



Effect of Gum Chewing and Coffee Consumption on Intestinal Motility in Caesarean Sections

Sezaryen Doğumlarda Sakız Çiğneme ve Kahve İçiminin Barsak Motilitesine Olan Etkisi

Intestinal Motility After Caesarean Section

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Öz

Amaç: Postoperatif dönemde flatulans ve defekasyon zamanı hasta konforu ile morbiditesini belirleyen ana etmenlerden biridir. Bu çalışmada komplikasyonsuz term sezaryen doğumlarda postoperatif sakız çiğneme ve kafeinsiz kahve içiminin barsak motilitesine etkisi prospektif randomize kontrollü klinik çalışma ile test edilmiştir. **Gereç ve Yöntem:** Çalışmaya sezaryen ile komplikasyonsuz doğum yapan 100 gebe basit randomizasyon yöntemiyle 4 gruba ayrıldı: Grup 1 (postoperatif 2. saatten sonra defekasyon olana kadar 4 saat arayla şekersiz sakız çiğnetilenler) n:25; Grup 2 (postoperatif 2. saatten itibaren defekasyon olana kadar 4 saat arayla günde 3 kez olmak kaydıyla 100 ml kahve içirilenler) n:25; Grup 3 (postoperatif 2. saatten itibaren defekasyon olana kadar 4 saat arayla 3 kez 100 ml sıcak su içenler: Sham grubu) n:25; Grup 4 (kontrol grubu) n:25. Hastaların ilk barsak hareketini hissettikleri, ilk gaz çıkışının gerçekleştiği ve defekasyon zamanları gruplar arasında karşılaştırıldı. **Bulgular:** Olguların ilk barsak hareketi hissi ve ilk gaz çıkış zamanı Grup 1'de sham ve kontrol gruplarına göre anlamlı olarak daha kısa saptandı. Gruplardaki hastaların defekasyon zamanı karşılaştırıldığında kontrol grubuna göre Grup 1, 2 ve 3'deki hastalarda süre anlamlı olarak daha kısa saptandı. Tüm gruplar arasında ise anlamlı farklılık bulunmadı. **Tartışma:** Sezaryen sonrası postoperatif dönemde şekersiz sakız çiğneme ve kafeinsiz kahve içilmesi uygulamaları ile hastaların gaz çıkışı ve defekasyon zamanları, dolaşısıyla hospitalizasyon süreleri kısaltılabilir.

Anahtar Kelimeler

Sezaryen Doğum; Erken Oral Beslenme; Postoperatif Bağırsak Fonksiyonu; Gaz Çıkarmak; Postoperatif İleus

Abstract

Aim: The time to first postoperative flatulence and defaecation are two of the main factors that determine caesarean patient comfort and morbidity. In this study, the effect of postoperative gum chewing and decaffeinated coffee consumption on intestinal motility was tested in full-term caesarean sections without complication with a prospective, randomised controlled trial. **Material and Method:** 100 women who underwent caesarean section without a complication were divided into 4 groups using the simple randomisation method: Group 1 (women given sugar-free gum at 4-hour intervals after postoperative hour 2 until defaecation) n:25; Group 2 (women given 100 mL coffee at 4-hour intervals beginning from postoperative hour 2 until defaecation for three times a day) n:25; Group 3 (Sham group—women given 100 ml hot water at 4-hour intervals beginning from postoperative hour 2 until defaecation for three times a day) n:25; and Group 4 (control group) n:25. Time to sensation of first bowel movement and time to passage of first flatus and defaecation were compared between the groups. **Results:** Times to sensation of first bowel movement and passage of first flatus were significantly shorter in Group 1 compared to the sham and control groups. Time to first defaecation was also detected to be significantly shorter in Groups 1, 2, and 3 compared to the control group. No significant difference could be detected between the groups. **Discussion:** Sugar-free gum chewing and decaffeinated coffee consumption during postoperative period after caesarean section may decrease the time to first flatulence and defaecation and thus, the hospitalisation time.

