

Effect of peroperative use of granisetron and ondansetron on postoperative nausea and vomiting – a comparative study

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Abstract

Background Post operative nausea and vomiting (PONV) is a common problem following general as well as regional anaesthesia. This causes great distress to the patient, may worsen surgical outcome and prolongs hospital stay. Prophylactic use of antiemetic in the preoperative or postoperative period reduces PONV.

Objectives The study was designed to compare antiemetic effects of intravenous use of granisetron and ondansetron in the peroperative period for prevention of PONV following elective gynaecological surgery under general anaesthesia.

Methods 60 (sixty) patients undergoing elective gynaecological surgery (total abdominal hysterectomy) under general anaesthesia of ASA grade I and II aged between 35-50 years were selected randomly and divided into two groups (group 'O' & group 'G') of thirty patients each. Patients of group 'O' received intravenous Inj. ondansetron 0.1 mg/kg body weight & group 'G' received intravenous Inj. granisetron 2 mg bolus over 30 sec just before peritoneal closure. Both the group received a standard general anaesthesia. Postoperative analgesia was provided with diclofenac suppository (50mg) and ketorolac tromethamine 30mg intra-muscularly. In the recovery room occurrence of post operative nausea and vomiting was assessed for 12 hours. All data were compiled and analyzed for statistical significance by Student's 't' tests (unpaired). $P < 0.05$ (CL 95%) was considered as significance.

Results The incidence of post operative nausea and vomiting was reduced in both groups but no significant difference between the groups. No haemodynamic or psycho-mimetic adverse events were observed in the patients.

Keywords: Postoperative nausea and vomiting, ondansetron & granisetron.

(JBSA 2011; 24(1): 18-22)

Introduction

Nausea, retching and vomiting are common among the post operative complications following surgery & anaesthesia¹. Although often regarded by medical and nursing staffs as only a minor complication of anaesthesia and surgery, these are frequently the cause of great distress to patients and it is often the worst memory of their hospital stay.² In the past, the incidence of post-operative nausea and vomiting was reported to be as high as 60% (range 14-82%) following operation under general anaesthesia.³ The aetiology of nausea and vomiting after surgery is multifactorial in

origin. Age, menstrual cycle, type of surgery and anaesthetic procedure may influence PONV.⁴ Many drugs have been tried to prevent or alleviate this problem. The antiemetics that are currently being widely used for treatment in our country are prochlorperazine, metoclopramide and promethazine. But these drugs have varying effectiveness and their use is limited because of delayed recovery, sedation and sometimes distressing side effect of extrapyramidal symptoms.^{5,6,7} The introduction of 5HT₃ receptor antagonist in 1990s was heralded as a major advance in the treatment of PONV because of the

absence of adverse effect that were observed with commonly used traditional antiemetics.^{8,9} The commonly used drug ondansetron⁸ 4 mg I/V single dose is the effective dose to prevent PONV.¹⁰ Recently introduced another 5HT₃ receptor antagonist granisetron has more potent and longer acting activity against cisplatin induced emesis than ondansetron.¹¹ Recent study demonstrated that granisetron reduces the incidence and severity of vomiting following strabismus repair and tonsillectomy.¹²

Methods

After obtaining approval of the institutional ethical committee of SSMC and Mitford Hospital 60 (sixty) women of ASA class I or II, scheduled for elective total abdominal hysterectomy were enrolled in the study. Written informed consent was taken from the patients. They were randomly divided into two groups of 30 patients each. Group- 'O': 30 patients received, ondansetron 8mg (4ml) intravenously (I/V) single dose just before peritoneal closure. Group- 'G': 30 patients received, granisetron 2mg I/V single dose just before peritoneal closure. In the preoperative period, the procedure was explained to the patients and informed consent was obtained from each patient. In the preoperative period patients were also enquired about motion sickness, history of previous anaesthesia and postoperative emesis. On arrival of the patients in the operation theatre I/V line was inserted and pulse rate, blood pressure and respiratory rate were recorded. Patients were preoxygenated for three minutes and induction was done with fentanyl 1µg/kg, thiopentone 5mg/kg, tracheal intubation was facilitated by suxamethonium 1.5mg/kg and general anaesthesia was maintained by halothane 0.5%, N₂O 60% with O₂ 40%. nondepolarizing muscle relaxant vecuronium 0.1 mg/kg was given. Intraoperative proper hydration was maintained with Hartman's solution. Just before peritoneal closure ondansetron 8mg in Group 'O' patient and granisetron 2mg Group 'G' patient I/V was given. At end of operation patient was reversed accordingly with neostigmine 0.05mg/kg plus atropine 0.02 mg/kg and recovery was smooth and uneventful. Intraoperative and postoperative monitoring were NIBP, ECG, SpO₂.

