Original Article

Effect of gum chewing on post-operative bowl mobility after cesarian section

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ABSTRACT:

Introduction: The possible methods to accelerate the return of early recovery of intestinal function after cesarean section include early oral hydration, mobilization and gum chewing.[6-8] Gum chewing stimulates nerves in the digestive system, causing release of gastrointestinal hormones and increasing the production of saliva and secretions from the pancreas. It also enhances the bowel motility by stimulating vago-vagal reflex, intestinal myoelectric activity and activating release of gastrointestinal hormones that increase the secretion of saliva and pancreatic juice. This response leads to both humeral and nervous stimulation of bowel MotilityRecovery of intestinal function after cesarean delivery is a challenge. Gum chewing stimulates nerves in digestive system. It also enhances bowel motility by stimulating vago-vagal reflex, intestinal myoelectric activity increasing secretion of saliva and pancreatic juice. The study aim was to determine efficacy of gum chewing for early recovery of intestinal function after cesarean delivery. **Methods**: This was a randomized controlled trial done in the Department of Obstetrics and Gynaecology, PIMS Hospital, Islamabad in six months from 28th November 2019 to 27th May 2020. A total of 100 women undergoing elective cesarean section were selected. Interventional Group was provided with sugar coated chewing gums 15 minutes every 2 hourly after surgery while in the control group no chewing gum was given. Study outcome was intestinal sounds (on auscultation), first passage of flatus, first feeling of hunger and the first defecation. **Results**: Mean age was 29.59 ± 4.26 in intervention and 29.41 ± 4.21 years in control group. The mean first bowl sound in group A (gum chewing) was 20.50 ± 2.45 hours whereas in group B (control) 26.98 ± 2.07 hours (p-value <0.001). The mean first passage of flatus was 18.45 ± 2.14 in group A and 25.70 ± 2.75 hours in group B (p-value, <0.001). The mean first Feeling of hunger was 10.32 ± 1.73 in group A and 16.13 ± 2.65 hours in group B (p-value <0.001). The mean first defecation was 27.36 ± 2.56 in group A while 41.08 ± 2.94 hours in group B (p-value, <0.001). **Conclusion**: The patients taking chewing gum after cesarean section have early postop intestinal functional recovery compared with those not taking chewing gum. **Keywords**: Cesarean section, gum chewing, passage of first flatus.

INTRODUCTION

Cesarean section has become the most common operative obstetrics intervention worldwide.[1] The number of cesarean sections performed each year is increasing at a dramatic rate. The prevalence of Cesarean section in Pakistan was reported to be 31.26% in 2015.[2] Postoperative care of women with c-section demands special attention. One key association of cesarean section is decrease in the bowel movements which leads to distention, abdominal pain and delayed hospital discharge.[3] This also leads to inability to maternal oral intake and infant breast feeding and results in healthcare cost. Withholding oral feeding following cesarean section is one of the traditional practices until resumption of regular bowel movement and is characterized by the presence of certain indicators such as bowel sound, passage of first flatus or stool, and feeling of hunger.[4] It leads to Postoperative ileus[3] which results in longer hospital stay, increased postoperative morbidity and excessive medical cost.[5]

In addition to these complications, mothers are not able to initiate breastfeeding and ultimately late recovery[6]. Promoting intestinal function recovery after caesarean section is on the top of research agenda of healthcare providers.[5] Traditionally postoperative feeding following cesarean section involve consumption of 2-3 liters of intravenous fluids in the first 12-24 hours and oral intake is usually allowed after 6 hours in the absence of nausea and presence of detectable bowel activity.

The possible methods to accelerate the return of early recovery of intestinal function after cesarean section include early oral hydration, mobilization and gum chewing.[6-8] Gum chewing stimulates nerves in the digestive system, causing release of gastrointestinal hormones and increasing the production of saliva and secretions from the pancreas. It also enhances the bowel motility by stimulating vago-vagal reflex, intestinal myoelectric activity and activating release of gastrointestinal hormones that increase the secretion of saliva and pancreatic juice. This response leads to both humeral and nervous stimulation of bowel Motility.[9, 10]

One study evaluating the effect of chewing gum reported that the first bowl sound (hours) in gum chewing was 21.9±7.8 hours compared to 26.1±9.5 hours in controls. The first defecation (hours) in chewing gum group was 30.7±5.9 hours whereas in the control it was 38.4±8.9 hours. A recent study compared the effect of gum chewing, early oral hydration, and early mobilization on intestinal motility after cesarean birth, and concluded that all of the three interventions increased intestinal motility, and should be recommended for preventing postoperative ileus and shortening hospital stay.[11] Using chewing-gum is one of the non-pharmacological interventions and is an inexpensive approach that can be used to stimulate the stomach motility. Limited data is available on this topic locally. The current study was planned to contribute knowledge in understanding the rate of gum chewing for improvement in gastrointestinal function after Cesarean section. The study aim was to determine the efficacy of gum chewing for early recovery of intestinal function after cesarean delivery.

