

Ondansetron Versus Dehydrobenzoperidol and Metoclopramide for Management of Postoperative Nausea in Laparoscopic Surgery Patients

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ABSTRACT

Background: In this prospective, randomized, double-blind study, we compared the efficacy of ondansetron versus dehydrobenzoperidol (droperidol) or metoclopramide in the treatment of established postoperative nausea and vomiting in 200 adult patients undergoing laparoscopic surgery under general anesthesia.

Methods: One hundred seventy-three American Society of Anesthesiologists (ASA) I and II patients satisfied inclusion criteria. Fifty-seven patients received ondansetron 4 mg (group O), 57 patients were given droperidol 1.25 mg (group D), and 59 patients received metoclopramide 10 mg (group M). Antiemetic efficacy was compared at 10 minutes and 30 minutes after the administration of the study drug.

Results: At 10 minutes, nausea scores in group O dropped from 8.3 to 3.7, in group D from 8.5 to 5, and in group M from 8.4 to 6.7; ($P < 0.05$ between the three groups). At 30 minutes, nausea scores were 1.3 in group O, 1.7 in group D, and 5 in group M; ($P < 0.05$ between group M and the other two groups). In the droperidol group, 25% of patients developed sedation. Patient satisfaction was best with ondansetron.

Conclusions: Both ondansetron and droperidol were more effective in the treatment of established postoperative nausea and vomiting than was metoclopramide. However, patients were satisfied best with ondansetron, which acts faster and causes less sedation than droperidol.

Key Words: Postoperative nausea and vomiting, Laparoscopic surgery, Antiemetics, Ondansetron, Dehydrobenzoperidol, Metoclopramide.

INTRODUCTION

Postoperative nausea and vomiting (PONV) are of major concern to patients undergoing surgery under both general and regional anesthesia;¹ they can delay hospital discharge,² and even result in overnight hospital admission to outpatient surgery.³ The incidence of postlaparoscopic vomiting is 35%.^{4,5} Ondansetron has been shown to be effective and well tolerated in the treatment of PONV.^{6,7} Ondansetron 4 mg has been shown to be the optimal dose.⁸ In the treatment of postoperative nausea and vomiting, ondansetron has also been shown to be superior to metoclopramide;^{9,10} however, it has been shown to be similar to dehydrobenzoperidol (droperidol).^{11,12}

No previous report that compares the three drugs together for the treatment of established PONV exists in the literature. The purpose of this study is to compare the antiemetic efficacy of ondansetron versus droperidol and metoclopramide in the treatment of established PONV in patients undergoing laparoscopic surgery.

METHODS

The institutional research committee approved this study, and the patients provided informed consent. American Society of Anesthesiologists (ASA) Class I and II patients undergoing laparoscopic surgery who developed postoperative nausea and vomiting were chosen. A total of 200 patients were enrolled in the study. Patients receiving pre- or intraoperative antiemetics were excluded. Also, exclusion criteria included postoperative pain scores > 5 , patients who received postoperative narcotics, pregnant females, patients with a nasogastric tube remaining postoperatively, and sedation scores > 1 . The degree of sedation was assessed as 1 = awake, 2 = drowsy, 3 = asleep.

One hundred seventy-three patients satisfied inclusion criteria. The following data were collected on all patients: age, weight, sex, history of diabetes and motion sickness, history of PONV, and type of operation, duration of surgery and anesthetic technique. The patients were divided into 3 groups. A random number was used to assign patients prospectively into one of the three treatment medications: ondansetron 4 mg, droperidol 1.25 mg, and

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metoclopramide 10 mg, in 2 mL solution. Fifty-seven patients received ondansetron (group O), 57 patients were given droperidol (group D), and 59 patients received metoclopramide (group M). The staff caring for these patients were blinded to the study drug received. Vital signs were recorded following each medication.

All patients were premedicated with glycopyrrolate 0.2 mg IM and diazepam 5 mg PO 45 minutes prior to the induction of anesthesia. After standard monitoring (EKG, noninvasive blood pressure, and oximetry) was applied, anesthesia was induced in the three groups with propofol 2mg/kg, fentanyl 2-3 ug/kg, and vecuronium 0.1 mg/kg. Anesthesia was then maintained by isoflurane and supplementary doses of vecuronium. The duration of the operation was recorded, and neuromuscular blockade was reversed at the end of surgery by a mixture of neostigmine 0.05 mg/kg and atropine 0.02 mg/kg. In the recovery room and upon the complaint of nausea, vomiting, or both, assessment of the degree of nausea was made subjectively by the patient using an 11 point (0 to 10) rating score. A score of 10 corresponded to worst possible nausea, vomiting, or both. An independent blinded observer gave one of the three study medications and recorded vital signs, oxygen saturation, and the nausea scores at 10 minutes and 30 minutes following the administration of the three study groups. Also

side effects, such as sedation, headache, dizziness, and agitation, were noted. Patients who continued vomiting following use of the three study drugs were given metoclopramide 10 mg as rescue antiemetics. After 2 hours, inpatients were discharged to the floor, where they were followed up for 24 hours by another independent observer; nausea score, vomiting, pain, and medications were recorded. The time for discharge of outpatients from the recovery room was also recorded.

