Original Article

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Comparison Between the Intravenous Ramosetron and Ondansetron in Prevention of Post-Operative Vomiting and Nausea in Adults Under General Anesthesia

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Abstract

Background: Present study was performed as randomized controlled trial to contrast the therapeutic efficiency of ramosetron and ondansetron for the management of recognized PONV in Subjects subsequent surgery under general anesthesia. **Subjects and Methods:** The Subjects will be separated into 2 groups of 100 each, in a random, single blinded mode. Group I received Ramosetron 0.3 mg I.V and Group II received Ondansetron 4 mg I.V. Postoperatively, Subjects were calculated for episodes of nausea, retching and vomiting and the need for rescue antiemetic at intervals of 0-2 hours, 2 -12 hours, 12 - 24 hours and 24 - 48 hours. **Results:** In this study, complete response was noted to be 60% in the Ondansetron group and 82% in the Ramosetron group. The requirement of rescue medication was less in the Ramosetron group compared to the Ondansetron group (2% vs. 14%). **Conclusion:** It is concluded from this study that Ramosetron 0.3 mg is safe and well-tolerated and additional effectual than Ondansetron 4 mg in the prevention of postoperative nausea and vomiting.

Keywords: General Anesthesia, Ramosetron, Ondansetron, Surgery.

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Introduction

Postoperative nausea and vomiting is an unlikeable, upsetting, and very tiring knowledge for Subjects. Postoperative nausea and vomiting (PONV) is frequent with a frequency of 30% in the postoperative phase and is very worrying to Subjects. They may guide to severe postoperative complications. The overall incidence of PONV has been accounted to be among 20% and 30%, but can augment up to 80% in high-risk Subjects.[1,2]

Development of an effectual antiemetic treatment has been loaded by the multifactorial nature of PONV. Not any of the accessible antiemetics are completely efficient for preventing PONV, particularly in high-risk Subjects. Given that at least four major receptor systems are occupied in the aetiology of PONV, a improved prophylaxis might be accomplished by utilizing a arrangement of agents acting at dissimilar receptor sites.[3]

The most widespread prophylactic antiemtic mixture utilized to avoid PONV in our institution is a combination of Intravenous Ondansetron, a 5 Hydroxy Tryptamine (5HT3) receptor antagonist with Dexamethasone.[4] Ramosetron is a recently developed selective 5-HT3 receptor antagonist. It displays significantly superior obligatory affinity for 5-HT3receptors with a slower dissociation rate from receptor binding, consequential in extra strong and longer receptor antagonizing belongings contrast with older 5-HT3 receptor antagonists.[5]

The risk of PONV depends on factors related to Subjects, surgeries and type of anaesthesia. Subject related factors include age, female gender, history of motion sickness and PONV in previous surgeries.[6] Anaesthesia factors include use of opioids inhalational anaesthetic agents like halothane and nitrous oxide. There are more incidences of PONV if Subjects undergo gastrointestinal tract, middle ear, squint and laparoscopic surgeries.[1]

The cost of PONV are:- 1) Physical: 2) Metabolic and 3) Psychological[7]

Ramosetron is a recently residential selective 5-HT_3 receptor antagonist with longer action period (up to 48 h) and superior

receptor similarity than its before developed congeners, with ondansetron. It is an effectual prophylactic and therapeutic 5-HT_3 receptor antagonist for the management of PONV. Even though ramosetron is higher to ondansetron for preventing PONV, ramosetron and ondansetron have never been contrast with reverence to their therapeutic effectiveness in treating established PONV.[8]

Therefore, Present research was design as a randomized controlled trial to evaluate the therapeutic efficacy of ramosetron and ondansetron for the management of recognized PONV in Subjects subsequent surgery under general anesthesia.

Subjects and Methods

The present clinical study consists of 200 adult Subjects admitted to undergo elective surgeries at Hospital & General Hospital Medical College.

In the present randomized, clinical study Grades I and II Subjects between the ages of 20 and 60 years undergoing elective surgeries under general anaesthesia were included.

The ethical committee was informed about the study and the approval was taken from them prior to start of study. All the included Subjects were informed about the study and the written informed consent was signed by them. all the Subjects were blindly and randomly divided into two groups: in group A there were 100 Subjects and also in group B there were 100 Subjects. Group I received Inj. Ondansetron 4 mg (2 mL) i.v. Group II received Inj. Ramosetron 0.3 mg (2 mL) i.v. Both the groups received drug 2 minutes before induction

Selection of Subjects

Inclusion criteria were as follows

Subjects of ASA Grades I & II

Subjects between the age group of 20 to 55 years.

