

Peppermint drop effect on ileus following cesarean section

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ABSTRACT

Objective: Intestine dysfunction and ileus are one of the cesarean section complications. medicinal herbs have been used to restore the postoperative intestinal function. Therefore, we decided to use a mint drop to improve bowel function after cesarean section. **Methods and Materials:** 102 women enrolled in the study. The patients were simply randomized and double blindly divided into two groups of 51 patients and giving them medication (mint drops) or placebo. Then, the initial evaluation included hearing the first bowel sound, having nausea and vomiting, the first gas passing feeling time, the first defecation feeling time, and duration of hospitalization was evaluated and compared between the two groups. **Results:** The mean time to hearing the first intestinal sounds was $9/05 \pm 2/44$ hours in the placebo group and $5/78 \pm 1/25$ hours in the treatment group. The interval between surgery and the first gas passing feeling time in the placebo group was $12/24 \pm 3/91$ hours and in the treatment group was $7/87 \pm 2/02$ hours. None of the patients had nausea and vomiting. **Conclusion:** Considering the significant difference between two groups in the meantime interval to hearing the first intestinal sound, the first gas passing feeling time, and the first defecation feeling time, we conclude that the peppermint drop is more effective than placebo in improving bowel function.

Keywords: Bowel function, cesarean section, ileus, peppermint

Introduction

The operation of cesarean section refers to the egress of the fetus, the placenta, and the membranes from cutting the section of the abdominal wall and womb. Today, cesarean section is one of the most common surgical operations to prevent the possible risks of fetus and mother. Increasing the incidence of cesarean section has attracted the attention of specialists, and the necessity of performing cesarean section is one of the major topics of the medical community.^[1]

High rates of caesarean sections are also associated with substantial health-care costs, which can pose a considerable burden on health systems.^[2]

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The result of a study conducted in 4 Southeast Asian countries in 2009 showed that 27 percent of deliveries was performed by cesarean section, and the most common cause was previous cesarean section.^[3]

Causes of cesarean section include history of previous cesarean section, fetal distress, cephalopelvic disproportion (CPD), and prenatal bleeding. Postoperative care following C-section includes proper nutrition and adequate hydration. Nothing by mouth is practiced postoperatively following C-section until the first flatus or bowel movement. A great focus of postoperative diet is to prevent and manage ileus.^[4]

The results of studies on the reasons of maternal request for elective cesarean section were fear of labor pain, anxiety for fetal injury/death, fear of childbirth, urinary incontinence, pelvic floor and vaginal trauma, doctor's suggestion, time of birth, experience of prior bad delivery, previous infertility and age at marriage.^[5]

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This rising trend is also can be seen in Iran.^[6] Based on the declared statistics of the health, cure, and medical education ministry, the prevalence of cesarean delivery in Iran is currently 40 percent^[6] which is recommended 2-3 times more than the world statistics.^[7]

The Nordic countries are examples of systems where midwives are the main care providers during pregnancy and labor, and where the percentage of CS has been stable between 15% and 21% for the past decade.^[8]

Cesarean section is a dangerous activity for mother and baby; it leads to an increase in the death of the mother and her baby two to four times the normal delivery and also it increases the complications such as infection, bleeding, embolism, intestinal dysfunction, etc., so that disability level after that is estimated five-ten percent of the normal delivery.^[9] Consequently, it seems to pay attention to this termination of pregnancy, the type and amount of used medications and the possible complications arising from it are necessary.^[10]

A little less than half of obstetricians confirmed a personal preference for CS. Interviewed physicians cited the shorter duration of a CS compared to a vaginal delivery as a reason for why CS might be favored. This combined with the ability of doctors to decide on the timing of the delivery makes CS a more convenient option for physicians.^[11]

Educating and empowering women to refute inappropriate doctor recommendations for CS may be as important of a pathway for reducing CS as changing women's underlying preferences.^[12]

It is therefore important that physicians are encouraged to implement evidence-based obstetric practices, such as VBAC, instead of automatically opting for CS.^[13]

Surgery stress resulting from cesarean delivery may cause changes in the autoimmune system which may reduce the movements of intestine and its problems. Intestinal dysfunction is one of the post-operative complications, which is common outbreak after abdominal surgery than other surgical operations, and it may take 2 to 4 days.^[13]

Abdominal distension is one of the complications after surgery that occurs in the digestive system and causes by air retention in the intestines, which occurs due to the slow movement of intestinal mucous membranes due to anesthesia, manipulation of bowel, and immobility. Gas retention in the intestines is common after cesarean section and causes respiratory problems. Besides, the place of sutures is under pressure due to the retention of abdomen, and their chance of opening after cesarean section is high.

