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ORIGINAL ARTICLE

The Effect Of *Dexamethasone* On Nausea, Vomiting And Pain In Parturients Undergoing Caesarean Delivery

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ABSTRACT

Background and Aim: Nausea, retching, vomiting and pain are common in parturients undergoing cesarean delivery which is performed under regional anaesthesia. The purpose of the present study was to evaluate the prophylactic use of dexamethasone for reducing emetic symptoms (nausea, retching, and vomiting) during caesarean section and analgesic requirements after caesarean surgery.

Material and Method: This is a quasi-experimental study. In a randomized, double-blind trial, 80 parturients received IV placebo (saline) or dexamethasone 8 mg, immediately after clamping of the umbilical cord. Intraoperative, post delivery emetic episodes, severity of pain after surgery, and analgesic requirements were performed by an investigator. The patients experiencing nausea evaluated its severity on a linear numeric scale ranging from 0 (no nausea) to 10 (severe nausea). To determine severity of pain, we used the VAS scale.

Results: The results of this study showed that the rate of emetic symptoms (nausea, retching, and vomiting) in an intraoperative, post delivery period, was lower in patients who received 8 mg dexamethasone than in the placebo group ($p< 0.001$). Requests for total requirements of opioids to relieve intolerable pain, were less in patients in the dexamethasone group, as compared with the placebo group ($P<0.001$). In addition, patients in group dexamethasone had significantly lower pain after caesarean than in the placebo group ($p<0.05$, $p<0.001$).

Discussion and Conclusion: In the parturients undergoing caesarean delivery performed under spinal anaesthesia in this study, prophylactic use of 8 mg dexamethasone was found to be effective for reducing emetic symptoms (nausea, retching, and vomiting) and analgesic requirements after caesarean section, and is recommended for routine use.

Key Words: Dexamethasone, Nausea, Vomiting, Pain, Caesarean

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Introduction

Nausea, retching, and vomiting during spinal anesthesia for cesarean delivery are distressing to the parturient and disturbing to the surgeon [1],[2]. Also, postoperative nausea and vomiting (PONV) are the most common complications after anesthesia and

surgery [3],[4]. These symptoms predispose the patient to aspiration of gastric contents, wound dehiscence, psychological distress, and delayed recovery and discharge time [5]. Caesarean delivery performed under regional anesthesia is associated with a relatively high incidence (50%-80%) of intraoperative, postdelivey nausea and vomiting, when no prophylactic antiemetic is provided [1], [2]. In spite of current research and ever-evolving pharmacologic therapies to minimize this unpleasant event, the overall incidence of PONV during the first 24 hours after surgery varies between 20% and 30% [6]. Consequently, patients report that they are willing to pay up to $100.00 out-of-pocket per surgery to prevent PONV [7]. Each year, millions of women (15% to 25% of deliveries in Western countries) give birth by caesarean section [8]. However, the associated risks of caesarean section (Cs) are considerable, one of which is the incidence of abdominal pain [9] that immediately occurs after Cs [10]. Studies showed that post Cs, pain has an adverse effect on initial and duration of breastfeeding [11], and this is recognized as a main confounder in recovery and surgery wards [10].Traditional antiemetics (droperidol and metoclopramide) are effective for prophylaxis against emesis in parturients undergoing caesarean delivery, but these drugs occasionally cause undesirable adverse effects such as excessive sedation, hypotension, dry mouth, dysphoria, restlessness, and extra pyramidal symptoms [1]. Dexamethasone, a synthetic glucocorticoid, has been shown to be effective in reducing the incidence of emesis in patients undergoing chemotherapy [1]. A review of the randomized trials conducted between 1996 and 2001 using perioperative single-dose steroid administration, showed that dexamethasone had antiemetic and analgesic effects in various types of operations [12]. The long-term administration of dexamethasone may cause undesirable adverse events such as an increased risk of infection, glucose intolerance, delayed wound healing, superficial ulceration of gastric mucosa, and adrenal suppression [1]. However, these adverse events were not related to a single dose of dexamethasone at 8 to 10 mg [13]. To prevent effects of nausea and vomiting, the use of prophylactic antiemetics in women undergoing caesarean surgery is justified. The purpose of the present study was to evaluate the prophylactic use of dexamethasone for reducing emetic symptoms (nausea, retching, and vomiting) during caesarean section, and analgesic requirements after cesarean surgery.