Keywords

Caesarean Section; Early Oral Feeding; Postoperative Bowel Function; Flatulence; Postoperative Ileus

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Introduction

The main cause of pain during the caesarean section postoperative period is delayed passage of flatus. Thus, the time to passage of first flatus and defaecation are two of the main factors that determine the postoperative patient comfort [1]. Autonomic nervous system changes that cause reduction in postoperative bowel movements are observed most commonly in caesarean section [2-4]. Gastrointestinal dysfunction causes accumulation of gas and secretions in the intestines resulting in nausea, vomiting, abdominal distension, pain, and ileus [5]. Such problems become especially more risky and important for the baby and mother because the patient is puerperant. Although early mobilisation and early oral intake reduce these problems, a well-tolerated and harmless agent has not been found to date [6]. Gum chewing and coffee consumption are cheap, safe, and easily tolerated methods that have been reported to increase postoperative intestinal motility [2,5]. However, these modalities have been studied as separate agents and in a limited number of randomised controlled trials in the literature [2,5]. The aim of this study was to test the effect of postoperative sugar-free gum chewing and decaffeinated coffee consumption on intestinal motility in full-term caesarean sections without complication in a randomised controlled clinical trial. Furthermore, our study is very important since it is the single authentic study in the literature that compares sugar-free gum chewing, decaffeinated coffee, and hot water consumption simultaneously.

Material and Method

Design and sample

The study was designed as a randomised controlled trial to be conducted at Sanko University, Faculty of Medicine, Department of Gynaecology and Obstetrics between 1 July 2014 and 31 August 2014 by inclusion of 100 pregnant women who underwent caesarean section without complication. In this study, the effects of both the postoperative gum chewing and decaffeinated coffee consumption on intestinal motility were tested in full-term caesarean sections without complication with a controlled clinical trial.

Inclusion criteria were defined as age above 18 years, completion of gestational week 37, elective caesarean delivery, absence of an active infection, and absence of systemic and chronic disorders in antenatal follow-up. The exclusion criteria were determined as preterm labour, multiple pregnancies, premature rupture of membranes, emergency caesarean section (due to ablatio placenta, placenta previa, chorioamnionitis, acute foetal distress, placental abnormalities, active haemorrhage, etc.), body temperature above 38°C, severe anaemia, history of abdominal surgery other than caesarean section, allergic reaction to the agents used, and inability to chew gum.

Patients were divided into 4 groups using a simple randomisation method with the aid of a computer: Group 1 (women given sugar-free gum at 4 hour intervals after postoperative hour 2 until first defaecation) n:25; Group 2 (women given 100 ml coffee at 4 hour intervals beginning from postoperative hour 2 until defaecation for three times a day) n:25; Group 3 (Sham group, patients given 100 ml hot water at 4 hour intervals beginning from postoperative hour 2 until first defaecation for three times a day) n:25; and Group 4 (control group) n:25. All

patients gave their consent and continued their collaboration to the end of the study, and no case was excluded for this reason. All patients were informed about the monitoring of their first flatus, defaecation, and the other data during the postoperative period.

Ethical considerations

This study was reviewed and approved by the ethics commission of SANKO University, Faculty of Medicine, Department of Obstetrics and Gynaecology, Gaziantep, Turkey. Before the launch of the research, patients were informed about the subject and the objectives of the research. Personal information would remain confidential and would only be used for the research data. Verbal and written permission were obtained from the patients who volunteered to participate in the research.

Procedure and data collection

Spinal anaesthesia was administered to all patients included in the study. No patient was given sedation. Surgery was initiated after insertion of a urinary catheter and achievement of sufficient level of emotional block. Caesarean section was performed for all study patients by the same surgical team with the standard Pfannenstiel incision to access the abdominal cavity. Mean operation time was determined to be 30 minutes. All pregnant women were included in the study in an 8-hour fasted state. No medication was given except for the spinal anaesthesia and preoperative prophylactic antibiotic. Room temperature was kept constant from the time the women entered the operating room until the time they exited it.

