A COMPARISON OF DROPERIDOL, METOCLOPRAMIDE AND PROPOFOL IN THE PREVENTION OF POSTOPERATIVE NAUSEA AND VOMITING

(Received 13 December, 1994)

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SUMMARY

Vomiting in the postoperative period is common in female patients undergoing gynaecologic laparoscopy. Thirty female outpatients ASA I-II, aged 20-50 years scheduled for gynaecologic laparoscopy were enrolled in a randomized, double blind study to compare the efficacy and side effects of droperidol, metoclopramide and propofol administered in two doses during induction and at the first hour postoperatively. After induction with thiopental, anesthesia was maintained with 1% isoflurane in 70% N20 and 02. Vecuronium was administered for muscle relaxation and no opioid was used during, peri and postoperative period. Each patient was prospectively assigned at random to one of three treatment groups: droperidol 40µgr/kg during induction and 20µgr/kg at the first hour postoperatively, metoclopramide 0.30 mg/kg during induction and 0.15 mg/kg at the first hour postoperatively or propofol 10mg during induction and the first hour postoperatively. Mean arterial pressure, heart rate, nausea and vomiting and sedation scores were recorded at 30, 60, 90 minutes and 2, 4, 6, 12, 24 hours postoperatively. None of the patients had vomiting during 24 hours postoperatively and there was no significant difference between nausea and vomiting scores and hemodynamic parameters of three groups ($p>0.05$). Sedation scores were significantly higher during 6 hours postoperatively in droperidol group and during 1 hour in metoclopramide and propofol groups ($p<0.05$). We concluded that with this protocol; droperidol, metoclopramide and propofol were effective in preventing postoperative nausea and vomiting for outpatient gynaecologic laparoscopy however droperidol caused prolonged sedation.

Key Words : Postoperative complication, Nausea, Vomiting, Sedation, Droperidol, Metoclopramide, Propofol

INTRODUCTION

Nausea and vomiting; the most common postoperative complications associated with outpatient general anesthesia, result in significant morbidity and longer stays in the recovery room (1-8). The indicende of emesis after general anesthesia is influenced by the type of surgical procedure irrespective of the anesthetic technique used and the highest incidence (40-54%) was reported in women undergoing gynaecologic laparoscopy (8). A large number of papers have been published suggesting the use of droperidol and metoclopramide as prophylactic antiemetic agents and conflicted results have been reported regarding their efficacy and recommended doses (4-7,9-22).

The aim of this prospective, randomized, double blind study was to evalate the efficacy and the side effects of two different intravenous doses of droperidol. metoclopramide and propofol in the prevention of postoperative nausea and vomiting in adult females undergoing outpatient laparoscopy under general anesthesia.

MATERIALS AND METHODS

Thirty females; ASA physical status I or II, scheduled for elective gynaecologic laparoscopy, gave informed consent to participate in the institutionally approved study protocol. Patients predisposed to nausea and vomiting secondary to gastrointestinal reflux, gastroparesis, motion sickness, inner ear disorders or central nervous system disorders as well as those with hepatic, renal abnormalities or history of drug abuse were excluded.

The main characteristics of patients and duration of anesthesia and surgery are reported in Table I. No patient was premedicated. Induction of anesthesia was performed with 5mg/kg thiopental intravenously. Tracheal intubation was facilitated by 1.5 mg/kg succinylcholine i.v. and anesthesia was maintained with 1% isoflurane in 70% N20 and 02. 0.1 mg/kg vecuronium i.v. was administered for surgical relaxation and at the end of surgery 30µgr/kg neostigmine and 0.5 mg atropine sulphate i.v. were administered to reverse residual neuromuscular blockade. All patients were randomly assigned to three groups (n=10). Group I patients received 40µgr/kg droperidol i.v. during induction and 20µgr/kg

i.v. at the first hour postoperatively. Group II patients received 0.30mg/kg metoclopramide i.v. during induction and 0.15mg/kg at the first hour postoperatively. Group III patients received 10mg propofol i.v. during induction and at the first hour postoperatively. No patients received opioids pre, per and postoperatively. Patients complaining of severe pain in the recovery room were given ketolorac 60mg i.m. In the recovery room with 30 minute intervals and at 2,4,6,12 hours postoperatively; the mean arterial pressure, heart rate, and nausea and vomiting and sedation scores graded on "Four Point Scale" were recorded (Table II). Twenty four hours postoperatively all patients were called on the phone and were questioned about postdischarge nausea, vomiting sedation and unusual sensations.