Material and methods

This is a quasi-experimental study that was performed at the Ilam Shahid Mostafa Khomeini hospital during the year 2008. We studied 80 parturients undergoing spinal anesthesia for elective caesarean delivery, aged 18–35 years, weight 50-75 kg, Height 150-175 cm, and primiparous. The exclusion criteria were the use of antiemetics within 24 hrs prior to surgery, regional anesthesia contraindicated, allergy to dexamethasone, established hypertension or glucose intolerance, the presence of a gastrointestinal disease, and a history of motion sickness and/or previous PONV. The study was approved by the institutional Ethics Committee, and informed consent was obtained from all patients. Patients were randomly assigned to the following study groups using a sealed envelope technique: placebo [(n=40) saline] or dexamethasone [(n=40) 8 mg] was administered by IV line immediately after clamping of the umbilical cord.

Each patient received IV lactated Ringer~ solution 20 mI/kg (up to 2000 mL) before the induction of spinal anesthesia. Spinal anesthesia was induced with lidocaine 5% (75-100 mg) via a 26-gauge Whit acre needle at the L3-4 or L4-5 interspace, in the lateral recumbent position. Oxygen 3 L/min was administered via a face mask. Standard monitoring during surgery included continuous heart rate measurement with an electrocardiogram, non-invasive blood-pressure assessed every 5 min, and pulse oximetry. The reduction in systolic BP

(>20% from baseline and/or <100 mm Hg) immediately after spinal injection, was treated by increasing the rate of IV fluid administration, by left uterine displacement from the vena cava, and by injection of IV ephedrine. Thus, maternal hypotension related to emetic symptoms before and after clamping the umbilical cord, was avoided. All patients received oxytocin 10 units after delivery of the baby. Intraoperative, post delivery emetic episodes (nausea, retching, and vomiting) and postoperative pain were recorded by an investigator blinded to treatment assignment. Postoperative variables including nausea, retching, vomiting and pain were recorded in the ward at the 3rd, 6th and 24th hrs, postoperatively. Nausea was defined as a subjectively unpleasant sensation associated with awareness of the urge to vomit; retching was defined as the laboured, spasmodic, rhythmic contractions of the respiratory muscles without the expulsion of gastric contents; vomiting was defined as the forceful expulsion of gastric contents from the mouth [5]. Patients experiencing nausea evaluated its severity on a linear numeric scale ranging from 0 (no nausea) to 10 (severe nausea). After hospitalization of the client in the surgery ward, pain severity was measured by VAS scale. VAS scale standard toll was for evaluating pain severity that started by 0 and terminated by 10. No pain =0 and maximum pain=10.

Postoperative analgesia was provided with a diclofenac (75mg) or pethidine (50 mg)- the routine analgesic treatment in our institution. All collected data were analyzed with using the statistical software (SPSS, Ver.13), descriptive statistics, Student t test, and Mann-Whitney test.

[Table/Fig 1]. Patient characteristics

Characteristic	Treatment group		P_V
	dexamethasone (n=40)	placebo (n= 40)	
Age (years, mean [SD])	26.6[3.9]	27.3[3.8]	>.05
Weight,kg (mean [SD])	66.8[2.5]	67.6[2.6]	>.05
Body height,cm (mean [SD])	161.7[5.9]	160.3[3]	>.05
Gestational age (weeks, mean [SD])	38.8[.76]	39.1[.64]	>.05
Duration of surgery, min(mean [SD])	56[11]	55[13]	>.05
Baseline systolic blood pressure, mmHg	122[11]	121[10]	>.05

[Table/Fig 2]. Outcome parameters according to randomization group

Outcome parameter	Treatment group		P_V
	dexamethasone (n=40)	placebo (n=40)	
*Emesis no. (%) of patients			
Total	3(7.5)	15(37.5)	<.001
Nausea	2(5)	7(17.5)	<.05
Retching	0(0)	2(5)	<.05
Vomiting	1 (2.5)	6(15)	<.05
Nausea severity (mean [SD])	3[1.2]	7[2.3]	<.05
VAS score after 3 h of treatment (mean [SD])	2.7[.4]	3.5[.6]	<.05
VAS score after 6 h of treatment (mean [SD])	1.5[.5]	3 [.6]	<.001
VAS score after 24 h of treatment (mean [SD])	.5[.5]	1.4[.3]	<.001
Total consumption of diclofenac (mg) (mean [SD])	79.8[20.4]	130.2[17.2]	<.001
Total consumption of pethidine (mg) (mean [SD])	15.8[5.4]	35.1 [7.5]	<.001

*Nausea, retching, or vomiting.

