THE AROMATIC EFFECTS OF CITRUS ARANTIUM ON PAIN AND VITAL SIGNS AFTER CAESAREAN SECTION

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ABSTRACT

Today, cesarean section is one of the most common gynecological surgeries. . post-cesarean pain relief in an effective way and without danger so as not to disturb mother's ability to take care of her child is required. This study aims to examine effect of aroma of Citrus arantium on post-cesarean pain and vital signs.

This clinical trial was conducted on 80 women, referring to Motazedi Hospital of Kermanshah for cesarean section in 2015. The subjects were randomly divided into intervention and control groups. In the intervention group, aromatherapy was performed with three drops of Citrus arantium immediately after the onset of pain and after 4, 8 and 12 hours. The control group also received aromatherapy with normal saline, using a similar method. Pulse, nausea, vomiting, headache, blood pressure were registered and Pain Severity were assessed before and after the intervention, using Visual Analogue Scale. For data analysis, independent t-test, Chi-square, and

Fisher's exact test were performed, using SPSS version 18. P-value less than 0.05 was considered statistically significant.

Statistical analysis showed that the mean Pain Severity was not significantly different between the two groups (P=0.19). However, after the intervention, there was a significant difference in Pain Severity between the two groups (P<0.05). Both groups had a significant difference in number of sedative injection (P<0.001). Diastolic blood pressure was reduced at second, third and fourth intervention in intervention group (P<0.05). Systolic blood pressure was reduce at fourth stage of intervention in intervention group (P=0.03). However, there was no significant difference in pulse rate between the two groups.

The use of aroma of Citrus arantiumis effective for reducing maternal pain after cesarean section.

Keywords: Aroma, *Citrus arantium*, Pain, Vital Signs, Cesarean Section

INTRODUCTION

Today, cesarean has been regarded as one of the most common surgical options for women, so that the rate of cesarean has been estimated about 27.3% around the world [1]. Almost 18.5 million people around the world have cesarean operation in a year [2]. According to a report by The World Health Organization in 2010, the rate of cesarean in Iran has been reported about 41.9% [2]. Cesarean section in cases where the life of the mother or fetus is in danger can be savior, but unfortunately this has been converted to a culture in most of communities like Iran [3]. Post-cesarean pain is a reason why patients afraid of surgical operation [4]. Post-cesarean pain disturbs mother's ability to take care of her child and breastfeeding, thus pain relief in an effective way and without danger so as not to disturb mother's ability to take care of her child and not to have side effects on baby is required[5]. Inadequate control of pain after cesarean increases complications of wound, infection, and costs of care, so that expenditures for hospital care and duration of hospitalization in cesarean compared to natural childbirth have increased for about 76% and 77%[4]. Further, uncontrollable pain after surgical operation causes increasing clotting properties of a patient's blood and reducing the power of the immune system [6]. With advancement of technology in health care, conventional methods of pain relief after surgical operations have remained insufficient, thus needing to interventions and complementary therapies is felt [7]. Nonpharmacologic approaches or complementary therapies have less side

effects and dangers, and they can be used alone or with other methods, thus they have been drawn into attention by many physicians and patients [8]. Aromatherapy is one of the complementary therapies, which is assumed effective in pain relief, reducing anxiety, insomnia, depression, fatigue, asthma and so forth [9]. Recently, aromatherapy has been largely increased as a complementary therapy in reducing pain in most of countries around the world [10]. Further, it has been considered as a simple and non-invasive technique that needs no specific equipment, and today it has received a huge attention by mothers [11]. Aromatherapy is called to use of volatile oils or aromas extracted from aromatic plants for therapeutic targets [12]. One of essential oils from aromatic plants with a large use in aromatherapy is the oil extracted from Citrus arantium.

Citrus aurantium is High consumption and indigenous medicinal plants Iran country that grows north and south of the country[13]. The flowers of this plant in traditional medicine for the treatment of neurological diseases such as hysteria, epilepsy, neurasthenia used. Additionally, this herb known as a sedative,hypnotic, appetizer and lifter palpitations[14]. Citrus aurantium essential oil compounds including

alkaloids, linalool, Lynanyl acetate, Msyryn, limonene, limonoids and flavonoids. limonene Relief Effects has been confirmed in human studies[15].Msyryn in the plant is a monoterpene compound and has analgesic, blocking sodium channels and voltage and muscle relaxant effects[13].

