



To compare the efficacy of prophylactic Ondansetron (4mg i.v) and Granisetron (2mg i.v) in preventing the incidence of PONV in adults undergoing Laparoscopic surgeries under general anaesthesia and to assess the requirement of other rescue antiemetic in the postoperative period.

KEYWORDS

Granisetron, Ondansetron, Postoperative Nausea and Vomiting (PONV), Laparoscopic surgeries.

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INTRODUCTION

Postoperative nausea and vomiting (PONV) is an unpleasant, distressing, and exhausting experience for patients. The overall incidence of PONV has decreased from 60% when ether and cyclopropane were used, to 20%-30% nowadays, with 0.1% of patients suffering from intractable PONV. Laparoscopy compared to conventional surgery reduces the patient morbidity significantly. PONV are the most common distressing symptoms occurring after laparoscopic surgeries. The incidence of PONV varies from 36–82 % during immediate postoperative recovery and can be as high as 40-70% in laparoscopic cholecystectomy. Patients fear for PONV more than postoperative pain, with 14% worrying about pain compared to 23% worrying about PONV. The risk factors for PONV include - female gender, non-smoking status, history of motion sickness, use of opioid analgesics, volatile anaesthetics, premedication, postoperative pain, patient mobilization, hemodynamic instability, initiation of early oral intake, residual pneumoperitoneum, obesity, 20-40 years of age and 7 days premenstrual phase.

Ondansetron is the class of selective 5 hydroxytryptamine subtype 3 (5HT₃)receptor antagonists which lack effects on cholinergic, adrenergic, dopaminergic or histaminergic receptors. Granisetron is recently introduced, 5HT₃ stronger 5HT₃ receptor antagonist, with binding. It is more potent and longer acting compared to ondansetron against emesis associated with chemotherapy, and has been found to be effective for preventing PONV after laparoscopic surgeries.

OBJECTIVES

- To determine the efficacy of prophylactic Ondansetron and Granisetron in preventing the incidence of postoperative nausea and vomiting in adults undergoing Laparoscopic surgeries under general anaesthesia.
- To assess the requirement of other rescue antiemetic in the postoperative period.

METHODOLOGY

In this randomized, clinical study, we studied 80 ASA Grade I and II patients between the ages of 15 and 55 years undergoing laparoscopic surgeries under general anaesthesia.

INCLUSION CRITERIA:

- ASA grade I and II.
- Age - 15 to 55 years.
- Patients scheduled for laparoscopic surgeries under general anaesthesia.

EXCLUSION CRITERIA:

- ASA grade III and IV.
- History of allergy to Ondansetron or Granisetron.
- Cardiac abnormalities (e.g., cardiomyopathy, congestive heart failure, arrhythmias requiring medication, more than first degree heart block, or preexisting complete bundle branch block).
- Significant liver disease or renal pathology.
- Patients with cancer on chemotherapy/radiotherapy.
- Patients shifted to ICU and ventilated in postoperative care.
- Patients put on nasogastric tube postoperatively.
- Known alcohol or drug abuse.

RESULTS

Group A 40 patients received Ondansetron 4mg(2 mL) IV. Group B 40 patients received Granisetron 2mg(2 mL) IV. Both the groups received the drug 2 minutes before induction.

DEMOGRAPHIC DATA

1) Age

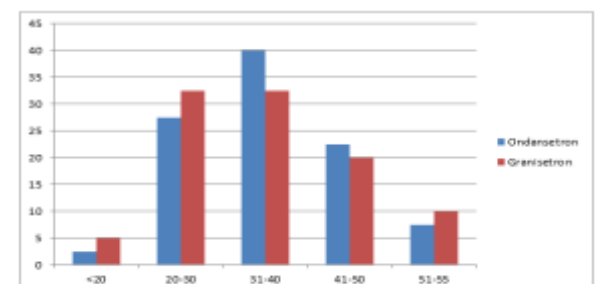
This distribution of the sample among both the groups was found to be statistically non-significant and matched with $P=0.608$.

