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EFFECT OF METOCLOPRAMIDE AND DEXAMETHASONE ON NAUSEA AND VOMITING IN CESAREAN SECTION UNDER SPINAL ANESTHESIA

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Abstract

Introduction: Nausea and vomiting during regional anesthesia in patients undergoing cesarean section (C/S) is still a major health issue. The efficacy of intravenous (IV) dexamethasone 8 mg versus intravenous (IV) metoclopramide 10 mg on reducing the incidence of nausea and vomiting and changes in the vital signs was examined in the present study.

Methods: One hundred and three (103) patients of 18 to 40 years with ASA I (American Society of Anesthesiologists) and II were selected for the present study. The patients were randomly assigned either in dexamethasone 8mg (Group A, n=49) or metoclopramide 10mg (Group B, n=54). The frequency of either nausea or vomiting after the administration of dexamethasone 8 mg (IV) and metoclopramide 10 mg (IV) were recorded in the first, 5, 10, 15, 30, and 60 minutes. For spinal anesthesia, 12.5 mg of 5% hyperbaric bupivacaine was administered intrathecal to the patients in both groups. During recovery, the vital signs, including heart rate, SPO2%, and blood pressure were recorded in patients of both groups.

Results: The patients in both dexamethasone (8 mg) and metoclopramide (10 mg) groups were comparable in age and ASA. The findings of the study didn't find a significant difference in the frequency of nausea and vomiting between two study groups after administration of anesthetic. Furthermore, there was no significant difference in vital signs of the patients between dexamethasone 8 mg and metoclopramide 10 mg group, except SPO2% at 60 minutes after recovery. The SPO2% was significantly higher in dexamethasone 8 mg group (97.47) compared to Metoclopramide 10 mg group (96.87).

Conclusions: The dexamethasone 8 mg and

Keywords: metoclopramide, dexamethasone, nausea, vomiting, spinal anesthesia.

metoclopramide 10 mg can be used safely in terms of nausea and vomiting, heart beating, and blood pressure for spinal anesthesia in pregnant women.

INTRODUCTION

Cesarean section delivery with regional anesthesia has been increasing over the last decades due to patient suitability, improvement in fetal condition at birth and greater maternal safety [(1)]. An important health problem in regional anesthesia for cesarean section for both patients, surgeons and the anesthesiologists is nausea and vomiting. The mechanism of intraoperative nausea and vomiting is unclear and complex. The possible reasons are hypotension, vagal stimulation, uterotonic drugs, and surgical stimulation. Moreover, the demographic characteristics of patients and anesthetic technique may have a role [(2)]. To reduce the incidence of postoperative nausea and vomiting (PONV), a number of treatments have been introduced, like 5-HT3 (5-hydroxytryptamine 3 receptor) antagonists (ondansetron and granisetron), antihistamine drugs, and dopamine receptor antagonists. The mentioned treatments have been shown to associate to major obstacles like cost (5-HT3 antagonists), extrapyramidal effects (dopamine receptor antagonists), and excessive sedation (antihistamine drugs causes tachycardia) [(3)]. This research is an attempt to compare the effect of a single dose of metoclopramide (10 mg) to dexamethasone (8) mg in patients undergoing elective cesarean section under spinal anesthesia [(4, 5, 6)].

Aim of the study

To show the effect of metoclopramide 10 mg and dexamethasone 8 mg on reducing the incidence of N/V (nausea and vomiting) in patients who undergoing elective C/S under spinal anesthesia.

METHOD

Randomized clinical trial study included 103 patients who underwent cesarean section of ASA I and II (American Society of Anesthesiology Class I and II) between 20 February and the first of December 2018. The patients were randomly assigned either in dexamethasone 8 mg (Group A, n=49) or metoclopramide 10 mg (Group B, n=54). The patient's scheduled for elective cesarean section were randomly assigned to group A or group B by a trained nurse at the department. The patients were selected from the anesthesia department of Duhok maternity hospital after taking ethical approval from the Scientific Research Division/ Department of Planning of Duhok General Directorate of Health in 2018.

1. **Inclusion:** the patient's schedules for elective cesarean section without complications and aged 18 years to 40 years old were selected for the study.
2. **Exclusion:** the patients had contraindication for metoclopramide, dexamethasone, or use antiemetic or ant depressive drugs, and those classified as ASA III and higher were excluded from the study. Moreover, those patients with extrapyramidal motoric diseases like malignant hyperthermia, mechanical ileus or epilepsy, pheochromocytoma, probable intraoperative administration of propofol, and hepatic insufficiency were

The investigator prepared the drug solutions in an ideal way. However, in order to make a complete blinded study, another anesthesiologist administered the drugs after clamping of the umbilical cord to the patients in both groups of the study. Postoperatively patients were observed and assessed in the ward for one hours for incidence of nausea and vomiting.

