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Effect of Preoperative Walking Exercise on Postoperative Bowel Function in Patients with Major Gynecological Surgery: A randomized clinical trial

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ABSTRACT

Objectives: To investigate the relationship between preoperative walking exercise and postoperative bowel function in patients undergoing major gynecological surgery.

Materials and Methods: This randomized trial was conducted between July 2022 and January 2023 and included patients who underwent major gynecological surgery. All patients received a standard of care followed by enhanced recovery after surgery protocols. In addition, patients in the exercise group performed 30 minutes of mild intensity walking exercise (at 30% of their maximal heart rate) twice before surgery.

Results: Of the 42 enrolled patients, 17 and 18 patients from the exercise and control group were analyzed, respectively. There were no significant differences in characteristics between the groups. Time to first tolerance of an oral diet did not differ significantly between the groups (22.0 ± 5.9 hours in the exercise group vs 26.3 ± 10.3 hours in the control group, p = 0.144), and neither did time to first achievement of normoactive bowel sound or length of hospital stay. However, patients with an estimated blood loss greater than 1,000 mL had benefit from the intervention, with a shorter time required to tolerate an oral diet (20.0 ± 1.4 hours vs 45.5 ± 3.5 hours, p = 0.011).

Conclusion: There is still insufficient data to encourage routine preoperative walking exercise before surgery in patients with benign gynecological conditions. However, preoperative walking exercise may be beneficial for patients who are at high risk of extensive blood loss during surgery.

Keywords: preoperative exercise, walking, postoperative, ileus, bowel function.

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ผลการเดินออกกำลังกายก่อนผ่าตัดต่อการฟื้นตัวของการทำงานของลำไส้ในผู้ป่วยหลังการผ่าตัดใหญ่ทางนรีเวช, การทดลองทางคลีนิคแบบสุ่ม

อธิชา ผาตินาวิน, ยุทธนา ของทิพย์

บทคัดย่อ

วัตถุประสงค์: *เพื่อศึกษาความสัมพันธ์ระหว่างการเดินออกกำลังกายก่อนผ่าตัด และการฟื้นตัวของทางเดินอาหารในผู้ป่วยที่เข้ารับการผ่าตัดใหญ่ทางนรีเวช*

วัสดุและวิธีการ: *วิจัยนี้เป็นการทดลองแบบสุ่มและมีกลุ่มควบคุม ทำการทดลองในเดือนกรกฎาคม 2022 ถึงเดือนมกราคม 2023 ผู้ป่วยทั้งหมดเข้ารับการผ่าตัดใหญ่ทางนรีเวช ผู้ป่วยในกลุ่มควบคุมจะได้รับการดูแลตามมาตรฐานตามมาตรการฟื้นตัวไว ในขณะที่กลุ่มออกกำลังกายจะเดินในคืนก่อนผ่าตัดช่วงละ 30 นาที ทั้งหมดสองช่วงที่ความหนักระดับอ่อน (ร้อยละ 30ของอัตราเร็วหัวใจเต้นสูงสุด)*

ผลการศึกษา: *จากผู้ป่วยเข้าร่วมงานวิจัยทั้งหมด 42 ราย ผู้ป่วยในกลุ่มเดินออกกำลังกาย 17 ราย และในกลุ่มควบคุม 18 ราย ถูกนำมาวิเคราะห์ พบว่าไม่มีความแตกต่างทางข้อมูลประชากรในทั้งสองกลุ่ม สรุปผลว่าระยะเวลาที่ผู้ป่วยสามารถเริ่มทานอาหารได้หลังการผ่าตัดไม่แตกต่างกัน (22.0 ± 5.9 ชั่วโมง ในกลุ่มเดินออกกำลังกาย vs 26.3 ± 10.3 ชั่วโมง ในกลุ่มควบคุม, p = 0.144) ระยะเวลาที่เสียงการทำงานของลำไส้กลับมาเป็นปกติ และระยะเวลาการนอนโรงพยาบาลไม่มีความแตกต่างเช่นกัน ผู้ป่วยที่มีการเสียเลือดระหว่างผ่าตัดมากกว่า 1,000 มิลลิลิตร ได้รับประโยชน์จากการเดินออกกำลังกาย โดยมีระยะเวลาที่ผู้ป่วยสามารถเริ่มทานอาหารได้หลังการผ่าตัดน้อยกว่า (20.0 ± 1.4 ชั่วโมง ในกลุ่มเดินออกกำลังกาย vs 45.5 ± 3.5 ชั่วโมง ในกลุ่มควบคุม, p = 0.011)*