TABLE 5: AGE DISTRIBUTION OF PATIENTS STUDIED

Age in years	Ondansetron		Granisetron	
	No	%	No	%
<20	1	2.5	2	5.0
20-30	11	27.5	13	32.5
31-40	16	40.0	13	32.5
41-50	9	22.5	8	20.0
51-55	3	7.5	4	10.0
Total	40	100.0	40	100.0
Mean + SD	35.93+8.67		34.85+9.94	

Samples are age matched with $P=0.608$

GRAPH 1: AGE DISTRIBUTION OF PATIENTS



2) GENDER:

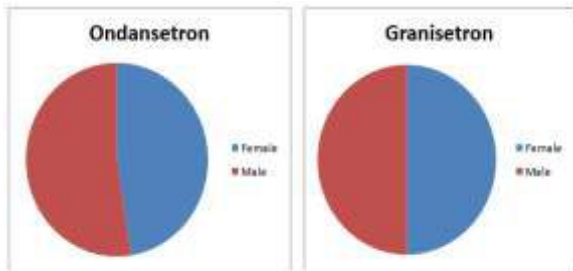
This distribution of the sample among both the groups was found to be statistically non-significant and gender matched with P=0.823.

TABLE 6: GENDER DISTRIBUTION PATIENTS STUDIED

Gender	Ondansetron		Granisetron	
	No	%	No	%
Female	21	52.5	20	50.0
Male	19	47.5	20	50.0
Total	40	100.0	40	100.0

Samples are gender matched with P=0.823.

GRAPH 2: DISTRIBUTION OF GENDER IN TWO GROUPS OF PATIENTS STUDIED



3) ASA GRADE:

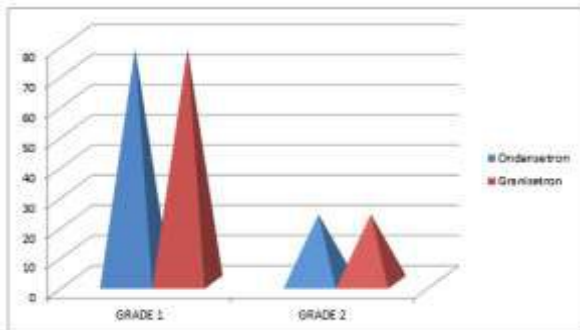
ASA grade distribution is statistically similar in two groups with P=1.000

TABLE 7: ASA GRADE DISTRIBUTION IN TWO GROUPS OF PATIENTS STUDIED

ASA Grade	Ondansetron		Granisetron	
	No	%	No	%
Grade I	31	77.5	31	77.5
Grade II	9	22.5	9	22.5
Total	40	100.0	40	100.0

Samples are ASA grade matched with P=1.000

GRAPH 3: DISTRIBUTION OF ASA GRADE IN TWO GROUPS OF PATIENTS STUDIED



4) BODY WEIGHT:

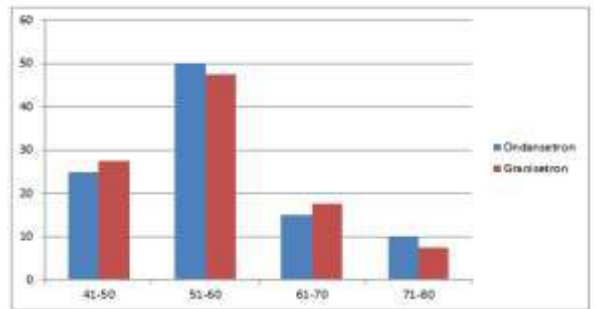
Weight distribution was statistically similar in the two groups with P = 0.698

Table 8: Weight (kg) distribution in two groups of patients studied

Weight (kg)	Ondansetron		Granisetron	
	No	%	No	%
41-50	10	25.0	11	27.5
51-60	20	50.0	19	47.5
61-70	6	15.0	7	17.5
71-80	4	10.0	3	7.5
Total	40	100.0	40	100.0
Mean+SD	57.55+8.37		56.83+8.26	

Samples are weight matched with P=0.698.