The ASA physical status was assessed according to the American Society of Anesthesiologists' guidelines [(7)]. The descriptive information of each patient was in frequency and percentage or mean and standard deviation. The differences of frequency of nausea and vomiting between dexamethasone 8 mg and metoclopramide 10 mg groups were examined by Fishers' exact test. In addition, the differences in vital signs of the patients were determined by independent t-tests. The P-value of less than 0.05 was considered as statistically significant difference. The statistical calculations were performed by using Statistical Package for Social Sciences version 25:00 (SPSS 25:00).

RESULTS

The analysis of the data obtained from both the dexamethasone 8 mg and metoclopramide 10 mg groups showed that both groups were similar in age (27.69 vs. 28.57; P=0.386) and ASA (ASA I: 93.9 vs. 92.6; P=1.00) (Table 1).

Table 1. Age and ASA characteristics of dexamethasone and metoclopramide groups

Characteristics	Group		P-Value (Two-Sided)
	Group A (Dexamethasone 8mg) n=49	Group B (Metoclopramide 10 mg) n=54	
Age (Year);	27.69 (4.77)	28.57 (5.33)	0.386
Mean/SD			
ASA; F(%)			1.00
ASA I	46 (93.9)	50 (92.6)	
ASA II	3 (6.1)	4 (7.4)	

*Independent t-test and **Fishers' Exact test were performed for statistical analyses.

The results didn't show a significant difference in the frequency of nausea and vomiting between dexamethasone 8 mg and metoclopramide 10 mg groups after administration in first, 5, 10, 15, 30, and 60 minutes after spinal anesthesia (Table 2).

Table 2. The frequency of nausea and vomiting in two dexamethasone and metoclopramide groups at 1, 5, 10, 15, 30, and 60 minutes after spinal anesthesia

Minute	Group		P-Value (Two-Sided)
	Group A (Dexamethasone 8 mg) n=49	Group B (Metoclopramide 10 mg) n=54	

First	(8.2)	5 (9.3)	1.00
5	(2.0)	2 (3.7)	1.00
10	(4.1)	2 (3.7)	1.00
15	(10.2)	3 (5.6)	0.47
30	(4.1)	2 (3.7)	1.00
60	(2.0)	0 (0.0)	0.48

Fishers' Exact test was performed for statistical analyses. The numbers are in frequency (percentage)

The study results also showed that there was no significant difference in the heart rate of the patients in dexamethasone 8 mg and metoclopramide 10 mg groups in first, 5, 10, 15, 30, and 60 minutes after recovery (table 3).

Table 3. Heart rates of patients in both metoclopramide and dexamethasone in both groups after recovery

Minute	Group A (Dexamethasone 8 mg)		Group B (Metoclopramide)		P-Value (Two Sided)
	Mean	Std. Deviation	Mean	Std. Deviation	
First HR	110.24	25.98	110.50	24.23	0.959
5	109.51	23.23	108.15	20.56	0.754
10	115.81	17.63	111.91	20.58	0.309
15	111.77	17.09	112.04	20.44	0.943
30	108.21	16.00	113.07	19.39	0.168
60	105.21	19.15	98.47	17.82	0.071

The study further revealed that there was no significant difference in SPO2% of patients in both groups in first, 5, 10, 15, and 30 minutes after recovery except in 60 minute (**P=0.029**). The SPO2% was significantly higher in dexamethasone 8 mg group (97.47) compared to metoclopramide 10 mg group (96.87), Table 4.

Table 4. SPO2% of patients in both Metoclopramide and dexamethasone in both groups after recovery

Minute	Group A (Dexamethasone 8 mg)		Group B (Metoclopramide 10 mg)		P-Value (Two Sided)
	Mean	Std. Deviation	Mean	Std. Deviation	
First	98.69	1.78	99.09	1.05	0.176
5	98.67	1.90	99.00	1.13	0.298
10	98.76	1.36	98.94	1.22	0.461
15	98.57	1.41	98.78	1.41	0.461
30	98.35	1.54	98.52	1.59	0.578
60	97.47	1.63	96.87	0.98	**0.029**

Finally, there was no significant difference in systolic and diastolic blood pressures of patients from both dexamethasone 8mg and metoclopramide 10 mg groups in first, 5, 10, 15, 30, and 60 minutes after recovery (P>0.05) (Table 5).

Table 5. Blood pressure of patients in both metoclopramide and dexamethasone in both groups after recovery

Minute	Group A (Dexamethasone 8 mg)		Group B (Metoclopramide10 mg)		P-Value (Two Sided)
	Mean	Std. Deviation	Mean	Std. Deviation	
First	98.69	1.78	99.09	1.05	0.176
5	98.67	1.90	99.00	1.13	0.298
10	98.76	1.36	98.94	1.22	0.461
15	98.57	1.41	98.78	1.41	0.461
30	98.35	1.54	98.52	1.59	0.578
60	97.47	1.63	96.87	0.98	**0.029**