สรุป: *ไม่มีหลักฐานสนับสนุนการเดินออกกำลังกายก่อนการผ่าตัดในกลุ่มผู้ป่วยที่ไม่ใช่โรคมะเร็งนรีเวชทุกคน อย่างไรก็ตาม การเดินออกกำลังกายก่อนผ่าตัดในกลุ่มผู้ป่วยที่มีความเสี่ยงที่จะเสียเลือดมากกว่า 1,000 มิลลิลิตร สามารถช่วยกระตุ้นการฟื้นตัวของทางเดินอาหารได้*

คำสำคัญ: *การออกกำลังกายก่อนผ่าตัด, การเดิน, หลังการผ่าตัด, ลำไส้อืด, การทำงานของลำไส้*

Introduction

Postoperative bowel ileus is a serious healthcare issue that lengthens hospitalization time and increases the risk of postoperative complications, as well as public health expenditures[1, 2]. Bowel ileus is defined as the inability to tolerate an oral diet, a delay in defecation or flatulence lasting more than four days after surgery[3]. The incidence of bowel ileus has been reported to range from 2.9% to 30% in women undergoing laparotomy gynecological surgery[4-7], with factors such as resection surgery type, operative time, opioid analgesic usage, nasogastric catheter insertion, fluid balance, receipt of blood component transfusion, and postoperative abdominopelvic complications being associated with postoperative bowel function recovery[5, 8].

Various interventions have been introduced to prevent postoperative bowel ileus, including the enhanced recovery after surgery (ERAS) protocol, which involves early feeding, coffee consumption, gum chewing, euvolemia, early ambulation, and multimodal analgesia[9]. Preoperative walking exercise has also been shown to improve postoperative bowel function, with researchers investigating the association between walking exercise and bowel function since 1989 and finding that mild intensity walking exercise had the greatest effect on gastric emptying time[10,11].

Walking exercise is employed in various healthcare settings. A randomized controlled trial demonstrated that walking exercise during bowel preparation in patients undergoing colonoscopy is safe and can improve bowel cleansing without significant patient discomfort[12]. However, a systematic literature review conducted using MeSH terms such as ileus, preoperative exercise, walking and/or ambulation, gynecology, and surgery, yielded only one randomized study by Ozdemir in 2019, which showed that preoperative walking exercise significantly reduced the time taken to tolerate solid food, time to first flatus, time to first defecation, and the incidence of postoperative paralytic ileus[10]. Nevertheless, since the study was only conducted in gynecological malignant patients, there is insufficient information to demonstrate the benefits to benign gynecological patients, who comprise the majority of those scheduled for elective major gynecological surgery. Additionally, the report did not highlight the limitations and complications associated with the intervention. The objective of this study was to examine the impact of preoperative walking exercise on postoperative bowel function in patients undergoing major gynecological surgery, as well as to identify any associated intervention related complications.

Materials and Methods

This study was a single center, non-blind, balanced randomization (1:1), standard treatment-controlled, parallel-group study conducted at Chonburi Hospital, a tertiary healthcare center in eastern Thailand. After obtaining approval from the institute ethics committee (reference number 17/65/R/h3), this randomized trial was conducted from July 1, 2022, to January 1, 2023. All enrolled patients provided written informed consent, and the study was registered in the Thai Clinical Trial Registry (TCTR20230103003).

The study recruited patients between the ages of 18 and 65 who were scheduled for elective major gynecological surgery and expected to have intrabdominal operative time longer than 30 minutes. The exclusion criteria included patients scheduled for laparoscopic surgery or spinal anesthesia, patients with an initial pain score of more than 3 points on the numeric rating scale, a history of abnormal bowel movement (constipation, diarrhea, or excessive straining) or inflammatory bowel disease, bowel obstruction, previous bowel surgery or planning of bowel resection, bowel preparation, inability to walk without assistance, abnormal laboratory investigation, cardiovascular disease, pulmonary disease, or osteoarticular disease. Other exclusion criteria were serious adverse events during exercise, a maximal heart rate of more than 220 minus age in years beats per minute, or less than 94% of pulse oximetry during exercise, bowel injury during surgery, and transfer to an intensive care unit or another hospital.

