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TO COMPARE THE EFFICACY OF IV ONDANSETRON & GRANISETRON IN PREVENTION OF POST-OPERATIVE NAUSEA & VOMITING IN ADULTS UNDERGOING ELECTIVE SURGERY UNDER GENERAL ANAESTHESIA

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ABSTRACT

To determine efficacy of prophylactic ondansetron & granisetron on incidence of PONV in adults undergoing elective surgery under general anaesthesia & to assess requirement of rescue antiemetics in postoperative period. 100 patients in the age group of 18-60yrs belonging to ASA I & II undergoing elective surgeries were randomly allocated to two groups of 50 each. Gp A received 4mg ondansetron IV & Gp B received 2mg granisetron IV 5 minutes before induction of anaesthesia. Post operatively patients were assessed for episodes of nausea, retching, vomiting & need for rescue antiemetics at interval of 0-2hrs, 3hrs, 6hrs, 12hrs & 24hrs. complete response defined as absence of nausea, retching or vomiting and no need of rescue antiemetics during 24hrs observation period. Rescue antiemetic metoclopramide 10mg IV was given in event of vomiting. Complete response was noted in 72% of ondansetron Gp & 86% in granisetron Gp. Requirement of rescue antiemetic was lesser in granisetron Gp as compared to ondansetron Gp. Granisetron 2mg is safe, well tolerated & more effective than ondansetron 4mg in prevention of PONV.

Key words: General anaesthesia, PONV, Rescue antiemetic, Metoclopromide, Complete response.

INTRODUCTION

Postoperative nausea and vomiting (PONV) are common sequelae of general anaesthesia and a leading cause of delayed discharge and unanticipated hospital admission after ambulatory surgical procedures [1]. The aetiology of nausea and vomiting after surgery is multifactorial in origin. Age, type of surgery and anaesthetic procedure may influence PONV [2]. The complex act of vomiting involves coordination of the respiratory, gastrointestinal, and abdominal musculature and is controlled by the emetic center [3, 4]. Area situated in the lateral reticular formation close to the tractus solitarius in the brain stem is thought to be the emetic center. Stimuli from several areas within the central nervous system can affect the emetic center. These include afferents from the pharynx, gastrointestinal tract and mediastinum, as well as afferents from the higher cortical centers (including the visual center and the vestibular portion of the eighth cranial nerve) and the chemoreceptor trigger zone (CTZ) in the area prostrema. The area prostrema of the brain is rich in dopamine, opioid, and serotonin or 5-hydroxytryptamine (5HT3)receptors.[3]Four major neurotransmitter systems appear to play important roles in mediating the emetic response viz. dopaminergic, histaminic (H), cholinergic, muscarinic and5HT3. As there are four different types of receptors, there are at least four sites of action of the antiemetic drugs. Antiemetic agents may have actions at more than one receptor, but they tend to have a more prominent action at one or two receptors. The introduction of 5HT 5HTreceptor antagonist in1990s was heralded as a major advance in the treatment of PONV

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because of the absence of adverse effects that were observed with commonly used traditional antiemetics [5]. The 5HT3 receptor antagonists produce no sedation, extrapyramidal reactions, adverse effects on vital signs or laboratory tests or drug interactions with other anaesthetic medications [6]. Current 5HT receptor antagonists include ondansetron, granisetron, dolasetron and tropisetron. Ondansetron and granisetron are now available in India. All the 5HT receptor antagonists have the same basic double nitrogen ring backbone for their chemical structure. This may be the chemical site of action of the 5HTreceptor antagonists on serotonin (which is a six and five ring, nitrogen based structure). 5HT receptor antagonists are routinely used nowadays to prevent PONV following surgeries under general anaesthesia.

MATERIAL AND METHODS

The present study was carried out in 100 patients in the age group of 18-60yrs undergoing elective surgeries after obtaining permission from institutional ethical committee and obtaining written informed consent from the patients.

Following inclusion and exclusion criteria were used to select the study subjects.

