

Effect of Chewing Gum on Recovery of Intestinal Function after Caesarean Section

Shubhra Singh¹, Radha Agarwal², Priyamvada Singh³, Ajay Singh Kalyanwat⁴

¹Senior Resident, Department of Obstetrics & Gynaecology, S.M.S. Medical College, Jaipur, Rajasthan

²Consultant, Department of Obstetrics & Gynaecology, BIMR, Gwalior, M.P.

³3rd Year PG Resident, Department of Pathology, Chirayu Medical College and Hospital, Bhopal, M.P.

⁴Associate Professor, Department of General Surgery, R.U.H.S. College of Medical Sciences, Jaipur, Rajasthan

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Corresponding author: Dr Ajay Singh Kalyanwat

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Abstract

Background: Chewing gum may act as non-pharmacological inexpensive measure to help in early postoperative recovery by increasing gut motility and preventing post-operative ileus.

Aims: The present study was conducted to find out the role of chewing gum on the recovery of bowel function post caesarean section.

Settings and Design: It was a Randomized Controlled Trial conducted in Obstetrics and Gynaecology department in a tertiary care hospital.

Methods and Materials: 82 post elective caesarean patients were enrolled including 41 cases and 41 controls. Cases were asked to chew chewing-gum after surgery along with standard routine post-operative care and controls were given only standard postoperative care. Both groups were examined to detect the time of first bowel sound, first passing flatus, first time of feeling hunger, time of first defecation and time of first eating.

Statistical Analysis: Data was compiled into Microsoft Office Excel version 2013 and descriptive statistical analysis was carried out. Qualitative variables and quantitative data were compared using (χ^2) test and (t) test respectively. Statistical significance was considered at p-value ≤ 0.05 .

Results: Highly significant difference ($p < 0.0001$) was seen in time of hearing of first bowel sound and first passage of flatus, significant difference ($p = 0.022$) was seen for first feeling of hunger and first eating and no significant difference ($p = 0.06$) was seen for first defecation among two groups.

Conclusion: Chewing gum in patients of CS is well tolerable, feasible and cost effective intervention that positively influences the recovery of bowel function and hence reduces hospital stay and overall cost.

Keywords: Caesarean, Chewing Gum, Post-Operative Ileus, Bowel Motility, Intestinal Recovery.

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Introduction

Approximately 10% pregnancies require Caesarean section (CS) [1]. CS is associated with higher chances of complications as compared to normal vaginal delivery [2]. Post-operative ileus (PI) is commonly associated with CS (10-15%) [3]. It is characterized by transitory stopping of regular bowel movements resulting in longer hospital stay, delayed breastfeeding and excessive cost. It takes 12-14 hours for stomach & small intestine to regain peristalsis after laparotomy and the colon takes 48-72 hours to regain its motility [4]. Practices such as postoperative early standing up, gum chewing and early liquid intake are seen to be used popularly in the recent times [5]. Gum chewing can be used as a low cost non-pharmacological agent which stimulates gut motility and enhances early regaining of intestinal peristalsis movement [6]. It acts as "sham feeding" which releases gastrointestinal hormones [7].

It is elucidated that gum chewing enhances gut motility after colorectal surgery [3] but not yet after CS. In most studies, chewing gum has been found beneficial in the resumption of bowel function [8], whereas Quah *et al.*, [9] had contradictory findings to the beneficial effect of chewing gum on early recovery of intestinal function. The present study was conducted to evaluate efficacy of chewing gum on recovery of intestinal function after CS.

Materials and Methods

It was an experimental Randomized Controlled Trial that was conducted in the department of Obstetrics and Gynaecology in a Medical college hospital after approval from the Institutional Ethics committee till the recruitment of patients of desired sample size for a period of 3 months. It included

pregnant women delivered by elective CS who were willing to be the part of study.

The formula for calculating the sample size of women was.

$$n = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 (S_1^2 + S_2^2)}{(\delta)^2}$$

Where $\delta = \mu_1 - \mu_2$

The average time assuming for first passage of flatus among the chewing gum group is 25.02 ± 5.8 hours and 31.08 ± 9.7 hours among control group as taken from previous study [8]. Using above formula, alpha error 5% with significance level 95% and beta error 10% (power of study 90%), $(1.96 + 1.282)^2 [(5.8)^2 + (9.7)^2] / (31.08 - 25.02)^2$, sample size was 37, which came out to be 41 in each group including 10% for drop outs. Therefore, total 82 pregnant female were recruited in this study as per selection criteria.