Patients admitted for gynecological services

were randomized into two groups using a computer-generated randomization sequence. Concealed block randomization was employed with a block size of six, and sequentially numbered sealed envelopes were utilized for allocation. The study was not blinded following the assignment of interventions.

All patients received standard care following the ERAS protocol. In the exercise group, patients participated in supervised walking exercise sessions lasting 30 minutes, conducted twice at a mild intensity corresponding to 30% of their maximum heart rate determined by the Karvonen formula[13]. These exercise sessions were supervised by physicians and took place between 16:00 and 22:00 on the day before surgery. Patients were instructed to adjust their walking speed to ensure their heart rate fell within the target range or to slow down if their heart rate exceeded the target. A one-hour break was recommended between exercise sessions. Patients were advised to promptly report any complications experienced during the intervention to their supervisor. Additionally, a pulse oximeter was attached to the middle finger of each participant.

After registration, the ERAS protocol was implemented. Prior to anesthesia, all patients followed a fasting period of up to 8 hours for light meals and up to 2 hours for clear fluids, without mechanical bowel preparation. Prophylactic intravenous antibiotics were administered to patients 15 minutes before the surgical incision.

Following the surgery, the nasogastric tube (if used during the procedure) was removed, and all patients received standardized postoperative care. This care included the ability to drink clear fluids (ranging from 50 to 800 mL) four hours after surgery. Pain management involved the administration of 50 mg of intravenous pethidine every 4 hours, along with regular oral paracetamol. Additional opioid or non-steroidal analgesics were given as needed, while metoclopramide was prescribed to address any instances of nausea or vomiting.

Patients were allowed to resume their liquid and solid diets once they showed no signs of adverse symptoms. Discharge from the hospital occurred when patients had stable vital signs, were free from fever for a minimum of 24 hours (defined as a body temperature ≥ 38°C in one measurement or ≥ 37.8°C in two measurements), were able to walk without assistance, could tolerate solid food without experiencing vomiting, had normal urination, and did not have any other postoperative complications.

The primary outcome measure in this study was the duration (in hours - hr) required for patients to tolerate a solid diet that necessitated chewing, providing more than 5 kcal/kg/meal. This criterion aligns with the guideline criteria outlined by the European Society for Clinical Nutrition and Metabolism[14] for discontinuing intravenous fluid or parenteral nutrition. The measurement period commenced at the conclusion of the surgical procedure, and the outcome assessors calculated the calorie content per meal using a weighing machine and measuring spoon.

After the surgery, the bowel sounds of each patient were monitored every six hours using a stethoscope until the first bowel sound was auscultated. Patients were instructed to promptly notify their doctor, nurses, or researcher upon experiencing their initial passage of flatus and feces. Furthermore, the researcher maintained weekly contact with the patients to assess postoperative complications and ascertain their readmission status.

Secondary outcomes included the time required for the first instance of normoactive bowel sounds (1-2 bowel sounds within 1 minute, as auscultated by stethoscope), the time for the first passage of flatus and stool, diagnosis of pathologic ileus according to Vather et al definition as mentioned above[3], occurrence of adverse events during walking exercise, postoperative complications, length of hospital stays, additional antiemetic, intravenous analgesic requirements, and readmission rate within one month. Based on previous research conducted by Ozdemir et al in 2019[10], the mean time to first tolerance of a solid diet in the exercise group and control group was 81.6 (±16.8) and 103.2 (±19.2) hours, respectively. To

achieve 90% study power with an α level of 0.05 and an assumed 20% dropout rate, a total of 42 patients were enrolled.

The normal distribution of variables was assessed using the Shapiro-Wilk tests. Categorical variables were compared using chi-square tests, while independent t-test was used to compare normally distributed continuous variables, and Welch's t-test was employed to compare unequal variables. The statistical analyses were performed using Stata (version 16). An intention-to-treat protocol was applied, with subgroup analysis conducted on affecting factors such as intraoperative procedure, operative time, amount of blood component transfusion, and estimated blood loss. A p value of less than 0.05 was considered statistically significant.

Results

A total of 45 patients were assessed for eligibility, out of which 42 were enrolled during the trial period, with 21 assigned to the walking exercise group and 21 to the control group (Fig. 1). Among the walking exercise group (E group) , two patients suffered from small bowel injuries, one required an appendectomy, and another was transferred to the surgical intensive care unit. In the control group (C group), two patients also experienced small bowel injuries, and one underwent an appendectomy due to an abnormal intraoperative finding. As anticipated, no individuals with bowel or pelvic adhesions were included in our study. Ultimately, 17 patients from the walking exercise group and 18 patients from the control group were included in the analysis.