METHODOLOGY

This randomized placebo controlled trial was conducted at the department of Gynecology/Obstetrics, MCH UNIT-I, Pakistan Institute of Medical Sciences (PIMS), Islamabad for six months from November 2019 to May 2020. Ethical clearance was taken from hospital ethics committee. Patients were selected after written informed consent.

Efficacy was defined as time from surgery to recovery of intestinal function and recovery of intestinal function was taken as passage of flatus and presence of regular bowel sounds on auscultation. Sample size was determined using confidence level of 95%, study Power of 80%, and taking anticipated average time of 1st feeling of hunger in general group as 11.8 hours while anticipated average time of 1st feeling of hunger in non-general group as 14.75 hours and population standard deviation of 6.9 hours. The study sample size came out to be 105 patients in each group.

The inclusion criteria was based on singleton pregnancy, caesarian under spinal or epidural except for previous caesarian section. Women having multiple pregnancies, abnormal placenta, diabetes mellitus, hypothyroidism, previous history of bowel injury / peritonitis or pancreatitis, operation time >2 hours, inability to chew, and intraoperative bowl injury were excluded from the study.

Women were assigned to one of two groups using lottery method. Patients underwent cesarean section in spinal anesthesia as per ward protocol. After delivery, patients were divided into two groups. Interventional group was provided with sugar coated chewing gums for 15 minutes every 2 hour after surgery. The time to intestinal sounds, first passage of flatus, first feeling of hunger and the first defecation was recorded.

The data was analyzed using SPSS version 20. Quantitative variables like age, parity, gestational age were measured as mean and standard deviation. The outcome of chewing gum were measured as mean ± standard deviation for time to first flatus, time to defecation, time of feeling hunger and time of bowel sounds. Student's t-test was applied to compare the outcomes between two groups.

RESULTS

Age range in this study was from 18 to 40 with an overall mean of 29.48 ± 4.25 years. The mean age of patients in interventional group was 29.59 ± 4.26 years and in control group it was 29.41 ± 4.21 years. Mean parity was 3.57 ± 0.68 in group A and 3.73 ± 0.69 in group B. (Table 1)

The first bowl sound (hours) in group A (gum chewing) was 20.50 ± 2.45 whereas in group B (control) it was 26.98 ± 2.07 and this difference in two means was statistically significant (p-value, <0.001). The first passage of flatus was 18.45 ± 2.14 hours in group A and 25.70 ± 2.75 hours in group B (p-value, <0.001). The first feeling of hunger came after 10.32 ± 1.73 hours in group A while after 16.13 ± 2.65 hours in group B (p-value, <0.001). The mean time to first defecation was 27.36 ± 2.56 hours in group A and 41.08 ± 2.94 hours in group B (p-value, 0.0001). (Table 2)

The outcome in terms of time for first flatus, defecation, first hunger and bowel sound was stratified with respect to patient's age categories. The effect of the intervention was found significant according to the age of patients as well (p-value, <0.001). (Table 3)

Table-1: Age distribution for both groups

	Interventional group (n=105)	**Control group (n=105)**	**Total (n=210)**
Age (years)			
18-30	57 (54.2%)	61 (58.1%)	118 (56.1%)
31-40	48 (45.7%)	44 (41.9%)	92 (43.8%)
Mean ± SD	29.59 ± 4.26	29.41 ± 4.21	29.48 ± 4.25
Parity			
Mean ± SD	3.57 ± 0.68	3.73 ± 0.69	3.66 ± 0.57

Table-2: Efficacy of gum chewing for early recovery of intestinal function after Cesarean delivery

	Interventional group (n=105)	**Control group (n=105)**	**p-value**
	Mean ± SD	**Mean ± SD**	
Time for first flatus (hrs)	18.45 ± 2.14	25.70 ± 2.75	<0.001
Time of defecation (hrs)	27.36 ± 2.56	41.08 ± 2.94	<0.001
Time of feeling hunger (hrs)	10.32 ± 1.73	16.13 ± 2.65	<0.001
Time of bowel sound (hrs)	20.50 ± 2.45	26.98 ± 2.07	<0.001

Table 3: Stratification of time for first flatus with respect to age group

Age of patient (years)	**Interventional group (n=105)**	**Control group (n=105)**	**p-value**
	Mean ±SD	**Mean ±SD**	
Time for first flatus (hrs)			
18-30 years	18.0 ± 2.42	25.47 ± 2.50	<0.001
31-40 years	18.98 ± 1.6	26.02 ± 3.0	<0.001
Time for defecation (hrs)			
18-30 years	27.25 ± 2.45	41.74 ± 1.99	<0.001
31-40 years	27.50 ± 2.70	40.16 ± 3.73	<0.001

Time of feeling hunger (hrs)			
18-30 years	9.35±1.40	16.89±2.86	<0.001
31-40 years	11.48±1.34	15.23±2.03	<0.001
Time of bowel sound (hrs)			
18-30 years	20.21±2.78	26.89±1.90	<0.001
31-40 years	20.85±1.96	27.11±2.30	<0.001