All the data collected was kept strictly confidential and used for the purpose of the study only. Written informed consent was taken. All pregnant women who had multifetal pregnancies, polyhydramnios, abnormal placenta, medical disorders, muscular and neurological disorders, past history of laparotomy for any bowel pathology or any other intra-abdominal inflammatory conditions like pancreatitis except CS, prolonged rupture of membranes, electrolyte imbalance, unable to chew gum, patient succumb to any intra-operative or post-operative complications and whose CS duration was more than 60 minutes were excluded.

All selected pregnant women as per selection criteria who delivered by elective CS were enlisted and randomised into case and control groups using computer generated random numbers. Patients in the case group chewed one stick of chewing

gum for 30 min four times a day at 6 hourly intervals without swallowing, starting from six hours after surgery until regaining of intestinal function along with standard post-operative care and patients in the control group received only standard post-operative care. Commercially available chewing gum of same brand was used for all cases in this study. Each patient included in the study was examined for bowel sound with the help of stethoscope every hour and was asked to record and inform the time of passing first flatus, time of first feeling hunger, first time of defecation and first time of eating.

The data was collected in a predefined structured case record form, which included general characteristics of women such as

age, educational level, occupation, obstetric history & gestational age. All parameters were noted down in a CS assessment sheet, which included time of birth, duration of surgery, time of giving successive chewing gum and parameters such as the time of first passage of flatus, time of first intestinal sound, time of first feeling of hunger, time of first defecation and the time of first eating after caesarean section.

Data was compiled into Microsoft Office Excel version 2013 and a descriptive statistical analysis was carried out. (χ^2) test were used for comparing Qualitative variables and quantitative data were analysed with (t) test. P-value ≤ 0.05 was considered as statistically significance.

Table 1: Comparing various parameters in cases and controls.

Events	Case (41)	Control (41)	Mean difference	P value (Unpaired t test)
Time of hearing of first intestinal sound (in hours)	9.54±0.99	16.13±2.008	- 6.590	< 0.0001 (highly significant)
Time of first passage of flatus (in hours)	17.17±2.64	24.99±2.60	-7.8200	<0.0001 (highly significant)
Time of first feeling of hunger (in hours)	17.02±2.05	18.47±2.62	-1.2100	0.022 (Significant)
Time of first defecation (in hours)	35.89±3.92	38.19±6.83	--2.3000	0.06 (Non- significant)
Time of first eating (in hours)	19.96±3.90	22.02±3.57	-2.0600	0.01 (Significant)

Significant difference ($p < 0.0001$) was seen in the time of hearing of first intestinal sound among the two groups, with the average duration of time required being 9.54±0.99 hrs and 16.13±2.008 hrs in case and control group respectively. Significant difference ($p < 0.0001$) was seen in the time for passage of first flatus among the two groups, with the average duration of time required being 17.17±2.64 hrs in case group and 24.99±2.60 hrs in control group. A significant difference ($p = 0.022$) was seen in the time for first feeling of hunger in hours among the two groups, with the average duration of time required in case group

being 17.02±2.05 hrs and in control group being 18.47±2.62 hrs. There was no significant difference ($p = 0.06$) in the time for first defecation in hours among the two groups, with the average duration of time required in case group being 35.89±3.92 hrs and in control group being 38.19±6.83 hrs. Significant difference ($p = 0.01$) was seen in the time of first eating among the two groups, with the average duration of time required in case and control group being 19.96±3.90 hrs and 22.02±3.57 hrs respectively.

Ethics: Ethical clearance was obtained from Institutional Ethics Committee and Obstetrics and Gynaecology department till the recruitment of patients of desired sample size for a period of 3 months.

Results

Among the total of 82 participants, cases and controls were equally divided in 1:1 ratio, with 41 participants in each group. The overall average age of study participants was 25.69 years with average age 26 ± 3.67 years and 25.39 ± 4.37 years in case and control group respectively and there was no significant difference ($p=0.49$) in the average age of both groups.

