

## A comparative study of palonosetron and ondansetron in prevention of post operative nausea and vomiting in laparoscopic cholecystectomy surgery

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### Abstract

**Introduction:** In this randomized, double-blind study we evaluated the relative efficacy of palonosetron (a new, selective 5hydroxytryptamine [5-HT<sub>3</sub>] receptor antagonist) and ondansetron in preventing postoperative nausea and vomiting (PONV) in patients undergoing laparoscopic cholecystectomy surgery.

**Materials and Method:** Patients were given either palonosetron 0.075 mg (n = 50) or ondansetron 8 mg (n = 50) intravenously, just before anaesthesia. The occurrence of nausea and vomiting and the severity of nausea according to a visual analogue scale were monitored immediately after the end of surgery and during the following 24 hour post surgical period in time intervals of 0-4, 4-8, 8-12 and 12-24 hour period.

**Result:** The incidence of PONV and nausea (not vomiting) was significantly lower in the palonosetron group than in the ondansetron group during the 24 hour post surgical period (P < 0.05). More patients in the palonosetron group had a complete response (no PONV and no need of rescue antiemetic) compared with the ondansetron group.

The need for rescue antiemetics was significantly lower in the palonosetron group than in the ondansetron group during the 24 hour post surgical period (P < 0.05). The severity of nausea (VAS) and incidence of adverse effects were not significantly different between the two groups. The incidence of PONV was significantly lower in the palonosetron group compared with the ondansetron group (32% vs 56%, respectively).

**Conclusion:** Palonosetron 0.075 mg was more effective than ondansetron 8 mg in preventing postoperative nausea and vomiting (PONV).

### Introduction

Post operative Nausea and Vomiting (PONV) is the most common distressing symptom following surgical procedures.<sup>(1)</sup> PONV can lead to increased recovery room time, expanded nursing care, potential hospital admission, and increased anxiety in forth coming surgical procedures.<sup>(2)</sup> It is a limiting factor in the early discharge of ambulatory surgery patient with a leading cause of unanticipated hospital admission.

**Nausea:** An unpleasant sensation referred to as a desire to vomit but not associated with muscular movements.

**Vomiting:** A forceful expulsion of (even a small amount) upper gastrointestinal contents through mouth.

**Retching:** An attempt to vomit with no stomach contents expelled, 'Dry heaves'.<sup>(3)</sup>

Nausea and Vomiting can be caused by range of stimuli like motion, surgery, various drugs and radiation. Disgusting sights, smell, memories can also cause nausea and vomiting and this has a physiological basis leading to avoidance.<sup>(4)</sup>

**Incidence:** 30-40%,<sup>(5)</sup> Up to 80% in high risk groups.<sup>(6)</sup>

**Risk factors:** The risks of postoperative nausea and vomiting are multifactorial. Female sex, a history of motion sickness or PONV, non-smoking status, intra-operative use of opioids, nitrous oxide, and volatile inhalational agents all increases the incidence.<sup>(7)</sup> In patients undergoing laparoscopic surgery, high CO<sub>2</sub> level is a potent emetogenic stimuli. (Fig. 1, 2)

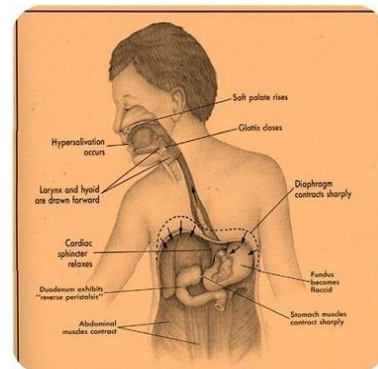


Fig. 1

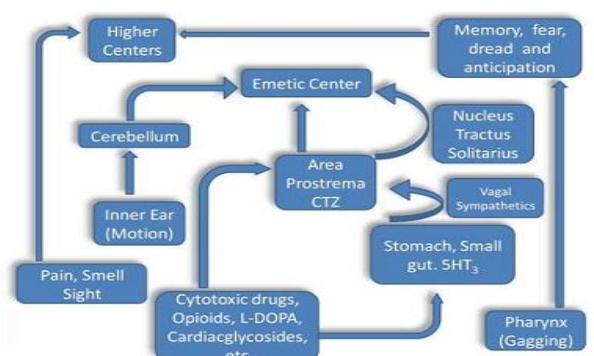


Fig. 2

Laparoscopic cholecystectomy (LC) has rapidly emerged as an alternative to open cholecystectomy and

is a routinely performed procedure for symptomatic cholelithiasis. But, postoperative nausea and vomiting (PONV) is a distressing and frequent adverse events of anesthesia and surgery, and the incidence following Laparoscopic cholecystectomy is as high as 46 to 72%.<sup>(8)</sup>