The intestinal disorder occurs in cases of drug interactions and opioids and abdominal surgery, especially in surgeries that are associated with a lot of manipulations of the intestines.^[14] This

disorder is also observed after cesarean section, and it causes pain, abdominal distension and failure to start proper nutrition, the lack of proper lactation for the baby, and increasing the number of days in hospital.^[15]

The cause of this physiological disorder after surgery can be due to autonomic system impairment (parasympathetic) and inflammatory processes.^[16] During cesarean section, a large amount of blood and fluid (amniotic fluid) is poured into the peritoneal cavity and is manipulated during the cleaning of abdominal cavity and stimulates the physiological processes, and causes intestinal disorder after it.^[17] Hence, this disorder is usually temporary and limited.

The evaluation of gastrointestinal function after general anesthesia directly affects the judgment of timely postoperative feeding time, which has important clinical significance.^[18]

In general, the gynecologists do not allow the post-operative cesarean section patients to take food up to intestinal function return, which is a sign with bowel movement, disposal of gas, stool, and feeling hunger.^[19] In general, delay to start of nutrition leads to increased cell division, late wound healing, increased risk of infection, and increased need for intravenous feeding.^[20]

There is no specific treatment for the intestinal disorder after surgery. However, several methods such as nasogastric suctioning, early nutrition, intravenous fluid injection,^[21,22] topical analgesia, reduced drug use, minimal manipulation surgery, using the cyclooxygenase inhibitors, prescribing non-steroidal anti-inflammatory drugs and drinks containing high carbohydrates are recommended to reduce intestinal disorder incidence after surgery.^[23]

To prevent and reduce the duration of intestinal disorders after surgery, various treatments, such as the use of drugs that have effect on bowel movements, early onset on nutrition and physical and psychological treatment reviewed in clinical trial. Thus, its clinical results were limited and non-generalized.

In particular, chewing gum has been reported to stimulate bowel movement and gas passage and to promote defecation by cephalic-vagal reflex. Some studies also reported that chewing gum is a cost-effective intervention for restoring intestinal function.^[24]

In several studies, medical plants such as fennel, cumin, and mint have been used to come back the intestinal function quicker after surgery, so we decided to use the mint drop to improve the function of the intestine after cesarean section and examine it. Most medications are used to reduce the symptoms of the digestive tract that have complications and side effects which leads most of us to take herbal medicines.

Researches have shown that the mint components exhibit analgesic, anti-inflammatory, anti-anxiety, relaxation, and

vasodilatation effects. Mint is used in traditional medicine as an ataractic for digestive disorders, inflammation, and muscle cramps.^[25]

Peppermint is a plant with a warm and dry nature that has many medicinal properties, and we can use it in various forms, including fresh, dried, essential oil, infusion, powder, etc., The plant is one of the best natural ingredients to treat various types of digestive problems and may be the most common use of mint to help treat gastrointestinal disorders.^[26]

The mint is safe, and so far, no significant complications for it has been reported. Also, it is located on the GRAS (Generally Regarded as Safe).^[27,28] In consumption during pregnancy and lactation period (2B), no specific side effects are expected.^[28]

The drops contain mint essence (menthe spicata) is in Karun oil. The effect of anti-flatulence of mint and its essential oil is well known due to the loose of lower esophagus sphincter and reduce gas pressure in the stomach.^[27,28] In a randomized clinical trial, two ways unaware with placebo control, during a 14 days' period, 70 patients with chronic digestive problems, such as flatus, were treated with herbal tablets containing mint. Analyzing the results of the trial proved significant correction of the gastrointestinal complaints scores for the group receiving the herbal pill compared with the placebo group ($0,05 > p$). Ultrasound results in evaluating the amount of gas present in the intestine also show a remarkable benefit of this pill.^[27]