Patient satisfaction (yes or no) was based on a questionnaire that included degree of nausea relief, side effects, and recommendations for future use.

Statistical analysis of data among the three groups was performed by the ANOVA test for nausea scores and recovery room stay and the chi-square test for rescue antiemetic use. A *P* value < 0.05 was considered significant for both tests.

RESULTS

No significant difference between the study groups existed with respect to the age, sex, weight, history of motion sickness, history of postoperative nausea and vomiting, diabetes, duration of operation and type of operation between the three groups (**Table 1**).

Table 1.
Demographic Data.

	Ondansetron	Droperidol	Metoclopramide
N	57	57	59
Sex: Female	45	45	44
Male	11	12	15
Weight: Female	69.1 +/- 12.1	68.3 +/- 10.2	70.2 +/- 13.8
Male	87.6 +/- 18.9	85.2 +/- 17.2	89.7 +/- 19.1
Motion Sickness	5	1	3
PONV	16	14	16
Diabetic	3	2	1
Age	46 +/- 17.6	44 +/- 16.2	42 +/- 18.3
Duration of Operation	90.2 +/- 23.3	80.6 +/- 20.6	85 +/- 19.3
Laparoscopic Cholecystectomy	30	32	33
Laparoscopic Herniorrhaphy	6	2	4
Laparoscopic Appendectomy	5	7	5
Diagnostic Laparoscopy	15	16	17

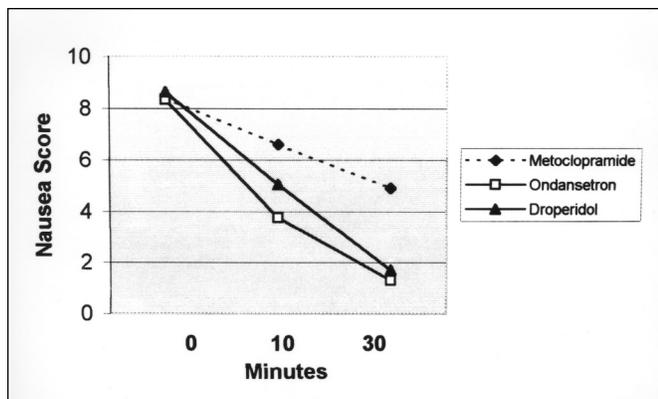


Figure 1. Nausea scores at 10 and 30 minutes versus the control score in patients who received O (Ondansetron), D (Droperidol) and M (Metoclopramide).

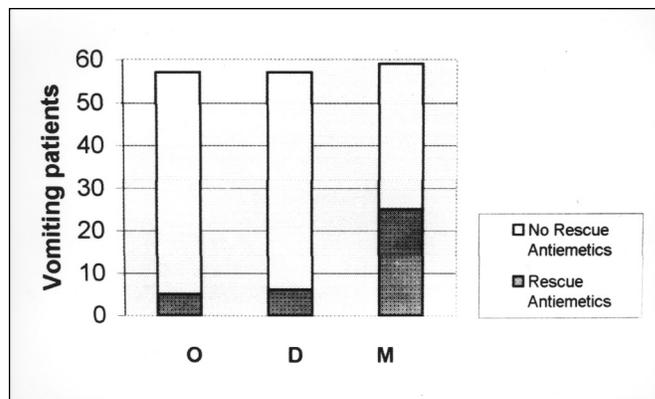


Figure 2. Number of patients who received rescue antiemetics (Metoclopramide 10 mg IV push) versus total number of patients in the O (Ondansetron), D (Droperidol) and M (Metoclopramide) groups.

As shown in **Figure 1**, both ondansetron and droperidol lowered the nausea score significantly better than metoclopramide did at 10 minutes and 30 minutes ($P < 0.05$). However, at 10 minutes, ondansetron, lowered the nausea score significantly better than droperidol did. ($P < 0.05$).

As shown in **Figure 2**, out of the 57 patients who received ondansetron, 5 maintained vomiting that needed a rescue antiemetic (metoclopramide 10 mg). Out of the 57 patients who received droperidol, 6 maintained vomiting that needed a rescue antiemetic. Also, out of the 59 patients who received metoclopramide, 25 maintained nausea, vomiting, or both that needed the rescue antiemetic. A statistical difference ($P < 0.05$) existed between the metoclopramide group and the other two

groups, but no difference was noted between the ondansetron group and the droperidol group.

As shown in **Table 2**, 25% of patients (14/57) in the droperidol group had sedation, (sedation score = 3), but no sedation was observed in the other two groups. All other side effects (headache, dizziness, malaise, and agitation) were similar among the three groups.