All patients in the sample (including the control group) received routine postoperative care. The urinary catheter was withdrawn at 6 hours postoperatively and when the amount of urine exceeded 1000 ml. Oral intake was initiated with a small amount of water at 2 hours postoperatively. Subsequently, the feeding schedule proceeded to a liquid diet for the next repast. A soft diet was planned for the next day after good tolerance of the liquid diet. Mobilisation was started after 8 hours. Patients in the gum chewing group were requested to chew 2 spearmint dragee gums with sugar-free sweetener (Vivident Xylit®, Perfetti Van Melle, Esenyurt, Turkey) three times a day (with at least 4-hour intervals, morning, noon, evening) for a period of 15 minutes from 2 hours after the operation until the time of defaecation. Patients in group 2 were given 100 ml coffee three times a day with at least 4-hour intervals until the time of defaecation after oral intake. Patients were given 2 g (1 teaspoon) of decaffeinated coffee (Nescafe Gold Kafeinsiz®, Nestle, Switzerland) prepared at the same machine at a temperature of 50-60°C for 10 minutes under the supervision of a nurse. No supplements (milk, sugar) were allowed.

The research assistant visited the patients regularly, every hour, and recorded the time of the first bowel movement, passage of flatus, and defaecation in data-collecting forms. Patients in the control group received routine care after the operation. Regarding postoperative analgesia, 75 mg diclofenac sodium was administered postoperatively at a maximum of 2 IM doses within 24 hours depending on the patient's request. Subsequently, oral acetaminophen was used as needed. Afterwards, time to sensation of first bowel movement and time to passage of first flatus

and defaecation were compared between the groups.

Data analysis

Collected data were analysed using the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA). Distribution of data was evaluated using the Kolmogorov-Smirnov test. Groups were compared by the Kruskal Wallis test as there were more than two groups and the data in groups were not normally distributed. Since data on BMI and pregnancy week were also not normally distributed, these demographic data were also compared between the groups using the Kruskal Wallis test. Age data were found to be suitable to normal distribution, and thus, compared using One Way ANOVA test. p-values of < 0.05 were considered as statistically significant. Data with normal distribution were expressed as mean \pm standard deviation, while data without normal distribution were expressed as median (minimum-maximum).

Results

All patients tolerated sugar-free gum and decaffeinated coffee without any complaints. Therefore, no patient was excluded from the study. No statistically significant difference was detected between demographic data for age, body mass index, and delivery week of the patients who experienced no complication during antenatal follow-up and follow-up during and after the operation (Table 1).

When all groups were compared, a statistically significant difference was observed between the groups for time to first bowel movement and time to passage of first flatus (Table 2). The shortest average times for the first bowel movement and passage of first flatus were recorded in the sugar-free gum chewing group as 300 (150-500) minutes and 360 (200-600) minutes, respectively. This was followed by the group given decaffeinated coffee, with the mean values of 320 (205-590) minutes for first bowel movement and 420 (300-650) minutes for passage of first flatus (Table 2).

Comparison of time to first defaecation showed significantly longer times for patients in the control group compared to other groups. The mean shortest time was 737 (490-910) minutes

detected in the sham group. However, when all groups were compared, no statistically significant difference was found (Table 2).

Discussion

In our study, we examined the effects of hot water and decaffeinated coffee consumption and sugar-free gum chewing after caesarean section on postoperative bowel movements. Our evaluation showed that the sugar-free gum chewing had an important effect on early initiation of bowel movements and passage of flatus. Sugar-free gum chewing was followed by decaffeinated coffee and then hot water consumption with respect to time to first bowel movement and passage of first flatus. Time to first defaecation was observed to be earlier in all groups compared to the control group, with the shortest time observed with hot water consumption. This was attributed to the fact that defaecation is related to factors independent of the operation such as the person's bowel habits and food consumption in the hospital, compared to other parameters.

