

Assessment of Effect of Ondansetron and Metoclopramide in the Treatment of Post-Surgical Vomiting: A Comparative Study

Girish Kumar Pathak¹, Vishal Kalia², Naveen Sahu³

ABSTRACT

Introduction: Post-operative nausea and vomiting episodes are one of the common unwanted phenomena encountered by the patients after major surgical procedures. Ondansetron and metoclopramide are the commonly used drugs for controlling the post-operative nausea and vomiting. Hence, we undertook the present study to compare the effect of ondansetron 4mg and metoclopramide 10 mg in patients undergoing major surgical procedures.

Material and methods: The present study was conducted in the department of surgery of Sukh Sagar Medical college and hospital, Jabalpur and included assessment of all the patients who underwent any major surgical procedure from January 2015 to November 2016. All the patients were randomly divided into two study groups. Group 1 included patients that were administered ondansetron while group 2 included patients in which metoclopramide, intra muscular, was administered. The total number of emetic episodes was assessed in all the patients of both the groups starting 15 minutes after the surgery upto 24 hour after the surgery.

Results: In group 1 and group 2, 25 and 30 patients were males respectively. Mean age of the patients in group 1 and group 2 was 44.5 and 45.8 years respectively. Mean weight of the patients in group 1 and group 2 was 64.2 and 62.8 Kg respectively. Significant result was obtained while comparing the gender of the patients in the two study groups.

Conclusion: In the prevention of post-operative vomiting episodes, ondansetron is superior in comparison with metoclopramide.

Keywords: Metoclopramide, Ondansetron, Vomiting

INTRODUCTION

One of the common troublesome phenomena after the major surgical procedures is the occurrence of post-operative nausea and vomiting episodes.^{1,2} It is a major point of concern both for the surgeon and for the patients undergoing major surgical procedures under general anaesthesia. Even in some surgical procedures, these unwanted side-effects can compromise the quality of the surgery.^{3,4} Ondansetron and metoclopramide are the commonly used drugs for controlling the post-operative nausea and vomiting. Drugs known to block dopamine, histamine and muscarinic cholinergic receptors have anti-emetic effects.³

Selective antagonists at the 5-hydroxytryptamine receptor have potent anti-emetic activity and ondansetron is the prototype of these compounds. The site of action of ondansetron is thought to be the 5-hydroxytryptamine receptor on neurons located in the visceral afferent vagus and in the area postrema.⁴ Both Ondansetron and metoclopramide have their own side-effects and advantages and differ from each other in terms of efficacy and side-effects.⁵⁻⁷ Hence, we undertook the present study to compare the effect of ondansetron 4mg and metoclopramide 10

mg in patients undergoing major surgical procedures.

MATERIAL AND METHODS

The present study was conducted in the department of surgery of Sukh Sagar Medical college and hospital, Jabalpur and included assessment of all the patients who underwent any major surgical procedure from January 2015 to November 2016. Duration of study was two years, from January 2015 to December 2016. All the patients were randomly divided into two study groups. Group 1 included patients that were administered ondansetron while group 2 included patients in which metoclopramide was administered. Ethical approval was taken from the ethical committee of the institute and written consent was obtained from the subjects after explaining in detail the entire research protocol. Patients with history of any other systemic illness, any known drug allergy or who have taken any other anti-emetic medication within one day before surgery were excluded from the present study. Same anaesthetic technique was used for providing anaesthesia to the patients in both the groups.

Assessment

The total number of emetic episodes was assessed in all the patients of both the groups starting 15 minutes after the surgery upto 24 hour after the surgery. Recording of all the vital signs and the complete timing and number of emetic episodes was done. For monitoring of the safety of the drugs, monitoring of the adverse reactions was done throughout the 24 hour observation period.

STATISTICAL ANALYSIS

All the results were analyzed by SPSS software. Chi-square test and student t test was used for the assessment of level of significance. All the results with p-value of less than 0.05 was taken as significant.