The mechanism of antispasmodic effects of mint essence was identified. The researchers believe that the ability of mint essence to control the contraction isolated smooth muscle due to inhibit the entry of calcium into the muscle cells and the clinical effects of mint essence to treat the symptoms of intestinal bowel syndrome, such as abdominal pain and discomfort, to excessive inhibition of the smooth muscles of intestine and as a result, they restore proper muscle tone.^[29]

Liu *et al.*^[30] in the research showed that the peppermint essence effectively improves the abdominal cramps. The peppermint essence loosens the lower esophagus and causes smooth muscle inhibition, and regulates the gastrointestinal tract; therefore, it has effects of anti-flatulence and digestive food. Kingham^[31] showed the effect of mints essence on colon spasm. Furthermore, Nash and his colleagues^[32] showed up in a study that peppermint essence has no significant effect on improving the symptoms of irritable bowel syndrome.

Luzny and his colleagues showed that mental illness and its treatments have effect on ileus.^[14] Agah *et al.* showed the effect of spray cumin and mint on dyspepsia symptoms.^[33] Liu and colleagues^[30] showed that mint essence is effective on improving the abdominal cramps. Other studies, including Lane *et al.*,^[34] and also Hines *et al.*,^[13] have examined the effects of mint drops on postoperative nausea and vomiting which received positive results.

Material and Method

102 women with elective cesarean section who were operated under spinal anesthesia with 38-40 weeks of gestational age and having the standard inclusion criteria including non-Previous history of abdominal surgery other than cesarean section without any gastrointestinal disease - No history of GERD- lake of gallstones - No underlying disease, such as diabetes and blood pressure- No use of gastrointestinal medicines, whether plant or chemical – Not having: Diarrhea - Vomiting or flatus within the past 48 hours, no drug use and the lake of susceptibility to mint drop and the desire to enter the study, were selected and entered the study.

First, they took a brief history of the patient and the patient profile form was completed, and the method of doing the work was explained to the patient. After obtaining the informed consent of the patients was divided into two groups in a blind, simple randomized way. The two groups were divided into anesthesia were homogeneous for spinal anesthesia and operation time (30-40 minutes) then, the patients were treated (20 drops in 30 cc), which is starts from 4 hours after the surgery and repeated at intervals of one hour in three doses.

The researcher was not aware of the type of medicine or placebo, and the code inserted on the glass was recorded in the form. The data collection tools contain an interview form and a questionnaire and examination of the research units. All patients were asked to record the hours of intestinal movements, the first gas disposal time - the first time of excretion of stool and having nausea, vomiting, and the scholar help from the control group and without notice item was recorded of patients every hour and information on the first hour of hearing of the intestinal sound, having nausea, vomiting, the first gas disposal time, the first time of excretion of stool and the first time to move the patient and hospitalization time.

The data were entered into SPSS software 16 after collection. To test the relationship between qualitative and quantitative variables, a T-test and U-Mann-Whitney were used. The relationship between qualitative variables was performed using the Chi-square test. Finally, for controlling the intervening variables, the linear model was used to determine the relationship between the independent variables and the quantitative values of dependent variable.

The significant level of all the testes is statistically considered 5%.

Ethical Code: IRMUMS fm REC.1395.360

Results

The mean age of patients who participated in the study was 16.5 ± 21.30 . The youngest person, 21 and the eldest, were

42 years old. Furthermore, the mean age of patients in the placebo group was 30.8 ± 4.85 and in the treatment group was 29.62 ± 5.44 years, due to the abnormal distribution of this data in the Kolmogorov-Smirnov test ($P = 0.025$), using the Mann-Whitney test did not show a significant difference in age between two groups ($P = 0.28$) [Table 1]. The mean BMI of patients in the placebo group was 59.1 ± 52.28 and 69.1 ± 64.29 in the treatment group, which was not significantly different between two groups using the t-test statistical test ($P = 0/719$) [Table 1].

In the placebo group, 19 cases had only one delivery, 16 had two deliveries, 14 had 3 births, and 2 had 4 births, while in the treatment group, 33 had 1 delivery, 14 persons had 2 births and 4 had 4 births. The difference between two groups in this view was significant by using the Mann-Whitney test ($P = 0.003$) [Table 2 and Figure 1].

None of the patients had nausea and vomiting in both groups [Table 2].

The mean time to hearing of the first intestinal sounds in the placebo group was 9.5-4.2-45 hours, and in the treatment group, it was 78.5-25.15. It indicated using the Mann-Whitney test that this interval in the treatment group was significantly less [Figure 2].

