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Original Article

Anaesthesia Section

Effect of Acupressure on Post–Operative Nausea and Vomiting in Cesarean Section: A Randomised Controlled Trial

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ABSTRACT

Background: Because of potential side effects of chemical treatments and in order to decrease the risk of nausea and vomiting in post–operative patients, there is a necessary requirement for some alternative therapeutic methods such as Acupressure.

Aim: The present randomized clinical trial study aimed to compare the effects of Acupressure and Metoclopramide on postoperative nausea and vomiting in Caesarean Sections.

Setting and Design: The patients who were subjected to caesarean surgeries, who were referred to the Ilam Mustafa Hospital in the west of Iran, were enrolled in this randomised clinical trial study.

Material and Methods: Totally, 102 patients who were selected for elective Caesarean Section were included in this study. Patients were randomly assigned to one of three groups, with 34 cases in each group. All groups were matched for effective factors on nausea and vomiting in inclusion and exclusion criteria. The control group did not receive any intervention, the second group received 10 mg Metoclopramide intravenously, immediately prior to anaesthesia induction and in the third group, Acupressure bands were applied at the P_6 points on both wrists, 15 minutes before anaesthesia induction. Intra-operative and post–operative emetic episodes were recorded by a trained investigator. The patients who experienced nausea were evaluated on a linear numeric scale which ranged from 0 (no) to 10 (severe).

Statistics and Results: The incidence of nausea and vomiting in postoperative periods was lower in Metoclopramide and Acupressure groups as compared that in the control group. The frequency of anti-emetic which was used was significantly higher in control group as compared to those in the other groups ($p<0.001$). No side effects or complications were caused by any intervention.

Conclusion: In parturients who underwent caesarean deliveries which were performed under spinal anaesthesia in this study, use of Metoclopramide and Acupressure was found to be equally effective for reducing emetic symptoms (nausea, retching, and vomiting).

Key words: Caesarean section, Post–operative nausea, Post–operative vomiting

INTRODUCTION

Caesarean section is a common form of delivery which constitutes 15-19% of all deliveries [1]. Post–operative Nausea and Vomiting (PONV) are annoying effects that influence 87-92% women after they undergo Caesarean Sections [2]. The aetiologies of PONV in parturients who undergo spinal anaesthesia for Caesarean deliveries are multi-factorial and they include physiologic changes of pregnancy, intra-operative hypotension, increased vagal activity and visceral stimulation, as well as administration of neuraxial opioids and oxytocic drugs [3]. Therefore, anaesthesiologists attempt to make approaches for improving patient outcomes. All attention has been focused on easy, cheap, and non-invasive methods and worry on their costs has led to attention on the use of alternative approaches for preventing emesis [4].

Chemical treatments are only partly effective in preventing PONV and they may cause side effects. Metoclopramide is a prokinetic agent which has been reported to be safe in parturients and it is effective for Intra Operative Nausea and Vomiting (IONV) and PONV prophylaxis [5].

Acupuncture point on the wrist (P_6 acupoint stimulation) is a substitute method for reduction of PONV, that has been studied in many trials [4, 6-7]. The use of P_6 acupoint stimulation can lead to reduction in the risk of PONV, with a least risk of side effects. Other studies have reported that the risks of PONV had reduced similarly after P6 acupoint stimulation and after taking anti-emetic drugs [4].

As traditional medicine is a fast growing faculty among the different fields of medicine and because of the benefits of Acupressure and also due to the potential side effects of chemical treatments, the present clinical trial study was designed to compare the effects of Acupressure and Metoclopramide on postoperative nausea and vomiting in Caesarean Section as the main objective.

MATERIAL AND METHODS

A total of 102 pregnant women were investigated in a randomised clinical trial, as was previously described for other clinical trial studies [8] between 29 September, 2011 to 23 October, 2012, at the Gynaecology Division of Mustafa University Hospital of Ilam, West of Iran. The study was approved by the Regional Ethics Committee of Ilam University of Medical Sciences. All participants completed an informed consent form prior to their attendence in the study.

The inclusion criteria were those which were proposed by the American Society of Anaesthesiologists Physical Status Classes I-II, and they were followed electively for those who were considered for the Caesarean Section operation. Those who were considered were patients who were healthy during the study, whose ages ranged from 18 to 35 years with gestational ages of 38-40 weeks and normal foetal heart rates at the first to fourth pregnancies, and with no history of a previous abdominal surgery.

