BUTTERWORTH HEINEMANN

Ambulatory Surgery, Vol. 3, No. 2, pp. 71–73, 1995

0966-6532/95 $10.00 + 0.00

0966-6532(95)00013-5

Incidence of postoperative vomiting in ambulatory gynaecological laparoscopies, depending on anaesthesic technique employed

L F Ortega, J Aguirre, I Blanco, L Tena, L Aguilera, E Cardenas

Hospital de Galdakao, Vizcaya, Spain

A prospective, randomized and double blinded, study was performed in 120 women undergoing gynaecological laparoscopy for tubal ligation or for diagnostic purposes. The women were divided into three groups, each of which received 30 μg kg^{-1} droperidol prior to induction with thiopental in group A, propofol in group B and induction with propofol and maintenance with an infusion of propofol in group C. The patients were assessed for postoperative vomiting and also the relationship with the periods of the menstrual cycle. The use of droperidol, prior to induction with propofol and maintenance of anaesthesia with an infusion of propofol, significantly lowered postoperative emesis in gynaecological laparoscopies, but we did not find a significant relationship between the day of menstrual cycle and the occurrence of vomiting.

Key words: Gynaecological laparoscopy, postoperative complications: vomiting, anaesthesic technique

Introduction

Postoperative vomiting is a frequent complication in women undergoing gynaecological laparoscopic surgery[1–4]. Numerous factors have been implicated, such as premedication[5,6], anaesthetic technique[7,8], hormone levels[9] and sex[10].

In a recent publication, Beattie et al.[11] reported the antiemetic effect of droperidol at a 30 μg kg^{-1} dose in this type of surgery. According to these authors, this effect did not appear during the menstrual period (days 1–8 of the menstrual cycle) and vomiting was therefore more frequent at that time. However, Honkavaara et al.[12] found a higher incidence of vomiting during the luteal phase (days 20–24 of the menstrual cycle).

In this study we have evaluated the incidence of postoperative vomiting in the above-mentioned surgical procedures, taking into account the anaesthetic technique employed.

Materials and methods

One hundred and twenty women (ASA physical status I or II), who were scheduled for gynaecological laparoscopies for tubal ligation or for diagnostic purposes, were entered into the study. Age, weight, day of last menstrual cycle, pneumoperitoneum maximal pressure, pneumoperitoneum duration, anaesthesia duration and incidence of postoperative vomiting data were obtained. In the postoperative phase patients were assessed by trained personnel from the Short Stay Unit, before discharge from hospital. Those women in whom we were unable to determine the day of last menstrual cycle, those who were taking oral contraceptives, those who had given birth recently or were breast feeding, were excluded from the study.

The menstrual cycle was divided into three phases: preovulatory phase (days 1–8), ovulatory phase (days 9–16) and postovulatory phase (days 17–28).

Anaesthesia

The 120 patients were randomly assigned to one of three anaesthetic regimens (see Table 1):

Group A (control): prior to induction, 30 μg kg^{-1} droperidol, 50 μg fentanyl, 2 mg midazolam and 0.01 mg kg^{-1} atropine were administered. Induction was carried out with 5–6 mg kg^{-1} thiopental followed by 1 mg kg^{-1} succinylcholine to ease tracheal intubation. Maintenance was achieved with 2 μg kg^{-1} fentanyl, oxygen–N_2O (FiO_2 of 33%), 0.5 mg kg^{-1} atracurium and 0.5–1% isoflurane. End-tidal volume was measured continuously with a capnometer and maintained at 5–5.5%.

Group B, in which the only difference in comparison to group A was the anaesthetic induction performed

Accepted: 2 May 1995
Correspondence and reprint requests to: LF Ortega, Servicio de Anestesiologia y Reanimación, Hospital de Galdakao, Galdakao, Vizcaya, Spain

Table 1. Anaesthesic technique

	Premedication	*Induction*	*Maintenance*	*Reversal drugs*
Group A (control)	Droperidol 30 μg kg^{-1} Fentanyl 50 μg Midazolam 2 mg Atropine 0.01 mg kg^{-1}	Thiopental 5–6 mg kg^{-1} Succinylcholine 1 mg kg^{-1} Succinylcholine	Fentanyl 2 μg kg^{-1} O_2–N_2O FiO_2 0.33 Isoflurane 0.5–1% Atracurium 0.5 mg kg^{-1}	Atropine 0.01 mg kg^{-1} Neostigmine 1.5–2 mg
Group B	Droperidol 30 μg kg^{-1} Fentanyl 50 μg Midazolam 2 mg Atropine 0.01 mg kg^{-1}	Propofol 1.5 mg kg^{-1} Succinylcholine 1 mg kg^{-1}	Fentanyl 2 μg kg^{-1} O_2–N_2O FiO_2 0.33 Isoflurane 0.5–1% Atracurium 0.5 mg kg^{-1}	Atropine 0.01 mg kg^{-1} Neostigmine 1.5–2 mg
Group C	Droperidol 30 μg kg^{-1} Fentanyl 50 μg Midazolam 2 mg Atropine 0.01 mg kg^{-1}	Propofol 1.5 mg kg^{-1} Succinylcholine 1 mg kg^{-1}	Fentanyl 2 μg kg^{-1} O_2–air FiO_2 0.33 Propofol infusion (6 mg kg^{-1} min^{-1}) Atracurium 0.5 mg kg^{-1}	Atropine 0.01 mg kg^{-1} Neostigmine 1.5–2 mg

with propofol at 1.5 mg kg^{-1} instead of thiopental. The maintenance of anaesthesia was exactly as in group A.

