

A RANDOMIZED INTERVENTIONAL STUDY ON EFFECT OF CHEWING GUM ON RECOVERY OF GASTROINTESTINAL FUNCTIONS IN POSTOPERATIVE PATIENTS FOLLOWING ABDOMINAL SURGERIES IN THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, SMS MEDICAL COLLEGE, JAIPUR

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Abstract

Background: Post-operative gastrointestinal dysfunction is one of the complications following abdominal surgery which results in delayed return of bowel motility. It causes discomfort, prolonged hospital stay; hospital acquired infection and enhanced treatment cost. This study was conducted with an aim to analyze the clinical outcome of effect of chewing gum mainly to avoid post-operative gastrointestinal dysfunction and to compare the different gastrointestinal variables between cases and control group.

Methods: In this study 80 patients were included, 40 Cases and 40. The cases were given chewing gum for duration of 15 minutes at 2nd, 4th and 6th hour of surgery. Bowel sound was auscultated at 3rd, 5th and 7th hour of surgery and outcomes were compared with control group. Control group were given only standard post-operative care.

Results: Among cases Mean duration of 1st bowel sound appeared was 9.23±2.2 hours while among control group was 15.99±3.48 hours and with operating time <1 hour is 5.1 ± 1.04 hours in cases and 6.2 ± .66 hours in control group while with operating time >1 hour it was 5.2 ± 1.03 hours cases and 6.3 ± 0.7 hours in control group. Mean duration of 1st flatus passed among cases was 13.3±2.24 hours while among control group was 26.62 ±2.6 hours and with operating time <1 hour was 13.8 ± 1.03 hours in cases and 16.25 ± 1.5 hours in control group, while it was 13.12 ± 1.96 hours in cases and 17.12 ± 1.5 hours in control group with operating time >1 hour. Mean duration of 1st motion passed among cases was 31.33±2.24 hours and was 44.62± 2.6 hours in control group and it was 48.8 ± 1.2 hours in cases and 50.7 ± 1.27 hours in control group with operating time <1 hour, while it was 48.8 ± 1.2 hours in cases and 51.1 ± 1.46 hours in control group with operating time >1 hour. Result was statistically significant P value (0.001).

Introduction

Gastrointestinal tract dysfunction is the most common complication that occur after abdominal surgeries and associated with higher risk of post-operative paralytic ileus (POI)^{1,2,3}. POI refers to severe constipation and intolerance of oral intake resulting from a non-mechanical insult that disrupts the normal coordinated propulsive motor activity of the gastrointestinal tract, it is an iatrogenic condition that occurs following abdominal surgery especially in the presence of factors like prolonged operative time, excessive bowel manipulation, immobilization, emergency procedures. This is due to malfunction of intestinal motility that results from a transient non-mechanical insult that disrupts the normal coordinated propulsive motor activity of the gastrointestinal tract^{1,2,3}.

Early initiation of intestinal motility after abdominal surgery is highlighted in the “Enhanced Recovery After Surgery” ERAS Protocol, also known as the multidisciplinary approach²⁰⁻²¹. In this protocol, particular attention has been given to early feeding regimes i.e., Sham Feeding regimes which is being investigated as

a means to stimulate bowel motility and confer an advantage while actually minimising harm caused by early oral feeding especially in patients who do not tolerate the same. Sham feeding is the concept where the patient sees the food, smells food but is not given food to swallow e.g., Chewing Gum. In our study we have used sugar free chewing gum to study its effect on peristalsis. The sugar substitutes in the sugar free gum (e.g., sorbitol and xylitol) may stimulate bowel function and have a non-stimulant laxative effect. stimulates the digestive cephalic phase by imitating eating and is considered a Virtual Diet³⁻⁵. The pathophysiological mechanism for the enhanced recovery bowel motility is due to activation of the cephalic-vagal pathway which is stimulating intestinal myoelectric activity in an attempt to counteract activation of the gastrointestinal μ opioid receptors. This response leads to both humoral and nervous stimulation of bowel motility²⁵. Chewing gum use post-operatively, has been associated with various improved outcomes, including early passage of flatus, early bowel sounds and shorter lengths of hospitalization. Given this, gum chewing might be a safe

and inexpensive way to provide the benefits of early stimulation of gastrointestinal tract. Hence early return of bowel gut motility leads to early starting of oral feeding, early breast feeding following caesarean section, early ambulation and early discharge from the hospital and decreases overall cost of hospitalization. Thus, the present Randomized interventional study is aimed at assessing the effect of chewing gum on recovery of gastrointestinal tract function after abdominal surgery.⁶

Material and Methods

- **StudyDesign:**
Randomized Controlled Study
- **StudyType:**
Interventional Study
- **Place of Study:** Department Of Obstetrics And Gynecology, Sms Medical College And Hospital, Jaipur.
- **Study Period:** March 2020 Onwards Till Desired Sample Size Is Reached Or One Year Whichever Is Earlier Plus Two Months For Data Analysis And Compilation Of Thesis.

