ORIGINAL ARTICLE

Gum Chewing: A Novel Method for Improving Gut Motility after Cesarean Section

Mayuri More[1], Sushil Kumar[2], Sunil Sharma[3]

Abstract

Background: The presence of bowel movements after any abdominal surgery is an important event and indication for switching the patient from intravenous fluids to oral feeding. Gum chewing has been reported to help in the early return of bowel sounds in patients who have undergone abdominal surgery. The present study evaluates the efficacy of gum chewing on bowel movements in postcesarean patients.

Materials and methods: A total of 200 women delivered by lower segment cesarean section, under spinal anesthesia were included in the study. The patients were randomly allotted to two groups. Group I—chewing gum group and group II—control group. Two hours after cesarean section, the women in the study group received one stick of gum every four hours to be chewed for 30 minutes until regaining their bowel function. The women in the control group followed the standard postoperative care. Each woman in both groups was examined abdominally using a stethoscope to detect the intestinal sound every one hour. The following outcome parameters were noted: the time to hear the first bowel sound, time to mobilization, time to first passage of flatus, time to first feeling of hunger, the time to first defecation, and length of the hospital stay.

Results: The two groups were well matched in terms of age of the patients, parity, ANC registration, gestational age, and the history of previous abdominal surgery. Outcome parameters connected with bowel movements were significantly shorter in group I (chewing gum). However, the duration of hospital stay in both groups was the same.

Conclusion: The study confirms the effectiveness of gum chewing on peristaltic activity after a primary lower segment cesarean section. It is a harmless and inexpensive method for stimulating early bowel movements. Early bowel movements also mean less use of IV fluids in the post-operative period, thus early ambulation.

Keywords: Bowel movements after cesarean section, Effect of gum chewing on bowel movements, Postoperative Ileus.

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Introduction

Cesarean section is the most common surgery that could result in postoperative changes in the autonomic nervous system, leading to reduced bowel motility and associated problems.[1] The delay lasting for 3–5 days, in return of regular bowel movements following an abdominal surgery is referred to as paralytic ileus.[2] It is also one of the major problems encountered by patients who have undergone a cesarean section, leading to an increased hospital stay, postoperative pain, abdominal distension, an inability to breastfeed the baby, and eventually delays in recovery.[3] Ileus occurs in cases with the use of opioids and excessive handling of intestines in abdominal surgeries that temporarily contribute to stoppage of the bowel movements; the mechanism related is probably a dysfunction in parasympathetic system activity (inhibitory neurons).[4]

Withholding postoperative oral intake to cesarean patients until the return of bowel function is a general practice. Clinically, the return of the bowel function is diagnosed by the passage of flatus or stools, feeling of hunger, or the presence of bowel sounds.[5] Studies have shown that early postoperative feeding could be safe prior to the return of flatus or stool;[6] a delay in the initiation of feeding leads to delayed wound healing, increased cell breakdown, elevated risk of infection, and the need for more intravenous fluids. This leads to additional costs on the healthcare system and on the family.[7]

There is no particular treatment for postoperative ileus although certain methods such as nasogastric suctioning, early feeding, IV fluid,[7,8] local analgesia, minimal surgical manipulation, use of non-steroidal anti-inflammatory drugs, and high carbohydrate content drinks[8,9] have been reported to decrease the incidence of postoperative ileus.

Gum chewing causes a person to feel good owing to stimulation of stomach and secretion of digestive and gastric juices. It increases the appetite and peristaltic bowel movements and also hastens ileus recovery[10–13] and it has also been recently reported as a method to reduce ileus.[14] Gumchewing is a form of sham feeding to stimulate bowel motility after surgery. The presumed mechanism of action is parasympathetic stimulation of the gastrointestinal tract, which is similar to oral intake but with theoretically less risk of vomiting and aspiration. Gumchewing is a cheap and harmless strategy to reduce postoperative ileus when used immediately after surgery. The present study was thus conducted to investigate the effect of gum chewing on the return of postoperative bowel motility in patients undergoing a cesarean section.

[1–3]Department of Obstetrics and Gynecology, MGM Medical College and Hospital, Kamothe, Navi Mumbai, India

Corresponding Author: Sushil Kumar, Department of Obstetrics and Gynecology, MGM Medical College and Hospital, Kamothe, Navi Mumbai, India, Phone: +91 9168199399, e-mail: cdrsushilkumar@rediffmail.com

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Aim and Objective

The aim of this study was to investigate the effect of gum chewing on the return of postoperative bowel activity in women undergoing a cesarean section.

Materials and Methods

Study Area

MGM Medical College and Hospital, Kalamboli, Mumbai. A tertiary care hospital.

