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Comparative Study of Metoclopramide, Ondansetron, and Granisetron in Prophylaxis of Post operative Nausea and Vomiting in Patient Undergoing Laparoscopic Cholecystectomy Under General Anaesthesia

Ashutosh Sayana[1],Yogesh Barshiliya[2]

1. Department of Surgery, Govt. Medical College, Haldwani (Uttarakhand). India

2. Venkateshwara School of Pharmacy, Meerut (U.P) India

ABSTRACT

The present study was designed to compare the efficacy of Metoclopramide, Ondansetron and Granisetron in prophylaxis of PONV in patient undergoing laparoscopic cholecystectomy under general anaesthesia. This study was carried out after an institutional ethics committee approval and after filling informed consent form by all the patients of ASA I and II (American Society Anaesthesiologists) of either sexes, aged between 20-60 years randomized selected into the three groups. Total 80 laparoscopic cholecystectomy patients with in the age range of 20-60 year were enrolled in this study. In all three groups, at 0-2 hrs duration the PONV difference was not significant (Fig: 5,6,). The difference was statistically significant in all three groups between 2-12 hrs (Fig: 7,8,9,) but not beyond that (Fig: 10). The order of performance was as follows group C > group B > group A. This study was performed to compare the effectiveness of Granisetron, Ondansetron and Metoclopramide in the management of PONV. The results of our study revealed that in the management of PONV, Granisetron was more effective than Ondansetron which showed better results than Metoclopramide

Key word: *PONV (Post Operative Nausea and Vomiting), ASA (American Society Anaesthesiologists), Laparoscopic Cholecystectomy. Metoclopramide, Granisetron, Ondansetron, Anaesthesia.*

INTRODUCTION

Post operative Nausea and Vomiting (PONV) is common after general anaesthesia. It is a significant cause of morbidity, especially in patients undergoing Laparoscopic cholecystecomy surgery[1].The most common and distressing symptoms, which follow anaesthesia and surgery, are pain and emesis. The syndrome of nausea, retching and vomiting is known as "**sickness**" and each part of it can be distinguished as a separate entity[2].

Nausea is defined as the subjectively unpleasant sensation associated with awareness of the urge to vomit. **Retching** is defined as the labored, spastic, rhythmic contraction of the respiratory muscles without expulsion of the gastric contents and **Vomiting** is defined as the forceful expulsion of gastric contents from the mouth[3]. PONV has been characterized as big "little problem"[4] and has been a common complication for both in patients and out patients undergoing virtually all types of surgical procedures[5]

Sometimes nausea and vomiting may be more distressing especially after minor and ambulatory surgery, delaying the hospital discharge[7]. There are number of factors influencing the occurrence of PONV which includes patient

factors (age, gender, obesity, anxiety, history of motion sickness or previous PONV and gastro paresis), operative procedures , anaesthetic techniques (drugs for general anaesthesia, regional anaesthesia and monitored anaesthesia care) and post operative factors (pain, dizziness, ambulation, oral in-take and opoids). Laparoscopic surgery is one condition, where risk of PONV is particularly pronounced. This increased risk of PONV is due to the pneumoperitoneum causing stimulation of mechanoreceptors in the gut[8].

EMESIS AND ANTIEMESIS

Vomiting occurs due to stimulation of the emetic (vomiting) centre situated in the medulla oblongata. Nausea is accompanied by reduced gastric tone and peristalsis. In the emetic response fundus and body of stomach, esophageal sphincter and esophagus relax, while duodenum and pyloric stomach contract in a retrograde manner. Rhythmic contractions of diaphragm and abdominal muscles then compress the stomach and evacuate its contents *via* the mouth. Conditions that inhibit gastric emptying predispose to vomiting[9].