Inclusion Criteria:

- Age ≥ 18 years to < 60 years.
- Underwent abdominal surgeries both obstetrics and gynecology (elective and emergency)

- Underwent Surgery under Spinal & General anesthesia
- Willing to participate, giving Written and Informed consent.

Exclusion Criteria:

- H/O of tooth or jaw surgery, which would affect the chewing movement
- H/o GI disorder or any previous GI surgery
- H/o Medical (Muscular and neurological) disorders
- Smoker or H/o drug addiction.
- Fluid and electrolyte imbalance.
- Those postoperative patients who need long-term fasting or total parenteral nutrition.
- Those patients who are participating in any other study.

Results

The present Randomized interventional study is done in the Department of Obstetrics and Gynecology, SMS Medical College and Hospital, Jaipur with the aim of assessing the effect of chewing gum on recovery of gastrointestinal tract function after abdominal surgery, 40 patients are given Chewing gum after operation are grouped as Cases and 40 patients who are not given Chewing Gum are Grouped as Controls and obtained following results.

Table 1: Socio-demographic profile

	Case	Control	P-value
Age	31.17 \pm 7.21 years	30.82 \pm 7.74 years	0.785
BMI	24.53 \pm 4.24 Kg/m ²	23.93 \pm 4.24 Kg/m ²	0.362

The both groups were comparable

Table 2: Mean Duration of return of Bowel activity in cases compared with Operating time

	1st Bowel sound		1st Flatus passed		1st Motion	
	<1 hr	>1hr	<1 hr	>1hr	<1 hr	>1hr
Cases	5.1+ 1.04	5.2 \pm 1.03	13.8+ 2.1	13.12+1.96	48.6+ 1.39	48.8+1.2
Controls	6.2 \pm 0.66	6.3 \pm 0.7	16.25 \pm 1.5	17.12 \pm 1.5	50.7 \pm 1.27	51.1 \pm 1.46.2
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Mean Duration of 1st Bowel sounds

- With operating time <1 hour

Mean duration of "1st Bowel sounds" in between case and control is 5.1+ 1.04, 6.2 \pm 0.66 respectively .

- With operating time >1 hour

Mean duration of "1st Bowel sounds" in between case and control group with operating time >1 hour is 5.2 \pm 1.03, 6.3 \pm 0.7 respectively.

A significant difference is found between mean duration of "1st Bowel sounds" in between case and control group with operating time <1 hour and >1 hour both. This is evident

from the T-Test performed, the p-value showed a significant (<0.05) result.

Mean duration of 1st Flatus passed

- With operating time <1 hour

Mean duration of "1st Flatus passed" in between case and control group is 13.8 \pm 1.03, 16.25 \pm 1.5 respectively

- With operating time >1 hour

Mean duration of "1st Flatus passed" in between case and control group is 13.12+1.96, 17.12 \pm 1.5 respectively.

A significant difference is found between mean duration of “1st Flatus passed” in between case and control group with operating time <1 hour and >1 hour both. This is evident from the T-Test performed, the p-value showed a significant (<0.05) result

Mean duration of 1st motion passed

- With operating time <1 one hour

Mean duration of “1st motion passed” in between case and control group is 48.8±1.2, 50.7±1.27 respectively

- With operating time >1 one hour

Mean duration of “1st motion passed” in between case and control group is 48.8±1.2, 51.1±1.46.2 respectively

A significant difference is found between mean duration of “1st motion passed” in between case and control group with operating time <1 hour and >1 hour both .This is evident from the T-Test performed, the p-value showed a significant (<0.05) result.

Table 3: Mean, median, minimum and maximum values of time of appearance of first Bowel sound in both groups

Time until first bowel sound appeared (hour)	Group	N	Mean	Std. Deviation	Std. Error Mean				
	Cases	40	9.23	2.22	.3517	9.15	4	17	P<0.01
	Controls	40	15.99	3.48	.5517	16.9	9	22	

Among 40 study subjects, time of appearance of 1st bowel sound after abdominal surgery is assessed in both the groups, mean time in cases group is 9.23±2.2 hours and 15.9±3.48 hours

Median time of appearance of 1st bowel sounds is 9.15 hrs in cases and 16.9hrs in controls, in cases minimum time is 4hrs and maximum time for appearance of 1st bowel sounds is 17 hrs, whereas in controls minimum time is 9 hrs and maximum time is 22 hrs, time taken for appearance of 1st bowel sounds is lesser in cases than controls and the difference is statistically significant (P<0.01).

