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The effect of early mobilization on constipation after abdominal surgery: A systematic review

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Abstract

Background/Aim: Constipation can occur after abdominal procedures. In this study, we investigated whether early mobilization after abdominal surgery is effective for treating constipation.

Methods: We conducted a systematic review of studies implementing early and planned mobilization after abdominal surgical procedures. We extracted studies published from 2012–2022 from six electronic databases: PubMed, Google Scholar, Science Direct, Cochrane, TürkMedline, and Ulakbim. The data were collected by two reviewers following a pre-designed subtraction form. We made use of narrative synthesis when presenting our results.

Results: We examined 10 articles that satisfied the inclusion criteria; patients underwent a cesarean section in four studies, bariatric surgery (gastric bypass) in one study, liver resection in one study, radical cystectomy in two studies, cholecystectomy in one study, and a kidney transplant in one study. The studies were characterized by differences in the early mobilization programs applied to patients after abdominal surgery. In two of the studies, the patients were mobilized accordingly to daily step goals; in five studies only early stimulation and walking attempts were utilized. In three of the studies, the patients were mobilized within the scope of mobilization programs prepared in detail after surgery, and the targets were determined in terms of distance walked. All of the studies stipulated that physical activity should gradually increase over time.

Conclusion: Early and planned mobilization programs applied after surgery had positive effects on first gas/first stool output time, the severity of abdominal distension, the occurrence of nausea/vomiting, and the onset of oral intake.

Keywords: abdominal surgery, early mobilization, planned mobilization, constipation

Introduction

Abdominal surgical interventions, which refer to operations performed on organs within the abdominal region, are surgical interventions in which major or minor complications are still occasionally observed despite technological and methodological advances [1]. Causes for abdominal surgery includes diseases of the stomach, gallbladder, liver, spleen, pancreas, small intestine, and large intestine [2]. Some problems observed after abdominal surgery are related to the gastrointestinal system [3-5]. Constipation is an abnormal condition in which the stool is hard and dry; voiding is furthermore infrequent and defecation may be difficult [6,7]. In the early postoperative period, rest, opioid/nonopioid analgesic drugs and the necessity of using slide/duck can all cause constipation [8]. Constipation can negatively affect quality of life and cause discomfort, and treating this issue is important in terms of truly individualizing care [6,9-11].

Early mobilization is important for rapid recovery and is one of the most effective methods for early initiation of bowel movements [12]. Patients may experience limited mobilization, however, due to pain, nausea, dizziness, fatigue, surgical complications, continued intravenous fluid intake, and the use of auxiliary equipment such as urinary catheters during the postoperative period [13-16]. Early mobilization is considered to be one of the cornerstones of Enhanced Recovery After Surgery (ERAS) protocols, and it is recommended after abdominal interventions [13,17]. According to ERAS protocols, patients should engage in activities from bed for at least two hours on the day of surgery and at least six hours per day until discharge [12,13]. Early mobilization studies in the literature have focused on the time of first mobilization, frequency, application protocol, the use of different measurement tools for evaluating mobilization (e.g., a pedometer or wearable technologies for determining walking distance in meters). It is recommended that patients receive a patient-specific care plan that defines daily targets for mobilization; patients should furthermore create a diary recording their out-of-bed activities [12]. Early mobilization practices and correct nutrition during the perioperative period can slow down the catabolic process that accelerates after surgery, reduce the risk of surgery-related stress response and ileus, and accelerate recovery [18]. Engaging in physical activity not long after abdominal surgical interventions is important to reduce recovery time and costs [19]. Studies have demonstrated that mobilization in surgical patients is an unmonitored nursing intervention [20,21]; patient follow-up is also a basic nursing intervention to increase mobility after surgical interventions [22].

This systematic review sheds light on information about the effects of early and planned mobilization conducted after abdominal surgical interventions and its effect on constipation.

Materials and methods

Research strategy

This systematic review was based on specific databases (PubMed, Google Scholar, Science Direct, Cochrane, TürkMedline, and Ulakbim) queried using the keywords "abdominal surgery", “early mobilization and surgery”, “early mobilization and constipation”, “early mobilization and initial flatus”, and “early mobilization and ileus and constipation”. The last search was conducted on September 22, 2022. We tabulated a total of 5,550 studies (2,000 from PubMed, 403 from Google Scholar, 1,180 from ScienceDirect, 1,167 from Cochrane, 390 from TürkMedline, and 410 from Ulakbim). Duplicate articles were identified (n=470) and excluded. The titles and abstracts of the remaining studies (n=5,080) were reviewed by the researchers and evaluated for compliance with the criteria determined within the scope of the study. We isolated 10 studies for inclusion in this systematic review. We made use of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) checklist tool to review the literature and summarize and report our results [36].