GRAPH 4: DISTRIBUTION OF WEIGHT (KG) IN TWO GROUPS OF PATIENTS STUDIED



5) TYPE OF SURGERY (LAPAROSCOPIC PROCEDURE)

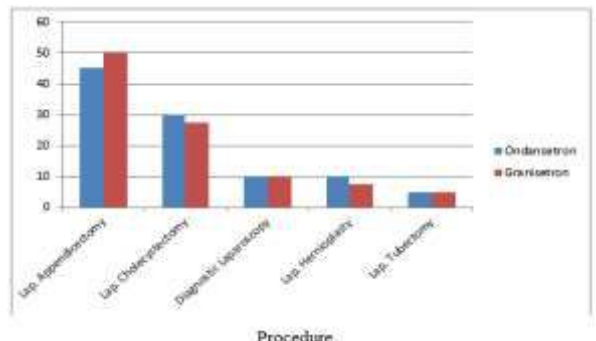
Type of surgery in both the groups was found to be statistically non-significant (P=0.987).

TABLE 9: PROCEDURE IN TWO GROUPS OF PATIENTS STUDIED

Procedure	Ondansetron		Granisetron	
	No	%	No	%
Lap. Appendectomy	18	45.5	20	50.0
Lap. Cholecystectomy	12	30.0	11	27.5
Diagnostic Laparoscopy	4	10.0	4	10.0
Lap. Hernioplasty	4	10.0	3	7.5
Lap. Tubectomy	2	5.0	2	5.0
Total	40	100.0	40	100.0

Lap-Laparoscopic.
P=0.987, Not significant, Fisher Exact test.

GRAPH 5: DISTRIBUTION OF PROCEDURE IN THE TWO GROUPS OF PATIENTS STUDIED



6) DURATION OF SURGERY:

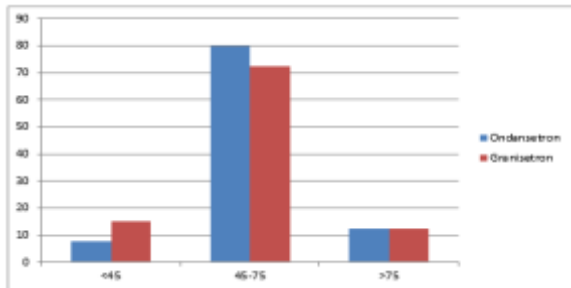
Mean duration of surgery was statistically similar in two groups studied, with P = 0.971.

TABLE 10: COMPARISON OF DURATION OF SURGERY IN TWO GROUPS OF PATIENTS STUDIED

Duration of surgery in Minutes	Ondansetron		Granisetron	
	No	%	No	%
<45	3	7.5	6	15.0
45-75	32	80.0	29	72.5
>75	5	12.5	5	12.5
Total	40	100.0	40	100.0
Mean+SD	56.48+11.75		56.38+12.64	

P=0.971, Not significant, Student t test

GRAPH 6: DISTRIBUTION OF DURATION OF SURGERY IN TWO GROUPS OF PATIENTS STUDIED



7) DURATION OF ANAESTHESIA

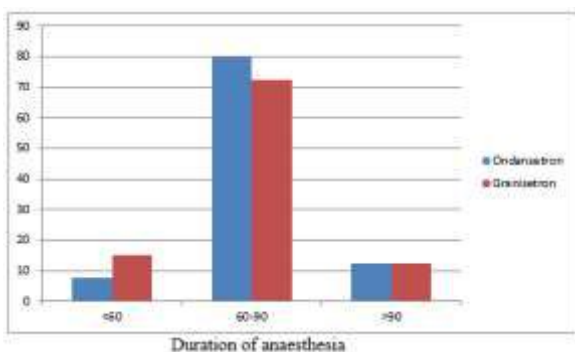
Mean duration of anaesthesia was statistically similar in the two groups of patients studied with P = 0.944.

TABLE 11: COMPARISON OF DURATION OF ANAESTHESIA IN TWO GROUPS OF PATIENTS STUDIED.

Duration of anaesthesia in minutes	Ondansetron		Granisetron	
	No	%	No	%
<60	3	7.5	6	15.0
60-90	32	80.0	29	72.5
>90	5	12.5	5	12.5
Total	40	100.0	40	100.0
Mean+SD	71.10+12.06		70.90+13.09	

p=0.944, not significant, student t test.