Group C, in which premedication administered was the same as in groups A and B. Induction was achieved with 1.5 mg kg^{-1} propofol and maintenance with an infusion of propofol at 10 mg kg^{-1} for the first 10 min and 6 mg kg^{-1} for the remaining surgery time, oxygen–air (FiO_2 of 33%). The rest of the drugs (succinylcholine, fentanyl and atracurium) were the same as in groups A and B.

Laparoscopy was performed in all patients with abdominal insufflation and use of the Trendelenburg position.

At the end of anaesthesia, atropine 0.01 mg kg^{-1} and neostigmine 1.5–2 mg, were administered.

Data analysis

Quantitative variables (age, weight, duration of anaesthesia, etc.) were compared using Student's *t* test. Pearson's χ^2 analysis with Yate's correction were performed to compare qualitative variables (vomiting). A *P* value of 0.05 was considered significant.

Results

There were no significant differences between the three groups relating to age, weight, pneumoperitoneum maximal pressure, duration of anaesthesia, pneumoperitoneum duration and end-tidal CO_2.

Postoperative vomiting occurred in 10 patients out of 120 (8.3%). In group A (control group) six cases of vomiting occurred (15%) and in group B, four cases occurred (10%). No vomiting was observed in group C (Table 2).

With regard to the relationship of postoperative emesis in respect of the three periods into which we divided the menstrual cycle and the anaesthetic technique used, we did not find significant statistical correlation in either of the two groups in which vomiting occurred (Table 3).

Table 2. Incidence of postoperative vomiting

	No vomiting	*Vomiting*	*%*
Group A (control)	40	6	15
Group B	40	4	10
Group C	40	0	0

P C/A: <0.05.

Table 3. Incidence of vomiting related to menstrual day

	Preovulatory days (1–8)	*Ovulatory days (9–16)*	*Postovulatory days (17–28)*
Group A (control)	3	1	2
Group B	1	1	2
Group C	0	0	0

P = not significant.

Discussion

Postoperative vomiting is a common symptom after anaesthesia. Although, in general, it has been considered a minor complication, it can lead to an increased recovery time, delaying patient discharge[13]. It therefore represents an important cause of postoperative morbidity. It has been observed that patients undergoing gynaecological laparoscopic surgery suffer a high incidence of postoperative emesis, involving multiple aetiological factors[4].

Diverse studies[14–18] have proved the antiemetic effect of propofol either as an induction agent and/or maintenance drug and, likewise, the antiemetic effect of 30 μg kg^{-1} droperidol previously used for anaesthetic induction. Droperidol inhibits dopaminergic postsynaptic receptors, although the physiological basis of such antiemetic effects still remains unclear. Oestrogens have been shown to increase the number of dopaminergic receptors, and would increase nausea and vomiting especially between days 8 and 24 of the menstrual cycle,

being the period when higher levels of oestrogens could be blocked by droperidol and not during the menstruating period (days 1–8)[11].

In this study, we did not find significant differences between the three groups with regard to the three periods into which the menstrual cycle was divided, which suggested that the previous explanation of the antiemetic effect of droperidol was not the only mechanism operating. On the other hand, as reported by Green and Jonsson[19], we observed that propofol used only as an induction agent did not have a statistically significant antiemetic effect. Nevertheless we did find a statistically significant decrease of postoperative emesis ($P < 0.05$) when combining propofol as inductor and maintenance drug. When we compared the results of this study with those in which ondansetron[20–25] (a new 5-HT3 receptor antagonist) was used as antiemetic medication, we did not find minor incidences of vomiting with the particular anaesthetic techniques we used.

In conclusion, an anaesthetic technique which would minimize the risk of postoperative vomiting in ambulatory laparoscopies, would be based upon the use of 30 $\mu g\ kg^{-1}$ droperidol, prior to anaesthetic induction with propofol, followed by propofol as the only maintenance drug, being administered by continuous infusion at 10 $mg\ kg^{-1}$ for the first 10 min and 6 $mg\ kg^{-1}$ during the rest of the surgical procedure.

Acknowledgements

We would like to thank the nursing staff in the Day Surgery Unit for their assistance and Nati Ricondo for her help in preparing the manuscript.