Inclusion criteria

Randomized controlled, experimental, and quasi-experimental design-type studies correlated with full-text articles published between 2012 and 2022 in Turkish and/or English were included.

Exclusion criteria

Review studies, retrospective and observational studies, studies involving intensive care units and pediatric patients, and articles and dissertations defined as gray literature, were not included. In addition, studies in which multiple ERAS protocols were used in abdominal surgery procedures were not included because they did not evaluate the effect of early mobilization practices alone.

Results

Eight of the studies satisfying the inclusion criteria were randomized controlled experiments, and two were of quasi-experimental control group research design.

The patients underwent a cesarean section in four studies, bariatric surgery (gastric bypass) in one study, liver resection in one study, radical cystectomy in two studies, cholecystectomy in one study, and a kidney transplant in one study. The investigations reported different early mobilization programs. In two of the studies, the patients were mobilized on the basis of daily step goals; in five of the studies, the patients only received early physical stimulation and opportunities to walk. In three of the studies, patients were mobilized within the scope of the mobilization programs prepared in detail after surgery, and the targets were determined to be distance walked. All of the studies gradually increased physical activity over time (Table 1).

In addition to constipation, early mobilization, the development of diarrhea, pain severity, fatigue, time of first bowel movements and sounds, length of hospital stay, walking distance, time spent sleeping, the incidence of a mother holding a baby after birth, rates of complications, quality of life, vital signs, wound healing time, and patient satisfaction were also tabulated.

The investigations revealed that the first gas and stool output times of the patients who woke up early after surgery were significantly shorter than the corresponding times of patients not woken up early after surgery. Furthermore, gastrointestinal motility and bowel sounds returned in a significantly shorter amount of time in the intervention-group