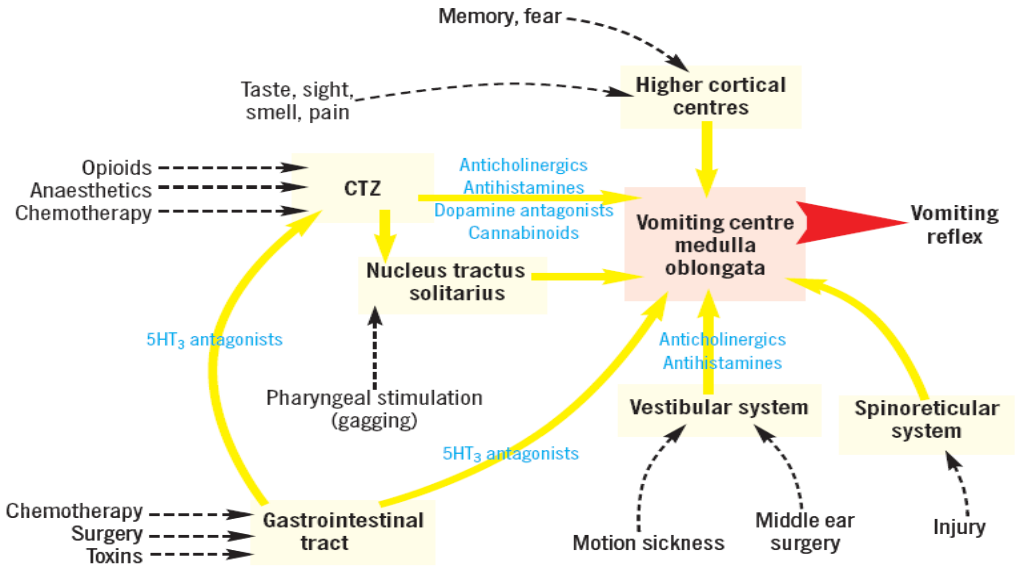

Figure 1: Vomiting pathways and drugs commonly used for nausea

TREATEMENT OF PONV:

There are four main classes of drugs used in the treatment of PONV. Anticholinergics, Antihistaminics, D_2 antagonists and 5-HT_3 antagonists. However, because of the many ways in which the vomiting centre can be triggered, no single drug or class of drug is completely effective in controlling PONV[10].

MATERIALS AND METHODS

This study was carried out after an institutional ethics committee approval and after filling informed consent form by all the patients of ASA I and II (American Society Anaesthesiologists) of either sexes, aged between 20-60 years randomized selected into the three groups.

Study site: G.M.C Haldwani.
Duration of study: Six months.

EXPERIMENTAL PROTOCOL:

Group A (n=25), Metoclopramide 10 mg as a single dose was given by slow i.v inj. with dilution over 5-10 min, prior to induction.

Group B (n=25), Ondansetron 4 mg as a single dose was given by slow i.v inj. with dilution over 5-10 min, prior to induction.

Group-C (n=25) inj. Granisetron 3 mg as a single dose was given by slow i.v inj. with dilution over 5-10 min, prior to induction.

INCLUSION CRITERIA:

- Patients posted for laparoscopic cholecystectomy surgery under GA.
- Patient in the age group of 20 to 60 years.
- Belonging to ASA grade of I & II

EXCLUSION CRITERIA:

- Patient suffering from severe medical illness, ASA grade III & IV.
- Patient with previous history of drug reaction to any of the drug used in the present study.
- History of PONV.
- History of motion sickness.
- History of jaundice within last one month or common bile duct (CBD) stones.
- The patient who have received anti-emetics in the previous 24 hrs.
- Pregnant and lactating women.

In whom operative procedure was complicated.

- Dense adhesions.
- Prolonged surgery > 1 hr.
- Significant intra operative bleeding.
- Menstruating women.

Preoperative assessment was done & routine investigations were noted. On the day of surgery the patient was examined carefully and vitals was noted throughout surgery period. Using single blind randomization techniques patients were assigned to three groups *viz*. Group A (Metoclopramide), Group B (Ondansetron), Group C (Granisetron).