Study Population

Women delivered by a lower segment cesarean section under spinal anesthesia.

Study Design

A case-control study. A total of 200 women delivered by a lower segment cesarean section fulfilling eligibility criteria were included in the study after taking informed consent. These cases were randomly divided into one of the following two groups (100 each) using computer-generated random numbers:

Group I—chewing gum group

Group II—control group (undergoing standard management)

Study Duration

Dec 2016—May 2018

Inclusion Criteria

- All women delivered by lower segment cesarean section under spinal anesthesia.

Exclusion Criteria

- Women undergoing cesarean section under general anesthesia.
- Patient's refusal to participate in the trial.

Methodology

Written informed consent was obtained from each participant. The demographic and obstetric data were collected. After two hours of cesarean section, the women in the study group received one stick of sugarless gum every four hours to be chewed for 30 minutes until regaining bowel function. The women in the control group followed the standard post-operative care. Each woman in both groups was examined abdominally using a stethoscope to detect the intestinal sound every one hour and was asked to report the time of first-time feeling of bowel movement, passing flatus or stool, or feeling hunger. The following outcome parameters were noted: the time to first bowel sound, time to mobilization, time to first passage of flatus, time to first feeling of hunger, time to first defecation, and the length of the hospital stay.

Statistical Analysis

The quantitative data were represented as their mean ± SD. Categorical and nominal data were expressed in percentage. The *t* test was used for analyzing quantitative data, the nonparametric data were analyzed by Mann–Whitney test, and categorical data were analyzed using the Chi-square test. The significance threshold of *p* value was set at <0.05. All analysis was carried out by using SPSS software, version 21.

Results

A total of 200 women delivered by a lower segment cesarean section fulfilling the eligibility criteria were included in the study after taking informed consent. These patients were randomly divided into one of the following two groups (100 each) using computer-generated random numbers:

Group I—chewing gum group and group II—control group undergoing standard management (Tables 1 and 2).

Mean age of group I was 27.13 years while in group II it was 26.42 years with no difference between the groups (*p* 0.54).

Out of the total 200 study cases, 52.5% were primi and 47.5% were multigravida with no significant difference between study the groups (*p* 0.77) (Tables 3 to 6).

Out of the total 200 study cases, 97.5% were registered cases, while 2.5% were unregistered cases with no significant difference between study groups (*p* 1.0).

Mean gestation age of study groups I and II was 38.67 and 38.91 weeks with no significant difference between study groups (*p* 0.71).

Histories of previous abdominal surgeries were given by 14% of cases in the study with no significant difference between study groups (*p* 0.83) (Tables 7 to 10).

Table 1: Group distribution of study subjects

Group	*N*	*(%)*
I (chewing gum)	100	50.0
II (control)	100	50.0
Total	200	100.0

Table 2: Mean age comparison of study groups

Variables	*Group*	*N*	*Mean*	*SD*	*p value*
Age	I	100	27.13	4.59	0.54
	II	100	26.42	4.05	

Table 3: Distribution of cases as per obstetric history

	Group			
Obstetric history	*I*	*II*	*Total*	*p value*
Primi	54	51	105	0.77
	54.0%	51.0%	52.5%	
Multi	46	49	95	
	46.0%	49.0%	47.5%	
Total	100	100	200	
	100.0%	100.0%	100.0%	

Table 4: Distribution of cases as per ANC history

	Group			
ANC history	*I*	*II*	*Total*	*p value*
Registered	97	98	195	1.0
	97.0%	98.0%	97.5%	
Unregistered	3	2	5	
	3.0%	2.0%	2.5%	
Total	100	100	200	
	100.0%	100.0%	100.0%	

Table 5: Mean comparison of gestation age among study groups

Variables	*Group*	*N*	*Mean*	*SD*	*p value*
Gestation age (weeks)	I	100	38.67	1.14	0.71
	II	100	38.91	1.09	

Table 6: Distribution of cases as per the history of previous abdominal surgeries

History of previous abdominal surgeries	*Group*			
	I	*II*	*Total*	*p value*
Yes	15	13	28	0.83
	15.0%	13.0%	14.0%	
No	85	87	172	
	85.0%	87.0%	86.0%	
Total	100	100	200	
	100.0%	100.0%	100.0%	

Table 7: Mean comparison of time to hear first bowel sound, first flatus, and defecation

Variables	*Group*	*N*	*Mean*	*SD*	*p value*
Time to hear first bowel sounds (hours)	I	100	10.76	0.34	<0.01
	II	100	18.01	0.43	
Time of first flatus (hours)	I	100	16.54	0.46	<0.01
	II	100	25.87	0.33	
Time to defecation (hours)	I	100	26.11	1.09	<0.01
	II	100	36.89	0.89	