Table 1: Summary of the studies included in the systematic review

Authors and year of publication	Title of the research	The design type of the research and the number of samples	Measurement tool(s) used	Research protocol	Results and conclusion
Zhu et al. 2021 [43]	Early mobilization intervention for patient rehabilitation after renal transplantation	Randomized controlled study Intervention=35 Control=35	Data are patient identification forms and the patients' activity diaries	An FTS-based early mobilization intervention was applied to the study group. Patients were allowed to turn in their own bed on postoperative day 1, and they practiced sitting up in bed on the 2nd postoperative day and performed rehabilitation exercises in bed with the help of postoperative nursing staff. On the 3rd postoperative day, the patients were allowed to do activities at their bedside. Changes in the vital signs of the patients were closely monitored.	The duration of bowel sounds, first gas and defecation were found to be significantly different in the study group compared with the control group (P<0.05).
Aldemir and Sayılan 2020 [37]	Effect of a mobilization program administered after open cholecystectomy on sleep duration and several other clinical variables	Experimental control study Study group=32 Control group=32	The data are from patient information forms, postoperative follow-up chart entries, a visual comparison scale, and pedometer printouts.	The patients in both groups were moved from their bed at the 7th hour postoperatively. Patients in the experimental group moved a total distance of 250–500 meters on the 1st postoperative day, 500–1500 meters on the 2nd postoperative day, and 1500–3500 meters on the 3rd postoperative day. The specified distance was divided into five time periods, and the patients were asked to walk with a pedometer. The control group was informed that they should carry a pedometer on the 1st, 2nd, and 3rd postoperative days. However, unlike the experimental group, patients in the control group did not receive any walking distance recommendations from the research nurse.	The first gas and stool outputs of the patients in the study group were earlier than those of the control group, and the walking distances of the patients in the study group were furthermore significantly longer (P<0.05).
Barai and Vahitha 2019 [35]	Effectiveness Of Early Ambulatıon On Post-Operatıve Recovery Among Prımıparous Post Cesarean Mothers-A Randomızed Control Trıal	Randomized controlled study Intervention=62 Control=62	- Numerical rating scale -Structured observation chart -Survey form -Mobilization hours and distance records	Patients in the intervention group were awakened 6 hours after their operation and were mobilized three times a day at 6-hour intervals for the first five days. Mobilization durations were increased day by day. Patients in the control group were mobilized after 18 hours according to a routine procedure. At the end of every 24 hours, the patients were evaluated for their first gassing.	There was a significant difference between the first gas output times of the patients in the intervention and control groups after surgery (P<0.05).
Herman et al. 2019 [40]	The Effect of Early Mobilization on Intestinal Peristaltics in Patients after a Cesarean Section in Kendari City Hospital	Quasi-experimental controlled study Study group=36 Control group=36	- Patients' activity diaries, Daily exercise	Patients were divided into two groups: 36 patients in the early mobilization group and 36 patients in the control group. The mobilization group started with leg exercises 4 hours after cesarean section. Standard treatment was initiated 10 hours after cesarean section in the control group.	In the early mobilization group, there was a significant improvement in intestinal peristalsis.
Hassan et al. 2019 [39]	Effect of Three Different Nursing Interventions on Intestinal Motility and Women's Satisfaction Post-Cesarean Section Birth	Randomized controlled trial Intervention 1=60 Intervention 2= 60 Intervention 3= 60 Control=60	Structured interview questionnaire -Numbered rating scale -Stethoscopic abdominal assessment -Visual analog scale -Patient satisfaction	The patients were divided into four groups (three intervention groups and one control group). Surgical patients in the early mobilization group were mobilized from the 4th hour after cesarean section, and they were allowed to walk at least 5–10 meters three times per day. Patients in the control group were mobilized 8 hours after surgery. The patients were evaluated in terms of postoperative nausea/vomiting, abdominal distension, bowel movements, gas and stool output every 2 hours for the first 2 hours and every 2 hours thereafter.	Early mobilized patients exhibited significantly shorter first gas output times compared with patients in the control group (P<0.05); early mobilized patients also exhibited shorter first stool exit times (but this difference was not significant).
Wiklund et al. 2015 [19]	Physical Activity in the Immediate Postoperative Phase in Patients Undergoing Roux-en-Y Gastric Bypass-a Randomized Controlled Trial	Randomized controlled trial Intervention=30 Control=25	-Pedometer -Patients' activity diaries -Postoperative recovery questionnaire -Patients in the intervention group provided daily step goals -Assessments of the step targets of patients in the intervention group	Before the study, all patients were informed about the importance of postoperative mobility. Patients in the intervention group mobilized in line with their daily step targets using a pedometer. All of the patients recorded the time they spent lying down, sleeping, walking, sitting, passing gas/stool, and the number of days they stayed in the hospital.	Despite the fact that there was no significant difference between the time of first gas and stool output between the groups (P>0.05), the patients in the intervention group exhibited shorter times to first gas and stool output. Planned and targeted mobilization practice increases the number of steps taken after surgery and facilitates mobilization.
Sahin and Terzioğlu 2015 [32]	The Effect of Gum Chewing, Early Oral Hydration, and Early Mobilization on Intestinal Motility After Cesarean Birth	Randomized controlled trial 240 participants, 7 intervention groups and 1 control group for a total of 8 groups; 30 patients in each group	-Patient information form -Gastrointestinal mobility assessment	The patients in the control group were mobilized at the 8th hour postoperatively in line with routine practices; the patients in the early mobilization group were mobilized at the 4th hour postoperatively when their vital signs were stable after being seated at the bedside for 10 minutes. Patients in the intervention group walked 5–10 meters three times per day.	It was determined that the first gas discharge time, the first intestinal motility onset time and the first gas transit time of the patients in the group in which all interventions including early mobilization were applied occurred significantly earlier than the control group (P<0.05). As a result of the study. It has been reported that early mobilization, chewing gum, and transition to early oral feeding are important interventions to shorten the hospital stay and reduce the risk of postoperative ileus development.
Ni et al. 2018 [33]	Early enforced mobilization after liver resection: A prospective randomized controlled trial	Randomized controlled trial Intervention=60 Control=60	Fitbit Flex smart wristband -Patient information form	Patients in the control group were told to only do in-bed exercises for 1–2 days after surgery and to stand by their bed on the 3rd postoperative day. Gradual mobilization was then introduced. The patients in the intervention group and their families were informed about early mobilization during the preoperative period, and their mobilization was performed when their vital signs and general conditions were stable after surgery. In-bed extremity exercises were performed on the 0th postoperative day for between 20 and 40 minutes each hour for the patients in the intervention group. On the 1st postoperative day, the patients were given breathing and coughing exercises in a semi-sitting position. Active-passive exercises were continued, and they were allowed to sit on their bed 2–3 times during the day and hang their feet. On the 2nd postoperative day, the catheter and drainage tubes of the patients were removed, and they were allowed to walk 2–3 times a day for a total of 250–500 meters. On the 3rd postoperative day, the patients were allowed to walk a total of 1500–3000 meters and to stand up more than 5 times per day. Evaluations were made at appropriate times according to the condition of each patient, and the amount of activity was determined according to the patient's needs.	The duration of nausea and vomiting and the first gas and stool output times of the patients in the intervention group were found to be significantly shorter (P<0.05). It was determined that the patients in the intervention group took a shorter time to experience abdominal distension than the control group, although this difference was not significant (P>0.05).
Dube and Kshirsagar 2014 [38]	Effect of Planned Early Recommended Ambulation Technique on Selected Post caesarean Biophysiological Health Parameters	Semi-experimental control group study Intervention=250 Control=250	Structured observation chart -Biophysiological parameters -Visual analog scale	Patients in the intervention group were given respiratory, coughing and leg exercises to perform 5–6 hours after their operation. Patients were asked to mobilize three times per day, at 3–4-hour intervals, over the first five days following surgery. Patients in the control group got out of bed and conducted leg exercises on the 3rd postoperative day. All of the patients were evaluated in terms of intestinal motility, abdominal distension, breast status, biophysiological parameters, and incisional pain for the first five days following surgery.	Compared with patients in the control group, the patients in the intervention group exhibited a significant decrease in peristaltic activity (P<0.05), abdominal distension and tenderness. Early planned mobilization can accelerate recovery after cesarean section.
Jensen et al. 2014 [41]	Multidisciplinary rehabilitation can impact on health-related quality of life outcome in radical cystectomy: secondary reported outcome of a randomized controlled trial	Randomized controlled trial Intervention=50 Control=57	-Patient information form -EORTC Quality of Life Core Questionnaire 30 (QLQ-C30) -Preoperative and postoperative EORTC BLS24 (bladder symptom-specific) EORTC BLM30 (14–17 days before surgery EORTC QLQC30 + EORTC BLS24; 4 months after surgery EORTC QLQC30 + EORTC BLM30) - one day before discharge EORTC INPATSAT- 32 inpatient satisfaction survey -Katz Scale -Charlson Comorbidity Index -Nutrition Risk Screening-2002 -Mobilization in determining hours and walking distance (meters) by clinical staff and patients -Recorded activity logs -Bristol scale -Visual analog scale	The same ERAS was applied to patients in the intervention and control groups. Two weeks after surgery, patients in the intervention group started an exercise program. Patients in the control group received a standard mobilization procedure and were evaluated only once a day by a physiotherapist. All patients provided assessments at various time points, and all patients maintained a mobilization log detailing pain and nausea severity. Patients received follow-up phone calls after being discharged.	There was no significant difference in the incidence of nausea and vomiting between the groups (P=0.36); patients in the intervention group exhibited less-developed abdominal distention and constipation (P=0.05 and P=0.02, respectively).

