Comparison of efficacy Ephedrine and phenylephrine in Postoperative Vomiting in Cesarean section

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ABSTRACT

Introduce: Postoperative nausea and vomiting (PONV) still is the most big problem event encountered in the PACU (Post Anesthesia Care Unit), despite advances in prevention and treatment. The incidence of PONV has remained high and has a major negative impact on patient satisfaction about the overall surgical experience.

Method: In double-blind, clinical trial, 104 patients were undergoing cesarean section was randomizing into two groups: Group P (100µg Phenylephrine) and Group E (6µg Ephedrine). We compared the Vomiting parameters between the two groups. Result: Patients in the recovery were compared in 2 groups regarding occurrence of vomiting that no statistical difference between two group (P >0.05). The results show that vomiting was seen in ASA1, and in ASA2 no vomiting was observed. The incidence of vomiting was 2 patients in young group and 1 patient in middle-aged group. The incidence of vomiting was 2 patients in slim group, 1 in moderate group and no sign of vomiting has been seen in the obese group. Conclusion: We conclude that ephedrine is the best drug for antiemetic prophylaxis before cesarean surgery based on cost and lack of side effects.

Key words: Ephedrine, phenylephrine, Vomiting, Cesarea

Introduction

Regional anesthesia has been shown to be effective, safe and the anesthetic of choice for elective and emergency Cesarean sections. Spinal anesthesia is easy to perform and it works fast using even a small amount of drug. In addition, there are less systemic complications compared to that of general anesthesia [1]. But Postoperative nausea and vomiting p ONV is a problem that patients identify as one of the worst, if not the worst problem that can occur after surgery. Therapy is not perfect, yet there are anaesthesia techniques that can help minimize the problem and drugs that can be used both to prevent and also treat the problem once it occurs. There is a genetic basis for why some people experience PONV more than others and also why treatment for some is better than others. It is easy to turn the vapourizer dial, but that is a part of the problem. Not everyone reacts the same to drugs. Postoperative nausea and vomiting (PONV) still is the most big problem event encountered in the PACU(Post Anesthesia Care Unit), despite advances in prevention and treatment [2]. The incidence of PONV has remained high and has a major negative impact on patient satisfaction about the overall surgical experience. Several studies have outlined the factors related to an increased incidence of PONV with the aim to target specific patients who might need effective antiemetic prophylaxis. It is assumed that PONV has a multifactorial origin, such as patient-related factors (e.g., female gender, history of motion sickness, or PONV), anesthetic factors (e.g., mask ventilation, volatile anesthetics, opioids), and surgical factors [13,6,7]. We investigated if the prophylactic administration of 6 mg ephedrine IV just before the transfer of the patient from the operating table into his bed could decrease the number of postoperative Vomiting episodes. Ephedrine has been recommended in this role, but its position has been challenged because of potential complications that
include supraventricular tachycardia, tachyphylaxis and fetal acidosis [2,3]. Advocates of phenylephrine claim better fetal acid–base status, and similar efficacy in blood pressure control, but its use is associated with bradycardia [2] and serial dilution for i.v. administration is a source of error9. The aim of the current study was to determine the comparison of efficacy Phenylephrine and ephedrine in postoperative vomiting in cesarean section in Gorgan’s educational and medical center Dezyany in 2012.

Materials and Methods

After obtaining approval from the hospital ethics committee and informed written consent, 104 patients older than 18 yr till 50 yr, ASA (American Society of Anesthesiologists) I and II, weighing 50–120 kg, 150–180 cm tall, women with singleton pregnancies scheduled for elective caesarean delivery under spinal anaesthesia were recruited in this randomised and double-blind study. Women with pre-existing or pregnancy-induced opioid and/or antiemetic premeditation; deviation from the anesthetic protocol; performance of a lesser surgical procedure; aggressive mask ventilation due to difficult airway management; placement of a nasal or oral gastric tube; and presence of an endotracheal tube or oral airway on arrival in the postanesthesia care unit (PACU) were excluded.