Table 4: Mean, median, minimum and maximum values of time of 1st Flatus passed in both groups

	Group	N	Mean	Std. Deviation	Std. Error Mean				
Time until first flatus passed(hour)	Cases	40	13.33	2.24	0.35	13.35	8.8	18.7	P<0.01
	Controls	40	26.62	2.60	0.41	26.75	20	30.4	

Mean time of passage of 1st flatus in case group is 13.3±2.24 hrs and 26.62±2.6 hrs in controls group, median time is 13.35 hrs in cases and 26.75 hrs in controls, minimum and maximum time is respectively 8.8 hrs and 18.7 hrs in cases and 20 hrs and 30.4 hrs in controls, there is statistically significant difference between the groups (P<0.01)

Table 5: Mean, median, minimum and maximum values of time of 1st motion passed in both groups

	Group	N	Mean	Std. Deviation	Std. Error Mean				
Time until first Motion (Hour)	Cases	40	31.33	2.24	0.35	31.35	26.8	36.7	P<0.01
	Controls	40	44.62	2.6	0.41	44.75	38	48.4	

Mean time of passage of 1st motion in case group is 31.33±2.24 hrs and 44.62±2.6 hrs in controls group, median time is 31.35 hrs in cases and 44.75 hrs in controls, minimum and maximum time is respectively 26.8 hrs and 36.7 hrs in cases and 38 hrs and 48.4 hrs in controls, there is statistically significant difference between the groups (P<0.01)

Table 6: Distribution of Study Subjects according to their Complications

Group		Complications like vomiting, bloating			P Value
		Yes	No	Total	
Cases	n	3	37	40	χ ² =0.55 P=0.45
	Percentage	7.5%	92.5%	100.0%	
Controls	n	5	35	40	
	Percentage	12.5%	87.5%	100.0%	
Total	n	8	72	80	
	Percentage	10.0%	90.0%	100.0%	

Only 7.5% of cases and 12.5% of control group population had some minor complications like Vomiting, Bloating etc., even though complications are less in cases group, there is no significant difference between both the group (P=0.45)

Discussion

The important complication after abdominal surgery is post-operative ileus (colonic stasis), which results in patient discomfort, prolonged length of hospital stays, and increased cost of treatment. The exact mechanism that produces postoperative ileus is unknown, but possible origins include gastrointestinal inflammatory response, stimulation of the mesenteric plexus, anesthesia, and use of opioid analgesics.

In this study total 80 patients were studied, 40 were cases and 40 were controls. The cases were given chewing gum after surgery while controls were given only standard post-operative care.

Among cases the mean duration of first sound heard was 9.23 ± 2.2 hours and while among controls this was 15.9 ± 3.48 hours ($p < 0.01$) similar finding was observed in the study of Kouba et al⁸, where the mean duration among chewing gum users was significantly reduced from 3.9 to 3.2 days in cases⁸. The study conducted by Akalper O et al,⁹ also shows similar results to our study, mean time to hear 1st intestinal sounds after surgery in cases group is 12.6 ± 7.7 hours and 16.3 ± 5.2 hours in Control group with statistically significant difference between the groups.

In the present study mean time of passage of 1st flatus among case group is 13.3 ± 2.24 hrs and 26.62 ± 2.6 hrs in controls group, median time is 13.35 hrs in cases and 26.75 hrs in controls, minimum & maximum time is respectively 8.8 hrs and 18.7 hrs in cases and 20 hrs and 30.4 hrs in controls, there is statistically significant difference between the groups ($P < 0.01$). In the study conducted by Mutlag SA et al.¹⁰ showed that mean time of passage of 1st flatus in study group is 13 ± 1.4 hours and 27.5 ± 42 hours in controls group, the difference between the group is highly significant ($P < 0.001$). Similar findings in the study of Kouba et al where the time to flatus was shorter in patients who received gum compared with controls (2.4 versus 2.9 days; $P < 0.001$)⁸.

Mean duration of "1st motion passed" in between case and control group is 48.8 ± 1.2 , 50.7 ± 1.27 respectively. A significant difference is found between mean duration of "1st motion passed" in between case and control group. This is evident from the T-Test performed, the p-value showed a significant (< 0.05) result

Only 7.5% of cases and 12.5% of control group population had some minor complications like Vomiting, bloating etc., even though complications are less in cases group, there are very mild complications occurred in both the groups without any significant difference between both the group (P=0.45).

Conclusion

This study was conducted over 80 patients, 40 were cases who were given chewing gum chewing three times a day post operatively and 40 were controls who were not fed with chewing gum selected randomly. All patients were observed hourly for appearance of first bowel sound, First flatus passed, and first motion passed were analysed. It was found that chewing gum have significant effect over bowel motility as bowel sound appear significantly earlier in cases than control and time for first flatus passed and first bowel passed were also found significantly earlier in cases than controls with P Value (< 0.01). Given this, gum chewing might be a safe and inexpensive way to provide the benefits of early stimulation of gastrointestinal tract. Hence early return of bowel gut motility leads to early starting of oral feeding, early breast feeding following caesarean section, early ambulation and early discharge from the hospital and decreases overall cost of hospitalization. Thus, through the present study chewing gum can be established as a simple intervention for early return of GI motility & thus aid in decreasing the burden of paralytic ileus & hospital stay on the community.

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