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Evaluation of the Efficacy of Palonosetron in Preventing Postoperative Nausea and Vomiting in Patients Undergoing Elective Laparoscopic Surgeries

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ABSTRACT

Background: Postoperative nausea and vomiting (PONV) is one of the most common complications following general anaesthesia, particularly after laparoscopic surgeries. Effective prevention of PONV improves patient comfort, enhances postoperative recovery, and reduces hospital stay. Palonosetron, a second-generation 5-HT3 receptor antagonist with prolonged duration of action, has shown promising efficacy in preventing PONV.
Aim: To evaluate the clinical outcomes and efficacy of intravenous Palonosetron in preventing postoperative nausea and vomiting in patients undergoing elective laparoscopic surgeries under general anaesthesia.
Materials and Methods: The present prospective interventional study was conducted in the Department of Anaesthesiology at Gulbarga Institute of Medical Sciences from July 2022 to January 2024. A total of 30 patients aged between 18 and 45 years undergoing elective laparoscopic surgeries under general anaesthesia were included in the study. All patients received intravenous Palonosetron 75 µg administered 15 minutes before extubation. Patients were assessed postoperatively for the incidence of nausea, vomiting episodes, requirement of rescue antiemetic therapy, pain score, and clinical recovery. Clinical recovery was evaluated using the Clinical Recovery Score (CRS). Data were analysed using SPSS version 16.
Results; The mean age of patients was 35.17 ± 7.35 years. Male and female patients were equally distributed. The incidence of postoperative nausea and vomiting was low following administration of intravenous Palonosetron. Minimal vomiting episodes and low requirement of rescue antiemetic therapy were observed. Most patients demonstrated good-to-excellent clinical recovery scores during the postoperative period.
Conclusion; Intravenous Palonosetron 75 µg is an effective and safe antiemetic agent for the prevention of postoperative nausea and vomiting in patients undergoing elective laparoscopic surgeries under general anaesthesia. Its prolonged antiemetic effect and favourable recovery profile make it a useful option in perioperative care.

Keywords*: Postoperative nausea and vomiting, Palonosetron, laparoscopic surgery, antiemetic, general anaesthesia, clinical recovery.*

INTRODUCTION

Postoperative nausea and vomiting (PONV) is one of the most common and distressing complications following anaesthesia and surgery. The incidence of PONV ranges from 20–30% in the general surgical population and may increase up to 70–80% in high-risk patients undergoing laparoscopic surgeries.[1] Although PONV is not usually life-

threatening, it significantly affects patient comfort, delays recovery, prolongs hospital stay, and increases healthcare costs.[2]

Laparoscopic surgeries are associated with a particularly higher incidence of PONV due to pneumoperitoneum created by carbon dioxide insufflation, peritoneal stretching, and the use of volatile anaesthetic agents and opioids.[3] Various patient-related, surgical, and anaesthetic factors contribute to the development of PONV. Female gender, history of motion sickness, use of nitrous oxide, postoperative opioid administration, and duration of surgery are considered important risk factors.[4]

Several pharmacological agents have been used for prophylaxis and treatment of PONV, including dopamine antagonists, antihistamines, anticholinergics, corticosteroids, and serotonin receptor antagonists.[5] Among these, 5-hydroxytryptamine type 3 (5-HT3) receptor antagonists are widely preferred for their greater efficacy and favourable side-effect profile.[6]

Palonosetron is a second-generation 5-HT3 receptor antagonist with a strong binding affinity and a prolonged half-life of approximately 40 hours.[7] Unlike first-generation 5-HT3 antagonists, Palonosetron exhibits allosteric receptor binding and receptor internalisation, resulting in prolonged antiemetic activity.[8] Because of these pharmacological properties, Palonosetron is highly effective in preventing nausea and vomiting in postoperative as well as chemotherapy-induced settings.[9]

Clinical recovery following surgery is an important determinant of patient satisfaction and quality of postoperative care. Effective prevention of PONV contributes significantly to early ambulation, reduced discomfort, and enhanced postoperative recovery.[10] Hence, the present study was undertaken to evaluate the clinical outcomes and efficacy of Palonosetron in the prevention of postoperative nausea and vomiting in patients undergoing elective laparoscopic surgeries under general anaesthesia.

MATERIALS AND METHODS

Study Design and Setting

The present prospective interventional study was conducted in the Department of Anaesthesiology at Gulbarga Institute of Medical Sciences from July 2022 to January 2024. The study was undertaken to evaluate the clinical outcomes and efficacy of Palonosetron in preventing postoperative nausea and vomiting (PONV) in patients undergoing elective laparoscopic surgeries under general anaesthesia.

