



ABOLITION OF POSTOPERATIVE VOMITING WITH METOCLOPRAMIDE ONDANSETRON AND GRANISETRON: A COMPARATIVE STUDY

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Abstract: Post-operative vomiting is one of the most common and distressing side effect encountered by patients following anesthetic and surgical procedure. Antiemetic drugs were administered before to prevent the post-operative vomiting. This study conducted to compare the efficacy of three different antiemetics. Total 75 patients was selected and randomly divided in to three groups. Group-I was treated with Metoclopramide, Group-II Ondansetron and Group-III Granisetron. The antiemetic activity of drugs compared at 0-4h, 4-8h, 8-16h and 16-24h time intervals. At 0-4h showed significant incidence of vomiting in Metoclopramide drug compared to other drugs. No incidence of vomiting observed at different time intervals in Granisetron administered patients. There is no significant difference in demographic and hemodynamic parameters compared three drugs at different time intervals. In this study observations showed Granisetron significantly prevent the post-operative vomiting compared to Metoclopramide and Ondansetron.

Keywords: Anti-emetics, Granisetron, Metoclopramide, Ondansetron, Post-operative, Vomiting.

INTRODUCTION

Anti-emetics are the agents used to prevent vomiting. Prior administration of these drugs prevents the post-operative vomiting in patients receiving general anesthesia [1]. Postoperative vomiting is one of the most common and distressing side effect experienced by patients following anesthesia and surgical procedure [2]. As per present era, incidence of postoperative vomiting ranges from 25-55% inpatient surgery, 8-47% outpatient surgery [3]. Postoperative vomiting can cause tension on suture lines, bleeding at operative sites, wound dehiscence and pain. In neurological cases it can increase intracranial tension [4]. Along with treatment of postoperative pain; there is requirement of prevention and treatment of emesis associated with major surgeries. Most of the used anti-emetic drugs like anti-histamines, anti-cholinergic, and dopamine receptor antagonist and narcoleptics posse's significant adverse effects. Metoclopramide is most commonly used anti-emetic, it prevent the emesis by acting as a dopamine receptor antagonist, accelerate gastric emptying and increase lower esophageal sphincter tone [5]. Postoperative emesis higher in women, adults, some of the surgeries like breast surgery, laparoscopy, and ear & eye surgery [6, 7]. The newer anti-emetics like 5-HT receptor antagonists provide better effect with fewer side effects compared to older drugs. These drugs provide alternative option to prevent postoperative emesis [8, 9]. This study designed and conducted to compare anti-emetic activity of Ondansetron and Granisetron with

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Metoclopramide in patients undergoing elective laparoscopic surgeries under general anesthesia.

MATERIALS AND METHODS

Inclusion criteria:

- Age 18-55 years.
- Using General Anesthesia.
- Undergoing elective laparoscopic surgery [10].

Exclusion criteria:

- Recent or chronic ingestion of any other medicine with potential anti-emetic properties.
- Hypersensitivity to Metoclopramide, Ondansetron, Granisetron.
- History of motion or morning sickness.
- Cardiovascular diseases (Hypertension, Angina, Congestive heart failure etc)
- Pulmonary diseases (Asthma, COPD etc)
- Renal diseases (Kidney failure, Kidney stones etc)
- Hepatic diseases (Liver cancer, Liver failure etc)
- Neurological diseases.
- Endocrine abnormalities and diseases [11].

Study design:

Total 75 patients was included and randomly divided in to three groups.

- Group-I- Metoclopramide (10mg/kg/i.v) [12]
- Group-II- Ondansetron (8mg/kg/i.v) [13]
- Group-III- Granisetron (40µg/kg/i.v) [14]

Each group contains 25 patients.



Procedure:

The total 75 patients in the age group of 18-55 years belonging to American Society of Anesthesiologist (ASA) grade I and grade II having general anesthesia undergoing elective laparoscopic surgeries under general anesthesia were selected for the present study. Every effort was made to standardize the anesthetic technique [15]. Intraoperative hydration with solute was set at 10ml/kg plus replacement of 3ml for each ml of blood lost. All the patients received premedication of Glycopyrrolate (0.2mg), Buprinorphine (4µg/kg) and Midazolam (0.03mg/kg) all through intravenous route, Patients were induced anesthesia with Thiopentonesodium (5mg/kg); tracheal intubation was facilitated with Vecuronium bromide (0.1mg/kg) anesthesia was maintained with N₂O & O₂ (5:3) and muscle relaxation with Vecuronium bromide with one fifth of loading dose [16]. Ventilation was controlled manually. At the end of surgery Neostigmine (0.05mg/kg) and Atropine (0.02mg/kg) intravenous was administered for reversal of neuromuscular blockade and after complete recovery patients were extubated. Selected patients were allocated randomly to one of the three groups [17]. As it was a double blind randomized study, medications was prepared in three identical 10ml syringes to ensure blinding. Before induction of anesthesia, patients were randomized in a double blind fashion and receive intravenous Metoclopramide 0.15mg/kg (Group-I), Ondansetron 8mg/kg (Group-II) and Granisetron 40µg/kg (Group-III) in 10 ml coded syringe. Patient's age, weight, pulse rate, blood pressure, duration of anesthesia and duration of surgery were recorded. After surgery patients were observed at different time intervals at 0-4h, 4-8h, 8-16 and 16-24h for postoperative vomiting. If patient complain pain Ketorolac 0.1mg/kg were administered. Incidence of vomiting occurring in first 4hs

postoperatively is considered as early vomiting and after 4h was considered as late emetic episode [18].