With regard to importance of pain relief in mothers post cesarean and necessity of their tranquility to set an effective relationship with baby and starting breastfeeding, and with regard to those side effects of pain that can affect recovery of patient, and also concerning convenient use and economically effective properties of this plant, the researcher aimed to examine effect of aroma of Citrus arantium on post-cesarean pain and vital signs.

RESEARCH METHOD

This two-group clinical trial was conducted on mothers, who had delivered healthy infants via cesarean section at Motazedi Hospital of Kermanshah, affiliated to Kermanshah University of Medical Sciences. The sample size was calculated at 34 participants per group with a significance level of 0.05 (95% confidence interval) and power of β=0.05 (statistical power of 95%). By predicting the dropout rate, 40 subjects were allocated to each group.

The inclusion criteria were as follows: 1) age range of 18-35 years; 2) no prior history of hypertension, coagulopathy, migraine, allergies to plants, olfactory dysfunction or known anxiety disorders; 3) non-use of addictive drugs or psychotropic medications; 4) birth of a healthy neonate; 5) use of spinal anesthesia for cesarean section; and 6) absence of respiratory failure during surgery.

The exclusion criteria were as follows: 1) development of medical or surgical problems, requiring immediate medical intervention during the study, 2) nausea or vomiting after the operation, and 3) sensitivity to aromatic essences or dissatisfaction after each inhalation.

This study was approved by the Ethics Committee of Tehran University of Medical Sciences. Moreover, permissions were obtained from Vice-Chancellery for research (at Kermanshah University of Medical Sciences), and President of the Motazedi Hospital.

The researcher visited the obstetric ward of the hospital on consecutive days. After introducing himself to mothers undergoing c-section and explaining the objectives of the study, written consent forms were obtained from the selected participants.

Continuous sampling was applied in this study and subjects were randomly assigned to two groups (intervention and control groups) by drawing lots. Numbers 1 and 3 were written on two identical cards and a colleague, who was unaware of the content of each card, was asked to choose one of the cards. The subjects were assigned to two groups as follows: No. 1 (intervention group) and No. 3 (control group).

In order to prevent the unwanted mixture of aromatic essences and the consequent influence on the samples, interventions were performed in separate rooms; one room was filled with the aromatic essence of Citrus arantiumand another with the fragrance of normal saline.

Visual Analogue Scale (VAS) was completed by both groups before the intervention and Pain scores were calculated.

In the intervention group, immediately after the onset of pain and after 4, 8 and 12 hours (four phases), three drops of Citrus arantiumfragrance were poured on a cotton ball and the subjects were asked to smell the fragrance for 5 min from a 10 cm distance. Half an hour after the intervention, VAS was completed again by the subjects.

The control group received aromatherapy via a similar method, using three drops of

normal saline. This process was continued until the number of samples was sufficient for the study. Pulse rate, blood pressure, nausea, vomiting, and headache were evaluated and controlled after aromatherapy. It should be mentioned that inhaling Citrus arantiumled to no side-effects for the subjects.

All the participants were willingly included in the study. Also, during the intervention, which continued for 12 hours after the onset of pain caused by cesarean section, all subjects were hospitalized at the ward. Considering the abovementioned points, none of the cases withdrew from the study.

Data collection tools included a two-section questionnaire. The first section consisted of demographic characteristics such as age, educational level, employment status, parity, number of pregnancies, number of c-sections, socioeconomic status, pregnancy status, parity, age at childbirth, and the neonate's gender. The second part of the questionnaire included Visual Analogue Scale (VAS). Division of the pain ruler was from zero to ten, and it was classified to the groups including mild pain (score 1-3), Moderate pain (score 3-5), severe pain (score 5-7), very severe pain (score 7-9), and intolerable pain (score 9-10) respectively.

In order to determine the validity of data collection tools, face validity was evaluated. For this purpose, after literature review (evaluating the related books and articles), the questionnaire was evaluated by ten faculty members under the supervision of university professors. After revising the questionnaire based on the experts' opinions, the final version of the questionnaire was presented to the ethics committee of the university.