The time interval among surgeries to the time when the gas is discharged in the placebo group was 12.24-1.93 hours and in the treatment group 87.8-2.87 hours, which indicates a significant decrease in the time interval in the group treated with mint ($p < 0.001$) again by using Mann-Whitney statistical test [Figure 3].

Furthermore, the time interval between surgery and Excretion of stool feeling was observed in the placebo groups hours were 14.4-14.42 hours and in the treatment group were 64.9- 28.3-3, in this case, using the Mann-Whitney statistical test, this interval time in the group treated with mint is significantly lower [Figure 4].

The interval between surgeries to walking in all participants in two groups was 12 hours, and the duration of hospitalization in all cases was 1 day, and both groups were completely similar [Table 1].

Discussion in order to investigate the effect of each of the underlying variables on how to respond to treatment, the relationship between distance to the first time of hearing of intestinal sounds with the type of treatment, age, BMI and the number of previous deliveries was evaluated using statistical regression test.

In this evaluation, it was found that the time interval up to the time of the hearing was the first intestinal sounds with the type of treatment (placebo or mint) ($B = -3.44$, standard error, 36.0, $P < 0.001$) and BMI ($B = 0/499$, standard error 12.22 and $P < 0.001$), but there was no significant relation between age and number of the previous delivery [Table 3].

Moreover, considering the relationship among the distances to the first time, the amount of feeling gas dispensing with the type of treatment, age, BMI and the number of previous deliveries were observed using a regression statistic test. Hence, there was a meaningful relationship between the interval time to the remission of gas and the type of treatment (placebo or mint) ($B = -4/65$, standard error ($P < 0/001$ and $0/611$), BMI ($B = 0 475$, standard error $0/201$, $P < 0/001$) but the observation relationship between age and number of previous deliveries was not meaningful [Table 4].

I examining the relationship between the first time of excretion of stool feeling with types of treatment, age, BMI, and the Number of previous deliveries with statistical regression test

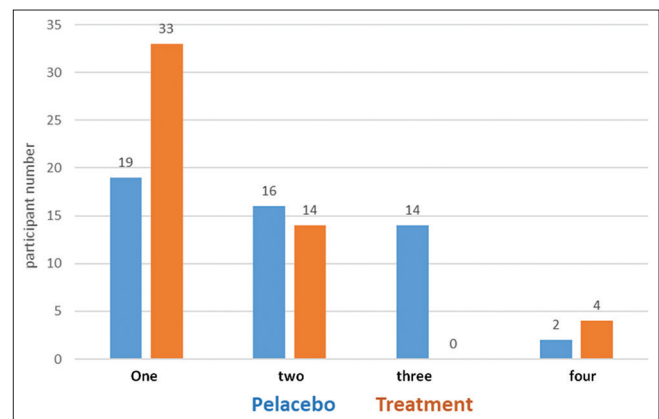


Figure 1: Comparing the number of births of the participants in the study of two groups placebo and treatment

Table 1: Comparison of quantitative variables in two groups of placebo and treatment

Feature	Placebo group (Range) mean±SD n=51	Treatment group (Range) mean±SD n=51	K_S	P
Age	30/8 (23-40) 30/8±4/85	29/6 (21-42) 29/6±5/44	0 0.025	0/287*
BMI	28/5 (25/5-32) 28/5±1/59	28/6 (26-34) 28/6±1/69	0/077	0/719*
The first time of hearing the intestinal sounds	9/05 (4-15) 9/05±2/44	5/78 (4-8) 5/78±1/25	0/028	<0/001*
The first time of feeling the gas flush	12/(2-24) 12/24±3/91	7/87 (4-12) 7/87±2/02	0/017	<0/001*
The first excretion of stool feeling	14/7 (6-24) 14/7±2/14	9/64 (5-17) 9/64±3/28	0/013	<0/001*
The interval between surgery to walking	12±0	12±0	-	-
Duration of hospitalization	1±0	1±0	-	-

*Mann-whitney test was used to compare the two groups. **Independent samples t-test was used to compare the two groups

Table 2: Comparison of quantitative variables in the placebo and treatment groups

