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RESEARCH ARTICLE

CHEWING GUM IN REDUCING DURATION OF POST OPERATIVE ILEUS

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ABSTRACT

Post operative (PO) ileus is a frustrating problem for patients undergoing laparotomy. Chewing gum was tried in 25 patients undergoing laparotomy for peritonitis due to appendicular perforation/appendicular abscess. The mean duration from surgery to passing of first flatus and passing of first stools were studied. The chewing gum group showed significant reduction in passing first flatus by 18 hours $P < 0.002$ and 31.12hrs $P < 0.001$ between passing first flatus and stools. Surprisingly duration of surgery showed no effect on duration of PO Ileus. ($P < 0.051$)

INTRODUCTION

Postoperative ileus (POI) is a form of gastrointestinal dysfunction that commonly occurs in patients after abdominal surgery and results in absent or delayed gastrointestinal motility, food intolerance, gas retention, and pain. POI may last for four to five days and complicate the full and timely recovery of the patient. Literature suggests that the duration of POI is in part related to the degree of surgical trauma and is most severe following extensive surgeries. Other studies suggest there are multiple contributing causes of POI and to date no specific interventions have been discovered that prevent and successfully resolve POI. Although POI has been recognized as a post-operative phenomenon since 1899, little progress has been made towards its prevention and treatment during a century in which other significant advancements in surgical techniques and postoperative care were made (Agostini, Chinnock & Daly, 1975; Barnes et al., 1997; Bayliss & Starling, 1899; Cisar & Ruppert, 1999; Le Blanc-Louvry et al., 2002; Luckey et al., 2003; Miedema & Johnson, 2003; Schuster & Montie, 2002). To date, physicians and nurses have little to offer patients other than reassurance that the incapacitating symptoms will resolve in time and bowel function will return (Matros et al., 2006). The purpose of this chapter is to introduce the problem that was studied, discuss the intervention of chewing gum in post operative care and its

significance to the discipline of nursing and suggest the contributions its findings may make to promoting changes in nursing practice protocols that have the potential to improve patient outcomes following abdominal surgery.

MATERIALS AND METHODS

Fifty patients who underwent laparotomy for peritonitis due to appendicular perforation, appendicular abscess were selected for the study. Informed consent is obtained from all participants in this study. In the study group, 25 patients were asked to chew gum thrice a day for one hour each time starting from six hours after the surgery until the passage of first flatus. (Test group) Commercially available sugar-free gum (Orbit) was used in this study. Orbit is a brand of sugarless chewing gum from the Wrigley Company. The gum contains phenylalanine and other sweeteners, as well as the preservatives BHA (Butylated hydroxyanisole) and BHT (Butylated hydroxytoluene). The gum is calorie-free (all food products that provide less than five calories per serving are considered to be calorie-free) and contains no protein, fat and only 1 g of carbohydrate. The carbohydrate comes from sorbitol, which is the main sugar alcohol used to sweeten this gum. Sugar alcohols offer fewer calories per gram than carbohydrates, such as sugar. The gum contains less than 2 percent of other ingredients such as the sugar alcohols mannitol and xylitol as well as the non-nutritive sweeteners aspartame and acesulfame K.

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Sorbitol is a sugar replacer, also called a sugar alcohol or polyol. Sugar replacers are used in a wide variety of food products besides chewing gum, including chocolate, candies, frozen desserts, baked goods, salad dressings and beverages. They are useful for providing sweetness with fewer calories. They add bulk and texture to foods, retain moisture and enhance the flavor profile. Sorbitol, specifically, provides 2.6 calories per gram and is 60 percent as sweet as sugar. It offers a cool, pleasant flavor. It is important to note that sorbitol may have a laxative effect when 50 g or more are consumed. Mannitol may have a laxative effect if only 20 g or more are consumed. Sugar alcohols do not promote tooth decay. Sorbitol is generally recognized as safe (GRAS) by the FDA. In the control group, 25 patients were kept conventionally nil orally in the postoperative period until the passage of first flatus. For the purpose of this study the parameter taken for the early bowel movement and recovery from paralytic ileus is the passage of first flatus after surgery.

Inclusion Criteria

- Patients with peritonitis due to appendicular perforations/abcess
- Age greater than 15 Yrs, less than 65 yrs
- Able to chew the gum

Exclusion Criteria

- Peritonitis due to other causes.
- Other co-morbid conditions like diabetes, hypertension.
- Malignancies

Antibiotics: All patient were put on antibiotics from the time of admission covering both gram positive and gram negative organisms (injections of cefotaxime, amikacin, and metronidazole)

Anaesthesia: All the patients were operated under spinal analgesia.