GRAPH 7: DISTRIBUTION OF DURATION OF ANAESTHESIA IN TWO GROUPS OF PATIENTS.



B. POSTOPERATIVE DATA

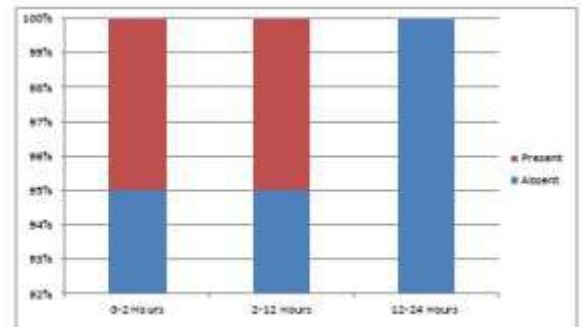
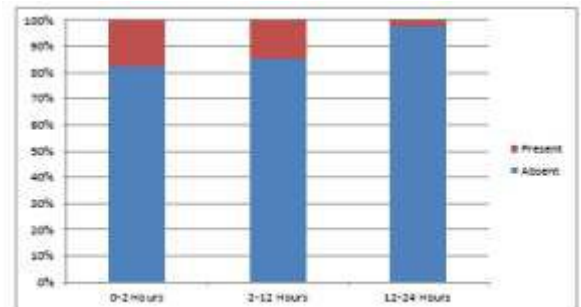
1) INCIDENCE OF NAUSEA:

Table 12 shows the occurrence of nausea during the first 24 hour postoperative period. These results were found to be statistically non-significant. (p>0.05).

TABLE 12: INCIDENCE OF NAUSEA IN TWO GROUPS AT DIFFERENT TIME INTERVALS.

Nausea	0-2 Hours	2-12 Hours	12-24 Hours	% change
Ondansetron (n=40)				
• Absent	33 (82.5%)	34(85%)	39(97.5%)	15.0%
• Present	7 (17.5%)	6(15%)	1(2.5%)	-15.0%
Granisetron (n=40)				
• Absent	38(95%)	38(95%)	40(100%)	5.0%
• Present	2(5%)	2(5%)	0(0%)	-5.0%
P value	0.154	0.263	1.000	-

Chi-Square test/Fisher Exact test



2) INCIDENCE OF RETCHING:

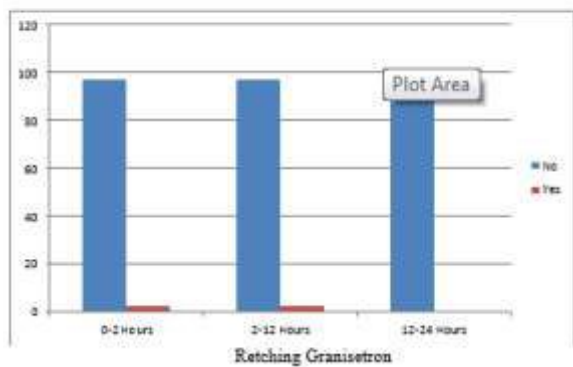
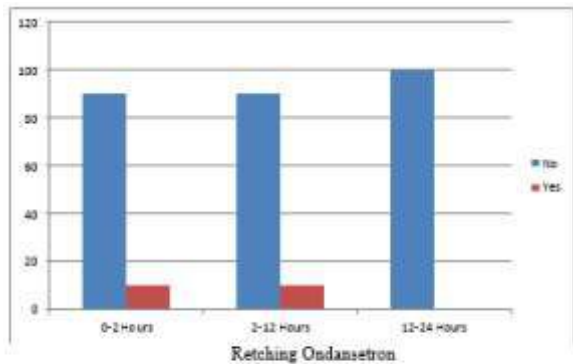
Table 13 & graph no 9 shows the occurrence of retching during the first 24 hour postoperative period. These results were found to be statistically non-significant (p>0.05).