Exclusion criteria were as follows

ASA grade III, IV and V. Smokers. H/o Motion sickness or PONV. Propofol or other anti-emetics given in last 24hrs. 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. Known alcohol or drug abuse. Pregnancy or lactating females

Pre-anaesthetic assessment was carry out on the prior day of surgery and a detailed history and present complaints were recorded. History of PONV and other risk factors were measured. General and systemic examinations of cardiovascular, respiratory andcentral nervous system were done. Required laboratory investigations like whole haemogram, routine urine, blood urea, serum creatinine, blood sugar, ECG, bleeding time and clotting time were completed. All Subjects received Tab. Alprazolam 0.5 mg and Tab. Ranitidine 150 mg on the earlier night of surgery. Subjects were educating to wait nil orally following 10PM on the prior night of surgery.

General anaesthesia with controlled ventilation was used in all Subjects. Preoperative pulse rate, blood pressure and peripheral oxygen saturation were evidenced in the operation theatre following concerning the following monitors: Continuous electrocardiogram Non invasive blood pressure, Pulse oximeter, Peripheral venous entrance was recognized and intravenous fluid was taking place with dextrose normal saline.

Subjects were premedicated with injection midazolam 0.05 mg/kg, Inj. Glycopyrrolate 0.02 mg/Kg & Inj. Pentazocine 0.5 mg/kg I.V. Subjects were erratically owed to 2 study drug groups (Group I & II) and then one of research drug group was administered intravenously while the Subjects were preoxygenated for 3 minutes and induced with Inj. Thiopentone sodium 5 mg/kg. Inj. Succinylcholine 1.5 mg/kg was utilized as muscle relaxant for intubation with appropriate size endotracheal tube and Inj. Vecuronium 0.08 mg/kg i.v were utilized to offer muscle relaxation during surgery depending on the type and period of the procedure. Maintenance of anaesthesia was with nitrous oxide (66%) and oxygen (33%) with halothane (0.5-1%) utilizing controlled ventilation. Subjects were observed during anaesthesia using continuous ECG, heart rate, blood pressure and pulse oximetry.

On achievement of surgery, the residual paralysis was reversed with Inj. Neostigmine 0.05 mg/kg i.v and glycopyrrolate 0.02 mg/kg i.v. Subjects were transported to the recovery room and afterwards to the ward after corroborate a sufficient level of consciousness and whole reflexes. Post operative analgesia was preserved by utilizing NSAID's like Diclofenac infusions thus evading Opioids post-operatively. The occurrences of PONV were traced with in the first 48 hours following surgery at intervals of 0-2 hours, 2-12 hours, 12- 24 hours and 24-48 hours. Episodes of PONV were recognized by artless grievance by the Subjects or by direct questioning. Rescue antiemetic was offers with Inj. Metoclopramide 10 mg i.v in the event of 1 or extra episodes of vomiting or Subjects' severity of nausea or retching based on the observer's discretion. Observation and results were assessed and evaluated among the two groups.

Results

A total of 200 Subjects of ASA grade I and II who were admitted for the elective surgeries were randomly selected for the study purpose. The included Subjects were separated into 2 groups A & B, with 100 Subjects in each group. In group the Subjects received Ondansetron and in group B the Subjects received Ramosteron.

Age distribution: in group B there were 18 Subjects in 21 to 30 years' age group, 28 Subjects were present in 31 – 40 years age

group, 26 Subjects were present in 41 – 50 years age group and 28 Subjects were more than 51 years age group. In the group A there were 24 Subjects in age group of 21 – 30 years, there were 24 Subjects in age group of 3 – 40 years, 30 Subjects in 41 – 50 years age group and there were 22 Subjects in more than 51 years age group. The average age of Subjects in group B was 44.10 ± 14.50 years, whereas it was 42.45 ± 13.28 years in Group A.

In group B there were 58 Subjects with ASA grade I and 42 Subjects with ASA grade II where as in group A there were 56 Subjects with ASA grade I and 44 Subjects with ASA grade II. The comparison of ASA grade was done between two groups and the comparison was found to be similar between the two groups with p = 0.840.

In group B there were 20 Subjects who underwent laproscopic surgeries, nose and orthopaedic surgeries were performed in 18 Subjects, there 16 Subjects who underwent spine surgery, ear surgery for performed in 10 Subjects, 2 Subjects underwent breast surgery and 8 Subjects underwent thyroids and other surgeries. In group A nose surgeries were done in 30 Subjects, ear surgeries were performed in 14 Subjects, 12 underwent orthopaedic surgeries and 4 Subjects underwent abdominal and breasts surgery.

The mean duration of Anaesthesia in group B was 76.30 ± 24.27 minutes and in Ondansetron group it was 76.30 ± 35.40 minutes. Mean duration of anaesthesia is statistically similar in two groups of Subjects studied with P = 0.938.