Intraoperatively: Appendectomy and peritoneal toilet was done in all cases; and abdominal tube drains were kept.

Chewing 'Orbit gum' in the post operative Care

All patients chewed the gum thrice a day for 1 hour each time starting from 6 hours after the surgery until the passage of first flatus. Commercially available sugar-free gum (Orbit) was used for this study. The time of passage of the first flatus and stool were recorded each subject was given a pad and a pencil and asked to record the date and time when they passed the "first flatus" following surgery. All the patients were ambulated on first postoperative day, at least twice daily, and to increase the time, distance, and frequency each additional day as their condition allowed until passage of first flatus. Oral feeds were started after the passage of flatus and then diet was advanced as per the discretion of the surgical team.

Instructions for Control Group: Standard postoperative care which included IV fluids (NS / 5%D) same antibiotics as above and analgesics were given. Other instructions were same as in test group.

Statistical Analysis

Data was analyzed by Statistical Packages for Social Sciences (SPSS) version 16.0. The correlation between two variables for continuous normal data by using Karl Pearson's Correlation coefficient and for continuous non-normal data by using Spearman's Correlation coefficient. The difference between groups with the same subjects by using paired t-test for continuous normal data and Wilcoxon Signed Rank test for continuous non-normal data. The association between control group and chewing gum group for times of first flatus(hours) by Fisher's Exact test. All p-values less than or equal to 0.05 statistically significant.

RESULTS

The passing of first flatus in chewing gum group with a mean of 46.32 hours when compared to control group with a mean of 64.32 hours. There is significant decrease in test group ($p < 0.002$) Table 1 & Figure 1.

Table 1. Association between control group and chewing gum group in times of first flatus (hours)

Hours	25-30	31-36	37-42	43-48	49-54	55-60	>60	total	P-Value	Inference
Control	2	0	0	3	5	0	15	25	0.002	Significant
Chewing Gum	4	4	1	3	6	4	3	25		
Total	6	4	1	6	11	4	18	50		

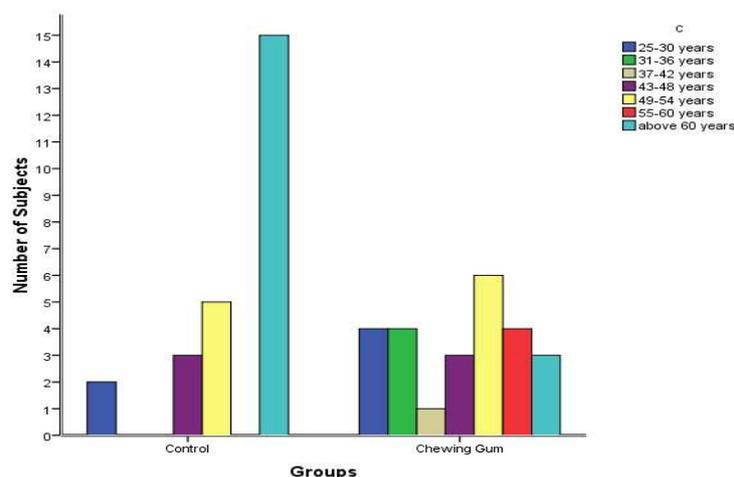


Fig. 1. Cluster bar diagram for association between control group and chewing gum group in times of first flatus (hours)

Table 2. Difference between times of first flatus (hours) and time of first stools (hours) for chewing gum group

Parameter	N	Mean	SD	SEM	P-Value	Inference
Time of first flatus (hours)	25	46.32	11.87	2.37	<0.001	Significant
Time of first stools (hours)	25	77.44	10.66	2.13		

