

Evaluation of postoperative gum chewing role in stimulating bowel motility in colonic surgery

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ABSTRACT

Objective: Postoperative ileus (POI) after abdominal surgery is an inevitable consequence of various etiologies. It causes much discomfort to patients by resultant vomiting, abdominal distention, and prolonged hospital stay; thus, exploring efficient and cost effective solutions could reduce the patients' suffering and hospital stay. This study aimed to evaluate the effect of gum chewing on the duration of POI following colonic surgery.

Patients and methods: Ninety patients at Aljumhoory Teaching Hospital from October 2007 to October 2008, undergoing elective large bowel surgeries were randomly assigned to the study group (n=44) and the control group (n=46). Patients in the study group chewed gum 3 times daily for 20 minutes starting from the 1st postoperative day until the return of bowel function. The control group patients had standard postoperative treatment. All patients were assessed clinically and the data were collected using an inquiry form for every patient.

Results: Study and control group patients were comparable at inclusion. The mean time for the passage of first flatus as well as the time for the first bowel movement was shorter significantly in the study group (by 20.4 hours, $P<0.01$; by 22 hours, $P<0.01$) respectively. The first feeling of hunger was also experienced earlier in study group cases (by 14.7 hours, $P<0.01$). The postoperative hospital stay was shorter in the study group, but the difference was not significant ($P<0.1$).

Conclusion: Early postoperative gum chewing significantly hastens the time of bowel function recovery following colonic surgery. Moreover, it is a cost-effective and well-tolerated treatment for POI.

Keywords: Postoperative colonic surgery, bowel motility, stimulation, evaluation, gum chewing.

دراسة تقويمية لدور مضغ العلكة في تحفيز حركة الأمعاء بعد عمليات القولون الجراحية

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الخلاصة

المقدمة: الشلل الأمعائي فيما بعد العمليات الجراحية هو نتيجة لا يمكن تفاديها ولها أسباب مختلفة، ولأنها تسبب الكثير من المضايقات وعدم الراحة للمرضى بما تسببه من: تقيؤ، وإنتفاخ بطني، ومدة بقاء أطول في المستشفى، فإن حلاً فعالاً قد يقلل من هذه التبعات.

الهدف: تقييم فعالية ودور مضغ العلكة بعد العمليات الجراحية للقولون في تحفيز عملية رجوع الوظيفة للمعي مبكراً.
المرضى وطريقة العمل: هذه الدراسة المستقبلية ضمت ٩٠ مريضاً ممن أجريت لهم عمليات جراحية للأمعاء الغليظة، وتم توزيعهم عشوائياً إلى مجموعتين: المجموعة الأولى مجموعة مضغ العلكة، وضمت ٤٤ مريضاً والمجموعة الثانية هي عدم مضغ العلكة، وضمت ٤٦ مريضاً. تم تقييمهم جميعاً سريرياً بواسطة جمع المعلومات عن طريق إستمارة إستبيان لكل مريض.
النتائج: كانت نسبة الإناث إلى الذكور هي ٢٤:٢١ و ٢٥:٢٠، ومعدل أعمار المرضى هو ٥٦ سنة و ٥١ سنة في المجموعة الأولى والثانية على التوالي. كانت الدواعي الجراحية كالتالي: سرطان القولون مع التوصيل المعوي ٢٩ مريضاً، سرطان القولون مع تفويه القولون ١٦ مريضاً، الإلتواء المعوي للقولون ١٥ مريضاً وغلغق تفويه القولون ٤٥ مريضاً.

كان وقت أول شعور بالجوع أبكر بـ ١٤,٧ ساعة، ووقت أول خروج للريح أبكر بـ ٢٠,٤ ساعة، ووقت أول تغوط أبكر بـ ٢٢ ساعة في المجموعة التي مضغت العلكة عن المجموعة الأخرى، وكان الفرق مؤثرا إحصائيا، وأما فيما يخص مدة البقاء في المستشفى فهي أقل بـ ٠,٨ يوما في المجموعة الأولى، لكن الفرق لم يكن مؤثرا إحصائيا.

