



The use of coffee for the prevention of ileus following abdominal surgery: A review of the current evidence

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ABSTRACT

Postoperative ileus (POI) is a form of intestinal paralysis that is seen especially after surgical procedures performed by entering the abdominal cavity. POI is common, particularly after abdominal surgery, with an incidence of 8-30%. The initial phase of postoperative paralytic ileus is treated with decompression using a nasogastric tube to correct electrolyte imbalances, with analgesia applied as needed. Prokinetic compounds have been used to prevent ileus and control pain (such as serotonin receptor antagonists, neostigmine, alvimopan, and ghrelin agonists), along with early mobilization, minimally invasive surgery, early introduction of solid food into the diet, thoracic epidural analgesia, and fluids. Coffee has been shown to accelerate postoperative bowel movements. However, despite extensive research on the physiological impacts of coffee, little is acknowledged regarding how it affects the gut. Coffee increases colonic motility within 4 min of consumption. In the postoperative period, the number of intestinal vocals heard by auscultation of intestinal vocals, first gas and first defecation times of patients who consume coffee are smaller/shorter than patients who do not consume coffee. Patients who drink coffee also have shorter hospital stays.

Keywords: Paralytic ileus; postoperative ileus; surgery; gynecological malignancy

INTRODUCTION

Postoperative ileus (POI) is a form of intestinal paralysis that is seen especially after surgical procedures performed by entering the abdominal cavity.¹ POI is a condition characterized by intestinal accumulation and consequent dilatation of the intestines as a result of the lack of a coordinated repulsive effect in the gastrointestinal tract. However, there is still no clarity about the pathogenesis of ileus occurring after surgery.

POI is common, particularly after abdominal surgery, with an incidence of 8-30%.¹⁻⁴ POI usually resolves within 2-7 days of formation.^{5,6} POI may be characterized by complaints of nausea, vomiting, bowel cramps and abdominal distention.¹ It takes 24-72 hours for normal motility of the gastrointestinal tract to be restored after manipulation. Irregular contractions, which may be unorganized and even vice versa, may occur during the dysfunctional period. As a reliable indicator of the function of

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the last part of the colon, such as the sigmoid colon and rectum, defecation does not guarantee that the coordination of the gastrointestinal tract has improved. Conditions that may occur after POI include fluid and electrolyte imbalance, impaired immunity, pneumonia, delayed wound healing and wound opening, and venous thromboembolism.^{5,7} Considering the cost-effectiveness of the health system on the country, POI can create a serious burden.^{3,4} In addition, the efficacy of chemotherapy will decrease as the duration of adjuvant therapy initiation is prolonged in patients undergoing surgery for malignant reasons. The complication rate, long-term hospitalization, and increased health service costs associated with POI constitute a serious burden.

The main reason why the pathogenesis of POI is not fully understood is the absence of a single cause and the additional burdens given by surgery, anesthesia and comorbidity. Putative causes include a systemic stress response to local trauma during surgery (due to adrenergic activity), opioid analgesics, inflammation, autonomic function, imbalances in the gastrointestinal hormonal system, and electrolyte imbalances.^{1,8} Ileus is an inflammatory process that may occur as a result of manipulation-induced leukocyte accumulation and induction of nitric oxide synthase in the intestinal muscle layer.⁹ Women who have undergone surgery for uterine, cervical, and ovarian cancers, especially those who have undergone a retroperitoneal lymph node dissection procedure, are at high risk of POI. It is thought that POI frequently occurs due to the risk of implantation in the intestinal serosa or mesentery, and the manipulation associated with the intense retraction required to move the intestines away from the site during pelvic and/or para-aortic lymph node dissection.

POI is treated via decompression using a nasogastric tube to correct the electrolyte imbalance, with analgesia applied as needed during the initial phase.¹ Prokinetic compounds have been used to prevent ileus and control pain (such as serotonin receptor antagonists, neostigmine, alvimopan), along with early stand up and moving, laparoscopy (minimal incision), early introduction of solid foods into the diet, reduced intraoperative nasogastric tube use, thoracic epidural analgesia, fluids and restriction of gum chewing.^{1,8,10} Early enteral feeding not only stimulates repulsive gut activity, with this, it activates the secretion of hormones that cause the gastrointestinal tract to move forward.² While not an excellent sign of overall intestinal function, defecation is nevertheless the most reliable marker of bowel function. In recent studies in the literature, chewing sugar-free gum, which is an inexpensive and easily applicable method, has been investigated in order to shorten postoperative flatulence, defecation and hospital stay, and thus reduce the