Table 13: Incidence of Retching in two groups at different time intervals

Retching	0-2 Hours	2-12 Hours	12-24 Hours	% change
Ondansetron (n=40)				
• No	36(90%)	36(90%)	40(100%)	10.0%
• Yes	4(10%)	4(10%)	0(0%)	-10.0%
Granisetron (n=40)				
• No	39(97.5%)	39(97.5%)	40(100%)	2.5%

• Yes	1(2.5%)	1(2.5%)	0(0%)	-2.5%
P value	0.166	0.359	1.000	-

Chi-Square test/Fisher Exact test



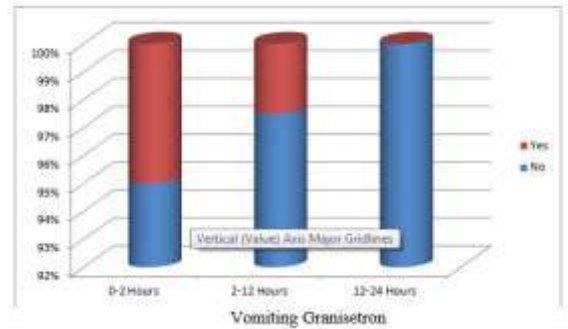
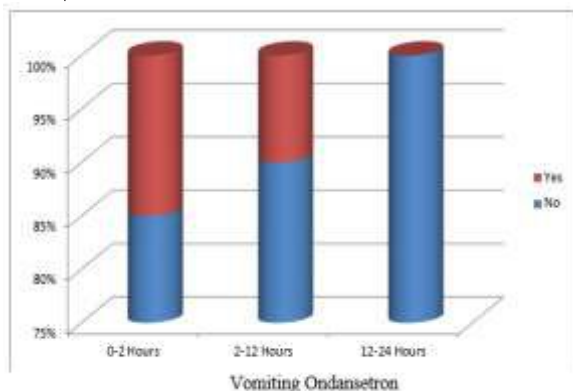
3) INCIDENCE OF VOMITING:

Table 14 & graph no 10 shows the occurrence of vomiting during the first 24-hour postoperative period. All these results were found to be statistically non-significant (p> 0.05).

TABLE 14: INCIDENCE OF VOMITING IN THE TWO GROUPS AT DIFFERENT TIME INTERVALS

Retching	0-2 Hours	2-12 Hours	12-24 Hours	% change
Ondansetron (n=40)				
• No	34(85%)	36(90%)	40(100%)	15.0%
• Yes	6(15%)	4(10%)	0(0%)	-15.0%
Granisetron (n=40)				
• No	38(95%)	39(97.5%)	40(100%)	5.0%
• Yes	2(5%)	1(2.5%)	0(0%)	-5.0%
P value	0.263	0.359	1.000	-

Chi-Square test/Fisher Exact test.



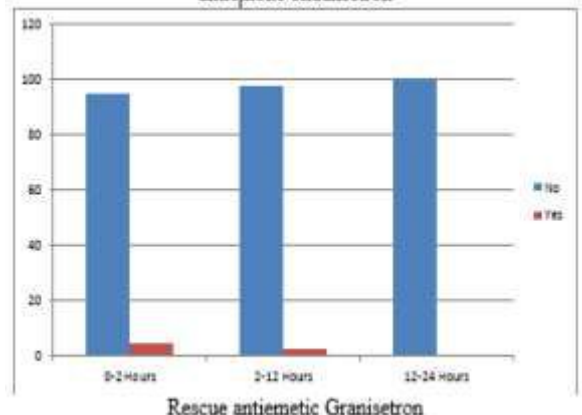
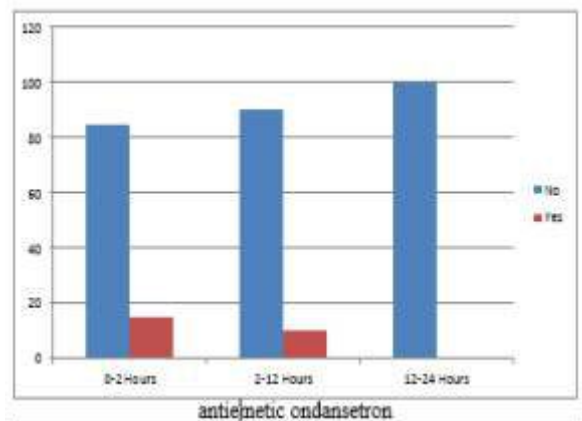
4) INCIDENCE OF RESCUE ANTIEMETIC REQUIREMENT:

The rescue antiemetic used was Injection Metoclopramide 10 mg i.v. These results were statistically non significant. (p> 0.05).

