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Prevention Of Postoperative Nausea And Vomiting In Patients With Morbid Obesity Undergoing Laparoscopic Bariatric Surgery

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Relevance: Obesity is a chronic disease of the 21st century and a global epidemic [1]. According to statistics, 1.4 billion adults worldwide are overweight [2, 3]. Of these, 900 million women and over 500 million men suffer from obesity. Morbid obesity is defined as excessive fat deposition with a body mass index (BMI) ≥ 40 kg/m² or BMI ≥ 35 kg/m² in the presence of obesity-related metabolic syndrome [3]. Twelve million adults in the United States suffer from morbid obesity with a BMI ≥ 40 kg/m² [4]. In Russia, according to the World Health Organization (WHO) in 2018, 23.5 million people were registered as obese [5]. According to WHO data, the average BMI in Uzbekistan is currently 26.5 kg/m², the highest in Central Asia [6]. Studies by Halliday T.A. and Sundqvist J. have shown that diets and weight-loss medications are ineffective in patients with morbid obesity [7, 8, 9]. Bariatric surgery has been proven to be the most effective long-term intervention for weight loss in obese patients [10, 11, 12]. Bariatric surgery is considered a treatment option for class III obesity (BMI ≥ 40 kg/m²) or class II obesity (BMI 35.0–39.9 kg/m²) with obesity-related comorbidities that have not responded to conservative treatment and other methods [13].
Despite the effectiveness of surgical treatment, postoperative nausea and vomiting (PONV) are frequently observed. The most common causes of readmission were nausea and vomiting (14.05%), abdominal pain (12.14%), and dehydration (10.78%) [Aman, M.W., Stem, M., Schweitzer, M.A. et al. Early hospital readmission after bariatric surgery. Surg Endosc 30, 2231–2238 (2016). https://doi.org/10.1007/s00464-015-4483-4]. In the population of patients undergoing bariatric surgery, PONV occurs at a frequency of about 80%, which is significantly higher compared to the general surgical population, where the incidence is approximately 40% [13, 14]. Given the above, the administration of antiemetics during and after surgery is an integral part of the process; however, the optimal standardized regimen has yet to be determined. The incidence of PONV depends on individual patient characteristics, such as a history of motion sickness, harmful habits, type of surgery, and the use of various anesthetic agents.
Repeated episodes of PONV can lead to dehydration, electrolyte imbalance, prolonged hospital stays, and more frequent readmissions. However, specific risk factors in patients with water-electrolyte imbalances who have undergone bariatric surgery have not been definitively identified, nor has the impact of PONV on postoperative outcomes.

Keywords:body mass index, morbid obesity, bariatric surgery, postoperative nausea and vomiting

Objective:
To evaluate the effectiveness of comprehensive prevention of PONV in patients with morbid obesity undergoing laparoscopic bariatric surgery using a combination

therapy including droperidol, ondansetron, metoclopramide, and dexamethasone during the intraoperative and postoperative periods.

Materials and Methods:

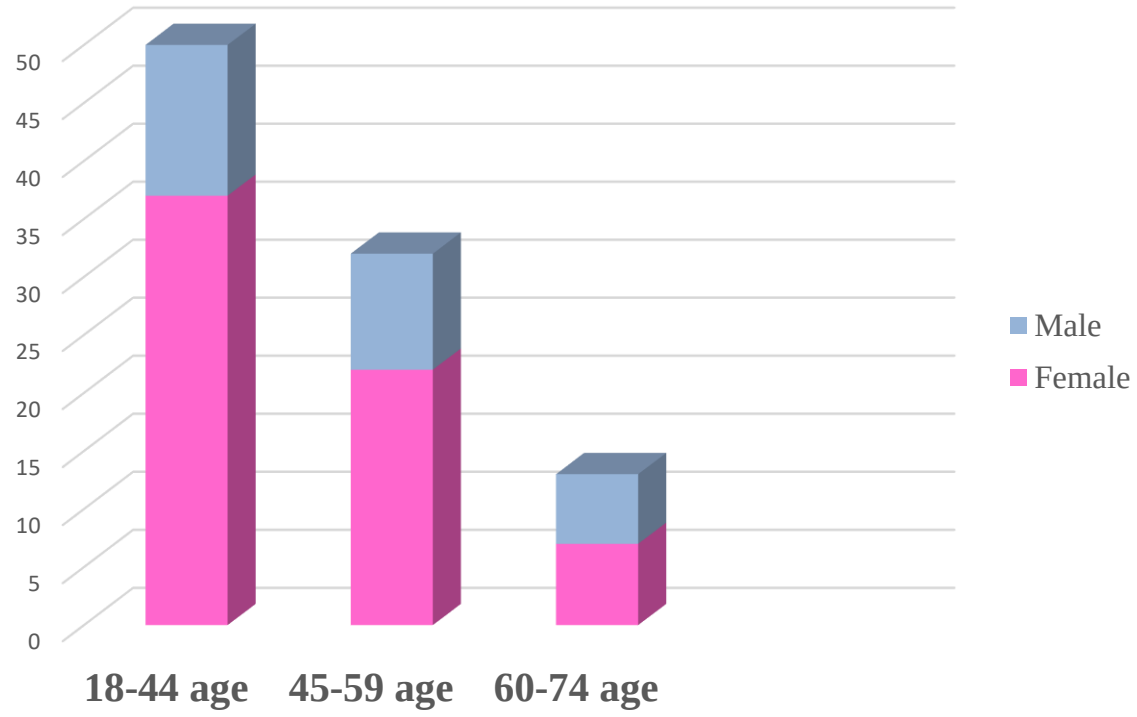
The study was conducted at the Department of Anesthesiology and Intensive Care of the Tashkent Medical Academy with the participation of 105 patients. Of these, 36 were men (34.3%) and 69 were women (65.7%) who underwent laparoscopic bariatric surgery between March and November 2024. The patients were divided into two groups. In the first study group, a treatment method aimed at preventing vomiting and facilitating postoperative recovery was used. In the control group, the standard treatment method was applied. Patients were stratified by sex, age, and degree of obesity. All patients in both groups were characteristically identical. The patients' condition was assessed in the intensive care unit on the first day after surgery using standardized scales to evaluate the intensity of nausea and vomiting (VAS - Visual Analog Scale for nausea and vomiting). General clinical data, such as the recovery of intestinal motility, hydration levels, and the need for medication correction, were also taken into account.