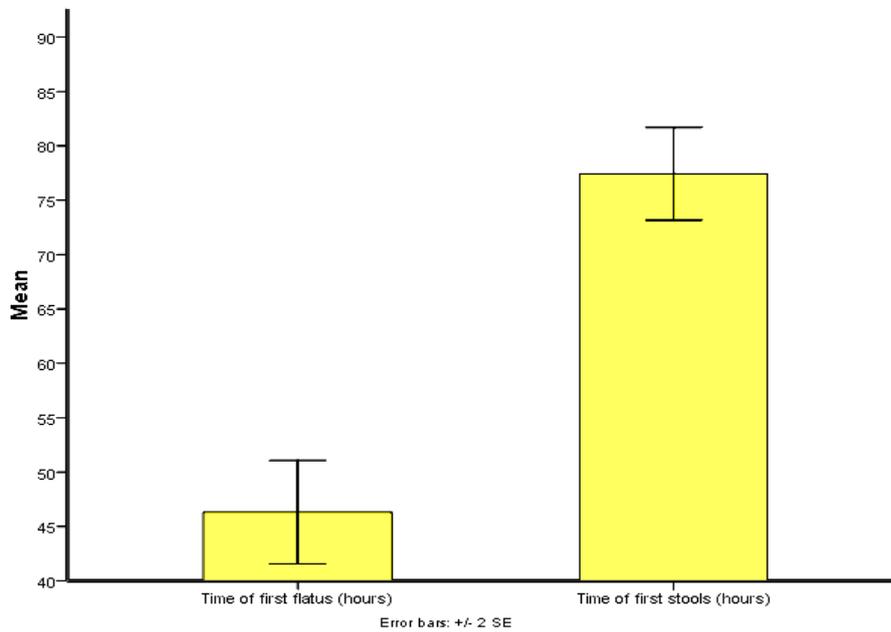


Fig. 2. Error bar diagram between times of first flatus (hours) and time of first stools (hours) for chewing gum group

Table 3. Correlation between time of first flatus (hours) and duration of surgery (minutes) for control group

Parameter	N	Mean	SD	r-value	P-value	Inference
Time of first flatus (hours)	25	64.32	17.47	-0.395	0.051	Not Significant
Duration of Surgery (minutes)	25	60.68	9.22			

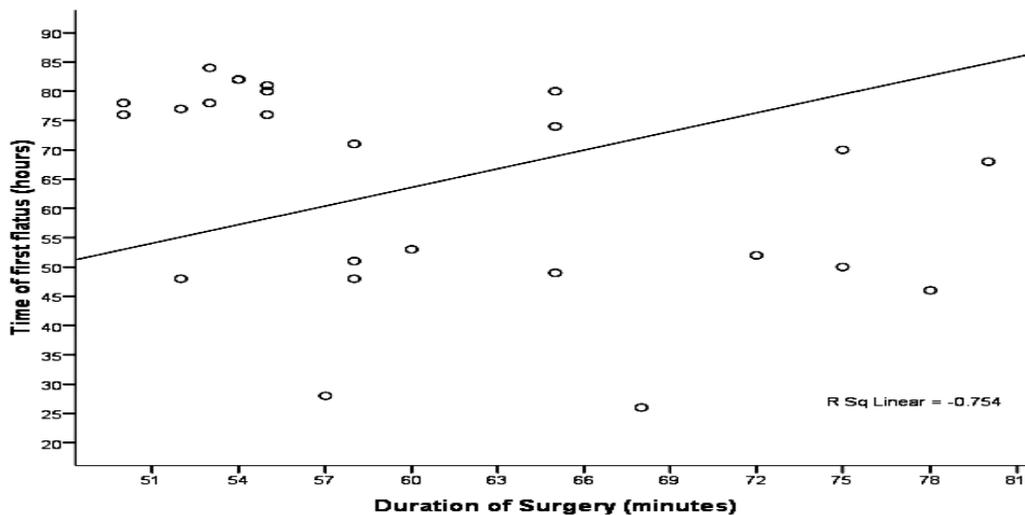


Fig. 3. Scatter plot between time of first flatus (hours) and duration of surgery (minutes) for control group

Table 3a. Correlation between time of first flatus (hours) and duration of surgery (minutes) for chewing gum group

Parameter	N	Mean	SD	r-value	P-value	Inference
Time of first flatus (hours)	25	46.32	11.87	-0.016	0.941	Not Significant
Duration of Surgery (minutes)	25	63.08	5.54			

