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REVIEW

Meta-Analysis of the Effect of Gum Chewing After Gynecologic Surgery

Seong Hi Park and Myung Sook Choi Q9

Correspondence
Myung Sook Choi, PhD, RN, Department of Nursing, Seoil University, 28 Yongmasan ro 90 gil, Jungnang-gu, Seoul 02192, Korea.
yeoneun@seoil.ac.kr

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ABSTRACT

Objective: To describe the scientific evidence related to gum chewing to reduce ileus after gynecologic surgery.

Data Sources: A literature search was performed using Ovid Medline, Embase, Cochrane Library, CINAHL, Scopus, and Web of Science databases.

Study Selection: Inclusion criteria included randomized controlled trials (RCTs) on the use of gum chewing after gynecologic surgery in which the main outcomes measured were time to first flatus, time to defecation, and length of hospital stay.

Data Extraction: Data on authors, country, randomization method, the type of disease, surgical and anesthetic methods, sample characteristics such as age and body mass index, gum chewing program, and study results were extracted from selected articles.

Data Synthesis: Of 493 publications, eight RCTs conducted between 2013 and 2017 involving 1,077 women were included in our meta-analysis. Weighted mean differences (WMDs) with 95% confidence intervals were calculated for the eight studies with the use of Cochrane Review Manager Version 5.3 (RevMan; 2014). The pooled results showed that gum chewing was superior to no gum chewing, with a reduction in WMD for time to first flatus of −6.20 hours (95% confidence interval [CI] [−9.51, −2.88]), WMD for time to first defecation of −9.03 hours (95% CI [−14.02, −4.04]), and WMD for length of hospital stay of −0.36 days (95% CI [−0.72, −0.01]). Q1 Q2

Conclusion: Gum chewing significantly reduced the time to first flatus and defecation after gynecologic surgery and should be recommended by health care providers.

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Seong Hi Park, PhD, RN, is an assistant professor in the Department of Nursing at Soonchunhyang University, Asan, Korea.

Myung Sook Choi, PhD, RN, is a professor in the Department of Nursing at Seoil University, Seoul, Korea.

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Postoperative ileus is a complication that often occurs after abdominal and pelvic surgery (Lubawski & Saclarides, 2008). The incidence of postoperative ileus after gynecologic surgery ranges from 5% to 25%, and the mean incidence is 10% to 15% (Balayla, Bujold, Lapensée, Mayrand, & Sansregret, 2015; Erowele & Sise, 2010; Fanning & Hojat, 2011; Whitehead et al., 2007). Postoperative bowel management after major gynecologic surgery has changed considerably over the last 2 decades. In general, the traditional postoperative feeding protocol after major abdominal surgery included nasogastric decompression. If a patient did not experience nausea, vomiting, and abdominal distention, the nasogastric tube was removed, and the diet gradually progressed from clear liquid to solid foods. However, because of advancement in surgical methods since the 1990s (e.g., laparoscopic surgery) and the effects of health care economics that emphasize early discharge, the implementation of the traditional feeding protocol after surgery is now being reevaluated (Nicholson et al., 2014). To reduce the occurrence of complications after abdominal surgery, Fanning and Valea (2011) developed a feeding protocol that has been applied after gynecologic surgery as well. Use of this protocol prevents vomiting and ileus through immediate postoperative feeding and bowel stimulation (Balayla et al., 2015; Fanning & Valea, 2011). Q3

As an alternative to the traditional feeding protocol, early oral intake has received increasing interest and has been actively recommended to individuals who undergo laparoscopic surgery (Schulman & Sawyer, 2005). However, use of this method has shown varied results. Several researchers reported that early feeding after abdominal surgery is helpful (Dag, Colak, Turkmenoglu, Gundogdu, & Aydin, 2011; Fujii et al., 2014; Manba et al., 2014; Wang, Chen, Liu, Ma, & Jia, 2015); however, an early feeding regimen did not result in a faster return to usual Q4

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Postoperative ileus is a common experience that can cause increased pain, discomfort, and a prolonged hospital stay.

diet (Bendavid, Martel, Sideris, Drolet, & Dubé, 2012; Shrikhande, Shetty, Singh, & Ingle, 2009). Other researchers reported no relationship between early oral intake after surgery and the development of ileus (Han-Guerts et al., 2007; Rao et al., 2011).