**Role of 5-HT3 antagonists in management of PONV:**

Ondansetron is being routinely used, either alone or in combination, for the prophylaxis of PONV in various surgeries mainly because of its lower cost.<sup>(9)</sup>

Palonosetron has got a far higher receptor affinity and a much longer half life which confer a prolonged duration of action. The long duration of antiemetic effect is quite beneficial in preventing PONV.

**Dose of Palonosetron:<sup>(6)</sup>**

**Adult:** IV 250 mcg for chemotherapy-induced nausea and vomiting, and 75 mcg as a single dose immediately before induction of anesthesia for PONV.

Our aim is to compare the incidence and severity of post operative nausea and vomiting between prophylactic palonosetron and ondansetron in patients undergoing laparoscopic cholecystectomy surgery.

**Materials and Method**

**Inclusion Criteria**

- Signed an informed consent form, Either Sex, 18-65 years, ASA Grade I / II & Non-smoker for at least the previous 12 months.
- Undergoing laparoscopic cholecystectomy surgery.

**Exclusion Criteria:** Patients having persistent or recurrent nausea, having chronic systemic medical illness. Patients taking an opioid dose, on a regular, daily basis or receiving radiation/chemotherapy were excluded.

**Groups:** The patients were randomly divided in 2 groups of 50 each according to the drug used. Randomization was done by chit and box method.

- Group A - 50 patients given Ondansetron 8 mg.
- Group B - 50 patients given Palonosetron 0.075 mg.

Both the drugs were given as single shot injections diluted to 5 ml with saline and given just before premedication.

Nausea and vomiting assessed by direct questioning of patient at 0-4, 4-8, 8-12 and 12-24 hours after recovery from anaesthesia. Nausea was assessed according to a visual analogue scale using VAS.<sup>(6)</sup>

VAS - 0, no nausea

VAS - 10, worst nausea

Retching and vomiting were assessed by simply questioning for yes or no.

PONV score was also calculated at different time intervals. PONV score means the total no. of the patients who suffered either from Nausea or Emesis (Vomiting/Retching) or if needed rescue medication.

No use of rescue medication was scored as 0 and if used, scored 1.

- Metoclopramide (10 mg iv.) permitted as a rescue antiemetic when

- episode of retching or vomiting was there
  - VAS > 5 and
  - if the patient requested treatment.
  - A complete response was defined as the absence of PONV and no use of rescue antiemetics.
- (Flow Chart showing methodology in Fig. 3)



Fig. 3

**Results and Discussion**

The distribution of sex is almost equal in both the groups. The difference between sex distribution is not significant (p-value>0.05). Each age group is almost equally distributed among the two groups. The mean age in years and SD in group A is 42.78 ± 10.96 and in group B is 41.60 ± 11.19.

- The statistical analysis revealed no significant difference in age of patients between the two groups. (p-value > 0.05).
- Hemodynamic variables were similar and there was no significant difference in these two groups.
- To study the overall efficacy of both the drugs Nausea, Vomiting and PONV score of 0-24 hour post surgical period was compared.(Fig. 4)