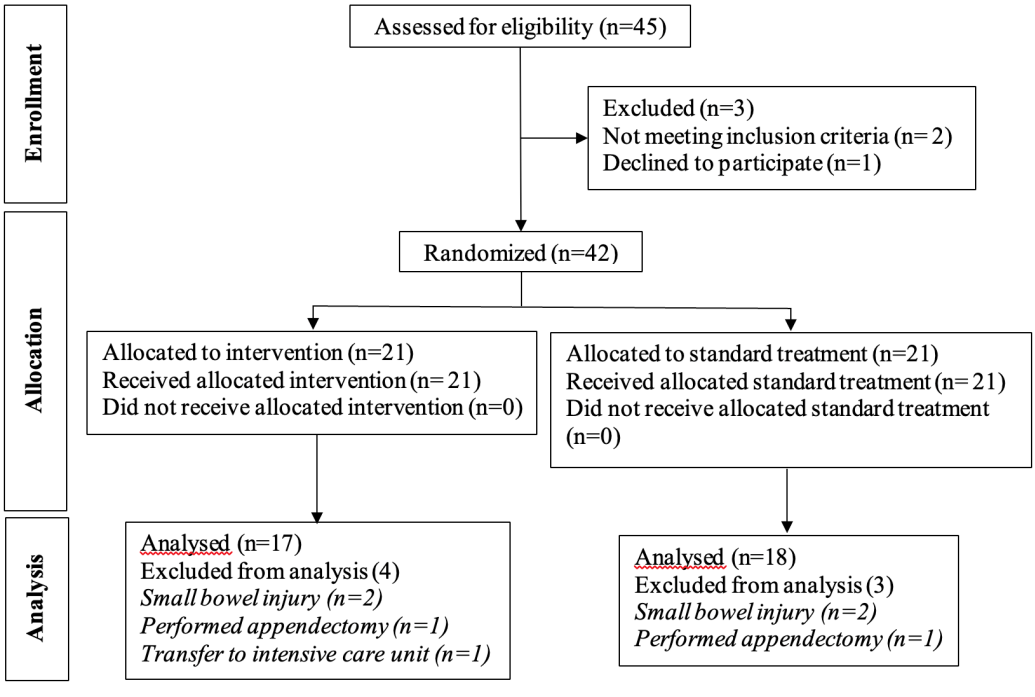

Fig. 1. Flow diagram.

The percentage of patients who walked and reached their target heart rate was 88.2% (n = 15). Patient characteristics of each group were comparable (Table 1). In the E group, 47.1% of patients had prior abdominopelvic surgery, while 50.0% in the control group had the same history. One patient in the E group was on antidepressant medication, and another used an anticholinergic substance. However, none of the patients in the C group used either of these medications.

Table 1. Baseline characteristics.

Baseline Characteristics	Control (n = 18)	Walking exercise (n = 17)
Age (years); mean ± SD	44.3 ± 8.4	39.8 ± 7.6
BMI (kg/m2); mean ± SD	24.8 ± 5.4	26.2 ± 5.2
Race; n (%)		
Thai	16 (88.9)	16 (94.1)
Other*	2 (11.1)	1 (5.9)
Parity; mean ± SD	1.1 ± 1.0	1.7 ± 1.3
Prior abdominopelvic surgery; n (%)	9 (50.0)	8 (47.1)
Cesarean delivery	6 (33.3)	2 (11.8)
Cystectomy	3 (16.7)	8 (47.1)
Salpingectomy	1 (5.6)	0 (0)
Previous abdominal surgical scar; n (%)		
Low midline incision	4 (22.2)	3 (17.6)
Pfannenstiel incision	4 (22.2)	3 (17.6)
Infraumbilical incision	1 (5.6)	2 (11.8)
Alcohol drinking; n (%)	1 (5.6)	1 (5.9)
Tobacco use; n (%)	0 (0)	2 (11.8)
Coffee drinker; n (%)	10 (55.6)	9 (52.9)
Medical condition; n (%)		
Diabetes mellitus	1 (5.6)	2 (11.8)
Hypertension	1 (5.6)	1 (5.9)
Other comorbid disease**	3 (16.7)	5 (29.4)
Medication; n (%)		
Antidepressant	0 (0)	1 (5.9)
Anticholinergic agents	0 (0)	1 (5.9)
Other bowel effected medication***	5 (27.8)	5 (29.4)
Preoperative hemoglobin (g/dL); mean ± SD	12.0 ± 1.6	12.6 ± 1.6

SD: standard deviation, BMI: body mass index, Kg: kilogram, m: meter, g: gram, dL: deciliter

*In control group, one was Cambodian, and one was Lao. In walking exercise group, one was Burmese.

