Effect of caffeine on postoperative bowel movement and defecation after cesarean section

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A great focus of postoperative diet is to prevent and manage ileus. Coffee is a common beverage that is commonly known for its positive gastrointestinal function \([11,12]\). Nonetheless, intake of coffee is also known for gastroesophageal reflux symptoms \([13]\).

The aim of this study was to evaluate the effects of postoperative coffee intake following C-section on bowel movement and defecation.

2. Methods

This randomized clinical trial was performed to investigate the effect of coffee on bowel movements and postoperative defecation following cesarean section among patients aged 18–35 years, referred to the hospitals of the (XXX) from June 2019 to June 2020. Written consent was obtained from all the patients before the participation in the study and all the queries were answered by resident doctor or gynecologist. Demographic information including age, history of underlying diseases such as diabetes, hypertension, heart disease, smoking history and gestational diseases including gestational diabetes, gestational

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hypertension and previous history of miscarriage were recorded. Patients were also asked regarding any known psychological and genetic disease and family and drug history was obtained, if any. Patients with prolonged surgery (more than 1.5 h), sensitive to caffeine and butyvacaine, unwillingness to participate in study, history of irritable bowel syndrome and idiopathic constipation were excluded from the study.

Patients under American Society of Anesthesiologists (ASA) class I and II underwent elective C-section with spinal anesthesia using 2.5 cc Marcaine at L4-L5 levels. The patients were divided in two groups. Control groups were provided 111 ml of water, three times a day whereas study group received 111 ml of coffee, three time a day (11am, 3pm and 7pm). The patient took the assigned beverages under the supervision of a trained nurse. The coffee was prepared by coffee machine, Nescafé® Alegria® (Gatwick, Sussex, The United Kingdom). In case of non-adherence or intolerability of the intervention, individuals were excluded from the study.

Patients in both groups were matched in terms of age. In the next step, the method of prescribing the drug and the side effects of the drugs for the patient were explained. The patient was monitored by a gynecologist during the treatment period, who also performed cesarean section in the patients. Finally, side effects such as nausea, vomiting, weakness and lethargy, bleeding, mortality were recorded in patients by resident doctor, who was involved in the research. It should be noted that all patients were recommended to walk 5–11 m, 24 h after surgery. The diet was also similar in such that liquid food was given for first 24 h and after 24 h, solid regular food was started. Patients were evaluated for the time of onset of bowel movements and the time of first defecation after cesarean section. Patients were asked to record any discomfort or signs, they would feel or see. The patients were followed up for 48 postoperative hours.

The data was statistically analyzed using software SPSS v22 (IBM, USA). The normality of the data was determined using a one-sample Klotogorov-Smirnov test. Student T test and analysis of variance was used for normal data and if not normal, Kruskal-Wallis and Mann-Whitney tests were used. P-value < 0.05 was considered to be statistically significant.

This study was approved by the Research Ethics Board of (XXX). Researchregistry6907.

The work has been reported in line with the CONSORT criteria [14].

### 3. Results

From the total of 36 patients included in the study (18 in each group), the mean age of the patients was 28.08 ± 3.87 years. Table 1 shows that control and study group were not significantly different in terms of age, body mass index, gravidity, parity and gestational age, p-value >0.05, respectively.

As can be seen in Table 2, the mean onset of bowel movements in case and control group (14.56 vs. 16.83 h) and the first defecation after cesarean section (27.78 vs. 31.67 h) was significantly different, p-value = 0.042 and p-value = 0.002, respectively.

The patients were further analyzed based on the two age groups, 30 and less than 30 years and more than 30 years. The time of first defecation was significantly different among study and control group among patients aged 30 years or less, p-value = 0.006. The first bowel movement was not significantly correlated with the age among the two groups and first defecation was not significantly different in case and control groups among patients aged more than 30 years, p-value = 0.251 (Table 3).

Based on the gestational age of the patients, the case and control groups were significantly different in terms of first defecation among the patients with 38 or less weeks of gestational period, p-value = 0.002. This group did not have significant difference in terms of first bowel movement, p-value = 0.195, respectively. The gestational age of more than 38 weeks was not associated with bowel movement and defecation, p-value = 0.145 and p-value = 0.148, respectively (Table 4).

Based on gravidity, patients were divided in two groups; gravida 1, and gravid 2 or more. Among gravida 1 group, patients in study and control groups had significant difference in terms of first defecation, p-value = 0.008. These patients were not significantly different in terms of first bowel movement, p-value = 0.081. Similarly, among gravid 2 or more groups, the case and control groups were not significantly different in terms of first bowel movement, p-value = 0.43 and first defecation, p-value = 0.253 (Table 5).