Feature	Type	Placebo group n (%) n=51	Treatment group n (%) n=51	P
Number of deliveries	1	(37/3%) 19	(64/7%) 33	0/003
	2	(31/4%) 16	(27/5%) 14	
	3	(27/5%) 14	-	
	4	(3/9%) 2	(7/8%) 4	
Nausea and vomiting	0	(100%) 51	(100%) 5	-

Table 3: Relative distance to the first time of hearing of intestinal sounds with type of treatment, age, BMI and previous delivery rates in regression test

Independent variable	B	Standard error	t	P*
Type of treatment (placebo or mint)	-3/44	0/36	-9/33	<0/001
Age	0/002	0/045	0/042	0/967
Number of previous deliveries	-0/246	0/24	-1/02	0/309
BMI	0/499	0/122	4/1	<0/001

also showed that there was a meaningful relationship between the time interval to excretion of stool was also associated to the type of treatment (placebo or mint) (B = -5/43), standard error were 0/74 and P < 0/001) and BMI (B = 0/607, standard error, 0/2446 and P = 0/015), but again the relationship observed between the age and number of previous deliveries was not significant [Table 5].

Discussion

Main findings

In general, the findings showed that drops of peppermint were significantly more effective than placebo in the rapid return of intestinal function including hearing the intestinal sounds earlier and shortening the time of gas excretion feeling and stool excretion from the time of operation in the patients with cesarean section.

Several studies were carried out on improving the function of intestine including the study of Nasrin Fazel *et al.*^[35] who examined the effect of Super Mint on reducing the severity of flatus after cesarean section and concluded that Super Mint had a reduction in the severity of flatus was effective after cesarean section.

From other studies, Dr. Akhlaghi *et al.*^[36] examined the effect of chewing gum in the reduction of ileus after cesarean section. They also concluded that chewing gum is effective to reduce the ileus after cesarean section.

In another study, also Dr. Mohsenzadeh *et al.*^[37] examined the effect of chewing gum on improving intestinal function after cesarean section, which was effective, and all three of these studies confirmed the results of our research.

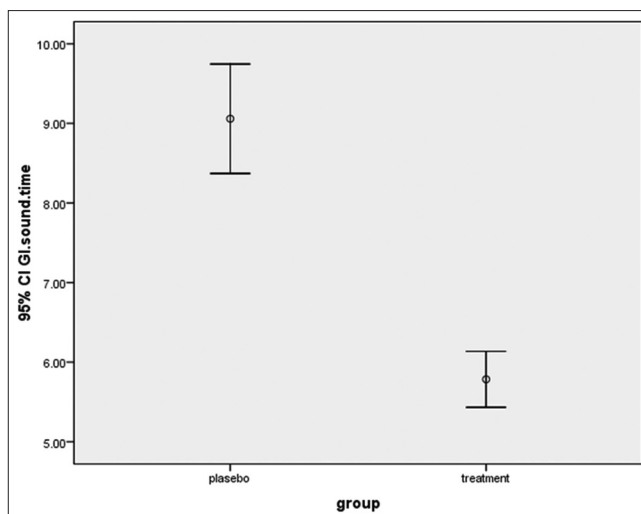


Figure 2: Comparing the time interval to the earliest sounds of intestines in two groups

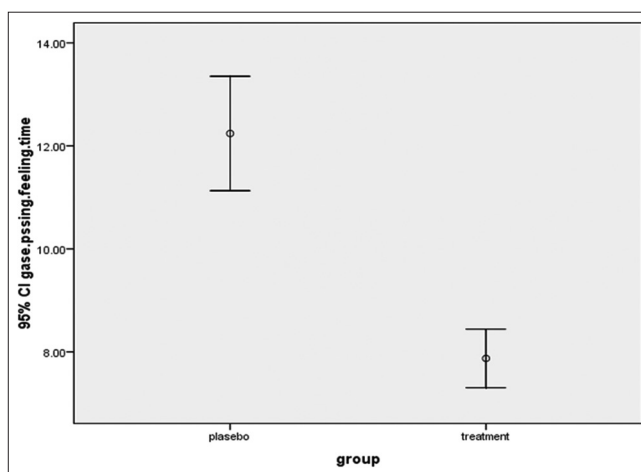


Figure 3: Distance up to the time when the gas was flushed in the two groups of placebo and treatment