cost. The possible mechanism of chewing gum is increased salivation, increased pancreatic juice, and stimulation of the secretion of peptide hormones.² Unfortunately, no method is completely successful.¹⁰ For example, opioid receptor antagonists significantly enhance bowel function, however, it should be noted that these drugs are expensive and difficult to find. As a result of long-term experience, it is known that early postoperative nutrition stimulates bowel motility, and this is thought to be under the influence of reflexes and gastrointestinal hormones. However, it is obvious that the incidence of nausea and vomiting may be higher as a result of early feeding. There are methods that improve the POI status by providing stimulation in the gastrointestinal tract and putting bowel motility into its normal activity. One of the most studied stimulants that can normalize bowel motility is coffee. It is also a very popular and constantly consumed beverage all over the world. In this article, we evaluated the connection between postoperative consumption of coffee and ileus.

Effect of Coffee on the Gastrointestinal System

Coffee is a widely used beverage all over the world, which has been shown to be effective on the cardiac and central neuronal systems, making it enjoyable to consume.^{1,11} Coffee accelerates postoperative bowel movements.^{12,13} Although its effect on the intestine and gastrointestinal system has not been clearly clarified, there are studies investigating its physiological effects. Coffee increases colonic motility within 4 minutes of consumption.^{12,14} Several possible mechanisms are thought to explain the effects of coffee on ileus. One of them is the increase in gastrin secretion and the increase of colonic spike and motor activity thanks to this hormone.¹⁵ Thanks to the exorphins in coffee, it has been determined that colonic motility is increased via opiate receptors in the brain and intestinal wall.^{14,16} Another mechanism by which coffee stimulates the motor activity of the colon is due to antagonism of adenosine receptors.^{9,17} Coffee has also been found to improve intestinal system by lowering esophageal sphincter pressure and stimulating gastric and small intestinal secretions.¹⁸

The main mechanism of coffee's effect on bowel function is thought to be due to the caffeine it contains. However, Dulskas et al.¹⁹ in a study by caffeinated and decaffeinated coffee consuming patients were compared and reported that decaffeinated coffee consumption shortened their bowel movements at a similar rate. New chemically active compounds that emerge during the decaffeination process may have an effect on the intestine. However, there is a study that found that decaffeinated coffee causes 25% less motor activity in the colon than caffeinated

coffee.¹⁴ Additionally, in a study in healthy people using manometry to measure rectosigmoid motor activity, consuming caffeinated and decaffeinated coffee had positive effects on the intestinal motility index.¹² More studies may be needed to understand the mechanism of action and chemical effects of caffeinated and decaffeinated coffee.

The Relationship Between Coffee Consumption and First Bowel Sound and Time of Defecation

It is possible to evaluate the actions of coffee drinking on the stomach intestinal tract by auscultating bowel sounds, and by determining the times to first postoperative flatulence and defecation. A randomized controlled trial by Müller et al.¹³ concluded that gastrointestinal function is accelerated in patients who drink coffee without any change in postoperative morbidity. The first bowel movement occurred earlier in the coffee-consuming group, in addition, the duration of distention and solid food tolerance was similar between the groups.¹³ Meta-analyses have revealed that tolerance to solid food, as well as times to first flatulence and defecation, are shorter in patients who consume coffee.^{1,2,20} In a research by Güngördük et al.¹⁰, patients that underwent abdominal hysterectomy and retroperitoneal lymph node dissection for a gynecological malignancy were evaluated. The coffee-drinking group consumed coffee three times per day, while the control group received ordinary postoperative nursing without coffee. The duration to first flatulence was reduced by 12 hours, the period to forbearance to solid nutrition decreased by 1.3 days, the length to primary intestine action decreased by 12 hours, and hospitalization duration decreased by one day in the coffee consuming cohort balanced to the control cohort. In addition, postoperative coffee drinking was found to be an independent preventive factor towards the development of POI, as assessed by regression analysis. In a study of patients with a gynecological malignancy, symptoms of POI were more common in the control than coffee-consuming group. In addition, the requirement for supplementary analgesic and/or antiemetic use in the postoperative period was found to be importantly less in coffee-drinking patients, which may have been due to less discomfort with the rapid passage of the first gas.¹⁰ Postoperative coffee consumption resulted in a fewer period to primary flatulence, first intestine move, and initial defecation in patients after laparoscopic gynecological surgery compared to a control group. The coffee-consuming group also exhibited accelerated functional recovery of the gastrointestinal tract.²¹ The state of tolerance to food was previously achieved by patients that consumed coffee after surgery. In addition, in the regression analysis of the studies, postoperative coffee drinking was an independent preventive factor inversely the occurrence