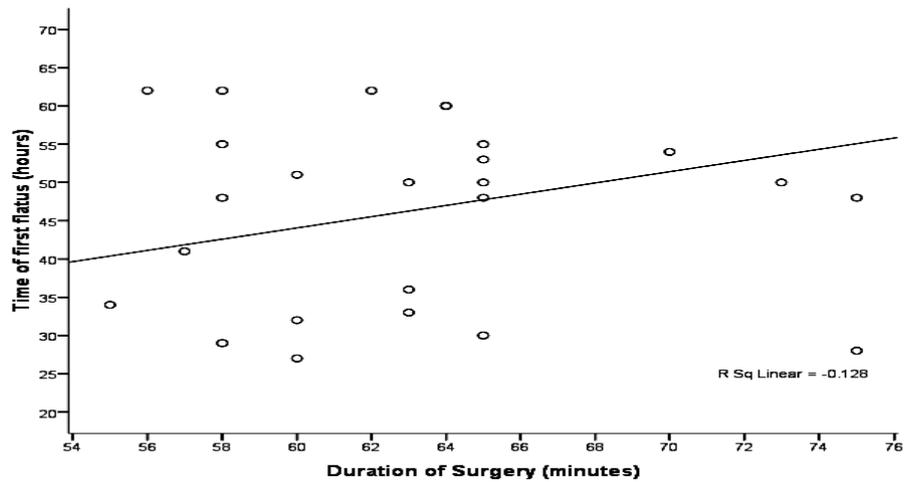


Fig. 3a. Scatter plot between time of first flatus (hours) and duration of surgery (minutes) for chewing gum group

So also there is significant difference in passing first flatus and first stools in test group $p < 0.001$. Table 2 & Figure 2. Surprisingly there is no statistically significant correlation between duration of surgery and time of first flatus in both the groups (there is reverse correlation $r = -0.395$ and $p = 0.051$) Table 3, 3a & Figure 3, 3a.

DISCUSSION

A total of 50 patients with peritonitis due to appendicular perforation were randomized into 25 patients each in the study and control groups. The study group was assigned to chew ORBIT—a brand of chewing gum in the Po period. The cases were diagnosed on the basis of ultrasound abdomen, and all eligible patients that presented during the study were included. A majority of the patients in both the groups were males and in the age group of 16-65 years. The mean duration of surgery was 63.48 min in the study group and 60.62 min in the control group. The recovery of gastrointestinal motility was determined by the passage of first flatus and bowel movement. The mean time for the passage of first flatus was 46.32 hrs in the study group and 64.32 hrs in the control group. On statistical analysis, flatus started significantly earlier in the study group cases as compared to the control group cases $p = < 0.002$. The mean time for the passage of first stool was 77.44 hr in the study group and 88.56 hr in the control group. It is seen that all the patients (100%) in the chewing gum group passed their first flatus in 65 hrs; whereas only 10 patients in the control group (40%) passed flatus during the same time. It is also noted that within 86 hrs, 20 patients in the chewing gum group passed the first stool (80%) during which only 5 patients in the control group (20%) passed stool. A Prospective, randomized study in a University teaching hospital on 46 patients operated by open appendectomy due to acute catarrhal appendicitis, appendicular abscess and appendicular generalized peritonitis by Ngowe MN, Eyenga VC et al also showed similar results. Patients in the study group passed first flatus at a mean time of 52.8 hrs where as in the control group at a mean time of 72 hrs. Patients in the study group passed their first stool at a mean time of 55.2 hrs where as in the control group at a mean time of 79.2 hrs, which showed chewing gum does accelerate postoperative

intestinal movement probably due to stimulation of cephalo vagal reflex. The results are comparable to the contemporary study done by Ngowe, Eyenga *et al*. In fact our study showed earlier recovery of bowel movement as evidenced by passing of first flatus when compared to the study of Ngowe MN, Eyenga VC *et al*.

Source	Flatus/stool	Study group-Hrs	Control group-Hrs
B. A. Rama Rao & Sahan Srinivas	Flatus	46.32	64.32
Ngowe MN & Eyenga VC et al	Stools	77.44	88.56
Asao et al	Flatus	52.8	55.2
Causoglu et al	Stools	72.0	79.2
	Flatus	50.40	76.80
	Stools	74.40	139.20
	Flatus	35.73	42.0
	Stools	56.27	63.0

The delay in passing first stool in our study may be explained by the fact our patients observe fasting since the time of first symptom i.e. pain abdomen or nausea. Moreover our patients tend to hold the defecation reflex for fear of wound breakdown and post op pain. These systematic reviews and meta-analyses have also found a significant reduction in time to first flatus as well as bowel movement in the gum chewing group.

In conclusion, gum chewing after laparotomy, has shown to significantly reduce the duration of post operative ileus as judged by the passage of flatus as well as stool.

Conflict of Interest

There is no conflict of interest involved in this study.

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