Inclusion criteria

- Patients in the age gp(18-60yrs) undergoing elective surgeries under general anaesthesia.
- ASA I and II

Exclusion criteria

- ASA III or more.
- Known allergy to the trial drugs.
- Patient refusal

A detailed preanaesthetic examination including history, general physical examination, systemic examination, spine examination for deformity was performed. Detail information about the patients was noted on a prestructured proforma. Routine investigations like hemogram, BT,CT, RBS & RFT were done. ECG & Chest X-Ray were done wherever necessary.

All patients were kept nil orally for 8-10hrs. Premedication was standardized with Tab. Diazepam 0.2mg/kg preoperatively on the night before surgery. Patients were allocated into 2 groups

ONDANSETRON GP- Gp A- 50 Patients receiving intravenous ondansetron 4mg.

GRANISETRON GP- Gp B- 50 Patients receiving intravenous granisetron 2mg.

PROCEDURE

- Patient was shifted to OT table. IV access with 18 G cannula done. Lactated Ringer's Solution 500ml was infused IV before the block.
- Monitors applied.-NIBP/SPO2/ECG. Baseline vitals recorded.
- Surgery done using standard general anaesthesia technique. Thiopentone sodium (4-5mg/kg) used as induction agent. Maintainance done with sevoflurane+oxygen+nitrous oxide. NM Blocker vecuronium 1mg repeated SOS. On completion of surgery , residual paralysis reversed with neostigmine (0.05mg/kg) & glycopyrrolate.
- IV fluids- Lactated Ringer's Solution given intraoperatively (10ml/kg/hr).
- Patient shifted to recovery room. Incidence of PONV were recorded within first 24hrs at interval of 0-2hrs, 3hrs, 6hrs, 12hrs & 24hrs.
- Episodes of PONV were identified by spontaneous complaints by patients or by direct questionnaire.

OBSERVATION AND RESULTS-

Table 1 shows that both groups were comparable with respect to age, height, weight & sex ratio without any statistically significant difference. ($p > 0.05$).

Table 2 shows there was no significant difference with regard to duration of surgery between the two groups.

Table 3 shows that occurrence of PONV was more in ondansetron gp as compared to granisetron gp.

Table 4 shows that incidence of postoperative retching was more in ondansetron gp as compared to granisetron gp.

Table 5 illustrates that ondansetron and granisetron are not associated with major adverse effects when used intravenously gor the prevention of PONV.

Table 1. Demographic Data

Parameter	Group A	Group B	P-Value
Age (years) Mean±S.D	42 ± 9	40± 10.9	0.18
Sex (Male: Female)	30:20	28:22	0.42
Height(feet) Mean±S.D	4.42 ±1.32	5.49 ±0.13	0.39
Weight(Kg) Mean±S.D	56.18 ±7.5	59 ±9.01	0.96

Table 2. Duration of surgery

Duration of Surgery	GP A	GP B	P-Value
Time in (minutes) Mean±S.D	134.2±15.3	132.4±8.2	0.81

Table 3. Occurrence of ponv

Duration	GP A	GP B	TOTAL
0-2hrs	8	1	9
3hrs	2	2	4
6hrs	2	1	3
12hrs	3	1	3
24hrs	6	0	8
Total	21	6	27

Table 4. Occurrence of Retching

Duration	GP A	GP B	TOTAL
0-2hrs	2	1	3
3hrs	3	1	4
6hrs	3	2	5
12hrs	4	2	6
24hrs	4	1	5
Total	16	7	25

Table 5. Adverse Effects

Adverse Effect	GP A	GP B
Headache	4	2
Dizziness	6	1
Allergic Reaction	1	1
Constipation	1	2

Fig.1. Duration of Surgery

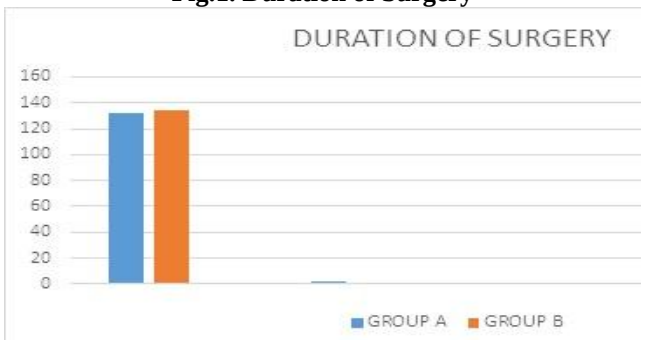


Fig 2.