53.65 % participants in case group and 60.97% participants in control group underwent CS which lasted for ≤ 40 mins. There was no significant difference ($p=0.65$) in the duration of surgery among the groups.

In study group, 52.43 % participants had CS done for first time where as 47.56 % had repeat CS done . The relative distribution showed repeat CS in 51.25% in case group and 43.90 % in control group and primary CS in 48.78 % in case group and 56.09 % in control group. Significant difference ($p=0.65$) was not seen in the relative distribution of primary and repeat CS among both the groups.

46.34% participants in case group and 53.65% participants in control group were primipara whereas 53.65% in cases group and 46.34% in control group were multipara. No significant difference was seen in the relative distribution of primi and multi para among both groups.

Discussion

Postoperative discomfort in the form of abdominal distension, nausea and vomiting is commonly associated with any abdominal surgery whether involving intestine or not, because of the postoperative ileus with a mean incidence of 10-15% [3] In India the

prevalence of Caesarean section is around 18% in urban India and 5% in rural India [10].

No significant difference ($p < 0.05$) was seen in case and control groups in average age, occupation, education level, duration of surgery, distribution of parity and the relative distribution of primary and repeat caesarean section. Similar finding was reported by Mansour *et al* [7], where no significant difference were seen in the general characteristics variables like educational level, age group, and socioeconomic status.

Ledari, [8] in his study in patient of C.S. in Iran found that sugarless gum chewing reduces the postoperative ileus. Also the confounders like age, BMI, gravida status, number of miscarriages and type of caesarean section etc were taken care by randomisation of patients and no significant difference was found between sugarless gum chewing group and control group. In this study, the author found that the patients in the chewing gum group had early hearing of bowel sound, early passing of first flatus and early feeling of hunger which was statistically significant but the time of first defecation was not significant ($p=0.06$) in both the group. Abd-El-Maeboud *et al* [11] and Safdari *et al* [12] also showed the same results in their studies.

Similar studies conducted by Kafali H [13] and Shang H [14] also reported early appearance of bowel sounds in a significantly shorter duration of time. This finding powers the physiological action of gum chewing to enhance intestinal function by release of gastrointestinal hormones that increases the secretion of saliva and pancreatic juice, leading to both humoral and nervous stimulation of bowel motility, which results in early return of bowel sounds, passage of flatus and return of appetite.

Zhu *et al* [15], in their study found that patient who chewed gum had significantly early recovery of the intestinal function, including concerned parameters showing recovery of bowel function and also the stay in hospital, as compared to patients who did not chew gum.

A meta-analysis study was conducted by Huang & He [16] in China to find out the effect of chewing-gum on recovery of intestinal function after CS. They reported that gum chewing had statistically significant effect on early recovery of intestinal function in form of time of passing first flatus and the time of first hearing of intestinal sounds.

Ajuzieogu OV [17] in his study conducted in Nigeria reported similar findings that the time of first peristaltic sounds (21.9 ± 8.0 vs. 26.1 ± 10.0), time of passing first flatus (24.8 ± 6.4 vs. 30.0 ± 10.0) and time of first defecation (30.7 ± 5.9 vs. 40.0 ± 9.0) were significantly shortened in gum chewing group compared with controls.

Jakkaew & Charoenkwan [18] conducted study about the effect of gum chewing on early return of bowel function in Thailand, and found no significant difference due to the effect of gum chewing in early recovery of intestinal function after CS. Although they showed shorter median time in chewing gum group but it was not statistically significant. Similar results were also supported by other studies done by Herma *et al* [19] and Akhlaghi *et al.*, [20]

The exact mechanism of chewing gum on early recovery bowel function is not known but some suggest that it acts like sham feeding and chewing causes more cephalic-vagal stimulation to GI motility. It was also suggested that after spinal anaesthesia, cephalic-vagal stimulation becomes less effective. However, there is no report about the possible effects of the ingredients of these gums [8].

Conclusion

Our study concludes that gum-chewing after CS is a well-tolerated, safe and inexpensive intervention that enhances bowel motility and thus improves early recovery of the patient and also reduces hospital stay and cost. This study recommends exploring more the effects of gum chewing on early recovery of bowel function and other abdominal surgeries.

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