It shows the incidence of nausea through the first 48 hour postoperative phase. Throughout the 0-2 hours interval, 8 Subjects out of 100 in Ramosetron Group had nausea while 22 Subjects in Ondansetron group had nausea. This was found to be statistically non significant (P=0.091). In the 2-12 hour, 12-24 hour and 24-48 hour intervals, 8, 6 and 2 Subjects of group B had nausea where as in group A 12, 12 and 8 Subjects had nausea, respectively. These results were found to be statistically non-significant.

The incidence of vomiting during the first 24-hour postoperative phase was evaluated. During the 0-2 hours period none of the Subjects in Ramosetron group had Vomiting whereas 10 Subjects (10%) Subjects had vomiting in Ondansetron group. This was found to be statistically non significant (P value> 0.05). During 2 – 12 hr period 2 Subjects in Ramosetron group and Ondansetron group vomited, during 12 – 24 hr and 24-48 hr period none of the Subjects in Ramosetron group vomited, whereas in Ondansetron group 2 Subjects vomited. These results were found to be statistically non-significant (p> 0.05).

In Ramosetron group 2 Subject complained of headache and 2 Subject complained of dizziness. In Ondansetron group 10 Subjects complained of headache and none of the Subjects complained of dizziness. Incidence of adverse reactions are more in Group Ondasetron but not statistically significant with P=0.269.

Discussion

Postoperative nausea and vomiting (PONV) has always been concern for anaesthesiologists and surgeons due to its deleterious effects on Subjects.[9,10] In spite of the advances in surgical method and anaesthetic method the occurrence of PONV has stay elevated.[11]

Despite the remarkable advances in medicine and growth of recent anaesthetics, PONV continues to be a chief reason of morbidity, with an occurrence of 30% in the postoperative phase. Hormonal factors may guide to a superior frequency of emetic episodes, with an observed occurrence of emesis around four times advanced in menstrual age group as contrast to the postmenopausal state.[12]

Subjects undergoing surgery under General Anaesthesia are at judicious to high risk for PONV as most surgeries are of long duration, with nasal and oral surgeries leads to ingestion of blood, involve use of peri-operative and postoperative opioids.[13] Therefore prophylactic treatment is preferable. Thus in our study we have used prophylactic antiemetic treatment for PONV.

Ramosetron 0.3 mg is measured as appropriate dosage for preventing postoperative emesis after anesthesia. The dosage selection of Ramosetron (0.3 mg, iv) was based upon the studies done by Fujii et al. In addition, the manufacturer's recommended dose is 0.3 mg i.v. once a day.

In the present study the nausea and vomiting assessment after the surgery was done at 0 -2 hrs, 2 – 12 hrs, 12 – 24 hrs and 24 – 4 hrs different interval. This was done in both the groups. The post operative assessment shows that there is insignificant difference between group A and Group B. Similar result of the study was obtained by Junghee Ryu et al. The incidence of vomiting was higher in Ondansetron group than Ramosetron group. But this difference was not statistically significant (p>0.05).

In the present study evaluation, during 0- 2 hrs, 2 Subjects needed rescue antiemetic in group B, whereas 8 Subjects in group A needed rescue antiemitics. The difference when calculated statistically it was found to be insignificant. The results were similar and comparable to previous study done.

Finally it can be concluded Ramosetron at an intravenous dose of 0.03 mg is safe and well-tolerated and additional effectual in rising incidence of entire answer than 4 mg intravenous Ondansetron when utilized for antiemetic prophylaxis in Subjects undergoing elective surgeries under general anesthesia. Benefits of Ramosetron like high receptor specificity, high potency makes it a valuable alternative to Ondansetron.

Table 1: ASA grade distribution in two groups

ASA grade	Group 1	Group 2
Grade I	58	56
Grade II	42	44
Total	100	100

Table 2: Incidence of nausea in two different groups

Nausea '	0 – 2 hrs	2 – 12 hrs	12 – 24 hrs	24 – 48 hrs	% change
Ramosetron					
Absent	92	92	94	98	+ 6.0%
Present	8	8	6	2	• 6.0%
Ondansetron					
Present	22	12	12	8	-14.0%
Absent	78	88	88	92	+14.0%

Table 3: Incidence of vomiting in two different groups

Nausea '	0 – 2 hrs	2 – 12 hrs	12 – 24 hrs	24 – 48 hrs	% change
Ramosetron					
Absent	100	98	100	100	
Present	0	2	0	0	
Ondansetron					
Present	10	2	2	2	-7.0%
Absent	90	98	98	98	+7.0%

Table 4: Distribution of complete response in two groups

Complete response	Group 1	Group 2
Yes	60	82
No	40	18
Total	100	100

Conclusion

Ramosetron at an intravenous dose of 0.3 mg is safe and well endured and further efficient than 4 mg intravenous Ondansetron for antiemetic prophylaxis in Subjects undergoing elective surgeries under general anaesthesia.

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