patients. Postoperative constipation and abdominal distention and abdominal tenderness were also reduced in surgical patients who were mobilized early, and the rates of postoperative nausea and vomiting also dropped. Additionally, oral intake was achieved in a shorter amount of time in those patients

Discussion

Mobilization interventions after abdominal surgery accelerate gastrointestinal motility, promote normalization of bowel functions, and reduce the severity of abdominal distention [1,23]. Data from the studies that we reviewed support the viewpoint that postoperative mobilization programs are effective interventions that can reduce the constipation experienced by patients.

One of the most common symptoms of gastrointestinal motility following abdominal surgery is postoperative constipation [24,25]; postoperative mobilization programs should aim to provide prompt relief for constipation. It has been reported that postoperative applications given to abdominal surgery patients shorten the period of first swelling in early and planned mobilization programs [26-29]. The results of the studies that we reviewed emphasize that although mobilization programs applied after abdominal surgical interventions differ in their structure, they often have a positive effect on bloating and defecation time. Studies have also reported a decrease in the rate of development of ileus and other complications that are observed in the gastrointestinal tracts of patients who undergo abdominal surgery and planned mobilization programs after surgery [30,31]. The studies in this systematic review showed that early and planned mobilization programs shorted the first stool exit times of patients after abdominal surgery [19,29,32,33]. These applications accelerate the process by which the gastrointestinal tract returns to normal. One of the primary symptoms of ileus that can develop after surgery is an inability to tolerate oral intake [24,25]. Sindell et al. [26] examined the effect of early mobilization on the onset of oral intake after abdominal surgery and found that the time to initial oral intake was shortened and that total oral intake increased during the postoperative period in patients who were early or excessively mobilized [27,28,34]. However, this effect was evaluated in only one of the studies included in this systematic review [35]. That investigation found that early and planned mobilization can boost gastrointestinal motility and enable oral intake to be tolerated relatively rapidly after surgery.

Conclusion

Early and planned mobilization practices have positive effects on the prevention of constipation-related complications. However, there is a need for additional well-designed randomized controlled studies that evaluate the effectiveness of mobilization programs in more research settings and in different patient groups.

International standards regarding early mobilization programs should also be established; such programs could be adapted according to the type of surgical intervention and the individual characteristics of the patient.

In the literature, it has been seen that the effects of early mobilization practices on constipation results after cesarean section have been tried to be determined. However, postoperative gastrointestinal system functionality is also very important, especially in bariatric surgery patients who have undergone colorectal surgery and are now widely practiced. In addition to the initial gas/fecal discharge time, the frequency of defecation, the amount of oral intake, the severity of nausea-vomiting, and abdominal distension are important nursing interventions for patients to return to their pre-operative regularities in the gastrointestinal tract after surgical intervention. However, it is noteworthy that studies generally try to determine the time of first gas/fecal output after surgery and other factors have been examined in a limited number of studies.

International standards regarding early mobilization programs should also be established; such programs could be adapted according to the type of surgical intervention and the individual characteristics of the patient.

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