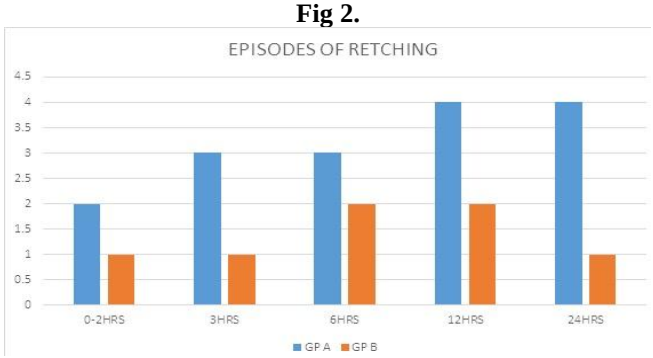
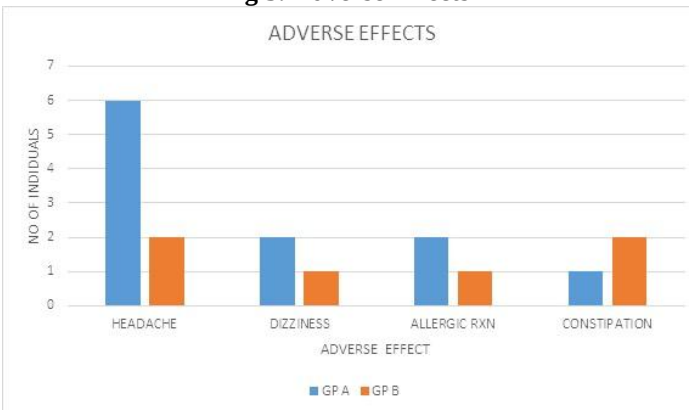


Fig 3. Adverse Effects



DISCUSSION

Postoperative nausea and vomiting (PONV) is of multifactorial origin. The incidence of PONV after anaesthesia, despite the advances in antiemetic therapy in the last decades is still found to be relatively high. The three most common causes for admission following day care surgery are pain, bleeding and intractable vomiting [7]. Factors affecting PONV include patient related factors (age, sex, phase of the menstrual cycle), anaesthesia related factors (use of volatile anesthetic agents, N_2O, Opioid) and surgery related factors [7]. According to some studies, Female gender has been associated with higher incidence of PONV compared to male patients [7, 8] On an average, female patients suffer three times more often from PONV than men [2]. But in our study there was no significant correlation between PONV & sex of the patient.

Our study was aimed at comparing the antiemetic efficacy of Ondansetron and Granisetron in preventing PONV We have conducted studies on 100 patients of ASA I and II with demographic data in terms of age, weight, which were similar in the two groups. There was no significant difference in Ondansetron and Granisetron ($P< 0.05$) in terms of Age and Weight.

Pearman conducted a study & concluded that postoperative nausea and vomiting is more common in young age group and obese patients [9].

Incidence of nausea in our study group was 25% in Ondansetron group, 11% in Granisetron group. Present study shows highly significant difference in first 0-4hr ($P < 0.05$). While in 4-12hrs incidence of nausea shows marginally significant difference. After 12-24hrs, there was no significant difference in nauseating episodes.

Pueyo and associates conducted similar study and observed that nausea and vomiting is more common in first 6 hours post operatively [10]. Same results are seen in the study done by Fujii [11].

Raphael concluded that optimal dose of Ondansetron for preventing post operative nausea vomiting is 4 mg and half life is 3 hours. While optimal dose of Granisetron is 2 mg and half life is 8-9 hours. So it is observed that after 6 hours Granisetron is more effective than Ondansetron for preventing PONV [12].

Bhattacharya and associates conducted similar study and concluded that 24% subjects in ondansetron gp had vomiting as compared to only 11% in granisetron [13]. Jankneqt and associates conducted similar study and concluded that Ondansetron when given at the induction time, it is ineffective in preventing PONV [14]. Sinha concluded the same results in his study [15].

