A COMPARATIVE STUDY ON THE PREVENTION OF POSTOPERATIVE NAUSEA BY DROPERIDOLE AND DIMENHYDRINATE*

(Received 21 July, 1992)

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SUMMARY

This study compared both the antiemetic and sedative postanesthetic effects of droperidole and dimenhydrinate. 40 ASA class 1 or 2 patients scheduled for cystoscopy were randomly assigned to either droperidole or dimenhydrinate group. Ten of these patients were included in both groups receiving either of the two drugs on two different occasions (n1= 25, n2=25).

For premedication, all patients received 0.01mg/kg atropine sulphate followed by either droperidole 1.25 mg or dimenydrinate 20 mg. intravenously. The duration of anesthesia, surgery and recovery were recorded. There was a significantly lower incidence of nausea in the dimenhydrinate group ($p<0.01$). None of the patients in the groups required additional doses of antiemetics in the recovery room. The time of recovery of full alertness and discharge was found to be significantly longer in the droperidole group ($p<0.01$). It was found that, dimenhydrinate is significantly more effective than droperidole in reducing the incidence of nausea in outpatient anesthesia. In addition, dimenhydrinate does not delay either the time to recovery or the time to discharge and we believe its routine use in outpatient anesthesia should be considered.

Key Words: Outpatient anesthesia. Postoperative complication: Nausea; Droperidole, Dimenhydrinate.

INTRODUCTION

Nausea, one of the most deleterious side effects of general anesthesia, may cause psychological, social and economical problems by delaying discharge especially in outpatient surgery. Droperidole, a butyrophenone with central cholinergic activity is commonly used to prevent postoperative nausea. However, there is concern that it may prolong recovery. Dimenhydrinate, an antihistamine which blocks the H1 receptor, has proven to be an effective agent for the prevention of the motion sickness (1). This study compared both the antiemetic and sedative postanesthetic effects of droperidole and dimenhydrinate.

MATERIALS AND METHODS

Fourty ASA class I or II patients scheduled for cystoscopy were randomly assigned to either a droperidole or dimenhydrinate group (n1= 25.n2=25). Ten of these patients were included in both groups receiving either of the two drugs on two different occassions.

For premedication, all patients received 0.01mg/kg atropine sulphate intravenously as soon as a 18G venous cannula was inserted into a peripheral upper extremity vein. The study drugs were administered intravenously (droperidole 1.25 mg and dimenhydrinate 20mg) in a double blind manner,prior to the induction of anesthesia. Anesthesia was induced in all cases with sodium thiopenthal 5mg/kg and succinylcholine 1.5mg/kg and was maintained with N20/02 (66%-33%) and 1 MAC enflurane. Airway was maintained with either an endotracheal tube or an anesthesia mask under controlled ventilation. No anticholinergic agents were administered. The duration of anesthesia and surgery were recorded. All patients were evaluated postoperatively until the time they were discharged home to determine whether nausea was present. The time necessary for postanesthesia recovery was evaluated according to three parameters determined as opening the eyes, spontaneous response and meaningful speech. Total time until discharge was recorded. All patients' evaluations, were performed by the same recovery room nurse blinded to the patient group assignment.

Data were analyzed using the Student's t test, differences were considered significant when $p<0.01$.

RESULTS

Patients in the two groups were similar with respect

* Presented in a part at The 10th World Congress of Anesthesiology (The Hague 1992).

to sex, age, weight, anesthetic drug dosage and duration of anesthesia and surgery (Table I). The incidence of nausea in the two groups is shown in table II. There was a significantly lower incidence of nausea in the dimenhydrinate group ($p<0.01$). There was a significant difference in the incidence of nausea between those patients whose airways were managed by endothracheal tube or mask. The incidence being higher in the intubated group ($p<0.01$). None of the patients in the two groups required additional doses of antiemetics in the recovery room. The time to recovery of full alertness and discharge was found to be significantly longer in the droperidole group ($p<0.01$) (Table III). One of the ten patients receiving the two drugs on two different occasions had nausea when he had received droperidole, yet he had no such complaint after dimenhydrinate administration. The recovery time for these ten patients were also significantly longer with droperidole than with dimenhydrinate ($p<0.01$) (Table IV).