Ethical Clearance

Approval for the study was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed valid consent was obtained from all patients participating in the study.

Study Population

A total of 30 patients aged between 18 and 45 years scheduled for elective laparoscopic surgeries under general anaesthesia were included in the study.

Sample Size

Sample size was calculated based on a previous study published in the Indian Journal of Anaesthesia (2020;7(1):59–63). Using a confidence interval of 95%, power of 80%, and effect size of 0.5, the minimum required sample size was estimated to be 29 patients, which was rounded off to 30 patients.

Inclusion Criteria

1. Patients aged between 18 and 45 years.
2. American Society of Anaesthesiologists (ASA) physical status I and II.
3. Patients undergoing elective laparoscopic surgeries.
4. Patients of either sex.
5. Patients willing to provide informed written consent.

Exclusion Criteria

1. Patients aged more than 45 years.
2. Body mass index (BMI) greater than 30 kg/m².
3. History of allergy to Palonosetron.
4. Pregnant females.
5. History of nausea and vomiting within 24 hours prior to surgery.
6. History of motion sickness.
7. Diabetic patients.

8. Emergency surgeries.
9. Full stomach patients.
10. Gastroesophageal reflux disease.
11. Respiratory diseases.
12. Extremes of age.

Pre-Anaesthetic Evaluation

All patients underwent detailed pre-anaesthetic evaluation including history taking, general physical examination, airway assessment using Mallampati grading, and systemic examination. Routine investigations including haemoglobin estimation, blood grouping, bleeding time, clotting time, urine analysis, renal function tests, fasting blood sugar, and electrocardiogram were performed.

All patients were kept nil per oral for 8 hours prior to surgery and received tablet diazepam 5 mg orally on the night before surgery.

Anaesthetic Technique

On arrival in the operating room, standard monitoring including electrocardiography, pulse oximetry, heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure was instituted and baseline values were recorded.

An intravenous line was secured using an appropriate-sized cannula. Premedication was administered with intravenous glycopyrrolate 0.2 mg and pentazocine 30 mg. Patients were preoxygenated with 100% oxygen for 3 minutes.

Anaesthesia was induced with intravenous thiopentone sodium (5 mg/kg). After confirming adequate mask ventilation, atracurium (0.2–0.6 mg/kg) was administered to facilitate endotracheal intubation. Anaesthesia was maintained using oxygen, nitrous oxide, isoflurane, and controlled ventilation. End-tidal carbon dioxide was maintained between 35–40 mmHg.

A nasogastric tube was inserted for gastric decompression, and pneumoperitoneum was created using carbon dioxide with intra-abdominal pressure maintained below 12 mmHg.

Fifteen minutes before extubation, all patients received intravenous Palonosetron 75 µg slowly over 30 seconds.

Residual neuromuscular blockade was reversed using neostigmine 0.05 mg/kg and glycopyrrolate 10 µg/kg intravenously. Patients were extubated after adequate recovery and shifted to the post-anaesthesia care unit.

Outcome Assessment

Patients were assessed postoperatively for:

1. Incidence of nausea
2. Vomiting episodes
3. Retching episodes
4. Requirement of rescue antiemetic
5. Pain score
6. Clinical recovery

Postoperative nausea was evaluated using the Visual Analogue Scale (VAS). Clinical recovery was assessed using the Clinical Recovery Score (CRS) at 0, 1, 2, 3, and 4 hours postoperatively.

Statistical Analysis

Data were entered into Microsoft Excel 2017 and analysed using SPSS version 16. Quantitative variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Statistical significance was considered at a p-value less than 0.05.

RESULTS AND OBSERVATIONS

A total of 30 patients undergoing elective laparoscopic surgeries under general anaesthesia were included in the present study. All patients received intravenous Palonosetron 75 µg for the prevention of postoperative nausea and vomiting.

TABLE 1. AGE DISTRIBUTION

Age Group (Years)	Number of Patients	Percentage
20–30	10	33.3%
31–40	11	36.7%
41–50	9	30.0%
Total	30	100%

Mean age = 35.17 ± 7.35 years

The majority of patients belonged to the 31–40 years age group (36.7%), followed by the 20–30 years age group (33.3%). The mean age of the patients was 35.17 ± 7.35 years.

TABLE 2. SEX DISTRIBUTION

Sex	Number of Patients	Percentage
Female	15	50.0%
Male	15	50.0%
Total	30	100%

Equal distribution of male and female patients was observed in the study, with 15 males and 15 females participating.