RESULTS

Table 1 shows the demographic details of the patients in both the groups. Number of patients in group 1 and group 2 were 200. In group 1 and group 2, 25 and 30 patients were males respectively. Mean age of the patients in group 1 and group 2 was 44.5 and

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45.8 years respectively. Mean weight of the patients in group 1 and group 2 was 64.2 and 62.8 Kg respectively. Significant result was obtained while comparing the gender of the patients in the two study groups. Figure 1 shows demographic details of the patients. Table 2 shows the number of emetic episodes in first 24 hours of surgery after administration of the drug. In group 1 and group 2, the number of patients with zero emetic episodes was 100 and 80 respectively. The patients with only one emetic episode during the first 24 hour of surgery in group 1 and group 2 was 20 and 25 respectively. Figure 2 shows the number of emetic episodes in first 24 hours of surgery after administration of the drug.

DISCUSSION

A high incidence of post-surgical nausea and vomiting are usually observed in female patients undergoing various surgical procedures.⁸ A higher incidence of post-operative nausea and vomiting has been observed with the use of opioids for extradural infusions after any major surgical procedure.⁹ Previous studies have shown that 4 mg of ondansetron is more effective in comparison with the 10 mg of metoclopramide in preventing the post-surgical nausea and vomiting.¹⁰⁻¹² Hence, we undertook the present study to compare the effect of ondansetron 4mg and metoclopramide 10 mg in patients undergoing major surgical procedures.

In the present study, we observed that in comparison with metoclopramide, ondansetron was significantly superior in controlling the episodes of emesis (Table-2). Significant results were obtained while comparing the number of emetic episodes in between the two study groups. Chen et al compared the efficacy of ondansetron with metoclopramide for the prevention of post-operative nausea and vomiting in patients after major gynaecological abdominal surgery. Anaesthesia was standardized using thiopentone, atracurium and methadone for induction followed by isoflurane in nitrous oxide-oxygen mixture. Fifty patients were randomized in a double-blind fashion to either receive intravenous) ondansetron 4 mg or metoclopramide 10 mg during closure of the pelvic peritoneum. The incidence and frequency of vomiting, and the incidence of severe nausea was recorded for 24 h after surgery. Ondansetron 4 mg and metoclopramide 10 mg had similar but short lasting efficacy for the prevention of vomiting in patients who received continued opioid analgesia after major gynaecological surgery. Morris et al compared the effect of Ondansetron with metoclopramide for prevention of post-operative nausea and emesis in in-patients undergoing major gynaecological surgery in this double-blind, randomized, placebo-controlled, multicentre study. A total of 1044 patients received a single intravenous (i.v.) injection of study medication immediately before induction of anaesthesia. Nausea and emesis were assessed over the 24 h post-operative period. Significantly more patients who received ondansetron experienced no emetic episodes (44%) compared with those who received metoclopramide (37%, $P = 0.049$) or placebo (25%, $P < 0.001$). No nausea was experienced by significantly more patients who received ondansetron (32%) than with patients who received metoclopramide (24%, $P = 0.009$) or placebo (16%, $P < 0.001$). In addition, fewer emetic episodes, less severe nausea and a reduced need for rescue antiemetics were also observed

Parameter		Group 1	Group 2	p-value
No. of patients		200	200	-
Gender	Males	25	30	0.01*
	Females	175	170	
Mean age in years		44.5	45.8	0.52
Mean weight in Kg		64.2	62.8	0.42

*: Significant

Table-1: Demographic details of the patients

No. of emetic episodes	Group 1	Group 2
0	100	80
1	20	25
2	10	15
3	5	5
≥4	1	5
Treatment failure	64	70

Table-2: No. of emetic episodes in first 24 hours of surgery after administration of the drug