Table 8: Mean time for feeling hunger and time for the first diet

Variables	*Group*	*N*	*Mean*	*SD*	*p value*
Time of feeling hunger (hours)	I	100	7.01	0.51	<0.01
	II	100	11.68	0.64	
Time to first diet (hours)	I	100	28.76	2.01	<0.01
	II	100	38.90	3.21	

Table 9: A comparison of mean IV fluids' requirement among study groups

Variables	*Group*	*N*	*Mean*	*SD*	*p value*
IV Fluids (500 mL)	I	100	4.17	1.12	<0.01
	II	100	7.01	2.13	

Table 10: A comparison of mean hospital stay among study groups

Variables	*Group*	*N*	*Mean*	*SD*	*p value*
Hospital stay (days)	I	100	4.04	1.12	0.44
	II	100	4.89	1.78	

Meantime to hear first bowel sound (10.76 vs 18.01 hours), time for first flatus (16.54 vs 25.87 hours), and time for defecation (26.11 vs 36.89 hours) were significantly less in the chewing gum group with respect to controls ($p < 0.05$).

Meantime of feeling hunger (7.01 vs 11.68 hours) and time for first diet (28.76 vs 38.9 hours) were significantly lower in the chewing gum group with respect to controls ($p < 0.05$).

Mean IV fluids administered were significantly lower in the chewing gum group with respect to controls (4.17 vs 7.01 pints; $p < 0.01$).

Most of the patients were discharged on 4th or 5th day post-cesarean section. Mean hospital stay was comparable between the chewing gum and control groups (4.04 days vs 4.89 days; p 0.44).

Discussion

Postoperative malfunctioning of the gastrointestinal tract is associated with high morbidity and regarded as a significant factor in determining the hospital stay of the patient. Multiple factors can cause a postoperative malfunctioning of the gastrointestinal tract (e.g. response to stress, interventions applied during operation, manipulation of the bowel, adhesions in case of repeat C-sections, and duration of surgery).

Oral feeding is customarily allowed for cesarean-section patients after confirming the initiation of gut sounds. Several studies have reported that oral feeding prior to gut motility may lead to an increase in the tissue injury, delayed wound healing, and high rates of postoperative infection. It has been observed that bowel motility and function are enhanced by gum chewing.[10–13]

The present study was aimed to investigate the effect of gum chewing on the postoperative bowel motility in women undergoing a cesarean section. A total of 200 women delivered by a lower segment cesarean section at our hospital fulfilling eligibility criteria were included in the study. These cases were randomly divided into one of the following two groups (100 each) using computer-generated random numbers. Group I—chewing gum group (study group), and group II—control group. The results are discussed in the upcoming paragraphs.

Demography

Mean age of group I was 27.13 years while in group II it was 26.42 years with no difference between the study groups (p 0.54). Both the groups were comparable with respect to obstetric history, ANC registration, and gestation age.

Intestinal Motility

In the present study, the mean time to hear first bowel sound (10.76 vs 18.01 hours), time for first flatus (16.54 vs 25.87 hours), and time for defecation (26.11 vs 36.89 hours) were significantly less in the chewing gum group with respect to controls ($p < 0.05$). The mean time of feeling hunger (7.01 vs 11.68 hours) and time for the first diet (28.76 vs 38.9 hours) was also significantly lower in the chewing gum group with respect to controls ($p < 0.05$).

Similar findings were also noted by various other authors.[1–16] In their study observed that mean postoperative time interval to first hearing of normal intestinal sounds (10.9 ± 2.7 vs 15.6 ± 3.7 hours), passage of flatus (17.9 ± 4.6 vs 24.4 ± 7.1 hours), defecation (21.1 ± 4.7 vs 30 ± 8.2 hours), and discharge from the hospital (40.8 ± 10.6 vs 50.5 ± 8.9 hours) were significantly shorter in the chewing gum group ($p < 0.001$). Ledari et al.[2] observed that the mean average postoperative interval of the first bowel sounds (21.9 vs 26.1 hours, $p < 0.01$), the first feeling of hunger (11.8 vs 14.5 hours, p 0.05), the first passage of flatus (24.8 vs 30.0 hours, p 0.0002), and the first defecation (30.6 vs 38.4 hours, $p = 0.001$) were significantly shorter in the chewing gum group when compared to the control group. Ajuzieogu et al.[3] observed that the mean time to first bowel sounds (21.9 ± 8.0 vs 26.1 ± 10.0), the mean time to first flatus (24.8 ± 6.4 vs 30.0 ± 10.0), and the mean time to defecation (30.7 ± 5.9