The reliability of the demographic questionnaire did not need to be confirmed, since it contained personal data. Also Visual Analogue Scale Various studies and in the world proven and is a standard scale for Measurements pain intensity.

For data analysis, independent t-test, Fisher's exact test and Chi-square were performed, using SPSS version 18. P-value less than 0.05 was considered statistically significant. This study was registered in the Iranian Registry of Clinical Trials (IRCT:14N201402215912).

Limitations

One of the limitations of this study was the occupancy of the intervention room by patients (not included in the study), using other aromatic essences prior to the intervention. Therefore, the aromas and flavors in the room could be considered as

confounding factors, interfering with the results of pain and anxiety evaluation before the intervention.

RESULTS

Statistical analysis showed that the two groups were not significantly different in terms of demographic characteristics. The mean age of subjects was 25.89±4.74 years and the mean gestational age was 39.48±1.05 weeks (Table 1). The majority of subjects in the intervention and control group (40%) had primary and secondary level education. In addition, most subjects were housewives (83.75%).

The economic status of the majority of participants (71.25%) was satisfactory. The two groups were not significantly different in terms of age, gestational age, educational level, occupational status or economic status. 72.5% of subjects had intended

pregnancies. Also, 58.75% of participants, including 28 subjects in the case group (70%) and 19 subjects in the control group (47.5%) were primiparous.

Additionally, 61 subjects (76.25%) had a prior experience of c-section. four subjects (10%) in the case group and 9 participants (22.5%) in the control group had a previous history of vaginal delivery. As the results indicated, the two groups were not significantly different in terms of wanted pregnancy, parity or history of cesarean section and vaginal delivery (P>0.05). Most of units under research in group under aroma of Citrus arantium (97.5%) had once and in control group(%57.5) had twice painkiller injection, and there was a significant difference on times of painkiller injections in individuals in both groups(P<0.001) (Table 2).

Table 1: Comparing the average age and pregnancy age in group under Citrus arantiumand control group

Variable	Intervention group	Control group	
	Mean and standard deviation	Mean and standard deviation	p-value (t-test)
Age	25.1±4.67	26.68±4.82	P=0.23
Gestational Age	39.57±1.05	39.4±1.05	P=0.67

Table 2: Frequency distribution of women in terms of number of pregnancies, parity, times of painkiller injections in individuals in group under Citrus arantiumand control group

Variable	intervention group			Control group		Type of test
		No	%	No	%	Fisher's exact test P=0.1
number of pregnancy	First	28	70%	18	45%	
	Second	9	22.5%	16	40%	
	Third and higher	3	7.5%	6	15%	
parity	First	28	70%	19	47.5%	Fisher's exact test P=0.052
	Second	10	25%	15	37.5%	
	Third and higher	2	5%	6	15%	
number of injecting	Once	30	75%	13	32.5%	Fisher's exact test
	Twice	10	25%	23	57.5%	

painkillers	Thrice	0	0%	4	10%	P≤0.001

Based on independent t-test results, the mean severity of pain before the intervention was not significantly different between the two groups (P=0.19). The mean pain score in the first stage of intervention was 8.1±1.64 and in the control group 8.82±1.03. in the Second stage of intervention was 5.37±1.31 and in the control group 8.07±0.69.in the Third stage of intervention was 2.7±1.01 and in the control group 6.2±0.6. in the fourth stage of intervention was 1.23±0.42 and in the control group 4.58±0.63.The obtained results showed that the mean severity of pain in intervention group at four stages was reduced after intervention. (P<0.05) (Table 3).

Table 4 shows that the intervention and control groups were not significantly different in terms of mean pulse rate before and after the intervention, according to independent t-test results (P>0.05). However, there was a statistically significant difference in systolic blood pressure in the fourth stage and diastolic blood pressure in second, third and fourth stageof the intervention between the two groups (P<0.05).