TABLE I. Patient characteristics

	DROPERIDOL	DIMENHYDRINATE
Number of patients	25	25
Sex(M/F)	16/9	17/8
Age(yr)	61.20±15.49	59.36±16.11
Weight (kg)	72.64±11.32	68.08±11.81
Duration of anesthesia (min)	23.08±8.78	27.28±6.86
Duration of surgery (min)	16.68±7.30	17.96±6.11

NOTE: Data given as mean±SD

TABLE II. Incidence of nausea in the two groups

	DROPERIDOL	DIMENHYDRINATE
Number of patients	25	25
On mask	20	21
Intubated	5	4
Number of nauseated patients	6 (24%)	2 (8%)
On mask	3	1
Intubated	3*	1*

* $p<0.01$ (droperidole group versus dimenhydrinate group)

TABLE III. The mean recovery scores in the two groups

	DROPERIDOL	DIMENHYDRINATE
Opening the eyes (min)	13.20±6.90	6.40±7.20.*
Spontaneous response (min)	18.16±8.39	8.44±9.85.*
Meaningful speech (min)	24.40±11.69	9.76±10.98.*
Discharge (min)	44.30±10.70	28.72±9.89.*

Values are time in minutes (mean±SD) from the end of anesthesia until patient reached stated state of recovery

* $p<0.01$ (dimenhydrinate group versus droperidole group)

TABLE IV. The mean recovery scores of those patients receiving both drugs

	DROPERIDOL	DIMENHYDRINATE
Opening the eyes (min)	13.20±6.90	4.00±4.07.*
Spontaneous response (min)	18.16±8.39	4.64±1.34.*
Meaningful speech (min)	25.00±13.11	9.76±10.98.*

Values are time in minutes (mean±SD) from the end of anesthesia until patient reached stated state of recovery

* $p < 0.01$ (dimenhydrinate group versus droperidole group)

DISCUSSSION

During the last decade the demand for outpatient surgery has grown rapidly. To keep pace with the changing surgical environment, anesthesiologists have been modifying their techniques to ensure a more rapid and a smoother recovery. However, postoperative nausea and vomiting remain the most common anesthesia related side effects in outpatient surgical facilities (2,3). A prophylactic antiemetic would be of great value in outpatient surgery and anesthesia.

Several studies have shown that, droperidole is effective in preventing postoperative nausea and its dopaminergic receptor activity is thought to acccount for its antiemetic actions (4-7). Droperidole has been reported to be effective in doses as low as 0.25mg (8) and 5 microgr/kg (9), and as high as 2.5 to 5mg (10-13). The lower dose of 5 microgr/kg was later found to be unreliable but both 10 and 20 microgr/kg were found to be more effective than a placebo; also it was stated that, 20 microgr/kg droperidole was able to reduce frequency as well as severity of the symptoms (7). Therefore, we administered 20 microgr/kg (approximately 1.25 mg for a 70 kg person) droperidole and found it to be effective in reducing the overall incidence of postoperative nausea, however dimenhydrinate came out to be superior to droperidole in its antiemetic action.

Droperidole is not devoid of side effects. Extrapyramidal symptoms (14) as well as bizzare psychosis (15,16),have been reported following premedication with droperidole. We made it a point to administer droperidole immediately prior to induction of anesthesia to avoid these possible side effects and we did not witness any of them in our 25 patients. The other reported side effect of droperidole is prolonged postoperative sedation (6,17-19). Although this has been reported only after use of higher doses of droperidole, 2.5 mg or higher (11, 19) we found that a modest dose (1.25 mg / 70kg) of droperidole also caused excessive sedation in the postoperative period and that it significantly did prolong discharge time when compared with dimenhydrinate (20mg/70kg).

Dimenhydrinate, an antihistaminic which blocks the H1 receptor, has been proven to be an effective and inexpensive agent for the prevention of motion sickness. The mechanism thought to account for this effect of the drug is a combination of primary H1 blocking effect and a central anticholinergic effect.

The mechanism of action responsible for the superior antiemetic effect of dimenhydrinate compared to droperidole is not clearly understood.

In summary, it was found that intravenous dimenhydrinate (20mg/70kg) is significantly more effective than droperidole (1.25mg/70kg) in reducing the incidence of nausea in outpatient anesthesia. Furthermore, dimenhydrinate does not delay either the time to recovery of full alertness and the time to discharge from hospital compared to the regimen of prophylactic intravenous droperidole. Taking into account that dimenhydrinate is also far less expensive than droperidole, we believe that its routine use in prevention of nausea in outpatient anesthesia should be considered.

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