Statistical differences in time dependent variables between groups were determined by one way analyses of variance (ANOVA) and Newman Keuls Test. A $p<0.05$ was accepted as statistically significant.

RESULTS

The three groups were comparable with regard to age, weight and duration of anesthesia. All data obtained from patients at predetermined time intervals are presented in Table III and IV. None of the patients had vomiting during twenty four hours postoperatively. One patient in droperidol group, two patients in metoclopramide group and one patient in propofol group had nausea but there was no significant difference between the nausea vomiting scores of the three groups ($p>0.05$). Sedation scores were significantly higher during six hours postoperatively in droperidol group and during the first hour postoperatively in metoclopramide and propofol groups ($p<0.05$) (Table III). In all groups the highest sedation score was 2. Hemodynamic changes were similar and nonsignificant in all patients ($p>0.05$). No changes in mood and no hallucinations were reported.

Table I: The characteristics of patients and duration of anesthesia

	DROPERIDOL	METOCLOPRAMIDE	PROPOFOL
Patients' age (years)	28.5 ± 5.7	31.0 ± 5.7	30.4 ± 6.7
Patients' weight (kg)	55.4 ± 9.9	58.2 ± 7.6	63.4 ± 8.3
Duration of anesthesia (min)	44.0 ± 9.4	36.5 ± 8.5	41.0 ± 1.1

Table II: Nausea - vomiting and sedation scores

	NAUSEA - VOMITING	SEDATION
1	No nausea and vomiting	Fully awake
2	Residual nausea without vomiting	Somnolent, response to call
3	Minor nausea with vomiting	Somnolent, response to tactile stimulation
4	Severe nausea with vomiting	Asleep, response to painful stimulaton

Table III: Patients' nausea-vomiting and sedation scores

	NAUSEA-VOMITING			SEDATION		
	DROPER	METOCL	PROPOF	DROPER	METOCL	PROPOF
30. min	1.1±0.1	1.0±0.0	1.1±0.1	1.6±0.1*	1.4±0.1*	1.6±0.1*
60. min	1.0±0.0	1.0±0.0	1.1±0.1	1.7±0.1*	1.4±0.1*	1.5±0.1*
90. min	1.0±0.0	1.1±0.1	1.0±0.0	1.5±0.1*	1.0±0.0	1.1±0.1
2. hour	1.0±0.0	1.1±0.1	1.0±0.0	1.4±0.1*	1.0±0.0	1.1±0.1
4. hour	1.0±0.0	1.0±0.0	1.0±0.0	1.2±0.1*	1.0±0.0	1.1±0.1
6. hour	1.0±0.0	1.0±0.0	1.0±0.0	1.2±0.1*	1.0±0.0	1.1±0.1
12. hour	1.0±0.0	1.0±0.0	1.0±0.0	1.1±0.1	1.0±0.0	1.0±0.0
24. hour	1.0±0.0	1.0±0.0	1.0±0.0	1.0±0.0	1.0±0.0	1.0±0.0

(*) $p<0.05$

Table IV: Patients' mean arterial pressure and heart rate values

	MEAN ARTERIAL PRESSURE			HEAT RATE		
	DROPER	METOCL	PROPOF	DROPER	METOCL	PROPOF
30. min	96.7±1.8	91.7±2.6	97.6±2.2	84.6±1.7	75.6±1.5	78.0±2.7
60. min	94.9±2.5	88.7±2.7	96.4±2.2	80.1±2.4	74.9±1.8	80.6±2.7
90. min	89.1±3.5	85.8±1.6	94.1±2.2	80.3±3.2	76.7±1.9	78.5±2.3
2. hour	87.9±3.6	87.9±2.4	92.0±2.5	80.7±2.9	78.0±1.0	76.0±2.2
4. hour	85.4±3.0	81.5±2.9	89.6±2.2	79.4±2.2	77.6±1.0	77.2±2.8
6. hour	85.2±2.8	82.2±3.0	91.5±1.6	78.0±3.3	76.0±1.1	78.2±3.1

DISCUSSION

Nausea and vomiting; among the most common postoperative complaints may increase morbidity by resulting in dehydration, electrolyte imbalance, venous hypertension, pulmonary aspiration of vomitus and delay discharge particularly after outpatient surgery (1-8).