Evaluations and implications are limited by the scarcity of randomised controlled trials conducted with these parameters. Gum chewing directly stimulates the gastrointestinal peptide hormone release and increases salivation and pancreatic fluids resulting in intestinal stimulation. This stimulates the passage of flatus and defaecation with the bowel movements [5]. In a randomised controlled trial with 200 pregnant women, time to first bowel sound, time to first defaecation, and hospital discharge were detected to be significantly earlier in the gum chewing group compared to the control, although the caesarean sections were conducted under general anaesthesia and not spinal anaesthesia [6]. This trial reported the mean times to first bowel movement, passage of first flatus, and first defaecation as 10.9 ± 2.7 ; 17.9 ± 4.6 ; and 21.1 ± 4.7 hours, respectively, in the gum chewing group and 15.6 ± 3.7 ; 24.4 ± 7.1 ; and 30 ± 8.2 hours in the control group [6]. A randomised controlled trial conducted in 100 pregnant women by Ledari et al. reported the mean time to first bowel movement after caesarean section as 21.9 hours in the gum chewing group and 26.1 hours in control group [7]. Patients who underwent colorectal surgery

may experience a more bothersome period with respect to intestinal passage. A meta-analysis that evaluated 244 patients who underwent colorectal surgery and 6 randomised controlled trials showed that the sugar-free gum was very well tolerated and significantly accelerated the time to first bowel movement, passage of first flatus, and first defaecation [8]. However, another study conducted in 120 patients by Akhlagi et al. reported the time to first bowel movement after caesarean section as 14.7 ± 6.5 hours in the gum chewing group and 16.6 ± 8.4 hours in the control group. Differences between the two groups did not reach statistical significance in this study [9]. This was one of the rare unfavourable studies; we believe that this result might be attributed to the surgical technique and study design. In our study, which was conducted under spinal anaesthesia, onset of

Table 1. Summary of demographic data of patient groups

	Group 1 n: 25	Group 2 n: 25	Group 3 n: 25	Group 4 n: 25	p
Age (years)	28 \pm 4.2	30 \pm 3.4	29 \pm 5.1	31 \pm 2.2	0.09*
BMI (kg/m ²)	27 (23-30)	27 (23-30)	26 (22-30)	27 (23-31)	0.31 ^a
Delivery week (weeks)	38.6 (37.8-39.1)	38.4 (38-38.6)	38.5 (38-40)	38.7 (38-39.6)	0.54 ^a
*One Way ANOVA	^a Kruskal Wallis				

Table 2. Summary of intestinal functions between groups

	Group 1 n: 25	Group 2 n: 25	Group 3 n: 25	Group 4 n: 25	p*
First bowel movement ^a	300(150-500)	320(205-590)	385(280-580)	405(188-680)	0.001**
Passage of first flatus ^a	360(200-600)	420(300-650)	490(345-705)	600(380-903)	<0.001**
Time to first defaecation ^a	802(710-930)	776(502-960)	737(490-910)	980(804-1010)	<0.001***

^a Times were calculated in minutes

* Kruskal Wallis test

** p value when all groups were compared

*** p value when control group was compared to other groups

defaecation was observed approximately at least 3 hours earlier in all groups compared to the control group. However, in studies conducted under general anaesthesia, a difference of up to 9 hours was observed in post-caesarean-section patients compared to the control group (21 hours vs. 30 hours) [6].

According to a successful meta-analysis that evaluated 939 caesarean patients with 6 recent randomised controlled trials, gum chewing, which is a well-tolerated method without any side effects, resulted in an earlier first bowel movement by 3.62 hours and time to first defaecation by 6.58 hours [10]. In our study, the first bowel movement, passage of first flatus, and first defaecation occurred 1.75 hours, 4 hours, and 2.96 hours earlier, respectively, in the gum chewing group compared to the control group. A clear consensus could not be achieved for the gum chewing protocol in the meta-analysis [10]. Protocols that were started 2 hours after operation as in our study or protocols that were started immediately after the operation and extended to 6 hours were also applied. For duration of gum chewing, a time range of 15 minutes to 1 hour was applied [10]. No observation indicating that these times and ranges were non-optimised or added superiority to studies could be noted, but these were considered to be the limiting factors for standardisation of meta-analysis [10]. No tolerability or side effect problems were observed in the studies; however, we believe that the decision on protocol should be made based on patient comfort and orientation. In addition, a meta-analysis that evaluated the efficacy of sugar-free gum in prevention of postoperative ileus following caesarean section showed that gum chewing for 30-60 minutes for at least 3 times a day was effective in reducing the incidence and outcomes of ileus but had no effect on hospitalisation time [11].