Patients who had used pre-operative opioids or those who had acute or chronic diseases which were associated with nausea and vomiting and those who had carpal tunnel syndrome, weights of < 50 kg or > 100 kg and digestive and ear disorders were all excluded from this study. All groups were matched for effective factors on nausea and vomiting in inclusion and exclusion criteria.

The researcher was not aware of grouping of participants. The data collection was carried out by a trained midwife who was not also aware of each medication and who had no idea about the plan of the study. The biostatistician who analyzed the data was blinded too on details of each group. Patients were randomly assigned to one of the three groups by a trained midwife, with 34 cases in each group, at the obstetrical triage unit, by using a random number chart [Table/Fig–1]. The first group (control) did not receive any intervention, unless it was undertaken on a needed basis due to their medical conditions and the second group received 10 mg of Metoclopramide intravenously, immediately prior to anaesthesia induction, as this was one of the most common medications of choice for preventing the nausea and vomiting. In third group, Acupressure bands were applied at the P_6 points on both wrists, 15 minutes before anaesthesia induction, in such a way that the patients felt only a gentle pressure and no discomfort. They were tightened in such a way that a piece of paper couldn't be placed between the pressure bands and skin. Bands were removed six hours later.

All participants received IV lactated Ringer solution 20 ml/kg (up to 2000 mL) before the induction of spinal anaesthesia. Spinal anaesthesia was induced in the right lateral position, at the L3-4 interspace, with a 26-gauge Whitacre needle, by an anaesthesiologist, with 10 mg hyperbaric bupivacaine (Bupivacaine HCl; Myungmoon Pharmaceuticals, Seoul, Korea). Standard monitoring during surgery was performed by making continuous heart rate measurements by using an electrocardiogram, by assessing non-invasive blood pressure every 2 min, and by pulse oximetry. Immediately after injecting the drug, the patients assumed supine positions and their uteri were transposed to the left by tilting the tables by 15° to the left, to prevent supine hypotensive syndrome. Oxygen 3 L/min was administered via a face mask. All patients received oxytocin 10 international units after their deliveries.

Severity of nausea was evaluated on a linear numeric scale which ranged from 0 to 10 (no nausea: 0; mild nausea: 1–3; moderate nausea: 4–7; severe nausea: 8–10; number of vomiting episodes in the 6 hrs after surgery and frequencies of anti-emetic requirements were recorded.

The protocol of this study was approved by Institutional Ethics Committee of Ilam University of Medical Sciences and informed consents were obtained from all participants.

STATISTICAL ANALYSIS

Statistics were performed by using SPSS program (Version 16) in consultation with a biostatistician. By using Epi Info version 3.5.1 and Stat Calc version 1.0.1, a sample size of 34 participants in each group was determined by the statistician, in order to have 80% power for detecting significant differences between the study groups for a confidence interval of 95%. Mean, median, percents and SD were used to describe the data. When a normal distribution for continuous data was not assumed, Kruskal-Wallis correlation was used to analyze the correlation between different variables. Categorical variables such as incidences of nausea, vomiting and anti-emetic requirements were analyzed by x^2 analysis of 3×2 contingency tables or by Fisher's exact test as appropriate, followed by a similar analysis by 2×2 tables for differences within the groups. ANOVA analysis was performed to predict the severities of nausea and vomiting after operations within different groups. Differences were regarded as statistically significant, with an alpha error of 0.05.

RESULTS

One hundred and two patients completed the study protocol. Key variables which are known to affect PONV such as age, height, weight, parity, gestational age and surgery time were balanced between groups [Table/Fig-1].

Characteristics	Group			p- value
	Control	Metoclopramide	Acupressure	
Age, year	27.3 ± 2.9	25.9 ± 3.1	26.8 ± 1.9	p=0.61
Weight, kg	67.1 ± 2.8	70.3 ± 3	66.8 ± 2.2	p=0.7
Height, cm	162.3 ± 3.7	158.9 ± 5.1	164.1 ± 2.4	p=0.34
Gestational age, week	39.1 ± 0.9	38.7 ± 1.1	39 ± 0.2	p=0.432
Duration of surgery, min	54.1± 8.2	56.3± 6.8	57 ± 9.5	p=0.13

[Table/Fig-1]: Comparison of Characteristics between Groups*
*Values are given as mean ± Standard Division

In our study, none of the 102 enrolled parturients were withdrawn for any reason. The incidence of vomiting during recovery following a Caesarean Section surgery was 32.34 % (11/34) in the Placebo group, it was 11.76 %(4/34) in Metoclopramide group and it was 17.64 %(6/34) in Acupressure group respectively. There were significant differences between groups who experienced vomiting. The frequencies of use of anti-emetics were significantly higher in control group as compared to those in other groups [Table/Fig-2].