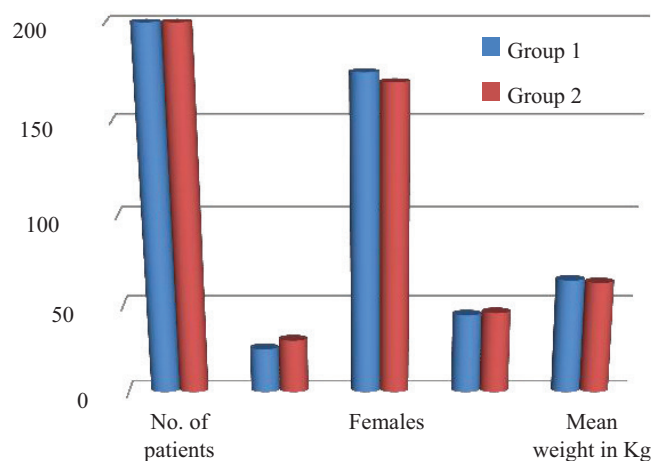


Figure-1: Demographic details of the patients

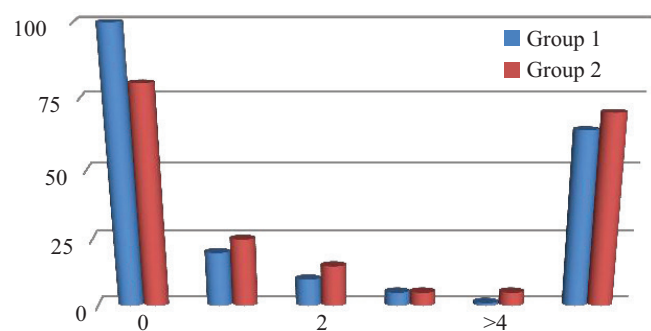


Figure-2: No. of emetic episodes in first 24 hours of surgery after administration of the drug

with ondansetron ($P < 0.05$ vs. metoclopramide and placebo). Metoclopramide and placebo-treated patients were also 1.5 times (95% CI 1.5-4.2) and 2.5 times (95% CI 1.1-2.0) more likely, respectively, to experience nausea post-operatively. Overall, ondansetron was the most effective antiemetic in this patient population.¹³ Pitkänen et al analyzed seventy-three patients who were scheduled for orthopaedic prosthesis surgery of the hip or knee. They received 4 mL of plain bupivacaine and 0.3 mg of preservative-free morphine i.t. for anaesthesia. The test drugs given in a double-blind and randomized fashion, were either metoclopramide 20 mg, three times, at 6 h intervals

(23 patients), ondansetron, 8 mg, twice, at 12 h intervals (25 patients), or 0.9% saline three times, at 6 h intervals (25 patients). The occurrence of nausea, vomiting and pain was followed for 24 h. The incidences of nausea and vomiting were 60% (15/25) and 56% (14/25) in the saline group, 52% (12/23) and 48% (11/23) in the metoclopramide group, and 52% (13/25) and 40% (10/25) in the ondansetron group. Incidences of severe vomiting were 24, 35 and 12% respectively. Eight patients in the saline group, seven in the metoclopramide and 10 in the ondansetron group did not need additional opioids for post-operative pain relief. They conclude that, metoclopramide and ondansetron were not better than saline in the prevention of post-operative emesis induced by intrathecal morphine.¹⁴ Alexander et al compared the incidence of postoperative nausea and vomiting in 124 patients undergoing major lower limb orthopaedic surgery following oral premedication with temazepam and ondansetron 8 mg, metoclopramide 10 mg or placebo. They received a standardised epidural and general anaesthetic. An epidural mixture containing bupivacaine 0.1% and fentanyl 10 mg.ml-1 was infused postoperatively. The occurrence of nausea and vomiting was assessed every 4 h for 24 h. The incidence of vomiting significantly decreased from 55% and 43% in the placebo and metoclopramide groups, respectively, to 26% in the ondansetron group ($p = 0.03$). The incidence of nausea and vomiting in patients who had previously suffered was also significantly reduced from 67% and 68% in the placebo and metoclopramide groups, respectively, to 29% in the ondansetron group ($p = 0.035$). We conclude that oral premedication with ondansetron 8 mg was superior to metoclopramide 10 mg and placebo in preventing postoperative nausea and vomiting following major orthopaedic surgery in patients given epidural opioid analgesia.^{15,16}

CONCLUSION

From the above results, the authors conclude that in the prevention of post-operative vomiting episodes, ondansetron is superior in comparison with metoclopramide. However, future studies are required to establish these facts more firmly.

