea and vomiting among morbidly obese patients following laparoscopic bariatric surgery. This strategy should be considered standard practice in bariatric anesthesia protocols. Further clinical investigations are needed to define optimal combinations and administration timing.

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