Sham feeding, known to not induce complications, is an emerging alternative to recover bowel function after surgery (Noble, Harris, Hosie, Thomas, & Lewis, 2009). Gum chewing is one of the most common methods of sham feeding, which activates the cephalic-vagal reflex via a mechanism similar to food consumption, thereby stimulating duodenal, stomach, and rectal motility (Fanning & Hojat, 2011). In addition, gum chewing increases the concentrations of gastrin, neurotensin, and pancreatic polypeptide in the plasma and increases the alkali secretion of the duodenum, which, in turn, promotes bowel function (Arosio et al., 2004; Balaji et al., 2002).

Gum chewing is often used to clean the mouth after eating and to prevent bad breath; it is also a nervous habit. However, gum chewing also is actively implemented to prevent dental caries (Burt, 2006), to whiten teeth (Kim et al., 2013; Porciani, Grandini, Perra, & Grandini, 2006), to recover masticatory function, and to relieve pain in individuals who experience discomfort after craniotomy through stimulation of the temporal muscle (Gravish, Winocur, Astandzelov-Nachmias, & Gazit, 2006). Furthermore, gum chewing stimulates the salivary gland and helps prevent drying of the mouth, which allows patients to feel more comfortable (Park & Chung, 2009).

As the diverse treatment effects of gum chewing have gained attention, investigators have reported on its ability to reduce ileus after colorectal surgery or hysterectomy (Ge, Chen, & Ding, 2015; Pereira Gomes Morais et al., 2016). This finding indicates that gum chewing is a safe intervention method in clinical settings. However, the efficacy remains unclear in women who undergo gynecologic surgery. Therefore, we performed a meta-analysis of randomized controlled trials (RCTs) to critically evaluate whether chewing gum reduces the incidence of postoperative ileus in women after gynecologic surgery.

Methods

We conducted our meta-analysis in accordance with the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins & Green, 2011) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher, Liberati, Tetzlaff, & Altman, 2009).

Search Strategies

An electronic literature search was conducted on April 10, 2017, in six databases, including Ovid Medline, Embase, Cochrane Library, CINAHL, Scopus, and Web of Science. We used the MeSH terms *chewing gum* and *gynecological surgical procedure* as keywords. For the search of RCTs, the search filter of the Scottish Intercollegiate Guidelines Network was used in Ovid Medline (Health Care Improvement Scotland, 2015). We also searched RCTs using the article types provided in each search engine. The combinations of search terms used are shown in Supplemental Table S1. We searched the reference lists of all relevant articles manually to identify additional relevant studies and performed a systematic search using Google Scholar to explore the gray literature, including internal reports and conference proceedings.

Inclusion Criteria

The inclusion criteria for studies incorporated in our review were RCTs that included women who had gynecologic surgery and were randomly assigned to gum chewing in the postoperative period. The primary outcomes measured were time to first flatus, time to defecation, and length of hospital stay; the secondary outcomes measured were time to first bowel sound and postoperative nausea and vomiting. Studies that included at least one of the primary and secondary outcomes were included. We did not limit language or the year of publication because we intended to conduct a comprehensive literature search. The first article that met the inclusion criteria was published in 2013, so the publication years of all included studies were between 2013 and 2017.

Study Selection and Data Extraction

We removed duplicates from the list of studies. Then, inclusion criteria were applied by examining the title and abstract; the main text was examined if it was difficult to make an accurate judgment based only on the title and abstract. Data extraction was initially performed by developing an evidence table to review the