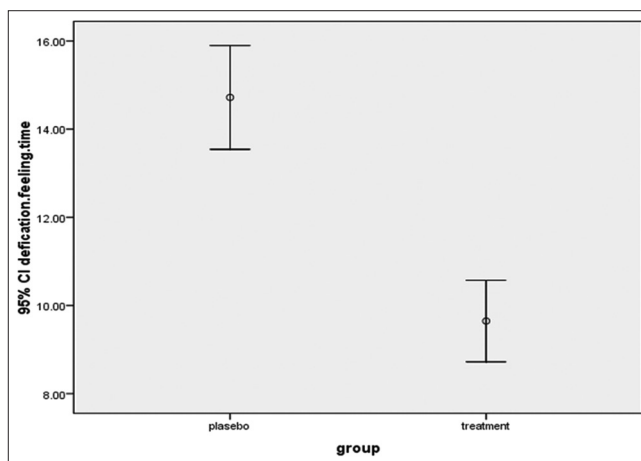


Figure 4: The interval between time and time of stool excretion in the two groups of placebo and treatment

Another study by Dr. Sekhavat *et al.*^[38] examined the effect of early nutrition on reducing digestive complications after cesarean

Table 4: Relation between the distance to the first time of feeling gas dispensing with the types of treatment, age, BMI and the number of previous deliveries in the regression test

Independent variable	B	Standard error	t	P*
Type of treatment (placebo or mint)	-5/43	0/74	-7/27	<0/001
age	0/051	0/091	0/566	0/572
Number of previous deliveries	-0/74	0/485	-1/52	0/13
BMI	0/607	0/246	2/47	0/015

Table 5: Relation between distance to first time of excretion of stool feeling with type of treatment, age, BMI and previous delivery rates in regression test

Independent variable	B	Standard error	t	P*
Type of treatment (placebo or mint)	-5/43	0/74	-7/27	<0/001
Age	0/051	0/091	0/566	0/572
Number of Previous deliveries	-0/74	0/485	-1/52	0/13
BMI	0/607	0/246	2/47	0/015

section with general anesthesia and concluded that early feeding after cesarean section could due to an earlier onset of a normal diet, shortening hospitalization and more satisfaction of patients. In our study, all patients underwent spinal anesthesia. The onset of treatment was 4 hours and the start of the fluid regimen was 6 hours after surgery.

In a study done by Dr. Safdari Dehcheshmeh *et al.*,^[39] the effect of the onset of fluid regimen on the return of intestinal movements and the satisfaction of patients who undergoing elective cesarean section was investigated, and they concluded that early onset of fluid regimen is effective in the rapid return of intestinal function. In our study, we also had an improvement in intestinal function, but the time to start treatment was constant 4 hours after surgery.

Having post-operative nausea and vomiting after cesarean section as a qualitative variable were studied in patients. In a total of 102 control and control groups, none of the cases included nausea and vomiting after cesarean section, which confirmed the Hines,^[13] Lane *et al.* study.^[34]

Moreover, the duration of hospitalization and the first time to move patients after cesarean section was similar in the two groups, and no difference was observed in these two variables.

The strong points of this plan were to provide easy access to patient information including the description of the procedure, the number of previous births, age, weight, and height of the patient. It was also possible to follow the patients after giving the drops of mint and placebo as easily as possible in the specialty women's hospital

Umm-al- Banin was comfortable with access to the patient and his information.

Weaknesses can be noted in how data is collected in some variables, for example, there is the possibility of errors when that asked in a subjective manner by himself about his first feeling of gas flushing and a sense of intestinal disposition.

Besides, some of the confounding variables such as cesarean section and general anesthesia were excluded in this study, and only in cesarean sectional women with spinal anesthesia without the history of digestive problems and history of gastrointestinal use from chemical and vegetation.

The use of an uncomplicated, inexpensive, and affordable herbal supplement that is effective in treating intestinal disorders after cesarean section is invaluable, and family physicians can prescribe it to patients without worry.

Conclusion

A droplet of mint can be used to restore faster intestinal function and decrease and severity of ileus after cesarean section. It is suggested that other research in this field be done with more patients and longer periods of time. Also, the onset of intestinal function, with the exception of interviewing the patient and subjective examination of patients, and used other methods to obtain more accurate information. Moreover, examining the effect of early onset of intestinal function on quality of life, anxiety reduction, and level of lactation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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