Our study shows no statistically significant difference in the baseline values of haemodynamic variables between the two groups before, during or after giving study drug. According to our study there was no haemodynamic alteration between these results. Study conducted by [16] also shows the same results. There is no haemodynamic alteration seen in PR, SBP and DBP during study period.

According to study [17], incidence of headache and constipation is more in Ondansetron group as compared to Granisetron group which matches with our results. Incidence of constipation and dizziness also shows significant difference in Ondansetron and Granisetron groups ($P <0.05$).

The use of rescue antiemetic in ondansetron group which was about 7(23%) whereas in Granisetron group about 3(10%) of the patients received rescue antiemetic. Stewart[23] in his study also has same result.

CONCLUSION

From the above clinical comparative study, we conclude that prophylactic intravenous administration of Granisetron 2mg is more effective drug than Ondansetron 4mg for controlling postoperative nausea and vomiting with fewer incidences of side effects.

Safety profile is more with Granisetron and it is more potent than Ondansetron. So we observed minimal emetic and nausea episodes in postoperative period in patients who had received i.v. Granisetron in comparison to i.v. Ondansetron**.**

CONFLICT OF INTEREST STATEMENT

No interest

ACKNOWLEDGMENTS

Nil

REFERENCES

1. Gold BS, Kitz DS, Lecky JA, Neuhans JH. Unanticipated admission to the hospital following ambulatory surgery. *JAMA*, 262, 1989, 3008-10.
2. Lerman J. Surgical & patient factors involved in postoperative nausea and vomiting. *Br J Anaesth*, 69, 1992, 245-325.
3. Watcha MF, White PF. Postoperative nausea and vomiting. Its etiology, treatment and prevention. *Anesthesiology*, 77, 1992, 162-184.
4. Paxton DL, Mckay CA, Mirakin KR. Prevention of nausea and vomiting after day case gynaecological laparoscopy. *Anaesthesia*, 50, 1995, 403-406.
5. Janknegt R, *et al*. Clinical efficacy of antiemetics following surgery. *Anaesthesia*, 54, 1999, 1059-1068.
6. Fujii Y, Tanaka H, Toyooka H. Optimal anti emetic dose of granisetron for preventing PONV. *Can J Anaesth*, 41, 1994, 794-797.
7. Mckenzie R, Tantisira B, Deepa. Comparision of ondanestron in the prevention of postoperative nausea and vomiting. *Anesth Analg*, 79, 1994, 961-64.

8. Bondner M, Honkovaara P. Nausea and vomiting after gynaecological laparoscopy depends upon the phase of the menstrual cycle. *Can J Anaesthesia*, 38, 1991, 876-87.
9. Pearman M.H. Single dose intravenous ondanestron in the prevention of postoperative nausea and vomiting. *Anaesthesia*, 49, 1994, 11-15.
10. Paxton DL, McKay CA. Prevention of nausea and vomiting after day care gynaecological laproscopy. *Anaesthesia*, 50, 1995, 403-46.
11. Fujii Y, Tanaka H, Toyooka H. Granisetron reduces vomiting after strabismus surgery and tonsillectomy in children Can J Anaesth 1996; 43: 35-38.
12. Raphael JH, Norton AC. Anitemetic efficacy of prophylactic Ondansetron in laproscopic surgery. Randomized double blind comparison with metoclopramide. *BJA*, 71, 1993, 845-48.
13. Bhattcharya D, Banerjee A. Comparison of Ondansetron and Granisetron for prevention of nausea and vomiting following day care gynecological laproscopy. *Ind J Anesth*, 47, 2003, 279-82.
14. Janknegt R. Clinical efficacy of antiemetic following surgery. *Anaesthesia*, 54, 1999, 1054-68.
15. Sinha PK, Sushil P. Ondansetron in prophylaxis of postoperative nausea and vomiting in patients undergoing breast surgery: A placebo-controlled double blind study. *J Ind Med*., 2, 2004, 102.
16. Dev N, Mehrotra S, Tyagi S K. A comparative study of metoclopramide and ondansetron. *Ind J Anaest*, 42, 1998, 52-56.