In the recovery room post operative analgesia was provided with diclofenac suppository (50mg) stat

and ketorolac tromethamine 30mg intramuscularly 8 hourly on complaining pain and repeated in all patients when necessary. For presence of nausea and vomiting, patients were interviewed at one hourly over the first 3 hours then at 3 hourly up to 12 hours postoperative period. The 12 hours study period was begun upon entry to the recovery room. The number and time of emetic episodes and the number & time of rescue antiemetic treatment was recorded. The rescue protocol constituted of granisetron/ ondansetron injected once. Patients were carefully observed for any adverse effect like sedation, drowsiness, flushing of any extrapyramidal symptoms.

Results

Demographic data of patients shown in table-I.

No clinically significant difference in heart rate in intraoperative and postoperative period were seen between the groups in time interval (Fig-1)

Statistically no significant difference was also observed in mean blood pressure during operation and postoperatively between the groups (Fig-2)

Statistically no significant difference was also observed in SpO₂ during operation and postoperatively between the groups (Fig-3)

Incidence of nausea and vomiting in different groups shown in table II

This study groups become statistically matched for age in years (Group O – 43.37±9.69, Group F 42.50±1.008), weight (Group O-51.43±12.00, Group F 50.50±1.53) and duration of surgery (Group O 71.50±1.950, Group F 71.07±1.894).

Table I Demographic data

	Age	Weight	Duration of surgery
	Mean ± SEM		
Gr-O	43.37 ± .996	51.43 ±1.200	71.50 ±1.950
Gr-G	42.50 ± 1.008	50.50 ±1.153	71.07 ±1.894
t-value	0.612	0.561	0.159
P-value	0.543	0.577	0.874

Values was expressed as mean ± SEM . Between groups analysis were done by unpaired student's t test, P<.01 are significant.

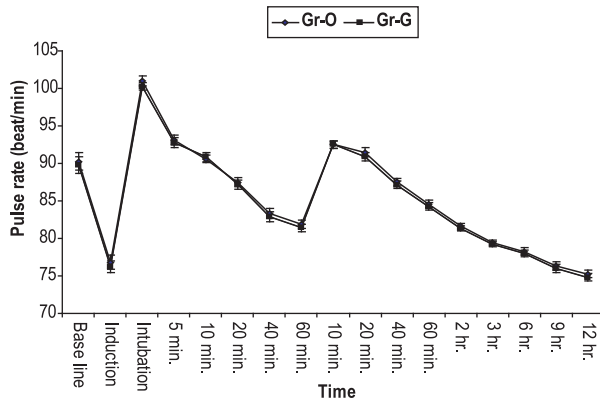


Fig 1 Intra operative and post operative pulse rate changes of different groups

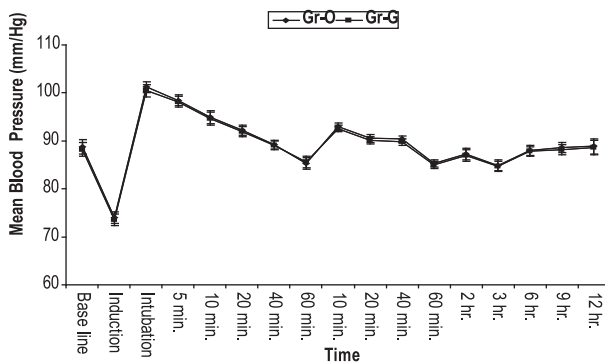


Fig 2 Intra operative and post operative mean blood pressure changes of different groups

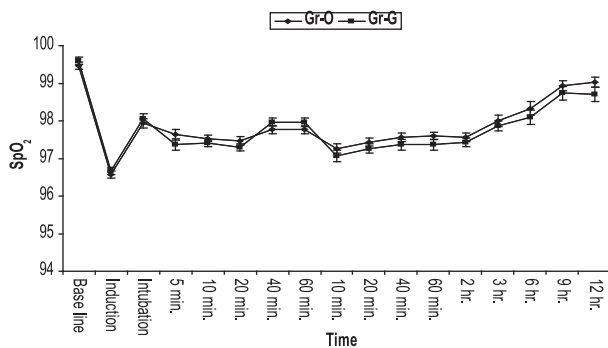


Fig 3 Intra operative and post operative SPO₂ changes of different groups.