of POI.²¹ The mean time to first flatulence was 17 hours in a coffee-drinking cohort and 22 hours in a control cohort; the main finding of that study was a shorter time to comeback of intestinal functions to normal in patients who consume coffee.⁹ Dulskas et al.¹⁹ suggested that consuming coffee may result in a bowel movement up to 24 hours earlier during the postoperative period. In addition, consuming coffee during the early process after surgery and providing early move shortens the average time to initial gas, defecation, and intestine movement.⁹ In 2015, in the study by Piric et al.²², the effects of tea and coffee consumption after the operation were investigated in patients who had colon operations. In the study, the comeback of intestinal functions was followed and it was concluded that the primary defecation time was earlier in coffee drinkers.²² Coffee not only shortens the time to first flatulence during the postoperative period, but also significantly shortens the time taken for solid foods to be tolerated.² In a study of healthy young volunteers who did not undergo surgery, 63% of the participants claimed that coffee led to the urge to defecate.¹²

Some studies have reported that similar results among coffee-drinking and control cohorts in terms of postoperative stool excretion time.¹¹ A meta-analysis showed that postoperative coffee consumption after cesarean section did not have a significant effect on stool excretion time,²⁰ particularly in cases in which bowel manipulation was not needed due to a short excretion time and large uterus. A general summary of studies on coffee consumption in postoperative patients is given in Table 1.

Effect of Coffee Consumption on Length of Hospital Stay and Medical Costs

Although the non-drug practices recommended in the enhanced recovery after surgery (ERAS) protocols result in significantly fewer periods to defecation, gas and tolerance of food after surgery, they do not shorten the hospital stay. However, adding coffee to the ERAS protocols may increase their clinical significance.² Patients who drink coffee had shorter hospital stays compared to a control group.^{2,10,11,13,19} Similarly, the duration of the hospital stay was shorter for coffee- than tea-consuming patients.²² Moreover, the length of stay was shorter in coffee-drinking cases that were operated on for a gynecological cancer.¹⁰ However, it has been shown that there is a similarity in the during the hospital stay between those who drink caffeinated and decaffeinated coffee.¹³ No correlation has been established between coffee consumption and any adverse effects during the postoperative period.^{1,2,13,19,22} Due to the shorter hospital stays, it is expected that coffee drinkers will spend less on health services.

Table 1. Overview of studies on coffee consumption in postoperative patients

		Type of surgery	First flatus in the coffee group	First bowel movement in the coffee group	First defecation in the coffee group	LOS in the coffee group
Güngördük et al. ¹⁰	3 per day, 100 g caffeine	Gynecologic oncology	↓	↓	↓	↓
Gungorduk et al. ²¹	3 per day, 100 g caffeine	Laparoscopic gynecological surgery	↓	↓	↓	↓
Rabiepoor et al. ¹¹	3 per day, 100 g caffeine	Caesarean	↓	N/A	N/A	N/A
Koseoglu et al. ⁹	3 per day, 100 g caffeine	Caesarean	↓	N/A	↓	N/A
Dulskas et al. ¹⁹	3 per day, 8 g caffeine	Colectomy	↓	↓	NM	N/A
Piric et al. ²²	3 per day, 100 g caffeine	Colon and rectum surgery	NM	NM	↓	↓
Müller et al. ¹³	3 per day, 100 g caffeine	Colectomy	N/A	↓	NM	N/A

NM: not mentioned; N/A: not applicable; LOS: length of stay

CONCLUSION

Coffee has been shown to accelerate postoperative bowel movements. The number of auscultated intestine vocals, and periods to initial flatulence and defecation after surgery, are smaller/shorter in coffee-drinking than non-coffee-drinking patients. Patients who drink coffee also have shorter hospital stays.

ETHICS

Peer-review: Externally peer-reviewed.

Contributions

Concept: K.G.; Design: K.G.; Data Collection or Processing: V.G.; Literature Search: V.G., İ.A.Ö.; Writing: K.G., İ.A.Ö.

DISCLOSURES

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