DISCUSSION

In the present study, the authors found no significant difference in the frequency of nausea and vomiting between the patients administered with metoclopramide 10 mg and those with dexamethasone 8 mg in the first, 5, 10, 15, 30, and 60 minutes following spinal anesthesia. In addition, the study did not find a significant difference in the heart rates of the patients between the metoclopramide 10 mg and dexamethasone 8 mg groups in the first, 5, 10, 15, 30, and 60 minutes of the recovery. Similar results were found for SPO2% difference in both study groups except in the 60 minutes after recovery. The patients in dexamethasone 8 mg had a greater SPO2% (97.47%) compared to 96.87% in the metoclopramide 10 mg. In this study we used metoclopramide because of its availability in our operation theater and less expensive as ondansetron. Kalani et al. (2017) [8] randomly assigned 120 patients aged 15-35 years old with ASA I and II either to the group ondansetron 6 mg or dexamethasone 8 mg in patients who underwent cesarean section. The investigators recorded the level of nausea and vomiting, blood pressure, respiratory rate and heart rate in the first, 5, 10, 15 and 30 minutes following spinal anesthesia and during recovery. The study found that the frequency of

nausea and vomiting in dexamethasone 8 mg was higher in the first (10.2%) and 5 minutes (13.6%) compared to 0% in the ondansetron 6 mg following spinal anesthesia. While, the patients in the ondansetron 6 mg had a higher prevalence of nausea and vomiting 16.7% compared to dexamethasone 8 mg (5.1%). In the present study, the incidence of nausea and vomiting during recovery between the study groups was not recorded. In the present study, the authors found no significant difference in the frequency of nausea and vomiting between the patients administered with metoclopramide 10 mg and those with dexamethasone 8 mg in the first, 5, 10, 15, 30, and 60 minutes following spinal anesthesia. In addition, the study did not find a significant difference in the heart rates of the patients between the metoclopramide 10 mg and dexamethasone 8 mg groups in the first, 5, 10, 15, 30, and 60 minutes of the recovery. Similar results were found for SPO2% difference in both study groups except in the 60 minutes after recovery. The patients in dexamethasone 8 mg had a greater SPO2% (97.47%) compared to 96.87% in the metoclopramide 10 mg. In this study we used metoclopramide because of its availability in our operation theater and less expensive as ondansetron. Kalani et al. (2017) [8] randomly assigned 120 patients aged 15-35 years old with ASA I and II either to the group ondansetron 6 mg or dexamethasone 8 mg in patients who underwent cesarean section. The investigators recorded the level of nausea and vomiting, blood pressure, respiratory rate and heart rate in the first, 5, 10, 15 and 30 minutes following spinal anesthesia and during recovery. The study found that the frequency of nausea and vomiting in dexamethasone 8 mg was higher in the first (10.2%) and 5 minutes (13.6%) compared to 0% in the ondansetron 6 mg following spinal anesthesia. While, the patients in the ondansetron 6 mg had a higher prevalence of nausea and vomiting 16.7% compared to dexamethasone 8 mg (5.1%). In the present study, the incidence of nausea and vomiting during recovery between the study groups was not recorded. Whereas, Kalani et al. (2017) [8] recorded it during recovery between their study groups, but they did not find statistically significant differences in the first 5, 10, 15, and 30 minutes of the recovery. The result of the present study did not reveal a significant difference in the incidence of nausea and vomiting between the study groups. In addition, the incidence was not high between the first and 60 minutes of the spinal anesthesia. For example, the higher incidence was in the first minute of the spinal anesthesia (8.2% in dexamethasone and 9.3% in the metoclopramide). This confirms that both medications could be safe in terms of nausea and vomiting to C/S patients. And the incidence was not high in Kalani et al. (2017) [8] study as well, Although, its incidence was higher in the first and 5 minutes of spinal anesthesia in the dexamethasone group compared to ondansetron one, ondansetron group had a higher incidence in the 30 minutes of the spinal anesthesia compared to dexamethasone (The overall incidence in both study groups of the study was not high). Even its incidence during recovery was not high and significantly different in the study groups, which indicate that both medications could be used for the spinal anesthesia purpose with a safe way. Afsargharehbagh et al. (2018) [9] found a high incidence of nausea and vomiting in patients who underwent C/S in metoclopramide (28.33 immediately, 21.67 after 6 hours, 18.33 after 12 hours, and 10 after 24 hours) and ondansetron (36.67 immediately, 35% after 6 hours, 16.67% after 12 hours, and 3.33 after 24 hours). The impacts of spinal anesthesia in pregnant and non-pregnant women are different. The distribution of anesthetic drug into the cerebrospinal fluid is not predictable. It is not only related to the spinal canal (Nan et al. 2013, Harada et al 2017) [10, 11], but also related to a number of successive changes in the balance of acids and bases (McArthur et al., 2005, Halpern et al 2004) [12, 13] and protein contents of cerebrospinal fluid protein (Ericson et al., 2019, Echevarria et al. 2001) [14, 15] owing to physiological alterations during pregnancy.

CONCLUSIONS

The dexamethasone 8 mg and metoclopramide 10 mg can be used safely in terms of nausea and vomiting, heart beating, and blood pressure for spinal anesthesia in pregnant women.

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