Variable	Group n (%)			p- value
	Control (c)	Metoclopramide (M)	Acupressure (A)	
Nausea	17(50 %)	9(26.47 %)	7(20.58 %)	p=0.03, c vs. m p=0.04, c vs. a
Vomiting	11(32.34 %)	4(11.76 %)	6(17.64 %)	p=0.01, c vs. m p=0.000, c vs. a
Antiemetic requirement	7(20.58 %)	1(2.94 %)	2(5.88 %)	p=0.000, c vs.m p=0.02, c vs. a

[Table/Fig-2]: Incidence of post operative nausea, vomiting and antiemetic requirement. Values refer to number (%) of patients

All subjects were evaluated for six hours. About 60 minutes after surgery, the mean of severity of nausea in Placebo group was 7.48 ± 0.69, while in the Metoclopramide group, it was 3.31± 0.45 and in the Acupressure group, it was 4.17± 1.15 respectively, by using the given dose (explained in methods section) [Table/Fig-3]. shows the comparison of severities of nausea between different groups. No side effects or complications were caused by any intervention.

Time	Group			p- value
	Control	Metoclopramide	Acupressure	
30th min after surgery	8.1 ± 1.62	4.54± 1.35	5.46± 0.81	p=0.000
60th min after surgery	7.48 ± 0.69	3.31± 0.45	4.17± 1.15	p=0.014
90th min after surgery	6.39 ± 1.1	3.2± 0.4	3.89± 0.7	p=0.036
120th min after surgery	6.1 ± 1.5	3 ± 0.3	3.25± 0.5	p=0.000
4th hour after surgery	4.3 ± 0.6	2.17± 0.7	1.97± 0.3	p=0.001
6th hour after surgery	4 ± 0.3	1.1± 0.1	1.9± 0.05	p=0.007

[Table/Fig-3]: The comparison of nausea severity between different groups*
*Values are given as mean ± Standard Deviation

DISCUSSION

Nausea and vomiting were investigated among 671 surgical patients. 19% reported one or more episodes of nausea and 10% suffered one or more emetic episodes during the study period [9]. In present study, the control group had a higher incidence of vomiting as compared to those in intervention groups. These findings were in agreement with those of a number of previous studies [10, 11].

In present study, Metoclopramide and Acupressure were seen to have the same effect on PONV. Studies have reported that Metoclopramide blocks dopamine receptors in the CTZ and vomiting centres. It also abbreviates bowel transit time and in high doses, it blocks serotonin receptors [12]. It has been demonstrated that those patients who received 50 mg intravenous Metoclopramide

had significantly reduced in late PONV; also their side effects were unsatisfactory [13].

Acupressure is one of the non-pharmacological methods which can prevent PONV. Several studies have shown that it was an effective method which could be used for the management of PONV [4,6, 14,15]. Also, the mechanism of action of Acupressure is still unclear. Several hypotheses have described this as ambiguity, but it might be due to its influence on restoration of the body's energy balance [11]. In Chinese medicine, P_6 point is called as the peak of body energy [16] and therefore, when Acupressure is competently applied, the body's energy balance will be restored [10]. In other studies, the effect of Acupressure at P_6 was confirmed in various medical interventions [17,18]. However, these results were in contrast with those of other studies [6,19,20].

CONCLUSION

In parturients who underwent Caesarean deliveries which were performed under spinal anaesthesia in this study, Metoclopramide and Acupressure were found to be similarly effective in reducing emetic symptoms (nausea, retching, and vomiting). Use of Acupressure has been recommended to reducing PONV, considering that it doesn't have side effects and because it is cheap.

ABBREVATIONS

BMI: Body Mass Index, PONV: Post–operative Nausea and Vomiting, IONV: Intra–operative Nausea and Vomiting.

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