REFERENCES

1. Yadav Deepak R, Ayyappan T, Shanmugam S, Sundaramoorthy K, Vetrichelvan T. Development and in-vitro evaluation of buccoadhesive Metoclopramide hydrochloride tablet formulations. *Development*. 2011;3:516–25.
2. Olver I, Clark-Snow RA, Ballatori E, Espersen BT, Bria E, Jordan K. Guidelines for the control of nausea and vomiting with chemotherapy of low or minimal emetic potential. *Support Care Cancer*. 2011;19:33–6.
3. Snow V, Weiss K, Wall EM, Mottur-Pilson C. Pharmacologic management of acute attacks of migraine and prevention of migraine headache. *Ann Intern Med*. 2002;137:840–9.
4. Furst S.R., Rodarte A. Prophylactic antiemetic treatment with ondansetron in children undergoing tonsillectomy. *Anesthesiology*. 1994;81:799–803.
5. Honkavaara P. Effect of ondansetron on nausea and vomiting after middle ear surgery during general anesthesia. *Br J Anaesth*. 1996;76:316–318.
6. Yi HS, Kim HS, Seo MR. Trial of Oral Metoclopramide on Diurnal Bruxism of Brain Injury. *Ann Rehabil Med*. 2013;37:871–4.

7. Faridaalae G, Rahmani SH, Mehryar H, et al. Comparison of Intravenous Metoclopramide and Acetaminophen in Primary Headaches: A Randomized Controlled Trial. *Emergency*. 2015;3:67–71.
8. Ewalenko P, Janny S., Dejonckheere M., Andry G., Wyns C. Antiemetic effect of sub hypnotic doses of propofol after thyroidectomy. *Br J Anaesth*. 1996;77:463–467.
9. Fujii Y., Tanaka H., Kobayashi N. Small doses of propofol, droperidol, and metoclopramide for the prevention of postoperative nausea and vomiting after thyroidectomy. *Otolaryngol Head Neck Surg*. 2001;124:266–269.
10. Livezey MR, Briggs ED, Bolles AK, Nagy LD, Fujiwara R, Furge LL. Metoclopramide is metabolized by CYP2D6 and is a reversible inhibitor, but not inactivator, of CYP2D6. *Xenobiotica*. 2013;44:309–19.
11. Al-Ansari K, Alomary S, Abdulateef H, Alshawagfa M, Kamal K. Metoclopramide versus ondansetron for the treatment of vomiting in children with acute gastroenteritis. *J Pediatr Gastroenterol Nutr*. 2011;53:156–60.
12. Hamid S.K., Selby I.R., Sikich N., Lerman J. Vomiting after adenotonsillectomy in children: A comparison of ondansetron, dimenhydrinate and placebo. *Anaesth Analg*. 1998;86:496–500.
13. Morris M, Ali AH. Comparison of Drugs and Intravenous Crystalloid in Reduction of Postoperative Nausea and Vomiting after Laparoscopic Surgery. *World Journal of Laparoscopic Surgery*. 2008;1:29-34.
14. Pitkänen A, Iqbal M, Yunus A, Ali K. Comparison of ondansetron and metoclopramide in the prevention of post-operative nausea and vomiting after laparoscopic cholecystectomy. *J Med Assoc Thai*. 2011;2:14- 56.
15. Alexander P, Conseiller C, Clyti N, Mamet JP. Ondansetron compared with metoclopramide in the treatment of established postoperative nausea and vomiting. The French Ondansetron Study Group. *Br J Anaesth*. 2008;79:322-326.
16. Varsha S Suryavanshi, Anjana Sahu, Minal Harde. Efficacy of combined epidural general anaesthesia for attenuating haemodynamic responses in gynaecological laparoscopic surgery. *International Journal of Contemporary Medical Research* 2016;3:1354-1358.

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