International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 12, No. 3, July – Sept 2023 Online ISSN: 2250-3137
Print ISSN: 2977-0122

ORIGINAL RESEARCH

Comparison of Ramosetron, Ondansetron and dexamethasone for the prevention of postoperative nausea and vomiting in patients undergoing surgery under general anaesthesia

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Received: 01 July, 2023 Accepted: 09 Aug, 2023

ABSTRACT
Numerous medications exist to treat nausea and vomiting, most of which fall into the categories of corticosteroids, 5-hydroxytryptamine3 (5HT3), dopamine-2 (D2), and neurokinin-1 (NK1) receptor antagonists, antihistamines and anticholinergics. All the patients fulfilling selection criteria were explained about the details of the disease process, options of treatment, ultimate outcome, possible effects, complications and chances of recurrence in both procedure and a written informed consent was obtained before enrollment. They were informed of their right to withdraw from the study at any stage. The mean nausea scale score was least in dexamethasone group at all the intervals. Thetimeofrescueanti-emeticadministrationtothesubjectswashighestinthe dexamethasone group.
Key words: Ramosetron, ondansetron, dexamethasone

INTRODUCTION

Postoperative nausea and vomiting are frequent side effects of anesthesia and surgery, occurring up to 80% of the time in high-risk patients and with an estimated prevalence of 30% in the general surgical population.[1,2] These results contribute significantly to post-operative patient discontent.[3,4] prolong hospital stays, and increase expenditures.[5,6]

Numerous medications exist to treat nausea and vomiting, most of which fall into the categories of corticosteroids, 5-hydroxytryptamine3 (5HT3), dopamine-2 (D2) and neurokinin-1 (NK1) receptor antagonists, antihistamines and anti-cholinergics. The six different substance classes have each been linked to a variety of side effects, including headache and constipation (5-HT3 receptor antagonists), extrapyramidal symptoms, sedation, arrhythmia and QT prolongation (D2 receptor antagonists), hyperglycemia, immunosuppression, and poor wound healing (corticosteroids), sleepiness, dry mouth, and urinary problems (antihistamines) and dry mouth and visual disturbances (anticholinergics) However, specific studies have noted a rise in headaches and vertigo.[7]

There is still no current evidence-based overview of all relevant substance classes or a clinically appropriate rating of all anti-emetic medications in terms of efficacy and safety, despite the ongoing increase in the number of clinical trials on PONV.

METHODOLOGY

TYPE OF STUDY

The present study was a prospective observational study.

SAMPLE SIZE

The study was conducted on a total of 90 patients who were divided into 3 groups with 30 patients in each

group basing on the type of anti-emetic administered.

INCLUSION CRITERIA

Patients meeting the following criteria were enrolled into the study.

1. Patients in the age group of 18 to 60 years.
2. Patients undergoing surgery under general anesthesia.
3. Patients in the ASA classes I and II.

EXCLUSION CRITERIA

Patients meeting the following criteria were excluded from the study.

1. Patients below 18 years and above 60 years of age.
2. Patients with shock and hypotension.
3. Patientswithhistoryofallergytoramosetron,ondansetronand dexamethasone.

EQUIPMENT NEEDED

Our study required the following equipment:

- Ramosetron 0.3mg.
- Ondensetron 4mg.
- Dexamethasone 8mg.
- Normal saline.
- Monitors-ECG, Pulse oximeter,NIBP monitor.

INFORMED CONSENT

All the patients fulfilling selection criteria were explained about the details of the disease process, options of treatment, ultimate outcome, possible effects, complications and chances of recurrence in both procedure and a written informed consent was obtained before enrollment. They were informed of their right to withdraw from the study at any stage.

DATA COLLECTION

- The patients meeting inclusion criteria were enrolled into the study.
- The patients were explained the study procedure and a written informed consent was obtained.
- Patients were observed for the incidence of nausea and vomiting postoperatively.
- The use of a prophylactic antiemetic was documented and the time of arrival in the post-anesthesia care unit (PACU) was noted so that each incidence of nausea and/or vomiting could be assessed in terms of the time, from timing of administration of study drug to that the episode of nausea or vomiting.
- Episodes of nausea and/or vomiting separated by more than 1 minute were considered to be individual incidents. Nausea and vomiting were assessed and rated according to aspecific nausea scale.

STATISTICAL ANALYSIS

The collected data was entered into Microsoft Excel Worksheet-2010 and data was taken into IBM SPSS Statistic for windows, version 24(IBM Corp., Armonk, N.Y., USA) software for calculation of frequency, percentage, mean, standard deviation and probability value.

RESULTS

Table 1: Subjects were distributed according to nausea at 0 hours

Nausea	Group A N (%)	Group B N (%)	Group C N (%)	P-Value
Yes	7 (23.33%)	11 (36.67%)	12 (40%)	0.0349
No	23 (76.67%)	19 (63.33%)	18 (60%)	
Total	30	30	30	

The above table gives data on distribution of subjects according to the nausea incidence at 0 hours.

Among the group A subjects, 7subjects (23.33%) had nausea and 23subjects (76.67%) did not have nausea at 0 hours.