Table II Incidence of Nausea and Vomiting in different groups.

Groups	Cases	Percentage
Group ‘O’ (n=30)	1	3%
Group ‘G’ (n=30)	1	3%

Incidence of nausea and vomiting in Group ‘O’ (3%) and Group ‘G’ (3%).

The incidence of nausea and vomiting in two groups were subjected to ‘Z’ test. No significant changes was observed between Group ‘O’ and Group ‘G’.

Discussion

Nausea and vomiting are common and frequent complications following surgery and anaesthesia. Most of the incidence of nausea and vomiting occur during the first two hours of recovery from anaesthesia. The etiology of postoperative nausea and vomiting is multi-factorial. Many factor associated with anaesthesia and surgery may contribute to nausea and vomiting. In the present study concern factors are type of anaesthesia, female patient and gynecological surgery. Incidence of nausea and vomiting is two to three times more in female due to changing endocrine environment which sensitize the brain stem emetic mechanism. During elective gynaecological surgery, general anaesthesia as well as some traction of vagal innervated gut may play role in triggering emesis. The reported overall incidence of nausea and vomiting after gynecological surgery is 75%.¹³

The antiemetics are now mainstay of therapy to prevent PONV. The antiemetics that are now currently being widely used for treatment in our country are prochlorperazine, metoclopramide and promethazine and many study have done with these drugs. But these drugs have varying effectiveness and there use is limited because of delayed recovery, sedation and sometimes distressing side effect of extrapyramidal symptoms.^{5,6,7} Malins et al. have also studied the efficacy of ondansetron compared with metoclopramide.¹⁴ Alon & Himmelseher studied the efficacy of a single intravenous dose of ondansetron 8mg, droperidol 1.25 mg and metoclopramide 10 mg given preoperatively to gynaecologica patients undergoing dilatation and curettage.¹⁵

Granisetron is a newer drug and limited studies have done with this drug in our country. So we have chosen ondansetron and granisetron for prevention of PONV in elective gynaecological surgery to compare these drugs about their efficacy and side effects during operations and 12 hours post operative period.

In the present study incidence of nausea and vomiting in group-O (those received Ondansetron

8 mg) is 3% and in group-G is 3%. Both ondansetron and granisetron decreases nausea and vomiting significantly ($P < 0.05$) in comparison to older antiemetics. But the comparison between group-O and group-G for prevention of PONV following elective gynaecological surgery is similar. In one study M Naguib¹⁶ with his co-worker shows that prophylactic antiemetic treatment with ondansetron resulted in a lower incidence of PONV than with metochlopramide and placebo in a randomized double blind comparative study on laparoscopic cholecystectomy. In another study Dipasri Bhattacharya¹⁷ et al shows that granisetron is much better than ondansetron for prevention of PONV following day case gynecological laparoscopy in a randomized double blind technique. In another study D. Bridges¹⁸, BS (Pharm) showed that low dose granisetron was equally effective as ondansetron, dolasetron with no toxicity in female patients at high risk for PONV. In our study most of the incidence of PONV occur with first two hours after surgery in two groups but in rest of the period no nausea and vomiting occur which is similar with the study of Dr. Bridges¹⁸. It has some dissimilarities with the study of Naguib¹⁶ and Dipasri Bhattacharya¹⁷. The aggravating factor for PONV in general anaesthesia are anaesthetics agents, distention by gas, per and postoperative use of narcotics. But in our study the possible aggravating factor are female patient general anaesthesia, vagal irritation.

Regarding hemodynamic changes SpO_2 , during operation and 12 hours post operative period no clinically significant changes occur. No other adverse effect like headache, constipation and flushing during operation and 12 hours postoperative period were observed in this study.

Pain as well as commonly used analgesic pethidine may cause nausea and vomiting. For this reason postoperative control of pain we used ketorolac tromethamine and diclofenac as required instead of pethidine. The study confirmed the previous study regarding the safety of the patient as side effects were mild.

Conclusion

Both the ondansetron and granisetron have similar antiemetic efficacy.

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