Inclusion Criteria:

1. Patient age over 18 years.
2. ASA (American Society of Anesthesiologists) class III anesthesia risk.

Exclusion Criteria:

1. Hypersensitivity or contraindications to the study drugs.
2. Chronic nausea, vomiting, motion sickness, or retching within 24 hours before anesthesia.



Stages of the Study

General inhalation anesthesia was administered to patients using intravenous propofol at a dose of up to 2.5 mg/kg, fentanyl at 1 μg/kg, and pipecuronium bromide at a standard dose to facilitate tracheal intubation. To ensure adequate lung ventilation

during anesthesia, a mixture of oxygen (40-50%) and air was used, with an isoflurane concentration of 1.5 ± 0.3 MAC. Fentanyl, as an opioid analgesic, was used to maintain a stable level of anesthesia during the surgery. Additional doses of pipecuronium bromide were administered to ensure muscle relaxation necessary for creating pneumoperitoneum and performing the surgical procedure.

Intraoperative Prevention of PONV:

During the anesthetic management of laparoscopic bariatric surgery, a combination therapy was used to prevent postoperative nausea and vomiting (PONV), including the following drugs:

- Droperidol 5 mg intravenously (IV)
- Dexamethasone 4 mg IV
- Ondansetron 4 mg IV

These drugs were administered during the anesthesia stage, before the start of the surgical procedure, to reduce the incidence of PONV in the postoperative period.

Postoperative Prevention of PONV:

After the completion of the surgery, all patients received medications to prevent PONV in the postoperative period. During the first 24 hours after surgery, patients were prescribed:

- Metoclopramide (10 mg IV): A prokinetic and antiemetic agent that enhances gastrointestinal motility and reduces the risk of vomiting associated with surgery and anesthesia.
- Ondansetron (4 mg IV): An antiemetic that blocks serotonin receptors, effectively preventing vomiting caused by anesthesia or surgical stress.

These medications were administered three times a day during the first 24 hours postoperatively.

Evaluation of Results and Effectiveness Criteria:

The effectiveness of PONV prevention was assessed based on the following criteria:

- Frequency and severity of nausea and vomiting in the postoperative period (using the Categorical Nausea and Vomiting Rating Scale, CNVRS).
- Duration of hospitalization.
- Need for additional antiemetic medications.
- Electrolyte imbalances associated with PONV.
- Number of readmissions or complications related to PONV.

Patient conditions were evaluated in the intensive care unit on the first day after surgery using standardized scales to assess the intensity of nausea and vomiting (e.g., Visual Analog Scale for nausea and vomiting). General clinical data, such as the recovery of intestinal motility, hydration levels, and the need for medication correction, were also considered.

Results:

In the clinical study, various combinations of antiemetic drugs were evaluated in the study group. This combination was applied to 105 patients, with the following results:

- **Metoclopramide + Droperidol:** n=30. Among these, nausea was observed in 28 ± 18.1 patients, and vomiting in 23 ± 14.2 patients. The frequency of nausea and vomiting was high, with 7–8 episodes.
- **Ondansetron + Droperidol**: n=30. With this regimen, nausea was recorded in 24 ± 13.4 patients, and vomiting in 21.7 ± 15.4 patients. The frequency of nausea and vomiting decreased compared to the previous regimen, with 4–5 episodes.