Statistical Analysis:

The data was analysed by SPSS (16.0 version) software. Chi-Square test applied to find the statistical significant within and between groups. P value less than 0.05 considered statistically significant [19].

RESULTS

No significant difference in the demographic data of included patients in this study. Slight increase in the weight in Granisetron group compared to other anti-emetics (Table.1). There was no significant changes in pulse rate, blood pressure in the all the groups before surgery. Metaclopramide administered group showed insignificant increase in the pulse rate, systolic blood pressure after surgery and other groups showed slight decrease. Decreased diastolic pressure was observed in diastolic blood pressure in Metaclopramide, Granisetron group and no change in Ondansetron group (Table-2). Metaclopramide showed significant incidence of vomiting at starting and it decreased at 16th hour. Granisetron showed less incidence of emesis. Granisetron administered preoperatively significantly prevent the emesis at all the time intervals (Table.3 & 4).

Table.1: Demographic and anesthetic data (MEAN±SD)

Patients characteristics	Metoclopramide (n=25)	Ondansetron (n=25)	Granisetron (n=25)
Age (Years)	29.36±5.80	30.92±6.09	29.68±5.45
Weight (Kg)	52.15±3.38	51.52±2.67	53.02±2.72
Duration of Anesthesia (min)	98.91±0.85	97.65±0.75	98.22±0.60
Duration of surgery (min)	91.20±0.62	89.90±0.55	90.45±0.58

Table.2: Hemodynamic changes before and after anesthesia (MEAN±SD)

Hemodynamic parameter	Metoclopramide (n=25)		Ondansetron (n=25)		Granisetron (n=25)	
	Before	After	Before	After	Before	After
Pulse rate (per min)	82.52±3.23	88.25±2.26	83.62±4.09	82.20±3.92	82.68±5.45	82.68±5.45
Systolic Blood pressure (mmHg)	122.34±9.83	126.03±8.51	123.48±8.72	123.82±7.73	122.52±8.76	123.29±2.56
Diastolic Blood Pressure (mmHg)	81.12±8.58	80.52±6.38	80.16±7.92	80.66±5.92	82.20±8.63	81.45±5.60

(P>0.05 no significant compared hemodynamic changes before and after within the drugs and between the drugs)

Table.3: Comparison of percentage of incidence of vomiting in different time intervals

Anesthesia period (hours)	Metaclopramide	Ondansetron	Granisetron
0-4 h	3 (12%)	0 (0%)	0 (0%)
4-8 h	3 (12%)	1 (4%)*	0 (0%)
8-16 h	2 (8%)	1 (4%)*	0 (0%)
16-24 h	1 (4%)*	1 (4%)*	0 (0%)

(P<0.05 significant compared 0-4 hour with other hours)

Table.4: Comparison of efficacy of drugs to prevent vomiting

Anesthesia period (hours)	0-4 hour	4-8 hours	8-16 hour	16-24 hour
Metaclopramide	3 (12%)	3 (12%)	2 (8%)	1 (4%)
Ondansetron	0 (0%)*	1 (4%)	1 (4%)	1 (4%)
Granisetron	0 (0%)*	0 (0%)*#	0 (0%)*#	0 (0%)*#

(P<0.05 significant compared Metaclopramide with Ondansetron, Granisetron, #P<0.05 significant compared Ondansetron with Granisetron)

DISCUSSION

Patients undergoing laparoscopic surgery show postoperative vomiting due to anesthesia. Pre administration of antiemetic drugs prevents the incidence of postoperative vomiting. Here we studied efficacy of three antiemetic drugs Metoclopramide, Ondansetron and Granisetron. There is no significant changes were observed in hemodynamic parameters. Incidence of emesis was high in Metoclopramide administered group compared to other drugs at 0-4 hours. No incidence of vomiting was observed patients treated with Granisetron. Number of emesis was more at 0-4h and decreased 4-8h, 8-16h. Only one patient had vomiting at 16-24h. This antiemetic drugs act on dopamine, serotonin receptors and prevent the vomiting. Metoclopramide act as a dopamine, 5HT₃ receptor antagonist and 5HT₄ agonist. Granisetron showed more efficacy than other drugs. This study explains Granisetron can inhibit incidence of vomiting. Use of this drug has more advantage than other drugs. There is requirement of several multi centre clinical trials to prove Granisetron efficacy to prevent post-operative vomiting.

CONCLUSION

Administration of anti-emetics in patients has high risk of postoperative vomiting should require special considerations and more clinical studies. From the above study observations explains i.v administration of Granisetron showed high efficacy compared to Metaclopramide and ondansetron.

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