PREMEDICATION:

Injection Midazolam (0.03 mg/kg) and Pentazocine (0.3 mg/kg) was used as a premedication. The study drugs were administered by slow i.v injection immediately before induction of anaesthesia.

GENERAL ANAESTHESIA:

Standard general anaesthesia was given using Thiopentone sodium (5-7 mg/kg) and Suxamethonium (1mg/kg) injection. Anaesthesia was maintained with N_20:O_2 in the ratio of 60:40 and Halothane 0.6% and muscle relaxation

maintained with inj. Vecuronium 0.04 -0.08 mg/kg. All patients were received insertion of nasogastic tube (NG) for gastric decompression prior to induction & port placement. The NG tubes shall be removed immediately after reversal of anaesthesia in all patients. Patients were reversed by inj.Neostigmine 0.04 mg/kg and inj.Atropine (0.02 mg/kg). Intra operatively vitals was recorded, fluid replaced as per requirements.

ASSESSMENT OF PONV:

Episodes of nausea and vomiting were recorded in the first 24 hours post operatively at the intervals of 0-1, 1-2, 2-4, 4-6, 6-12, 12-24 hr. PONV was evaluated by using a numeric scoring system 0: no nausea or vomiting, 1: nausea alone 2: vomiting once 3: vomiting two or more times in 30 minutes[12]. A PONV score of 3 or persistent nausea (>2 hours) is defined as severe PONV[12] and treated with 10mg i.v. Metoclopramide as a rescue anti-emetic.

RESULTS

0: NO NAUSEA OR VOMITING
1: NAUSEA ALONE.
2: VOMITING ONCE.
3: VOMITING TWO OR MORE.

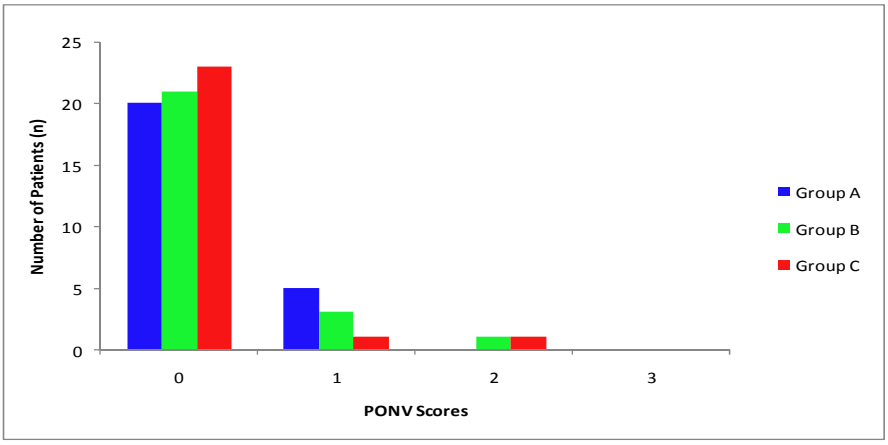

Figure 2: Post operative Nausea & Vomiting in three groups in 0-1hrs time interval

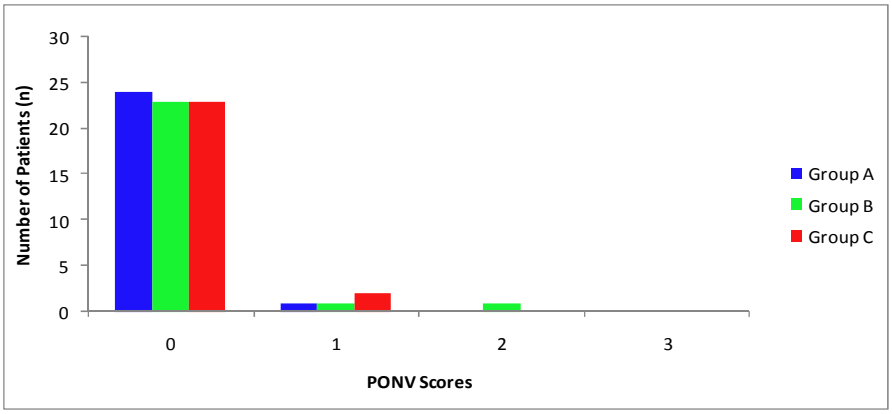

Figure 3: Post operative Nausea & Vomiting in three groups in 1-2 hrs time interval