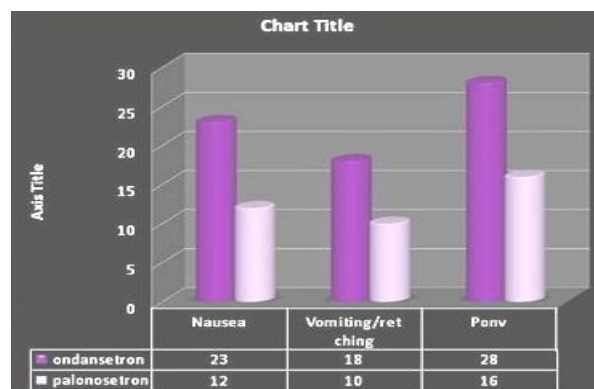
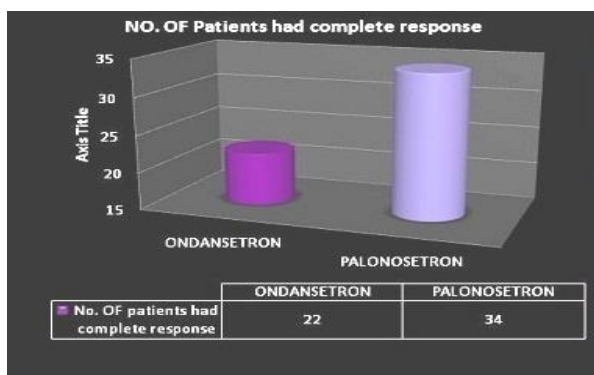


Fig. 4: 0-24 hour comparison of nausea, vomiting/retching, PONV

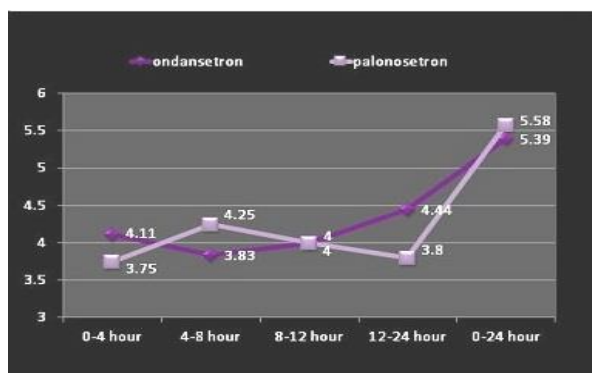
(It should be very much clear that for comparison, the no. of the patients are taken not the no. of the episodes)

- The **severity of Nausea** was assessed by VAS scale at various time intervals and was insignificant ( $p$  value - 0.8200) in both groups.
- Postoperative analgesic used in both the groups was diclofenac 75-150 mg. The rescue antiemetic medication was used as Metoclopramide 10 mg IV. The need for rescue antiemetic was more in ondansetron group (no.-20) than palonosetron group (no. -10), which is statistically significant.
- The incidence of nausea (not vomiting) was significantly lower in the palonosetron group than in the ondansetron group ( $p < 0.05$ ). There was no significant statistical difference in the visual analogue scale for nausea. (Fig. 6)



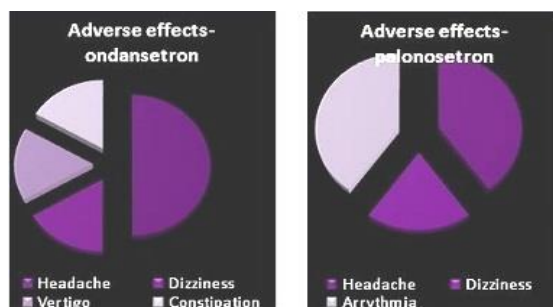
**Fig. 5: Comparison of complete responses in both groups in 24 hour study period**

- More patients in the palonosetron group had a complete response (no PONV and no need of rescue antiemetic). (Fig. 5)



**Fig. 6: Comparison of VAS score in both groups**

- The need for rescue antiemetics was significantly lower in the palonosetron group.
- Incidence of adverse effects were not significantly different between the two groups. (Fig. 7, 8)



**Fig. 7**

<b>Adverse Effects</b>		
ADVERSE EFFECTS	Group A (ondansetron) n*(%)	Group B (palonosetron) n*(%)
Headache	3 (6)	2 (4)
Dizziness	1 (2)	1 (2)
Vertigo	1 (2)	-
Constipation	1 (2)	-
Arrhythmia	-	2 (4)
<b>Total</b>	<b>6 (12)</b>	<b>5 (10)</b>

**Fig. 8**

**Conclusion**

- The incidence of PONV was significantly lower in the palonosetron group compared with the ondansetron group (32% vs 56%, respectively). There was no significant statistical difference in the visual analogue scale for nausea.
- In conclusion, palonosetron 0.075 mg was more effective than ondansetron 8 mg in preventing PONV.

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