Result

None of the 80 enrolled parturients was withdrawn for any reason. Baseline patient characteristics and duration of surgery are shown in [Table/Fig 1]. Patient characteristics were not different among the treatment groups. The incidence of emetic symptoms (nausea, retching, and vomiting), and requirement for rescue medication are presented in [Table/Fig 2]. In an intraoperative, post delivery period, the rate of emetic symptoms (nausea, retching, and vomiting) was lower in patients who received the dexamethasone than in the placebo group (7.5% (3/40) vs 37.5% (15/40), respectively; ($P < 0.001$); [Table/Fig 2]. Severity of nausea was significantly different between the groups($P <0.05$).

Patients in group dexamethasone had a significantly lower pain after caesarean delivery, and the total consumption of diclofenac or pethidine was lower in this group than in the placebo group ($P < 0.001$), ($P < 0.05$),[Table/Fig 2].

Discussion and Conclusion

The etiology of nausea, retching, and vomiting in parturients undergoing spinal anesthesia for caesarean delivery is complex, and is dependent on a variety of factors. These emetic symptoms are influenced by maternal hypotension. Hypotension may cause brain-stem hypo perfusion, and thus trigger the vomiting center to induce emesis [1]. In this study, if necessary, rapid fluid infusion, left uterine displacement, or administration of ephedrine, were performed for the prevention and/or early treatment of

maternal hypotension. Numerous factors, including age, sex, smoking, a history of motion sickness, and/or previous postoperative emesis, pain, operative procedure, or anesthetic management are considered to affect the incidence of nausea and vomiting[5]. In this study however, these factors were well balanced between the groups, so that the difference in the incidence of post delivery emetic episodes (nausea, retching, and vomiting) during caesarean delivery under spinal anesthesia, could be attributed to the study drug. Also, to avoid potential adverse effects on the foetus, the study drug was administered via IV immediately, after clamping of the umbilical cord.

Dexamethasone is effective for the control of emesis in patients receiving chemotherapy for cancer[5] Several investigations have shown that dexamethasone decreases the incidence of PONV in patients undergoing laparoscopic cholecystectomy, laparoscopic and gynecological surgery, thyroidectomy, pediatric tonsillectomy and caesarean delivery [1],[5],[14],[15] [16],[17],[18],[19]. The exact mechanism by which dexamethasone prevents PONV is not known, but there have been several suggestions such as central or peripheral inhibition of the production or secretion of serotonin, central inhibition of the synthesis of prostaglandins, and changes in the permeability of the blood–brain barrier to serum proteins. There is also a possibility that established reduction in prostaglandin synthesis mediated by dexamethasone, contributes to analgesia [5]. Dexamethasone has also been used to reduce pain after caesarean delivery and laparoscopic gynecological surgery. [5],[19] In a recent review by Bisgaad, dexamethasone was reported to be effective for the treatment of pain after laparoscopic cholecystectomy. Postoperative pain and supplementary opioid requirements were reduced by approximately 50%, in patients receiving dexamethasone [20]. Dexamethasone is not associated with the sedative, dysphoric, and extra pyramidal symptoms found with traditional antiemetics (e.g., droperidol and metoclopramide). However, long-term administration of dexamethasone may cause adverse effects such as an increased risk of infection, glucose intolerance, delayed wound healing, superficial ulceration of the gastric mucosa, and adrenal suppression. Dexamethasone is slightly more expensive than the commonly used and well-established antiemetics such as droperidol and metoclopramide. However, the use of these drugs has been limited, because they can occasionally cause excessive sedation and/or extrapyramidal symptoms [5]. Decisions about the choice of antiemetics should be made after considering its effects on patients, as well as the cost. In our study, 8 mg dexamethasone was more effective than placebo for preventing emetic symptoms (nausea, retching, and vomiting). The need for diclofenac or pethidine for intolerable pain was less in patients who had received 8 mg dexamethasone than placebo. To conclude, prophylactic use of 8 mg dexamethasone is effective for reducing emetic symptoms and the analgesic requirements in women undergoing caesarean surgery under spinal anaesthesia.

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