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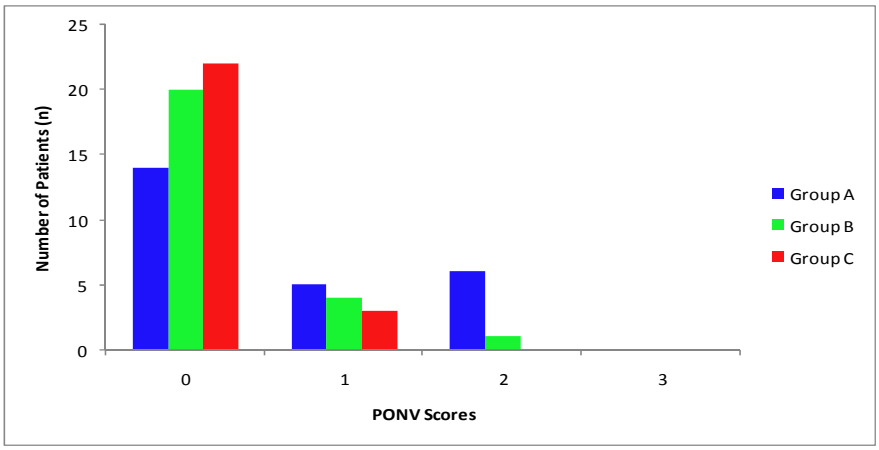

Figure 4: Post operative Nausea & Vomiting in three groups in 2-4hrs time interval

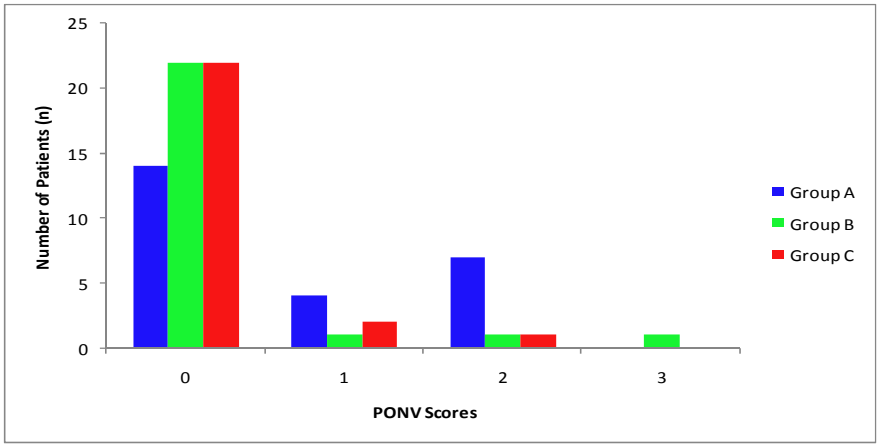

Figure 5: Post operative Nausea & Vomiting in three groups in 4-6 hrs time interval *Significant (P≤0.05)