Table 3: Comparing mean and standard deviation of severity of pain before and after interventions in individuals in group under Citrus arantiumand control group based on Visual Analogue Scale (VAS)

Variable	intervention group	control group	p-value
severity of pain before intervention	8.8±1.41	9.05±1.17	P=0.19
severity of pain in first stage of intervention	8.1±1.64	8.82±1.03	P=0.02
severity of pain in second stage of intervention	5.37±1.31	8.07±0.69	P<0.001
severity of pain in third stage of intervention	2.7±1.01	6.2±0.6	P<0.001
severity of pain in fourth stage of intervention	1.23±0.42	4.58±0.63	P<0.001

Table 4: Comparing mean of pulse and blood pressure before and after interventions in individuals in group under Citrus arantiumand control group based on Visual Analogue Scale (VAS)

Variable	intervention group	control group	p-value
Diastolic blood pressure before intervention	68.75±7.31	70.75±7.97	P=0.23
Diastolic blood pressure after first stage of intervention	68.75±7.31	70.7±7.97	P=0.23
Diastolic blood pressure after second stage of intervention	68.37±7.19	70.75±7.97	P=0.03

Diastolic blood pressure after third stage of intervention	**68.87±7.15**	**70.75±7.97**	**P=0.005**
Diastolic blood pressure after fourth stage of intervention	**67.13±7.32**	**70.75±7.97**	**P=0.03**
Systolic blood pressure before intervention	**110.5±9.11**	**111.75±11.29**	**P=0.54**
Systolic blood pressure after first stage of intervention	**110±9.4**	**111.75±11.29**	**P=0.45**
Systolic blood pressure after second stage of intervention	**108.88±8.65**	**111.62±11.11**	**P=0.22**
Systolic blood pressure after third stage of intervention	**108±8.14**	**111.25±10.9**	**P=0.13**
Systolic blood pressure after fourth stage of intervention	**107.38±8**	**111±10.51**	**P=0.02**
pulse before intervention	**85.37±4.52**	**83.05±6.08**	**P=0.06**
pulse after first stage of intervention	**85.23±4.55**	**82.95±6.1**	**P=0.1**
pulse after second stage of intervention	**84.4±4.52**	**83.05±6.08**	**P=0.26**
pulse after third stage of intervention	**83.9±4.16**	**82.1±7.39**	**P=0.18**
pulse after fourth stage of intervention	**83.45±4.07**	**82.85±5.82**	**P=0.59**

DISCUSSION

In this study, the effects of Citrus arantiumaroma on post-cesarean pain and vital signs were examined. The results indicated a reduction in the severity of pain by the use of Citrus arantiumessence. Unfortunately, no study has evaluated the effect of Citrus arantiumon the severity of pain, so far.

Fast recovery is one of the important areas of research in medical sciences [16]. Use of common analgesics such as benzodiazepines delays the speed of recovery in patients [17]. On the other hand, use of aromatherapy and analgesia together and reducing the amount of required painkillers facilitate recovery, reduce costs after operation and increase patients' satisfaction [18].

The results of study of Babashahy et al (1389) aimed to determine the effects of inhalation aromatherapy on anxiety level of patients before surgery of abdomen and heart indicated that inhalation aromatherapy is effective in reducing anxiety before

surgery And You can use this method as complementary medicine therapies in clinical practice [19]. Findings of this study are relevant with the results of study by Babashahy et al.

The results of study of Shabaniyan et al (1387) aimed to comparison the impact of diazepam and Citrus arantium Extract on preoperative anxiety showed that State anxiety After taking drug in both consumer groups of diazepam and Citrus arantium reduced and Comparison of the two groups showed no significant difference [20].

Study by Lehrene et al (2000) indicated that Citrus arantium essential Broadcast in the Dental waiting room Causes Reducing anxiety in Referred patients [21].

The study of Mahmoudi et al (2005) conducted on medicinal plants indicated that Flavonoid isolated from the Citrus arantium extract has sedating effects and anti-anxiety properties [22].

The overview of these findings indicates a reduction in the severity of pain after cesarean section in the intervention group (using Citrus arantiumessence), compared to the control group. Hence, it is suggested that the essence of Citrus arantiumbe used as a simple and non-invasive technique for reducing pain after cesarean section.

Considering the limitations of studies evaluating the effects of Citrus arantiumaroma on post-cesarean pain and vital signs and the limited number of studies on this subject, further research is required.

CONCLUSION

The present study indicated that the use of Citrus arantiumcan be a suitable complementary technique for reducing pain after cesarean section. Use of this medicinal plant, along with other techniques such as massage therapy, is highly recommended for mothers.

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