الإستنتاجات: إن مضغ العلكة مبكرا بعد الجراحة يسرع من إسترجاع المعى لوظيفته، وبالتالي تحمل المرضى للطعام عن طريق الفم بصورة أبكر.

الكلمات المفتاحية: بعد العمليات الجراحية للقولون، حركة الأمعاء، تحفيز، تقييم، مضغ العلكة.

INTRODUCTION

Post operative ileus (POI) is a transient cessation of coordinated bowel motility after surgical intervention, which prevents effective transit of intestinal contents and/or tolerance of oral intake.¹ Primary POI occurs in the absence of any precipitating complication,² it is an inevitable response to surgical trauma.¹ Secondary POI occurs in the presence of a precipitating complications such as uremia and hypokalemia.³

The incidences of POI in different common abdominal surgeries are; 4.1% after abdominal hysterectomy, 6.2% after appendectomy, 14.9% after large bowel resection and 19.2% after small bowel resection.⁴ The average time for resolution of POI after major abdominal surgery is 24 hours for small bowel surgery, 24- 48 hours for stomach surgery, and 48-120 hours for large bowl surgery.⁵

The manifestations and consequences of postoperative ileus include; delayed passage of flatus and stool, increased nausea and vomiting, delay in resuming oral intake with possible need for parenteral nutrition and wound healing, and delay in postoperative mobilization. In addition, POI increases the risk of other complications such as pulmonary complications. Prolonged hospitalization decreases patient satisfaction and increases health care cost.^{6,7}

Conventionally, POI has been managed by gastric decompression by nasogastric (NG) tube, keeping the patient nil per mouth, and intravenous fluid supplementation until the ileus resolves and patient passes flatus.⁸ However, very few improvements in the understanding of POI have been established in the past 100 years, and therefore therapies have changed minimally. In recent years, the use of gum chewing has emerged as a new and simple modality for decreasing POI. Chewing gum acts as sham feeding, potentially stimulating gastric and bowel motility through repetitive stimulation of the cephalic-vagal complex.⁹ Recently, it has been

proposed that hexitols present in sugarless chewing gums might also be playing a role in the amelioration of POI.⁴

The aim of this study was to assess the efficacy of the gum chewing after abdominal surgery especially in the return of bowel function.

PATIENTS AND METHODS

This is a prospective randomized study, included 90 patients with colonic surgeries, between October 2007 and October 2008 in the surgical ward of Al- Jumhoory Teaching Hospital. The surveyed patients were evaluated for the effectiveness of the sugarless gum chewing in alleviation of postoperative ileus following abdominal surgeries, especially involving the large bowel. The surgical operations included colon cancer (resection and anastomosis), volvulus of sigmoid, colon cancer (resection and colostomy), and closure colostomy.

The patients were divided into two groups:

Group 1: gum chewing (44) patients (24 males and 20 females).

Group 2: no gum chewing (46) patients (25 males and 21 females).

Mean age for group 1 was 56 years, and for group 2 was 51 years.

The gum chewing group started chewing sugarless gum (1 GM per stick) that does not contain hexitol, in the morning of the first postoperative day. Patients chewed one stick of gum three times daily: in the morning, afternoon and in the evening, for 20 minutes.

Postoperative analgesia (diclofenac sodium and tramadol injections) was given to all patients in both groups (75 mg & 50 mg twice daily) respectively tailored to the individual patients requirement.

The two groups were tested for:

1. Time at first flatus.

2. Time at first feeling of hunger.
3. Time at first bowel motion.
4. Duration of hospital stay.

Student-t test was used to perform statistical analysis where $P < 0.05$ was considered statistically significant for all compared values.

RESULTS

All patients (90) of the two groups completed the protocol study until recovery of bowel. There were no difference in mean age and gender (the female: male ratio was (1:1.25) (No. 21:25) in the no gum group and (1:1.4) (No. 20:24) in the gum chewing group. **Table 1** showing all 90 patients with different surgeries, classified according to gender.