DISCUSSION

With the development of advanced medical care and policy support, the rate of caesarean delivery has increased worldwide over the past decades.[12] However, it may lead to many complications such as postoperative ileus with an incidence rate of 10–15%[13]. Ileus leads to longer hospital stay, increased postoperative morbidity and excessive medical costs.[14] Post cesarean bowel movement and intestinal function is a frequent complication leading to excessive burden on hospitals and individuals. Promoting intestinal function recovery after caesarean section is on the top of research agenda of healthcare providers. This study aimed to assess role of gum chewing on early recovery of intestinal function. Gum chewing as a kind of sham feeding was introduced in hope that it may hasten the intestinal function recovery in recent years, by means of stimulating the cephalic vagal reflex, the hormones secretion may increase.[15]

This study found out that the mean first bowl sound (hours) in gum chewing group was 20.50 ± 2.45 whereas in the control group it was 26.98 ± 2.07 hours (p-value 0.0001). The average first passage of flatus (hours) was also significantly less in gum chewing group (p-value <0.001). According to study, the first passage of flatus (hours) 24.8±6.4 whereas in control 30.0±9.7 with P value 0.002. Comparatively, a meta-analysis showed that chewing gum after cesarean delivery can significantly shorten the time to first flatus [standardized mean difference (SMD) = -0.73; 95% confidence interval (CI) = -1.01 to -0.14; p < 0.001].[16] In another study, one hundred and eighty women booked for elective caesarean section were randomized into gum-chewing group (n = 90) or control group (n = 90). The mean time to first flatus was 24.8 ± 6.4 vs. 30.0 ± 10.0 hours.[17] In one study, in the gum-chewing and the control group there was a significant difference in the mean postoperative interval of the first bowel movement (20.89 ± 8.8 versus 27.93 ± 9.3 hours, P = 0.004).[18] In a local randomized controlled trial conducted on 100 females who were planned to undergo caesarean section, the mean duration between cesarean section and first bowel sound was 21.39 ± 0.68 hours in chewing gum group compared to 28.27 ± 0.60 hours in control group.[19] Nimarta et al, through a randomized trial observed that the mean time of return of bowel sounds after surgery was significantly lesser (21.4 ± 2.8 hr) in the experimental group than in the control group (23.7 ± 2.8 hr).[20]

In the present study, the first Feeling of hunger (hours) was 10.32 ± 1.73 hours whereas in control group it was 16.13 ± 2.65 hours (p-value, <0.001). One study witnessed the first Feeling of hunger (hours) was 11.8 ± 6.1 whereas in the controls it was 14.5 ± 7.7 hours (p-value, 0.050).[3] In another study, in the gum chewing and the control group there was a significant difference in the first feeling of hunger (10.37 ± 6.0 versus 16.33 ± 9.3 hours, p-value, 0.005).[18] Nimarta et al, through a randomized trial observed that mean time of return of appetite after surgery was significantly lesser (59.9 ± 9.8 hours) in experimental group than in the control group (67.2 ± 7.6 hr).[20] The first defecation (hours) was 27.36 ± 2.56 in experiment and 41.08 ± 2.94 hours in the controls (p-value, <0.001). A meta-analysis found that chewing gum after cesarean delivery can significantly shorten the time to the first defecation (SMD = -0.53; 95% CI = -1.61 to - 0.07; p = 0.07; I^2 = 92%).[16] Another study reported the first defecation was 31.17 ± 5.3 hours versus 40.08 ± 8.8 hours (p-value, <0.001) which were significantly shorter in the gum-chewing group compared to those of the control group.[18] In a local randomized controlled trial conducted on 100 females who were planned to undergo caesarean section, the mean duration between cesarean section and first defecation was 31.56 ± 0.81 hours in chewing gum group and 41.28 ± 0.80 hours in the control.[19]

One meta-analysis including 12 RCTs focused on chewing gum and postoperative ileus in adults, found that chewing gum provided small benefit in reducing time to flatus, and time to bowel motion, but not in the length of stay or the incidence of complications, it's noteworthy that these studies included patients receiving either colorectal surgery or cesarean sections, in which lots of heterogeneities might exist.[21] Another meta-analysis showed that chewing gum could promote the early recovery of gastrointestinal function after cesarean section, but the start time and frequency of chewing gum were different.[22] These abundance of evidence are in support of chewing gum after cesarean section for early recovery of bowel function. This study has many advantages in terms of facilitation in reducing postoperative ileus in cesarean patients. Moreover, the intervention has programmatic implications in terms of lesser hospital stay, thus, lesser costs for the patient and healthcare system. There were few limitations of the study as well which were related to sample size achievement as the study was conducted during the COVID-19 pandemic and presentation of overall patients was slow, however, the acute conditions were dealt with cesarean sections which led to accomplishment of study. Overall the study benefits outweigh the limitations.

CONCLUSION:

The patients taking chewing gum after cesarean section have early postop intestinal functional recovery compared with those not taking chewing gum. So, it is recommended that post-operative gum chewing should be advised in every woman undergoing cesarean section in order to enhance postoperative recovery, early mobility, short hospital stay, early patient discharge, less chances of deep venous thrombosis. Thus, less hospital burden and more beds will be available for patients.

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