Besides the patient related factors such as age, gender, obesity, tendency toward motion sickness, anesthetic technique, type and duration of surgery, the timing of administration of antiemetic therapy and total dose administered has been postulated to affect the incidence of postoperatve emesis (1, 2, 5, 8, 17, 18). The presumption is that early blockade of receptors in chemoreceptor trigger zone prevents their activation during surgery and thus reduces vomiting postoperatively. This suggests that antiemetic agents that work by this mechanism should be administered during induction. However several studies have also shown these drugs to be effective when given immediately after completion of surgery (7-22). We administered droperidol, metoclopramide or propofol to patients undergoing gynaecologic laparoscopy during induction and at the first hour postoperatively in two doses to increase efficacy and duration of action.

A prophylactic antiemetic would be of great value in outpatient surgery such as gynaecologic laparoscoy having the incidence of postoperative nausea vomiting as high as % 40-54 (8). Droperidol and metoclopramide have been evaluated for postoperative antiemetic efficacy in this population and contradictory reports concerning their effectiveness had been published (4, 9-16, 21). Although previous studies have noted that propofol anesthesia is accompanied by significantly less postoperative nausea and vomiting, only Borgeat et al (6) suggested that propofol in subhypnotic doses (10 mg) possess direct antiemetic properties in minor elective surgery (23, 24).

Droperidol; a dopamine receptor antagonist have been widely used as a prophylactic antiemetic. It had been reported to be unreliable as an antiemetic in doses as small as 5µgr/kg, more effective than a placebo in doses of 10-20µgr/kg (11, 16, 21) and be associated with extrapyramidal side reactions and prolonged postoperative sedation in doses of 25-75µgr/kg. However, according to Cohen et al (13) and Melnick et al (10), no significant differences in the incidence of postoperative nausea and vomiting were observed when droperidol was compared with placebo after general anesthesia without tracheal intubation. In our study; droperidol administered 40µgr/kg i.v. during induction and 20µgr/kg i.v. at the first hour postoperatively was found to be effective, no extrapyramidal reactions or anxiety were observed during twenty four hours postoperatively, however patients' sedation scores were significantly higher in droperidol group during six hours postoperatively.

Metoclopramide is a benzamide with both central and peripheral antiemetic reactions. In addition to its ability to block dopaminergic and 5-hydroxytryptaminergic receptors at the chemoreceptor triger zone, it increases lower eosephageal sphincter tone and enhances gastric and small bowel motility thereby preventing the delayed gastric emptying (1, 15, 17). Reports on the utility of metoclopramide for prophylaxis against postoperative emesis in high risk surgical populations have been contradictory (7, 11, 13, 17). However, all records support the conclusion that the patients who received metoclopramide were discharged earlier than either droperidol or control groups. In our study we found metoclopramide administered 0.3 mg/kg i.v. during induction and 0.15mg/kg at the first hour postoperatively was effective to prevent postoperative emesis and caused neither drowsiness nor extrapyramidal reactions.

It has been shown that general anesthesia conducted with propofol is associated with less nausea and vomiting during the early postoperative period than any other anesthetic technique (23, 24). In our study, we administered propofol in subhypnotic doses (10mg) during induction and at the first hour postoperatively and found that it is at least as effective as droperidol and metoclopramide in preventing postoperative emesis without side effects. Our result is in agreement with Borgeat et al (6) who concluded that subhypnotic doses of propofol possess direct antiemetic properties. Although it is

suggested that propofol exerts its antiemetic action by the modulation of some subcortical pathways, further studies are needed to elucidate precise mechanism and optimum dosage regimen.

We concluded that droperidol, metoclopramide and propofol are effective to prevent postoperative nausea and vomiting in female patients undergoing gynaecologic laparoscopy when they are administered in two doses during induction and at the first hour postoperatively, however because of the sedative effects of droperidol, metoclopramide or propofol are appropriate in outpatient surgical procedures.

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