As distinct from the sugar-free gum chewing, coffee consumption has not been much studied for intestinal passage. In general, the studied groups were either healthy volunteers or limited numbers of patients who underwent colon surgery [5,12]. Although there are data indicating that the coffee consumption increases the intestinal motility in healthy volunteers, effects on bowels postoperatively are not yet clearly known [12,13]. Besides being caffeinated or decaffeinated, coffee contains hundreds of active metabolites for its laxative effect and onset of action begins after 45 minutes of consumption reaching the peak plasma levels [14].

In a randomised controlled trial in patients who underwent elective laparoscopic colectomy, decaffeinated coffee was compared to caffeinated coffee and water with respect to postoperative ileus risk and resulted in earlier onset of bowel movements but was not found to be statistically significant with regard to passage of first flatus. However, decaffeinated coffee was observed to be very well tolerated [15]. Also in our study, decaffeinated coffee was preferred since it is better tolerated both by the mother and the baby. Another study using caffeinated coffee detected a significantly shorter time to first bowel movement as compared to water [5]. In a study that compared coffee with tea in postoperative patients who underwent colon and rectum resection, coffee was found to be safe and shortened the time to first bowel movement and time to first defaecation by about 15 hours [16]. Also in our study, the first bowel movement and passage of first flatus occurred 1.42 hours and 3

hours earlier, respectively, in the decaffeinated coffee consumption group compared to the control group. Time to first defaecation was also significantly shorter than for the control group, and even shorter than for the gum chewing group.

Early postoperative fluid intake in patients undergoing caesarean section under regional anaesthesia is both safe and significantly shortens the times of passage of first flatus/faeces and length of hospitalisation [17,18]. A prospective randomised trial compared the initiation of water intake at 2 hours and 8 hours postoperatively, and found a difference of 2 hours for first bowel movement and 12 hours for passage of first faeces between two groups [19]. Oral water intake was initiated at 2 hours postoperatively in our study. This was considered to be the reason for general shorter durations obtained for the parameters observed in our study compared to many other studies. A shorter time for defaecation was also observed in the hot water group when compared to the other groups.

Limitation of the study:

The limitation of our study is the relatively small sample size as the basis of groups. Blind trials including a higher number of subjects would better rule out the statistical deviations and variations affecting the outcome. The strength of our study is that it compares three different parameters with an independent control group and used randomised assignment to groups. It is also very important that our study is the single authentic study in the literature that compares sugar-free gum chewing, decaffeinated coffee, and hot water consumption.

Conclusion

For caesarean section, one of the most commonly performed surgical interventions, the time to first flatulence and defaecation may be decreased by sugar-free gum chewing and decaffeinated coffee consumption, which are demonstrated to be natural motility enhancers, during the postoperative period. These products, which are not given to patients in routine practice and are not consumed by the patients unless prescribed, did not cause any postoperative complications. These are cost-effective and well-tolerated protocols that can be applied safely.

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Consent: Written informed consent was obtained from all participants. Written consent was obtained from the local Ethics Committee.

Competing interests

The authors declare that they have no competing interests.