Also, the average time for discharge from the recovery room was 170 minutes +/- 30 for group O, 250 +/- 55 for group D, and 210 +/- 50 for group M. A significant difference existed between the three groups ($P < 0.05$). Patient satisfaction was best with ondansetron 82%, metoclopramide 65%, and droperidol 59%.

Table 2.
Side Effects.

	Ondansetron	Droperidol	Metoclopramide
Sedation	0	14 (25%)	0
Headache	8 (14%)	6 (10%)	5 (8%)
Dizziness	7 (12%)	6 (10%)	6 (10%)
Malaise	7 (12%)	10 (17%)	6 (10%)
Agitation	2 (4%)	3 (5%)	3 (5%)
Extrapyramidal Spt	0	0	0

DISCUSSION

Postoperative nausea and vomiting are multifactorial in origin. Patient-controlled factors like age, sex, obesity, history of motion sickness, history of previous PONV and diabetes exist. Surgical factors like type of surgery, duration of surgery, type of anesthesia, along with postoperative pain or analgesia (narcotics) contribute to its etiology.¹ In this study, however, the treatment groups were similar with regards to patient demographics, surgical procedure, anesthetics administered, and analgesics. Therefore, the response to the different treatment drugs can be attributed to the antiemetic drug administered.

The antiemetic mechanism can be either central or peripheral. Drugs used for the treatment of PONV are usually antihistaminics, anticholinergics, dopamine receptor antagonists, and 5HT₃ antagonists.¹ The present study is the only report that compares the three drugs ondansetron, droperidol, and metoclopramide for the treatment of PONV. Our results show that both ondansetron 4 mg and droperidol 1.25 mg are more effective than metoclopramide 10 mg in the treatment of established postoperative nausea and vomiting in patients undergoing laparoscopic surgery. Although the nausea score at 30 minutes shows no significant difference between group O and group D, the nausea score analysis at 10 minutes shows that ondansetron is better than droperidol. In addition, droperidol 1.25 mg caused a 25% incidence of sedation and a longer stay in the recovery room for outpatient surgery.

In conclusion, we have shown that ondansetron 4 mg and droperidol 1.25 mg are more effective than 10 mg metoclopramide in the treatment of established PONV in adult patients undergoing laparoscopic surgery. However, droperidol was significantly less effective at 10 minutes than ondansetron is at decreasing nausea scores. Also, droperidol was followed by sedation associated with a prolonged recovery room stay.

Therefore, the use of ondansetron is recommended in outpatient surgery.

References:

1. Watcha MF, White PF. Postoperative nausea and vomiting: its etiology, treatment and prevention. *Anesthesiology*. 1992;77:162-184.
2. Lee PJ, Pandit SK, Green CR. Postanesthetic side effects in the outpatient. Which are the most important? *Anesth Analg*. 1995;80(suppl.):S271.
3. Gold B, Kitz D, Leeky JB, Neuhaus JM. Unanticipated admission to the hospital following ambulatory surgery. *JAMA*. 1989;262:3008-3010.
4. Patasky AV, Kitz DS, Andrews RW, Lechry JH. Nausea and vomiting following ambulatory surgery. *Anesth Analg*. 1988;67(suppl.):S163.
5. Metter SE, Kitz DS, Young MC, et al. Nausea and vomiting after outpatient laparoscopy, incidence, impact on recovery room stay, and cost. *Anesth Analg*. 1987;66:S116.
6. Scuderi P, Wetchler B, Sung WF, et al. Treatment of postoperative nausea and vomiting after outpatient surgery with 5HT₃ antagonist ondansetron. *Anesthesiology*. 1993;78:15-20.
7. Larijani GE, Gratz I, Afshar M, et al. Treatment of postoperative nausea and vomiting with ondansetron: a randomized, double blind comparison with placebo. *Anesth Analg*. 1991;73:246-249.
8. Claybon L. Single dose ondansetron for the 24-hour treatment of postoperative nausea and vomiting. *Anaesthesia*. 1994;49(suppl.):24-29.
9. Diemursch P, Conseiller N, Clyti N, et al. Ondansetron compared with metoclopramide in the treatment of established postoperative nausea and vomiting. *Br J Anaesth*. 1997;79:322-326.
10. Polati E, Verlati G, Finco G, et al. Ondansetron versus metoclopramide in the treatment of postoperative nausea and vomiting. *Anesth Analg*. 1997;85:395-399.
11. Berghuis DO, Goritski WJ, Mandel DK et al. Comparison of ondansetron, ephedrine and droperidol for treatment of postoperative nausea and vomiting. *Anesthesiology*. 1993;79(suppl.):A7.
12. Heim C, Müzer T, Listyo R. Ondansetron versus droperidol. *Anaesthesist*. 1994;43:504-509.