TABLE 15: INCIDENCE OF RESCUE ANTIEMETIC REQUIREMENT IN TWO GROUPS AT DIFFERENT TIME INTERVALS.

Rescue antiemetic	0-2 Hours	2-12 Hours	12-24 Hours	% change
Ondansetron (n=40)				
• No	34(85%)	36(90%)	40(100%)	15.0%
• Yes	6(15%)	4(10%)	0(0%)	-15.0%
Granisetron (n=40)				
• No	38(95%)	39(97.5%)	40(100%)	5.0%
• Yes	2(5%)	1(2.5%)	0(0%)	-5.0%
P value	0.263	0.359	1.000	-

Chi-Square test/Fisher Exact test.



1) INCIDENCE OF COMPLETE RESPONSE:

“Complete response” defined as the absence of nausea, retching or vomiting and no need for rescue antiemetic during the 24 hour postoperative observation period.

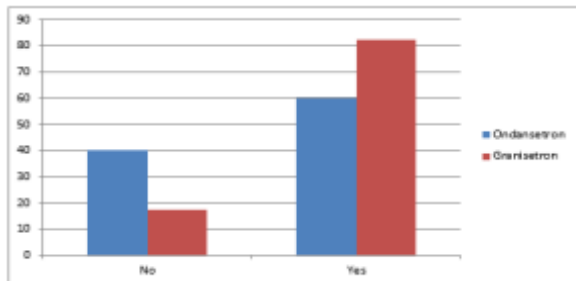
Complete response is significantly more in granisetron group with P=0.026*.

TABLE 16: COMPLETE RESPONSE IN TWO GROUPS OF PATIENTS STUDIED.

Complete Response	Ondansetron		Granisetron	
	No	%	No	%
No	16	40.0	7	17.5
Yes	24	60.0	33	82.5
Total	40	100.0	40	100.0

P=0.026*, Significant, Chi-Square test

GRAPH 12 : DISTRIBUTION OF COMPLETE RESPONSE IN TWO GROUPS OF PATIENTS STUDIED



6) INCIDENCE OF ADVERSE REACTIONS:

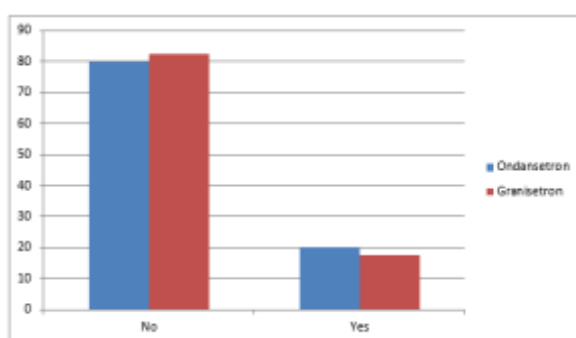
Incidence of adverse reactions are not statistically significant with P=0.775.

TABLE 17: ADVERSE REACTIONS IN TWO GROUPS OF PATIENTS STUDIED

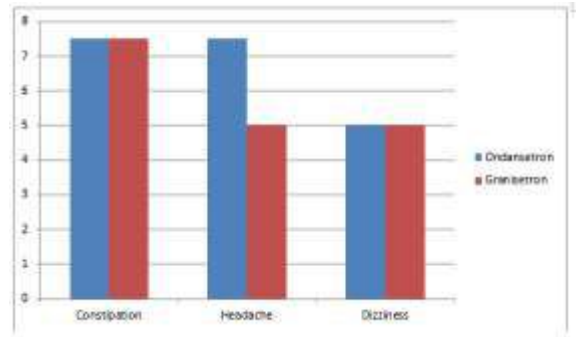
Complete Response	Ondansetron (n=40)		Granisetron (n=40)	
	No	%	No	%
No	32	80.0	33	82.5
Yes	8	20.0	7	17.5
• Constipation	3	7.5	3	7.5
• Headache	3	7.5	2	5.0
• Dizziness	2	5.0	2	5.0

P=0.775, Not significant, Chi-Square test.