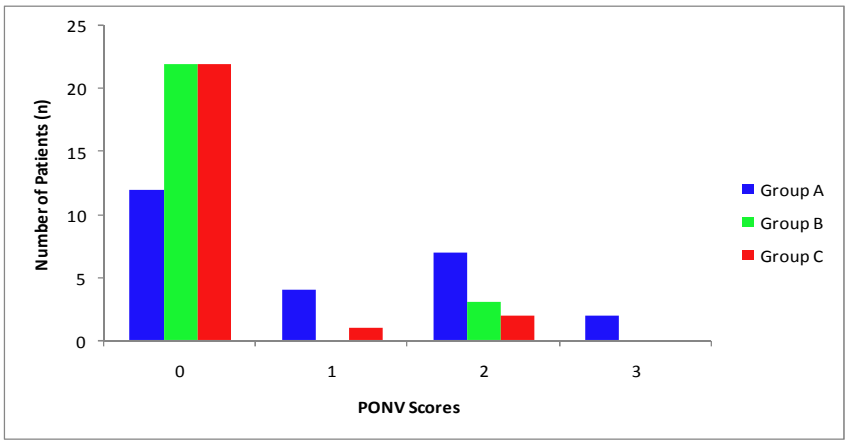

Figure 6: Post operative Nausea & Vomiting in three groups in 6-12 hrs time intervals *Significant (P≤0.05)

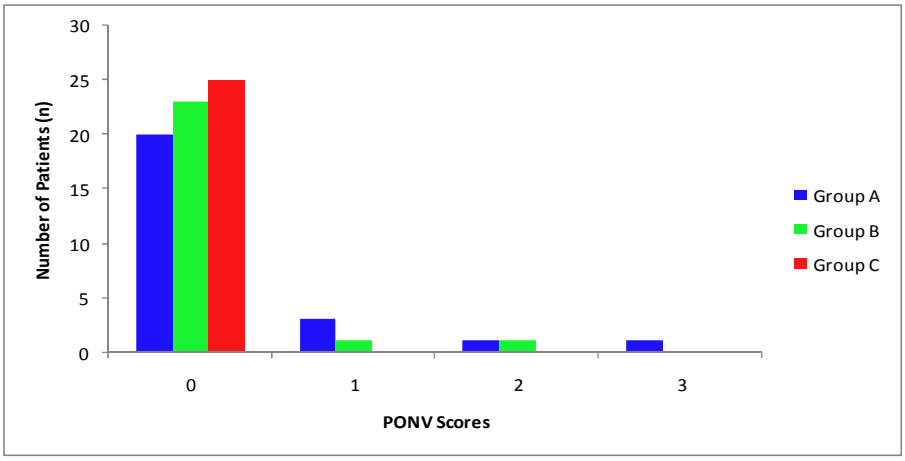

Figure 7: Post operative Nausea & Vomiting in three groups in 12-24 hrs time interval

Total 80 laparoscopic cholecystectomy patients with in the age range of 20-60 year were enrolled in this study. Five patients were excluded from the study because they did not follow inclusion criteria. Before enrollment in this study patients were informed verbally about this study and written consent form was signed by each subject. The patients were randomly divided into three groups.Group A patients received Metoclopramide 10 mg as a single dose while group B patients & group C patients received Ondansetron 4 mg and Granisetron 3 mg as a single dose respectively. In all three groups, at 0-2 hrs duration the PONV difference was not significant (Fig: 2,3,). The difference was statistically significant in all three groups between 2-12 hrs (Fig: 45,6,) but not beyond that (Fig: 7). The order of performance was as follows group C > group B > group A.

DISCUSSION:

There are four main classes of drugs used in the management of PONV, Anticholinergic, Antihistaminics, D_2 antagonists and 5- HT_3 antagonists. The results of our study revealed that in the management of PONV Granisetron was more effective than Ondansetron which is considered better than Metoclopramide. The findings of our study have a resemblance to other two studies where Ondansteron was more effective than Metoclopramide & placebo[13,14]. One other study revealed that minimal emetic episodes were observed in early post operative period (1-12 hrs) in patients who had received Granisetron (i.v.) in comparison to Ondansetron and Metoclopramide[15].

CONCLUSION:

This study was performed to compare the effectiveness of Granisetron, Ondansetron and Metoclopramide in the management of PONV. The results of our study revealed that in the management of PONV, Granisetron was more effective than Ondansetron which showed better results than Metoclopramide. The results showed that Granisetron is a better choice for the treatment of post operative nausea and vomiting. Some other advanced studies are needed to establish these findings.

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