vs 40.0 ± 9.0) were significantly reduced in patients who chewed gum compared with controls. Wajid et al.[5] observed that the mean duration of the feeling of hunger was 11.38 ± 3.14 hours in the chewing gum group and 16.84 ± 0.49 hours in the control group. The mean duration of first bowel sound was 21.39 ± 0.68 hours in the chewing gum group and in the control group were 28.27 ± 0.60 hours. The mean duration for the first passage of flatus was 25.94 ± 0.71 hours in the chewing gum group and 32.00 ± 0.77 hours in the control group. The mean duration of the first defecation was 31.56 ± 0.81 hours in the chewing gum group and 41.28 ± 0.80 hours in the control group. Mansour et al.[10] in their study observed the following findings in chewing gum and control group: first time of hearing intestinal sound was 3.93 ± 1.02 vs 4.87 ± 1.96, $p = 0.008$, the first passage of gas was 6.54 ± 1.37 vs 7.65 ± 2.42, $p = 0.013$, the first hungry feeling was 7.63 ± 2.24 vs 8.83 ± 3.18, $p = 0.024$, the first defecation was 10.25 ± 2.15 vs 11.58 ± 1.96, $p = 0.031$, the first eat was 11.60 ± 2.03 vs 14.08 ± 3.58, $p = 0.000$, respectively. Deshpande et al.[14] observed a significant difference in the return of bowel movement (8.8 vs 17.5 hours), first feeling of hunger (7.2 vs 12.5 hours), first passage of flatus (17.5 vs 26.4 hours), and first defecation (27.1 vs 37.2 hours) respectively in the study (chewing gum) and control groups. Sajid et al.[15] in their study had following observations: In group I (chewing gum), the duration of passing first flatus was 7.39 ± 1.98 hours and in group II (control group), the duration was 12.80 ± 4.26 hours, the average duration to passing flatus was significantly lower in the chewing gum group when compared with controls (p value < 0.01). In group I (chewing gum), the duration of defecation was 10.93 ± 2.78 hours and in the group II (control), it was 18.82 ± 5.46 hours; the average duration to defecation was also significantly lower in the chewing gum group when compared with the controls (p value < 0.01). In group I (chewing gum), the duration to defecation was 10.93 ± 2.78 hours and in the group II (control) it was 18.82 ± 5.46 hours; the average duration to defecation was significantly lower in the chewing gum group when compared with controls (p value < 0.01).

Short et al.,[4] Zhu et al.,[6] Huang et al.,[8] Morais et al.[9] and Ciarduli et al.[12] in their respective reviews also observed that gum chewing is associated with early recovery of bowel motility in women after a cesarean section.

Hospital Stay

Most of the patients were discharged on the 4th or 5th day post-cesarean section. Mean hospital stay in the present study was comparable between chewing gum and control group (4.04 days vs 4.89 days; p 0.44).

Similar to the present study, Esfehani et al.[16] in their study also observed no difference in the duration of hospital stay between study groups. Huang et al.[8] in a systemic review observed that length of hospital stay (SMD: 0.59; 95% CI: 1.18–0.00; $p > 0.05$; I^2: 93%) was reduced in the chewing gum group; however, these results were not statistically significant. However, Maeboud et al.[1] in their study observed that mean days for discharge from the hospital (40.8 ± 10.6 vs 50.5 ± 8.9 hours) were significantly shorter in the chewing gum group ($p < 0.01$). Short et al.,[4] Zhu et al.,[6] Morais et al.,[9] and Ciarduli et al.[12] in their respective reviews also observed that gum chewing is associated with a decreased length of hospital stay (LOHS).

Thus, to summarize, our study depicted that gum chewing is very beneficial and effective in the early return of bowel motility and quick recovery after cesarean section. Gum chewing after CS is safe, well-tolerated, and associated with rapid resumption of intestinal motility and a shorter hospital stay, with a potential impact on reducing the overall healthcare costs in the case of routine implementation. Hence, the routine use of chewing gum is strongly recommended after a cesarean section.

Conclusion

The conclusion has been drawn on the basis of the results and observations of the present study indicating the effectiveness of gum chewing on the peristaltic activity after a primary lower segment cesarean section. It is an acceptable and inexpensive method for decreasing the time of regaining bowel movements and earlier passage of flatus and stool. It is found to be effective in reducing the use of intravenous fluids in the immediate postoperative period in a cesarean patient. In short, the chewing gum method is a simple, acceptable, well-tolerated, and cost-effective way to promote bowel movements in patients who have undergone a cesarean section.

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