GRAPH 13: DISTRIBUTION OF ADVERSE REACTIONS IN TWO GROUPS OF PATIENTS STUDIED.



GRAPH 14: INCIDENCE OF EACH ADVERSE EFFECT IN TWO GROUPS OF PATIENTS STUDIED



7) OVERALL INCIDENCE OF NAUSEA, RETCHING, VOMITING AND RESCUE ANTIEMETIC REQUIREMENT:

These results were significant statistically.

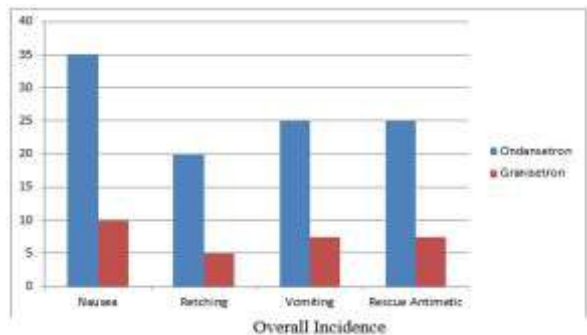
TABLE 18: COMPARISON OF OVERALL INCIDENCE OF NAUSEA, RETCHING, VOMITING AND RESCUE ANTIEMETIC IN TWO GROUPS STUDIED

Overall Incidence	Ondansetron (n=40)		Granisetron (n=40)		P Value
	No	%	No	%	
Nausea	14	35.0	4	10.0	0.007**
Retching	8	20.0	2	5.0	0.04.*
Vomiting	10	25.0	3	7.5	0.034*
Rescue Antiemetic	10	25.0	3	7.5	0.034*

* Moderately significant (P value: 0.01 < P < 0.05)

** Strongly significant (P value : P < 0.01)

GRAPH 15: OVERALL INCIDENCE OF NAUSEA, RETCHING, VOMITING AND RESCUE ANTIEMETIC IN TWO GROUPS OF PATIENTS STUDIED



CONCLUSION

Our study showed that overall incidence of complete response in granisetron group (82.5%) is higher than ondansetron group (60%) and is statistically significant [p value = 0.026* (p < 0.05)]. Granisetron at an intravenous dose of 2 mg is safe and well-tolerated and more effective than 4 mg intravenous ondansetron for antiemetic prophylaxis in adults undergoing laparoscopic surgeries under general anesthesia and can be employed as routine antiemetic prophylaxis for PONV.

SUMMARY

The patients were divided randomly into 2 groups (A & B) of 40 each. Approximately 2 minutes before induction of general anaesthesia each patient received either 4mg i.v ondansetron or the 2mg i.v granisetron. Uniform anaesthetic technique was

employed for both the groups. Postoperatively patients were assessed for episodes of nausea, retching and vomiting and the need for rescue antiemetic at intervals of 0-2 hours, 2-12 hours, and 12-24 hours. Episodes of PONV were identified by spontaneous complaints by the patients or by direct questioning and recorded. Rescue antiemetic Inj. Metoclopramide 10 mg IV was given in the event of one or more episodes of vomiting. Incidence of complete response and adverse effects were assessed 24 hours postoperatively. Observation and results were evaluated between the two groups.

1. There was no statistically significant difference between ondansetron & granisetron on incidence of nausea, retching, vomiting, need for rescue antiemetic at intervals of 0-2 hours, 2-12 hours, 12-24 hours postoperatively.

2. Both ondansetron & granisetron were well tolerated, with minimum adverse effects; most common adverse effect observed was constipation. There was no significant difference between the two groups with respect to adverse effects.

3. Overall incidence of complete response in granisetron group (82.5%) is higher than ondansetron group (60%) and is statistically significant p value = 0.026* (P < 0.05).

Based on the results of our study, Granisetron at an intravenous dose of 2 mg is safe and well-tolerated and more effective than 4 mg intravenous Ondansetron for antiemetic prophylaxis in laparoscopic surgeries under general anaesthesia.

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