In the operating theatre, standard monitoring with non-invasive arterial pressure, electrocardiography and pulse oximetry was established. Women rested undisturbed in the supine position with left uterine displacement for 5 min, following which baseline blood pressure and heart rate were calculated as the mean of three successive readings measured 3 min apart. An 18-gauge intravenous cannula was sited. Each patient received a 5-mL/kg i.v. infusion of Ringer’s lactate solution over 15–20 min before spinal anaesthesia. After prehydration, the fluid infusion was continued at minimal rate to maintain vein patency, regardless of any haemodynamic changes with the patient in the left lateral position, 2 mL of 5% hyperbaric lidocaine was injected intrathecally at L4-5 via a 27-gauge Quincke spinal needle. Patients were then immediately turned supine and positioned with left uterine displacement. Heart rate and blood pressure were recorded at 1-min intervals from the time of induction of spinal anaesthesia until delivery, all parameters (blood pressure was measured and recorded every 3 minutes from the beginning of the anaesthesia up to delivery of the baby, and every 5 minutes up to the end of the operation. Oxygen, 6 L/min was delivered via a face mask until delivery.

The dermatomal level of anesthesia, assessed by loss of pin prick discrimination, was recorded 5 and 15 min after induction of spinal anaesthesia. Sensory block to T4 dermatome was considered adequate for surgery. Women were randomly assigned to receive one of two vasopressin solutions whenever maternal systolic pressure decreased to 80% of baseline or less. Group E received a 1-mL bolus of ephedrine 6 µg/ml; group P a 1-mL bolus of phenylephrine 100 µg/ml 2 hour before surgery. A PACU nurse, blinded to the study drugs, observed the patients for signs of vomiting. Patients were questioned regarding the presence and severity of nausea at the time of admission to the PACU and at half-hour intervals. Patients had been severe emetic sequelae (SES). Patients with SES were deemed to have failed antiemetic prophylaxis and received first, IV metoclopramide 10 mg if symptoms persisted. Postoperative analgesia was provided with morphine and meperidine.

Statistical analysis:

Descriptive statistics were calculated for continuous variables as crosstab. To assess the trend within the variables, two-way analysis of variance was used. P < 0.05 was regarded as statistically significant. SPSS 18.0 for Windows statistical software (SPSS Inc., Chicago, IL, USA) was used for statistical analysis.

Results And Discussion

Of the 104 patients studied, patients required cesarean and 52 were assigned to the ephedrine group and 52 to the phenylephrine group. Patients in the recovery were compared in 2 groups regarding occurrence of vomiting that no statistical difference between two group (P = 0.083). These two groups were compared regarding age groups, weight. The results show that vomiting was seen in age groups: young (18-30) and middle-aged (31-50). The incidence of vomiting was 2 patients in young group and 1 patient in middle-aged group (Table2). Finally patients were classified and compared in 3 weight groups: slim (50-80), moderate (81-100) and obese (101-120). The incidence of vomiting was 2 patients in slim group, 1 in moderate group and no sign of vomiting has been seen in the obese group. (Table1).

Patients often express fear about PONV when questioned before surgery. Its importance compared with other possible postoperative sequelae varies but is generally high10. When questioned about issues of concern, 22% of 800 patients gave PONV the highest level of concern, compared with 34% for postoperative pain and 24% for waking up during surgery [11]. The investigation of PONV has not proved to be an easy task. Outlines for adequate methodology have been published [12] but several aspects make generalization or comparison of results difficult. There is a wide array of patient, anesthetic, and surgical factors that influence incidence and severity of PONV [5,14].
Methods of determining whether a patient suffers PONV vary. Patients may be asked repeatedly about nausea, or only complaints offered spontaneously may be registered. The occurrence of vomiting may be known from patient interrogation spontaneously may be registered. The occurrence of nausea, or only complaints offered repeatedly about nausea, or only complaints offered may suffer PONV vary. Patients may be asked confusion is the observation time. Some studies distinguish between nausea, retching, and vomiting, whereas others use a single term. The incidence may refer to the number of patients experiencing PONV or the number of events. The severity is either not differentiated or reported in categories (mild–severe), in visual analog scale scores or elaborate nausea scores, or implied by the need for antiemetic medications. Another source of confusion is the observation time. Intraoperative nausea and vomiting and PONV are sometimes not reported separately. The postoperative recording may end with the discharge of the patient from the postanesthetic care unit, the first analgesic administration after a regional anesthetic, or the passing of anywhere between 12 and 72 h after a defined “time zero.”