Among the group B subjects, 11subjects (36.67%) had nausea and 19subjects (63.33%) did not have nausea at 0 hours.

Among the group C subjects, 12subjects (40%) had nausea and 18subjects (60%) did not have nausea at 0 hours.

The statistical P value calculated was 0.0349 which indicated that there was a highly significant statistical difference among the three groups in terms of nausea incidence at 0 hours. More subjects of group C experienced nausea and least subjects in group A experienced nausea 0 hours.

Table 2: Subjects were distributed according to nausea at 12 hours

Nausea	Group A N (%)	Group B N (%)	Group C N (%)	P-Value
Yes	9 (30%)	18 (60%)	20 (66.67%)	0.01
No	21 (70%)	12 (40%)	10 (33.33%)	
Total	30	30	30	

The above table gives data on distribution of subjects according to the nausea incidence at 12 hours.

Among the group A subjects, 9subjects (30%) had nausea and 21subjects (70%) did not have nausea at 12 hours.

Among the group B subjects, 18subjects (60%) had nausea and 12subjects (40%) did not have nausea at 12 hours.

Among the group C subjects, 20subjects (66.67%) had nausea and 10subjects (33.33%) did not have nausea at 12 hours.
The statistical P value calculated was 0.01 which indicated that there was ahighly significant statistical difference among the three groups in terms of nausea incidence at 12 hours. More subjects of group C experienced nausea and least subjects in group A experienced nausea at 12 hours.

Table 3: Subjects were distributed according to nausea at 24 hours

Nausea	Group A N (%)	Group B N (%)	Group C N (%)	P-Value
Yes	5 (16.67%)	10 (33.33%)	14 (46.67%)	0.04
No	25 (83.33%)	20 (66.67%)	16 (53.33%)	
Total	30	30	30	

The above table gives data on distribution of subjects according to the nausea incidence at 24 hours.
Among the group A subjects, 5subjects (16.67%) had nausea and 25subjects (83.33%) did not have nausea at 24 hours.
Among the group B subjects, 10subjects (33.33%) had nausea and 20subjects (66.67%) did not have nausea at 24 hours.
Among the group C subjects, 14subjects (46.67%) had nausea and 16subjects (53.33%) did not have nausea at 24 hours.
The statistical P value calculated was 0.04 which indicated that there was ahighly significant statistical difference among the three groups in terms of nausea incidence at 24 hours. More subjects of group C experienced nausea and least subjects in group Aexperienced nausea at 24 hours.

Table 4: Comparison of nausea scaleamong three groups

Time/Nausea scale	Group A Mean ±Sd	Group B Mean ±Sd	Group C Mean ±Sd	P-Value
0 Hours	0.62±0.4	1.37±0.96	1.60±1.3	0.0158
12 Hours	2.18±1.86	3.15±1.27	3.43±1.39	0.0163
24 Hours	2.73±1.88	3±1.62	3.63±1.85	0.0175

The above table gives data onnausea scale scores among three groups.
The mean score of subjects in group A, B and C at 0 hours was 0.62±0.4, 1.37±0.96 and 1.60±1.3 respectively. The statistical P value calculated was 0.0158which indicated that there was ahighly significant statistical difference among the three groups in terms of mean nausea scores at 0 hours. The score was highest in group C and least in group A.
The mean score of subjects in group A, B and C at 12 hours was 2.18±1.86, 3.15±1.27 and 3.43±1.39 respectively. The statistical P value calculated was 0.0163which indicated that there was ahighlysignificant statistical difference among the three groups in terms of mean nausea scores at 12 hours.The score was highest in group C and least in group A.
The mean score of subjects in group A, B and C at 24 hours was 2.73±1.88, 3±1.62 and 3.63±1.85 respectively. The statistical P value calculated was 0.0175which indicated that there was ahighly significant statistical difference among the three groups in termsof mean nausea scores at 24 hours. The score was highest in group C and least in group A.

Table 5: Comparison of time of vomiting after surgery among three groups

Rescue Antiemetic	Group A Mean ±Sd	Group B Mean ±Sd	Group C Mean ±Sd	P-Value
Time Hours	3.91 ± 0.4	2.11±0.35	1.90±0.64	**0.01**

The above table gives data on comparison of time of time of vomiting administration among three groups.
The time of vomiting in groups A, B and C was 3.91 ± 0.4 hours, 2.11±0.35 hours and 1.90±0.64hours respectively. The statistical P value calculated was 0.01 which indicated that there was a significant statistical difference among the three groups in terms of time of vomiting to the subjects. The time was highest in group A and lowest in group C.

DISCUSSION

NUSEA INCIDENCE AT 0 HOURS

Among the group Asubjects, 23.33% had nausea and 76.67% did not have nausea at 0 hours.
Among the group B subjects, 36.67% had nausea and 63.33% did not have nausea at 0 hours.
Among the group C subjects, 40% had nausea and 60% did not have nausea at 0 hours.
The statistical P value calculated was 0.0349 which indicated that there was a highly significant statistical difference between the three groups in terms of nausea incidence at 0 hours. More subjects of group C experienced nausea and least subjects in group A experienced nausea 0 hours.
Theresultsofourstudywereinco-relationwiththepaststudiesconductedbySubramanium B8, Panda NB9Usmani H10.