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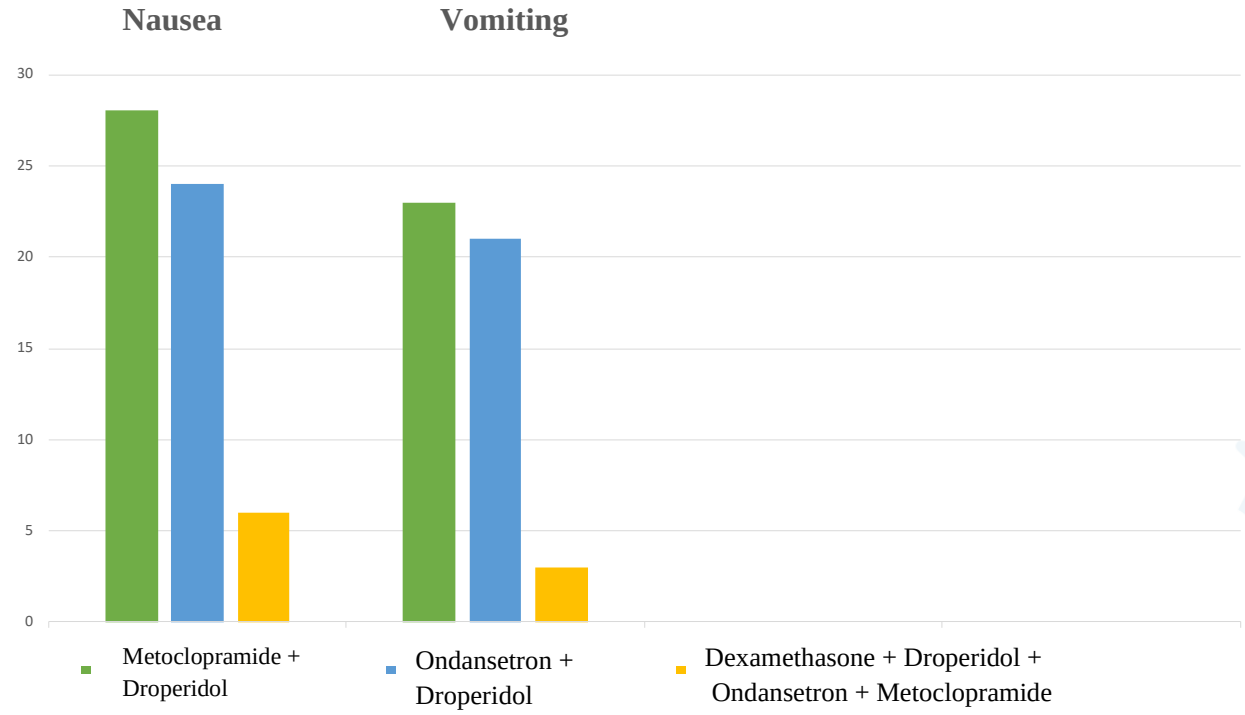
- **Dexamethasone + Droperidol + Ondansetron + Metoclopramide**: n=45. When this combination of drugs was added to the therapy, the frequency of nausea decreased by 6 ± 1.4 cases, and the frequency of vomiting decreased by 3 ± 1.0 cases compared to the previous combinations. The frequency of nausea and vomiting was reduced to one episode.

	Metoclopramide + Droperidol	**Ondansetron + Droperidol**	**Dexamethasone + Droperidol + Ondansetron + Metoclopramide**
Nausea	28 ± 18.1	24±13.4	6±1.4
Vomiting	23±14.2	21.7±15.4	3±1.0



These results indicate the positive effect of comprehensive therapy in reducing the frequency of nausea and vomiting, which may be useful in selecting the optimal treatment regimen for patients with this symptom complex.

Conclusions:

The obtained data were analyzed to assess the effectiveness of the proposed PONV prevention regimen. The combined use of droperidol, dexamethasone, and ondansetron intraoperatively, as well as metoclopramide and ondansetron in the postoperative period, significantly reduced the frequency and intensity of PONV in patients with morbid obesity who underwent laparoscopic bariatric surgery. These results may serve as a basis for developing optimized PONV prevention protocols in clinical practice.

These findings may indicate a low incidence of postoperative nausea and vomiting (PONV) with the use of selected anesthetic agents and anesthetics that do not cause pronounced nausea and vomiting, such as propofol and isoflurane. It should also be noted that opioids were not used for adequate pain management in the postoperative period, which could have influenced the incidence of PONV, as these drugs are often associated with the development of nausea and vomiting.

During the examination of our patients who experienced vomiting, acid-base balance (ABB) tests were conducted, based on which electrolyte balance (EB) correction was performed.

For further analysis, potential risk factors such as gender, age, presence of comorbidities, and specific surgical intervention characteristics should be considered, as they may influence the development of PONV. However, within the scope of this

study, we can conclude that this anesthetic strategy, with the use of a combination of antiemetic drugs, may be effective in reducing the incidence of postoperative nausea and vomiting in patients undergoing elective surgical procedures.

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Volume 35 January 2025 ISSN (E): 2795-4951

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