



Review Article

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Improving Outcomes through Implementation of Gum Chewing for Abdominal Surgical Patients

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Abstract

Post-operative ileus (POI) is a common complication after abdominal surgery. It results in prolonged hospital stays, increased healthcare costs, delayed advancement in diet, and decreased patient satisfaction. Although there are multiple interventions to decrease POI, the use of chewing gum may improve patient outcomes at low cost with minimal side effects. This project compared the use of post-operative gum chewing on time to first flatus or defecation, rate of POI, and length of hospital stay among abdominal surgical patients over a period of 3 weeks to no intervention. A retrospective chart review for the two-month period prior to the intervention was conducted to obtain a control group. The target sample size was 51 for both control and treatment groups. The target was met for the control group, but only 24 patients were recruited for the treatment group. The treatment group included patients who underwent gynecological or colorectal surgery. The treatment group received chewing gum starting post-operative day one, three times a day. Patients chewed gum for thirty minutes until first flatus or defecation. Results revealed the mean time to first flatus was 2.3 (SD = 1.3) days in the control group and 1.5 (SD = 0.6) days in the treatment group. Time to first flatus was significantly reduced in the gum chewing group ($p = .006$). Gum chewers had a shorter time for first defecation ($M = 2.13$ days, $SD = 0.84$) than control group ($M = 3.00$ days, $SD = 1.71$). Length of hospital stay for gum chewing group was 2.54 (SD = 1.69) days and for control group 3.18 (SD = 1.93) days.

Keywords: Chewing gum; post-operative ileus; flatus

Introduction

Post-operative ileus (POI) is one of the common complications in the postoperative period [1]. Although there are various treatments and care approaches, such as early feeding, ambulation, regional epidural block, and minimally invasive surgery available, 10% to 30% of patients still develop POI after abdominal surgery [2]. POI is a non-mechanical bowel obstruction with transient cessation of bowel mobility [1]. Common signs and symptoms of POI include abdominal distention, nausea, vomiting, inability to tolerate oral diet, absence of flatus and bowel movement [3]. The pathophysiology of POI is multifactorial involving manipulation of the intestine, opioid use, and postoperative stress [2]. In general, surgical manipulation of the intestine during surgery results in decreased contraction of intestinal smooth muscle and the use of postoperative opioids for pain control slows the intestinal transit times [4]. As a result, POI is considered a common outcome after

major abdominal surgery and results in prolonged hospital stay, increased healthcare costs, and delayed advancement of diet [5]. POI results in inability to tolerate nutrition because of the decreased bowel motility which may lead to increased length of hospital stay and healthcare costs. An estimated cost of POI-related complications in the United States surpasses \$1.5 billion per year [6]. According to guidelines for postoperative care in gynecologic and colonic surgery, the Enhanced Recovery After Surgery (ERAS) Society recommends the use of chewing gum to prevent POI. Although there are various interventions to reduce POI, implementation of chewing gum, an evidence-based 2 practices, may improve patient outcomes with minimal side effects. This inexpensive, simple, easy, non-pharmacological intervention performed by simply chewing can result in enhanced bowel motility and rapid resolution of POI. Furthermore, it is relatively easy for nurses to implement. Gum

chewing should be an adjuvant treatment to prevent or reduce POI [7]. Yet, it is not widely used in U.S. hospitals and its implementation is very slow [8]. The project was designed to determine the effect of the use of chewing gum on shortening time to first flatus or defecation, reducing the rate of POI, and shortening post-surgical length of stay among abdominal surgical patients.

Clinical Question

What is the impact of implementation of chewing gum in relation to time to first flatus or defecation, rate of POI, increase patient satisfaction and length of hospital stay among abdominal surgical patients?

Purpose

The purpose of this direct practice improvement (DPI) project was to decrease the instance of POI on the medical surgical unit. Implementing the use of chewing gum among abdominal surgical patients is a cost-effective, non-pharmacological intervention for reducing time to first flatus or defecation and length of hospital stay. The project was designed to determine the effect of the use of chewing gum on the following:

- shortening time to first flatus or defecation
- reducing the rate of POI
- shortening post-surgical length of stay among abdominal surgical patients.

Conceptual framework

A logic model provided the foundation for this project. The logic model is a road map or a visual representation of theory of change and program design [6]. A logic model is a systematic and visual way to present and share an understanding of the relationships among the resources necessary to operate a program, the activities needed to run a program, and the changes or outcomes to be achieved through the program. A logic model is a conceptual map. It is useful in clearly outlining the necessary components of a program, including the relationships among the program goals, objectives, activities, and measurable outcomes. The logic model may be presented to actual clients to pilot the program; therefore, participants can see whether the program is effective through experiencing the findings. This project includes an evidence-based project implementation, the use of chewing gum, and the relationships between input and process output and between outcome and project impact. The goal of this project was to improve patient outcomes and align with organizational goals.

