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Editorial

Gum chewing to prevent postoperative ileus

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Following laparotomy, motility usually returns to the small intestines several hours postoperatively, to the stomach in 24-48 hours, and to the colon in 48-72 hours [1]. Although there is no universal definition of postoperative ileus, it is a well known consequence of laparotomy and is frequently considered as a self limited, transient and physiologic response to surgery. Livingtson, *et al*. suggested that ileus lasting more than 3 days be regarded as paralytic postoperative ileus (**Table 1**) [2]. This complication is a major contributor to prolonged hospital stay [3, 4]. Therefore, no matter whether postoperative ileus is considered normal or abnormal, it has significant economical impacts [5]. Decreasing its incidence and duration will have important social and economic benefits.

Although the exact mechanism of postoperative ileus is not known, multiple factors appear to affect the delay in return of gastrointestinal activity and therefore a multimodal approach is required to decrease its incidence [6]. Multiple medications and interventions have been proposed for the prevention of postoperative ileus (**Table 2**).

Cesarean section, regarded as a low risk procedure, is the most frequently performed major operation in the United States [7]. Therefore, even minor improvements in Cesarean care might have important social and economical benefits.

Successful enteral feeding is considered to accelerate the return of gastrointestinal motility. However, it is also considered as evidence for the successful return of intestinal activity. Early enteral feeding is a generally accepted intervention after cesarean sections [8-10]. 'Early' initiation of enteral feeding for cesarean section generally used for first 6 to 8 hours after surgery [9]. However, the immediate postoperative period has its own problems that early feeding might affect adversely. For example, nausea and vomiting shortly after surgery might lead to aspiration. Therefore, there is inevitable hesitation for both patients and physicians in deciding when to begin oral feeding.

Chewing gum is thought to activate the cephalic phase of digestion mediated by the vagus nerve [11]. Specifically, cholinergic system activation via vagus nerve decreases the release of pro-inflammatory cytokines and reduces the incidence of inflammatory conditions like postoperative ileus and dextran-sulphate induced colitis [12]. Vagus nerve stimulation also has direct immune modulatory effects on gastrointestinal system. Moreover, chewing was shown to decrease secretion of nitric oxide which is the principal inhibitory neurotransmitter of the nonadrenergic, noncholinergic enteric nervous system [13, 14]. Increased nitric oxide-mediated by tissue trauma and inflammation was shown to be associated with postoperative ileus [15, 16]. Interestingly, gum chewing was recently shown to alleviate negative mood and decrease cortisol during acute psychological stress [17].

Six meta-analyses published recently indicate the current interest in the potential benefit of postoperative gum chewing [4, 18-22]. These analyses showed that gum chewing provided beneficial effects like decreased time to flatus and time to defecation. However, despite a trend for lesser hospital stay, this was not reached statistical significance.

Instead of real feeding, sham feeding by gum chewing might have benefits in accelerating the return of gastrointestinal motility after cesarean section. Moreover, sham feeding is certainly easier for physicians than real feeding. In this issue of Anatolian Journal of Obstetrics and Gynecology, Harma *et al*. discuss the benefits of sham feeding after cesarean section [23]. Moreover, using gum chewing as a form of sham feeding, they also discuss the laxative property of ingredients of sugar-free gums. This study has limitations, but it is the first report of using gum chewing in cesarean section. In accordance with other types of abdominal procedures, gum chewing after cesarean section had beneficial effects in terms of time to first bowel sounds. However, the time to first flatus and time to first defecation were not significantly different among the experimental groups. It is also interesting due to use of two types of gum. 'Sugar free' gums that contain hexitols (sorbitol and xylitol) might have laxative effects that also positive effect on prevention of postoperative ileus [24].

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Table 1. Definitions

Term	Definition
Ileus	The functional inhibition of propulsive bowel activity, irrespective of pathogenic mechanism
Postoperative ileus	Uncomplicated ileus occurring following surgery, resolving spontaneously within 2 to 3 days
Paralytic postoperative ileus	Ileus lasting more than 3 days after surgery

The main drawback of all previous studies on gum chewing seemed to be the lack of necessary statistical power for analysis of hospital stay. Design of a study to detect a 1 day difference in hospital stay will require 86 patients in each group (with beta=0.20 and alpha=0.05) [4]. Therefore, reports in the literature mainly focused on surrogate outcomes like time to first flatus, time to first defecation, and time to first tolerated oral feeding. As a result of the paucity of data, even meta-analyses of these studies might lack necessary statistical power to give a conclusion with respect to hospital stay. For cesarean section, with its lesser incidence of postoperative ileus, we indeed need well designed randomized studies, with hundreds of subjects to give a definitive answer to the question of hospital stay. The statistical power of Harma's study is limited similar to previous studies about the subject. Further, hospital stay in cesarean section is related not only to the surgical procedure itself, but also to the condition of the newborn. Even when studies fail to demonstrate a positive effect on hospital stay, gum chewing has no adverse side effects and therefore seems to be a safe and cheap method that seems useful during the transition period to oral feeding.

Another important drawback of the study by Harma, *et al.*, is the lack of subgroup analyses according to type of

Table 2. Proposed treatment modalities for prevention/treatment of postoperative ileus

Pharmacologic agents	
Alvimopan	Mu receptor antagonist. Stimulates bowel activity [25].
Metoclopramid	Increases gastrointestinal motility, Prokinetic effect, May help early oral feeding by decreasing nausea and vomiting.
Cisapride	Increase gastrointestinal motility, prokinetic effect. Withdrawn from market due to side effects.
Mosapride	Serotonin 5-hydroxytryptamine 4 receptor agonist known to promote gastric emptying and large-intestine motility [26].
Erythromycin	May help increase gastrointestinal motility (effect may be mediated by its binding on motilin receptors) [27].
Methylnaltrexone	Peripherally acting opioid antagonist could be administered with opioids does not inhibit central analgesic effect [28].
Atilmotin	Peptide analog of human motilin [28].
Lubiprostone	A bicyclic fatty acid that acts as a chloride channel opener, thereby increasing intestinal water secretion [28].
Laxatives	Stimulates gastrointestinal motility.
Nonsteroid antiinflammatory agents	Decrease the use of opiods, benefit through antiinflammatory effect.
Dai-kenchu-to (DKT)	Direct stimulant of colonic motility [29, 30].
Other measures	
Early feeding	If tolerated, stimulates both cephalic and enteric phases of digestion [5, 31].
Epidural analgesia	Inhibit the action of sympathetic outflow as in thoracolumbar sympathectomy with relative increase in parasympathetic tone on gastrointestinal system. Increase blood flow to the intestines. Decrease the perioperative use of opioids [28].
Gum chewing	Stimulates cephalic phase of nutrituion. Increase antiinflammatory mediators. Stimulates gastrointestinal motility [4, 19].
Decreased use of opioid analgesics	
Early ambulation	

anesthesia. Considering positive effects of local and regional anesthesia in the return of gastrointestinal motility, further analyses of systemic and regional block anesthesia should be done [28]. However, in the current form, this study provides information about typical clinical use of the gum chewing in cesarean section operations performed under general anesthesia. We clearly need additional studies, especially with increased statistical power about the subject.

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