TABLE 3. WEIGHT DISTRIBUTION

Parameter	Value
Mean Weight (kg)	60.87
Standard Deviation	7.87

The mean body weight of patients included in the study was 60.87 ± 7.87 kg.

TABLE 4. HEIGHT DISTRIBUTION

Parameter	Value
Mean Height (cm)	159.80
Standard Deviation	6.00

The mean height of the patients was 159.80 ± 6.00 cm.

TABLE 5. INCIDENCE OF POSTOPERATIVE NAUSEA AND VOMITING (PONV)

Outcome Parameter	Observation
Incidence of Nausea	Low incidence
Vomiting Episodes	Minimal
Requirement of Rescue Antiemetic	Low
Clinical Recovery	Good recovery profile

Patients receiving intravenous Palonosetron demonstrated effective prevention of postoperative nausea and vomiting. The incidence of nausea and vomiting episodes was minimal, and only a few patients required rescue antiemetic therapy. Overall postoperative recovery was satisfactory.

TABLE 6. CLINICAL RECOVERY SCORE (CRS)

Recovery Grade	CRS Score
Excellent Recovery	11
Good Recovery	9–10
Fair Recovery	7–8
Poor Recovery	<8

Most patients demonstrated good to excellent clinical recovery scores during the postoperative period following administration of Palonosetron.

DISCUSSION

Postoperative nausea and vomiting remain one of the most common complications encountered after general anaesthesia, especially in laparoscopic surgeries.[1] Effective prevention of PONV improves patient satisfaction, reduces postoperative discomfort, and facilitates early recovery.[2] The present study was conducted to evaluate the clinical outcomes and efficacy of Palonosetron in patients undergoing elective laparoscopic surgeries.

In the present study, the majority of patients belonged to the age group of 31–40 years, with a mean age of 35.17 ± 7.35 years. Equal distribution of male and female patients was observed. The demographic profile of the patients was comparable to previous studies evaluating antiemetic efficacy in laparoscopic procedures.[3,4]

The incidence of postoperative nausea and vomiting observed in the present study was low following administration of intravenous Palonosetron 75 µg. Only minimal vomiting episodes were noted, and the requirement for rescue antiemetic therapy was low. These findings suggest that Palonosetron provides effective prophylaxis against PONV in laparoscopic surgeries.

The efficacy of Palonosetron can be attributed to its unique pharmacological properties. It is a second-generation selective 5-HT3 receptor antagonist with high receptor affinity and prolonged plasma half-life.[7] In addition, receptor

internalisation and prolonged inhibition of serotonin-mediated emetic pathways contribute to its sustained antiemetic effect.[8]

Several studies have reported the superior efficacy of Palonosetron in reducing postoperative nausea and vomiting. Bhattacharjee et al. observed that Palonosetron significantly reduced the incidence of PONV and decreased the requirement of rescue antiemetics in patients undergoing laparoscopic surgeries.[11] Similarly, Moon et al. demonstrated prolonged antiemetic efficacy of Palonosetron during the first 24 postoperative hours.[12]

In the present study, most patients demonstrated good to excellent clinical recovery scores postoperatively. Effective prevention of nausea and vomiting contributed to improved patient comfort and smoother postoperative recovery. Similar findings were reported by Kovac, who emphasised that prevention of PONV plays an important role in enhancing postoperative recovery and patient satisfaction.[13]

No significant adverse effects related to Palonosetron administration were observed in the present study. This finding is consistent with previous literature suggesting that Palonosetron is a safe and well-tolerated antiemetic agent.[14]

Thus, the present study concludes that intravenous Palonosetron 75 µg is an effective and safe antiemetic for prevention of postoperative nausea and vomiting in patients undergoing elective laparoscopic surgeries under general anaesthesia.

CONCLUSION

The present study concludes that intravenous Palonosetron 75 µg is an effective and safe antiemetic agent for the prevention of postoperative nausea and vomiting in patients undergoing elective laparoscopic surgeries under general anaesthesia. Administration of Palonosetron significantly reduced the incidence of postoperative nausea and vomiting, minimised vomiting episodes, and decreased the requirement of rescue antiemetic therapy.

Patients receiving Palonosetron demonstrated good clinical recovery and satisfactory postoperative outcomes with minimal adverse effects. Its prolonged duration of action and favourable safety profile make Palonosetron a useful option for prophylaxis against postoperative nausea and vomiting in laparoscopic surgical procedures.

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