Several different mechanisms may play a role in causing PONV in patients who receive regional anesthesia. In a retrospective analysis, Crocker and Vandam [16] found that hypotension (systolic blood pressure _ 80 mmHg), a block higher than the fifth thoracic segment, and the anesthetic mixture (e.g., addition of vasoconstrictors to the local anesthetic) increased the incidence of nausea and vomiting during spinal anesthesia. The prospective work of Carpenter et al. [17] in a similar setting confirmed these findings. It appears that not one single mechanism is responsible for causing PONV. Several mechanisms may be active simultaneously, and the importance of each in a particular case may remain speculative. Nausea and vomiting are not among the cardinal signs and symptoms of toxicity of the currently used local anesthetics when infused systemically, although they may occur in the context of general cerebral toxicity [18].

Consequently, they are usually not considered as emetogenic. Considerable effort has been invested to identify patients at increased risk of PONV. These studies often involve the use of elaborate statistics, and they vary in patient characteristics as well as surgical and anesthetic case mix15,17,19,20. Unfortunately, because most do not analyze a regional anesthesia group separately, there is little information available on the influence of specific patient risk factors on PONV in the context of regional anesthesia.

Age: Younger age was shown to be a risk factor for PONV in the studies by Apfel et al. [21], Sinclair et al. [19] and Cohen et al. [15] No significant correlation, however, was found by Larsson et al. [20] or Koivuranta et al. [18], Quinn et al. [23] reported results of 3,850 inpatients and analyzed separately the 606 patients undergoing regional anesthesia. Younger age was significantly associated with nausea or vomiting in both general and regional anesthesia groups. Standl et al. [24] interviewed 217 patients 4 days after spinal anesthesia for lower extremity orthopedic surgery. Patients younger than 20 yr complained most often of PONV (20%), while only 4% of patients between 40 and 60 yr of age did so. For patients older than 60 yr, the risk increased again to 9%. This increase at olderage was also observed by Kalso25 in 50 cases of spinal anesthesia for lower extremity orthopedic surgery. Patients younger than 20 yr complained most often of PONV (20%), while only 4% of patients between 40 and 60 yr of age did so. For patients older than 60 yr, the risk increased again to 9%. This increase at olderage was also observed by Kalso25 in 50 cases of spinal anesthesia for lower extremity orthopedic surgery. Patients younger than 20 yr complained most often of PONV (20%), while only 4% of patients between 40 and 60 yr of age did so. For patients older than 60 yr, the risk increased again to 9%. This increase at olderage was also observed by Kalso25 in 50 cases of spinal anesthesia for lower extremity orthopedic surgery.

Gender: There is more consistency regarding the influence of gender. Female patients were found to be at significantly higher risk of PONV in the studies of Apfel et al. [21], Cohen et al. [15], Sinclair et al. [19], Larsson et al. [20] and Koivuranta et al. [18]). The latter also specified this relation for their regional anesthetic group, where they found PONV rates of 48% for females and 26% for males. The same results were found by Quinn et

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al. [23]. In the regional anesthesia group, they reported postoperative nausea in 28% of women and 14% of men, and vomiting in 17% and 7%, respectively [23]. A relation of nausea and vomiting to the menstrual cycle was pointed out in an investigation of 68 women with epidural anesthesia for lower extremity surgery, with the peak incidence during days 25 to the end of cycle [18]. These studies indicate that female gender is a significant risk factor for PONV in patients receiving general and regional anesthesia, while the influence of the menstrual cycle needs further study. Other factors, such as previous history of PONV or motion sickness, smoker–nonsmoker status, or obesity have not been sufficiently investigated in patients undergoing regional anesthesia. This study shows that ephedrine drug was more effective in prevention vomiting that was same Hagmann et al. [27] and David et al. [28] studies. The difference in these two studies did not compare the two drugs each other and ephedrine was used only in the two studies and dose used in the studies was different but phenylephrine was more effective in the Tanaka et al. [29] study which also similar to the above two studies a single drug and more dose medication had been taking. Unfortunatly we could not found same studied that compared the two drugs compare to each other and we had to use studies with only drug.

**Conclusion:**

This study demonstrates that ephedrine is an effective prophylactic antiemetic agent in patients having spinal anesthesia for Cesarean section. When compared to phenylephrine, a significantly greater number of patients given ephedrine 6mg/ml, phenylephrine 100 µg were free of emetic sequelae and did not require rescue antiemetics. Ephedrine 6 mg was ineffective for the prevention of PONV. Finally, we conclude that ephedrine is the best drug for antiemetic prophylaxis before cesarean surgery based on cost and lack of side effects.

**Acknowledgments**

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**References**