Patients without previous pregnancy were significantly different in terms of first defecation, p-value = 0.026, however no such correlation was found for first bowel movement, p = 0.146. Previous pregnancy was not correlated with first bowel movement and first defecation in case and control groups, p-value = 0.295 and p-value = 0.053, respectively (Table 6).

BMI 25 and less was significantly correlated with first defecation in case and control group, p-value = 0.008 however was not correlated with first bowel movement, p-value = 0.051. BMI greater than 25 was not significantly correlated with first bowel movement, p-value = 0.612 and p-value = 0.197, respectively (Table 7).

### 4. Discussion

Our study reported that first bowel movement and first defecation time is significantly reduced (shorter) among women who are given coffee following C-section. Furthermore, patients with gestational age of 38 weeks and shorter, aged 30 years or less, gravida 1, previous pregnancy and BMI 25 kg/m² or less presented with significantly shorter time of first defecation.

In an intervention study conducted by Rabieipour et al., 2018, investigating the effect of coffee on bowel movements after surgery, 111 patients were studied and divided into two groups; coffee and controls. Consumption of coffee was 111 ml at 8, 12 and 21 h after surgery and it was found that the time of onset of bowel movements, hearing of bowel sounds and defecation of the first stool was not different between the two groups. However, first flatulence was significantly shorter in the intervention group (6). These findings are not in line with those reported in ours. Differences in the sample size, demographic variables, comorbid conditions and caffeine addiction could have influenced these outcomes [15].
In a review study by Eamudomkarn et al., it was reported that coffee consumption as a beverage in the postoperative phase causes earlier bowel movements and shorter duration of first flatulence [16].

In an intervention study conducted by Güngördük et al. [17] to investigate the effect of coffee compared to water on bowel function after surgery, it was found that the time available until the first bowel movement, tolerance of solid food, time of first defecation and time of first flatus was significantly shorter in coffee group. Kruse et al. also...
reported that intake of coffee postoperatively is associated with a shorter time of first bowel movement and first defecation (9). Dulskas, Klimovskij [18] also concluded that caffeinated coffee intake following laparoscopic colectomy reduced the time of first bowel movement whereas tolerance of solid food was shorter in decaffeinated coffee group. The time of first flatus and hospital duration was not significantly different in the two groups. Our study did not evaluate the effects of decaffeinated coffee and parameters like flatulence and ileus were not evaluated in the study. A recent systematic review and meta-analysis by Gkegkes, Minis [19] showed that postoperative intake of coffee shortens the duration of first bowel movement, first flatus and tolerance of solid diet. The study concluded that coffee improves gastrointestinal motility without any postoperative complications.

Our findings are based on small sample size and postoperative parameters like vitals and adverse effects of spinal anesthesia were not evaluated in our study. Further studies are therefore required in this field that include these parameters and evaluate the effects of different doses of caffeine.

5. Conclusion

The findings of this study showed that the mean onset of bowel movements and the first defecation after cesarean section in the intervention group (coffee) was significantly lower than the control group, which had a significant effect among patients under 31 years of age with a history of pregnancy, gestational age less than 38 weeks and BMI less than 25. Therefore, considering the importance of early onset of gastrointestinal movements in people undergoing cesarean section, coffee is a safe and inexpensive method among cesarean section patients. The favorable effects may be more based on demographic and maternity-related parameters. Therefore, studies with a larger sample size are required in this area.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Conflict of interest

The authors deny any conflict of interest in any terms or by any means during the study.

Sources of funding

N/A.

Ethical approval

This study was approved by the Research Ethics Board of Tehran Islamic Azad University of Medical Sciences, Tehran, Iran (IR.IAU.TMU.REC.1399.323).

https://ethics.research.ac.ir/ProposalCertificateEn.php?id=172722&Print=true&NoPrintHeader=true&NoPrintFooter=true&NoPrintPageBorder=true&LetterPrint=true.

Researchregistry6907.

Consent for publication

Written informed consent was obtained from the patient for publication of this research and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Availability of data and materials

All relevant data and materials are provided with in manuscript.

Ethical approval

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Funding for your research

All sources of funding should be declared as an acknowledgement at the end of the text. Authors should declare the role of study sponsors, if any, in the collection, analysis and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication. If the study sponsors had no such involvement, the authors should so state.

Contributors’ statement page

Dr. Mahnaz Narimani Zamanabadi and Dr. Mohamad Aryafar: conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript.

Dr. Farshid Gholami and Dr. Reza Alizadeh: Designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript.

Dr. Seyed Ahmad Seyed mehdi: Coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

Consent

Not applicable.

Registration of research studies

Name of the registry:
Unique Identifying number or registration ID: researchregistry:6907
https://www.researchregistry.com/browse-the-registry#home/?view_2_search=6907&view_2_page=1.

Guarantor

Dr. Mahnaz Narimani Zamanabadi.

Declaration of competing interest

All authors must disclose any financial and personal relationships with other people or organisations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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