Table 2 showing mean time of duration of surgery and operative complication in all 90 patients.

All patients in the two groups started mobilization on the first postoperative day.

Table 3 showing different clinical characteristic in both group (gum chewing and control).

A part from three patients in the control group and one patient in the study group who had mild chest infections, there were no other complications.

Table 1. Types of colonic surgery used in the study & no. of patients in both groups according to sex.

Indication for surgery	Control group		Gum chewing group	
	Male	Female	Male	Female
Colon cancer (resection & anastomosis)	8	6	8	7
Volvulus of sigmoid	3	2	3	2
Colon cancer (resection & colostomy)	3	5	3	4
Closure colostomy	11	8	10	7
Total	25	21	24	20

Table 2. Intraoperative findings.

Characteristics	Control group (n 46)	Gum chewing group (n 44)	P-Value
Mean (SD) duration of surgery in minutes	115 (50)	108 (39)	0.02
Intra operative complications	0	0	0

Table 3. The main outcome measures.

Characteristics	Gum Chewing group (n=44)	Control group (n=46)	p-value
Time for 1 st bowel motion mean (SD) hr	52.6 (9.1)	74.6 (6.8)	<0.01
Time for 1 st feel of hunger mean (SD) hr	48.9 (7.6)	63.6 (8.0)	<0.01
Time for 1 st flatus mean (SD) hr	53.3 (8.0)	73.7 (6.5)	<0.01
Post-operative stay in hospital mean (SD) days	5.0 (2.7)	5.8 (2.6)	0.1

DISCUSSION

There was significant reduction in mean time for the first feeling of hunger postoperatively in the gum chewing group, (39) patients which was in the second postoperative day, while 30 patients in the control group experienced it in the third postoperative day (14.7 hours; P value= <0.01). This is similar to Asao *et al* study.¹⁰ in which the time was (1.1day, p value= <0.01), but not to Rob Schuster *et al* study.¹¹ who found no significant difference in time for feeling of hunger between both groups (9.3 hours; P value=0.27).

There was significant decrease in mean time for first passage of flatus in gum chewing group (20.4 hours; P value <0.01). This result is comparable to Asao *et al*,¹⁰ Schuster *et al*,¹¹ Chan *et al*,¹² Vasquez *et al*¹³ and Kouba *et al*,¹⁴ their results were: (1.1 days; $p < 0.01$), (14.8 hours; $P < 0.05$), (20.8 hours; $P < 0.0006$) and (14 hours) and (0.5 day; $p < 0.001$) respectively. On the other hand, Matros *et al*¹⁵ finding was (7 hours; $P = 0.384$), this may be attributed to how the gum was given, since they used the gum in combination with sips of clear fluid.

In our study there was a statistically significant shorter mean time for first bowel movement in gum chewing group (22 hours; $P < 0.01$). Similarly Schuster *et al*¹¹ (26.2; $P = 0.04$), Chan *et al*¹² (33.3 hours; $P < 0.0002$), Vasquez *et al*¹³ (25 hours),¹³ and Kouba *et al*¹⁴ (0.7 day; $p < 0.01$) reported comparable results. However, our outcome is different from that of Quah *et al*¹⁶ (0.6 days) and Matros *et al*¹⁵ in which there was no significant reduction in mean time for bowel motion.

From our data we found that there was statistically non-significant reduction in mean time for postoperative hospital stay (0.8 day; P value =0.1) **Table 3**. These results are consistent with those obtained in studies performed by Quah *et al* (1.71 days),¹⁶ De Castro *et al* (1.3 day)¹⁷ and a meta-analysis done by Purkayastha *et al* (3.27; P=0.23),¹⁸ but not with that of Asao *et al*¹⁰ which may be attributed to the use of laparoscopic colectomy in their study.

CONCLUSION

Gum chewing early in the postoperative period following colonic abdominal surgery significantly hastens time to bowel function and ability to tolerate feeding.

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