NAUSEA INCIDENCE AT 12 HOURS

Among the group A subjects, 30% had nausea and 70% did not have nausea at 12 hours.

Among the group B subjects, 60% had nausea and 40% did not have nausea at 12 hours.

Among the group C subjects, 66.67% had nausea and 33.33% did not have nausea at 12 hours.

The statistical P value calculated was 0.01 which indicated that there was a highly significant statistical difference between the three groups in terms of nausea incidence at 12 hours. More subjects of group C experienced nausea and least subjects in group A experienced nausea at 12 hours.

The results of our study were in co-relation with the past studies conducted bySubramanium B8, Panda NB9 Usmani H10.

NAUSEA INCIDENCE AT 24 HOURS

Among the group A subjects, 16.67% had nausea and 83.33% did not have nausea at 24 hours.

Among the group B subjects, 33.33% had nausea and 66.67% did not have nausea at 24 hours.

Among the group C subjects, 46.67% had nausea and 53.33% did not have nausea at 24 hours.

The statistical P value calculated was 0.04 which indicated that there was a highly significant statistical difference between the three groups in terms of nausea incidence at 24 hours. More subjects of group C experienced nausea and least subjects in group A experienced nausea at 24 hours.

The results of our study were in co-relation with the past studies conducted bySubramanium B8, Panda NB9 Usmani H10.

NAUSEA SCALE SCORE

The mean score of subjects in group A, B and C at 0 hours was 0.62±0.4, 1.37±0.96 and 1.60±1.3 respectively. The statistical P value calculated was 0.0158 which indicated that there was a highly significant statistical difference between the three groups in terms of mean nausea scores at 0 hours. The score was highest in group C and least in group A.

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The mean score of subjects in group A, B and C at 24 hours was 2.73±9.88, 3±1.62 and 3.63±1.85 respectively. The statistical P value calculated was 0.0175which indicated that there was a highly significant statistical difference between the three groups in terms of mean nausea scores at 24 hours. The score was highest in group C and least in group A.

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CONCLUSION

The present study concludes that Dexamethasone is best suited for the prevention of postoperative nausea and vomiting in patients undergoing surgery under general anaesthesia taking into consideration the following parameters:

Very less number of subjects receiving dexamethasone experienced nausea at 0, 12 and 24 hours.

The mean nausea scale score was least in dexamethasone group at all the intervals. Thetimeofrescueanti-emeticadministrationtothesubjectswashighestinthe dexamethasone group.

REFERENCES

1. Apfel CC, Kranke P, Katz MH, *et al*. Volatile anaesthetics may be the main cause of early but not delayed postoperative vomiting: a randomized controlled trial of factorial design. British Journal of Anaesthesia2002; 88: 659-68.
2. Gan TJ, Belani KG, Bergese S, *et al*. Fourth consensus guidelines for the management of postoperative nausea and vomiting. Anesthesia and Analgesia 2020; 131: 411– 48.
3. Gan T, Sloan F, Dear Gde L, El-Moalem HE, Lubarsky DA. How much are patients willing to pay to avoid postoperative nausea and vomiting? Anesthesia and Analgesia 2001; 92: 393– 400.
4. Myles PS, Williams DL, Hendrata M, Anderson H, Weeks AM. Patient satisfaction after anaesthesia and surgery: results of a prospective survey of 10,811 patients. British Journal of Anaesthesia 2000; 84: 6– 10.
5. Dorman RB, Miller CJ, Leslie DB, *et al*. Risk for hospital readmission following bariatric surgery. PLoS One 2012; 7: e32506.
6. Parra-Sanchez I, Abdallah R, You J, *et al*. A time-motion economic analysis of postoperative nausea and vomiting in ambulatory surgery. Canadian Journal of Anesthesia 2012; 59: 366–75.
7. Weibel S, Schaefer MS, Raj D, Rücker G, Pace NL, Schlesinger T, Meybohm P, Kienbaum P, Eberhart LH, Kranke P. Drugs for preventing postoperative nausea and vomiting in adults after general anaesthesia: an abridged Cochrane network meta-analysis. Anaesthesia. 2021 Jul;76(7):962-73.
8. Subramanium B, Madan R, Sadhasivam S, Sennaraj B, Tamilselvan P, Rajeshwari S, *et al*. Dexamethasone is a cost-effective alternative to ondansetron in preventing PONV after pediatric strabismus surgery. Br J Anaesth. 2001;86:84–96.
9. Panda NB, Bharadwaj N, Kapoor P, Chari P, Panda NK. Prevention of nausea and vomiting

after middle ear surgery: Combination of ondansetron and dexamethasone is the right choice. J Otolaryngol. 2004;33:88–92.
10. Usmani H, Quadir A, Siddiqui RA, Sharma SC. Ondansetron and dexamethasone in middle ear procedures. Indian J Otolaryngol Head Neck Surg. 2003;55:97–9.