Population and sample selection

This project was conducted in the medical surgical unit of a hospital in Maryland. The participants included adult patients 18-80 years of age who had abdominal surgery, no allergy to chewing gum ingredients, presence of natural teeth, bowel continuity, ability to tolerate regular diet at baseline, return to preoperative level of cognitive status, ability to follow instructions, and without

risk of aspiration. The sample was divided into two groups, the control group (n = 51) were surgical patients admitted prior to intervention and treatment. Because the unit has only had limited total beds and admitted an average of five surgeries per day, it was difficult to obtain the minimum sample size recommended for the intervention group, but every effort was made to recruit as many patients as possible.

Intervention

A two months' retrospective chart review was performed to determine what the rate of POI was prior to the implementation of the project. The information gathered from the charts included age, sex, race and ethnicity, date of hospital admission, date and time of surgery, post-operative date and time of admission to the unit, type and method of surgery, date and time of first flatus, date and time of first bowel movement, and date of discharge. Data was collected on a control group of patients admitted prior to the implementation of a chewing gum intervention and on a treatment group that participated in the intervention to determine the effectiveness of the chewing gum intervention on the rate of POI among abdominal surgical patients. The participants were provided with sugar free gum three times a day by the Principal Investigator (PI) starting from the day after your surgery at 8AM, 12PM and 4PM until you pass flatus (gas) or have a bowel movement. The participants were instructed to chew gum for thirty minutes each time. The PI answered all questions and concerns during the overview of the DPI project to nurses. The PI was available during implementation to answer any questions patients or anyone else had. The gum chewing study audit form and data collection sheet were completed for each participant by the PI.

Result

The mean time to first flatus time was 2.3 (SD = 1.3) days in the control group and 1.5 (SD = 0.6) days in the treatment group. Time to first flatus was statistically significantly reduced in the gum chewing group compared with the control group, Mann Whitney U = 257, p = .006. Time to first defecation was documented only for a total of 22 patients (14 control and 8 gum chewing). The large percentage of missing data made time to first defecation an unreliable measure. There was a trend for gum chewers to have shorter time to first defecation (M = 2.13 days, SD = 0.84) than the control group (M = 3.00 days, SD = 1.71), although the difference was not statistically significant, possibly due to the small sample size for this variable, Mann Whitney U = 33.5, p = .127. Twenty-six percent of the control group were diagnosed as having POI. In the gum chewing group, none of the patients were diagnosed with POI. This difference was statistically significant, t (49) = 4.149, p < .001. It appears as if the gum chewing intervention successfully reduced the incidence of POI in these abdominal surgical patients. Post-operative length of hospital stay for the gum chewing group was 2.54 (SD = 1.69) days and for the control group 3.18 (SD = 1.93) days. This difference was not statistically significant, Mann Whitney U = 492.5, p = .157. It should be noted that in the control group there was one outlier

with a post-operative length of stay of 31 days. This patient was not included in the above comparison. Inclusion of this patient raised the mean for the control group to 10.7 days (SD = 51.04), although the difference between the groups remained statistically insignificant. The large standard deviation when this patient was included and the fact that the patient was an outlier argued for not including this patient in the comparison of post-operative length of stay. Twelve (50%) of the gum chewing patients rated their level of satisfaction with the gum chewing procedure. All 12 patients agreed or strongly agreed that the gum chewing schedule was easy to follow. A majority of patients (58.3%) enjoyed chewing gum on a regular basis; only 16.7% did not enjoy chewing gum regularly. All patients agreed or strongly agreed that the gum chewing protocol was helpful. All patients agreed or strongly agreed that they would recommend gum chewing to a friend undergoing surgery.

Summary

The chewing gum intervention for abdominal surgical patients was to hasten time to first flatus or defecation, reduce rate of POI, and decrease length of hospital stay. In recent years, chewing sugar-free gum has emerged as a new, inexpensive and nonpharmacological intervention to stimulate gastrointestinal motility. Chewing gum is part of existing evidence-based practice and is part of the ERAS guideline recommendations for postoperative care but, is not practiced regularly as an intervention along with other care elements such as early ambulation and early feeding. Chewing gum postoperatively has shown decreased incidence of POI, early passage of flatus, bowel movement, decreased length of stay, lower cost, and increased patient satisfaction. Review of the literature focused on use of chewing gum in abdominal surgeries like colorectal, general abdominal, and gynecological surgery. Multiple peer reviewed articles and a Cochrane review on the use of chewing gum for postoperative recovery of GI function show evidence for

the use of chewing gum to decrease POI. Outcomes reported in these studies were time to first flatus, time to fist bowel movement, length of hospital stay, tolerability of gum, time to bowel sounds, complications and cost. Chewing gum can be used in conjunction with other safe and effective strategies to decrease or prevent POI. Implementation of chewing gum may reduce the time for first flatus or defecation, decrease length of stay, and improve patient outcomes and satisfaction.

Acknowledgement

None

Conflicts of Interest

Author has no conflict of interest.

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