References

1. Topcu SY, Oztekin SD. Effect of gum chewing on reducing postoperative ileus and recovery after colorectal surgery: A randomised controlled trial. *Complement Ther Clin Pract* 2016; 23: 21-5.
2. Short V, Herbert G, Perry R, et al. Chewing gum for postoperative recovery of gastrointestinal function. *Cochrane Database Syst Rev* 2015; 2: CD006506.
3. Saygi AI, Özdamar Ö, Gün İ, Emirkadı H, Müngen E, Akpak YK. Comparison of maternal and fetal outcomes among patients undergoing cesarean section under general and spinal anesthesia: a randomized clinical trial. *Sao Paulo Med J* 2015; 133: 227-34.
4. Semiz A, Akpak YK, Yılanlıoğlu NC, Babacan A, Gönen G, Çam Gönen C, Asiliskender M, Karaküçük S. Prediction of Intraoperative Nausea and Vomiting in Caesarean Delivery Under Regional Anaesthesia. *J Int Med Res* 2017; DOI: 10.1177/0300060516680547.
5. Müller SA, Rahbari NN, Schneider F, et al. Randomized clinical trial on the ef-

fect of coffee on postoperative ileus following elective colectomy. *Br J Surg* 2012; 99(11): 1530-8.

6. Abd-El-Maeboud KH, Ibrahim MI, Shalaby DA, Fikry MF. Gum chewing stimulates early return of bowel motility after caesarean section. *BJOG* 2009; 116(10): 1334-9.

7. Ledari FM, Barat S, Delavar MA. Chewing gums has stimulatory effects on bowel function in patients undergoing cesarean section: a randomized controlled trial. *Bosn J Basic Med Sci* 2012; 12(4): 265-8.

8. Vásquez W, Hernández AV, Garcia-Sabrido JL. Is gum chewing useful for ileus after elective colorectal surgery? A systematic review and meta-analysis of randomized clinical trials. *J Gastrointest Surg* 2009; 13(4): 649-56.

9. Akhlaghi F, Pourjavad M, Mansouri A, Tara F, Vahedian M. Effect of gum chewing on prevention of post cesarean ileus *Hayat* 2008; 14: 35-40.

10. Zhu YP, Wang WJ, Zhang SL, Dai B, Ye DW. Effects of gum chewing on post-operative bowel motility after caesarean section: a meta-analysis of randomised controlled trials. *BJOG* 2014; 121(7): 787-92.

11. Craciunas L, Sajid MS, Ahmed AS. Chewing gum in preventing postoperative ileus in women undergoing caesarean section: a systematic review and meta-analysis of randomised controlled trials. *BJOG* 2014; 121(7): 793-9.

12. Rao SS, Welcher K, Zimmerman B, Stumbo P. Is coffee a colonic stimulant? *Eur J Gastroenterol Hepatol* 1998; 10(2): 113-8.

13. Boekema PJ, Samsom M, van Berge Henegouwen GP, Smout AJ. Coffee and gastrointestinal function: facts and fiction. A review. *Scand J Gastroenterol Suppl* 1999; 230: 35-9.

14. Liguori A, Hughes JR, Grass JA. Absorption and subjective effects of caffeine from coffee, cola and capsules. *Pharmacol Biochem Behav* 1997; 58(3): 721-6.

15. Dulskas A, Klimovskij M, Vitkauskiene M, Samalavicius NE. Effect of coffee on the length of postoperative ileus after elective laparoscopic left-sided colectomy: a randomized, prospective single-center study. *Dis Colon Rectum* 2015; 58(11): 1064-9.

16. Piric M, Pasic F, Rifatbegovic Z, Konjic F. The effects of drinking coffee while recovering from colon and rectal resection surgery. *Med Arch* 2015; 69(6): 357-61.

17. Malhotra N, Khanna S, Pasrija S, Jain M, Agarwala RB. Early oral hydration and its impact on bowel activity after elective caesarean section--our experience. *Eur J Obstet Gynecol Reprod Biol* 2005 ;120(1): 53-6.

18. Fanning J, Valea FA. Perioperative bowel management for gynecologic surgery. *Am J Obstet Gynecol* 2011; 205(4): 309-14.

19. Mulaım B, Celik NY, Kaya S, Yanik FF. Early oral hydration after cesarean delivery performed under regional anesthesia. *Int J Gynaecol Obstet* 2008; 101(3): 273-6.

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