References

1 Palazzo MGA, Strunin L. Anaesthesia and emesis. I: Etiology. *Can Anaesth Soc J* 1984; **31**: 178–87
2 Palazzo MGA, Strunin L. Anaesthesia and emesis. II: Prevention and management. *Can Anaesth Soc J* 1984; **31**: 407–15
3 Patakay AO, Kitz DS, Andrews RLO, Lecky JH. Nausea and vomiting following ambulatory surgery: Are all procedures created equal? *Anesth Analg* 1988; **67**: 163
4 Watcha MF, White PF. Postoperative nausea and vomiting: Its etiology, treatment and prevention. *Anesthesiology* 1992; **77**: 162–84
5 Cohen SE, Woods WA, Wyner J. Antiemetic efficacy of droperidol and metoclopramide. *Anesthesiology* 1984; **60**: 67–9
6 Doze VA, Shafer A, White PF. Nausea and vomiting after outpatient anesthesia – effectiveness of droperidol alone and in combination with metoclopramide. *Anesth Analg* 1987; **66**: 41
7 Raudel GI, Levy L, Kothery SP, Pandit SK. Propofol versus thiamylal-enflurane anesthesia for outpatient laparoscopy. *J Clin Anesth* 1992; **4**: 185–9
8 Sengupta P, Plantevin OM. Nitrous oxide and day-case laparoscopy: Effects on nausea, vomiting and return to normal activity. *Br J Anaesth* 1988; **60**: 570–3
9 Beattie WS, Forrest JB, Buckley DN, Lindblad T. Nausea and vomiting correlates with estrogen levels and alters dose response for droperidol. *Anesthesiology* 1988; **71**: 3
10 Forrest JB, Beattie WS, Goldsmith CH. Risk factors for nausea and vomiting after general anaesthesia. *Can J Anaesth* 1990; **37**: 90
11 Beattie WS, Lindblad T, Buckley DN, Forrest JE. Menstruation increases the risk of nausea and vomiting after laparoscopy: A prospective randomized study. *Anesthesiology* 1993; **78**: 272–6
12 Honkavaara P, Lehtinen AM, Hovorka J, Kortilla K. Nausea and vomiting after gynaecological laparoscopy depends upon the phase of menstrual cycle. *Can J Anaesth* 1991; **38**: 876–9
13 Metter SE. Impact of nausea and vomiting on recovery room stay in outpatient diagnostic laparoscopy. *Anesth Analg* 1987; **66**: 116
14 Korttila KT. Less nausea and vomiting after propofol than after enflurane or isoflurane anesthesia. *Anesthesiology* 1988; **69**: 578
15 Johnston R, Noseworthy T, Anderson B, Konapad E, Grace M. Propofol versus thiopental for outpatients anesthesia. *Anesthesiology* 1987; **67**: 431–3
16 Vinik HR. Diprivan compared with methohexitone or isoflurane for maintenance of anaesthesia. VIIth European Congress of Anesthesiology, Vienna, 1986
17 Youngberg JA, Texidor MS, Smith DE. A Comparison of induction and maintenance of anesthesia with propofol for induction with thiopental and maintenance with isofluorane. *Anesth Analg* 1987; **66**: 191
18 Millar SM, Jewkes CE. Recovery and morbidity after day case anaesthesia. A comparison of propofol with thoipentone/enflurane with and without alfentanil. *Anaesthesia* 1988; **43**: 738–43
19 Green G, Jonsson L. Nausea: The most important factor determining length of stay after ambulatory anaesthesia. A comparative study of isoflurane and/or propofol techniques. *Acta Anaesth Scand* 1993; **37**: 742–6
20 Wetchler BV, Sung VF, Duncalf D, Joslyn AF. Ondansetron decreases emetic symptoms following outpatient laparoscopy. *Anesthesiology* 1990; **73**: 36
21 Bodner M, Poler SM, White PF. Initial evaluation of ondansetron – A novel antiemetic. *Anesthesiology* 1990; **73**: 328
22 Brewer AR, Peters KR, Becker GL. Ondansetron. Effects on nausea and vomiting in ambulatory surgery. *Anesthesiology* 1993; **79**: 13
23 Kovac A, Pearman M, Khalil S, Scudari P, Templeton D. Phrophylactic intravenous ondansetron in male outpatients undergoing general anesthesia: A multicenter study. *Anesthesiology* 1993; **79**: 9
24 McKenzie R, Covac A, O'Connor T, Duncalf D, Angel J, Gratz I et al. Comparison of ondansetron versus placebo to prevent postoperative nausea and vomiting in women undergoing ambulatory gynecologic surgery. *Anesthesia* 1993; **78**: 21–8
25 Berghnins PA, Goritsky WJ, Mandel DK, Beerle BJ, Dewhirst WE. Comparison of ondansetron, ephedrine and droperidol for treatment of postoperative nausea and vomiting. *Anesthesiology* 1993; **79**: 7