**In control group, two with human immunodeficiency virus infection and one who had well-controlled thyroid disease. In the walking exercise group, two with human immunodeficiency virus infection, one with occasional migraine, one with major depressive disorder, and one who had allergic rhinitis.

***In control group, two were taking tenofovir disoproxil fumarate/ lamivudine/ dolutegravir sodium, one was taking ferrous fumarate, one was taking metformin, and one was taking amlodipine. In walking exercise group, two were taking tenofovir disoproxil fumarate/ lamivudine/ dolutegravir sodium, two were taking metformin, one was taking ergotamine and one was taking amlodipine.

The pathology of surgical lesions in this study was predominantly benign (Table 2). Hysterectomy was the most frequent intraoperative procedure performed in both groups (58.8% in the E group and 55.6% in the C group). The operative time, type of anesthesia, estimated blood loss, volume of perioperative intravenous crystalloid, insertion of postoperative closed-suction percutaneous drain, dosage of perioperative morphine, and usage of anticholinergic drugs were comparable between the two groups.

Table 2. Surgical characteristics.

Surgical characteristics	Control (n = 18)	Walking exercise (n = 17)
Pathology of surgical lesion; n (%)		
Benign	16 (88.9)	14 (82.4)
Malignancy	2 (11.1)	3 (17.6)
Intraoperative procedure; n (%)		
Adnexal surgery	6 (33.3)	6 (35.3)
Hysterectomy	10 (55.6)	10 (58.8)
Surgical staging*	2 (11.1)	1 (5.9)
Operative time (minutes); mean ± SD	117.2 ± 48.4	115.4 ± 56.9
Type of anesthesia; n (%)		
General Anesthesia	18 (100)	16 (94.1)
Combine (Spinal block and General anesthesia)	0 (0)	1 (5.9)
Estimated blood loss (mL); mean ± SD	403.3 ± 337.8	363.5 ± 371.8
Postoperative closed-suction percutaneous drain; n (%)	0 (0)	1 (5.9)
Perioperative morphine used (mg); mean ± SD	10.0 ± 2.1	9.0 ± 1.6
Perioperative anticholinergic agent used (mg); mean ± SD		
Succinylcholine	52.8 ± 56.2	63.5 ± 57.4
Cisatracurium	10.3 ± 6.0	12.6 ± 5.7
Blood component transfusion (mL); mean ± SD	74.1 ± 149.6	39.7 ± 163.5
Perioperative intravenous crystalloid (mL); mean ± SD	1,391.7 ± 581.6	1,511.8 ± 788.7

mL: milliliter, mg: milligram, SD: standard deviation

*In control group, one was performed radical hysterectomy with bilateral salpingo-oophorectomy with bilateral pelvic lymph node dissection, and one was performed transabdominal simple hysterectomy with bilateral pelvic lymph node dissection with omental biopsy with peritoneal washing. In walking exercise group, one was performed radical hysterectomy with bilateral salpingo-oophorectomy with bilateral pelvic lymph node dissection

Table 3 presents the primary and secondary outcomes of the study. The time to first tolerance of an oral diet did not differ between the E group (22.0 ± 5.9 hours) and the C group (26.3 ± 10.3 hours) (p = 0.144). Similarly, the time to first achievement of a normoactive bowel sound and the time to first passage of stool were comparable between the two groups. However, the time to the first passage of flatus was shorter in the control group. The length of hospital stays, readmission rate, additional antiemetic requirement, and additional intravenous analgesia requirement did not differ between the two groups.

No patient in either group was diagnosed with pathologic ileus. One patient in the walking exercise group complained of mild abdominal discomfort with a pain score of 3 out of 10 on the visual analog rating scale after finishing the walking session, which alleviated spontaneously after bed rest. There were no serious adverse events. One patient in the E group had a postoperative complication and was readmitted within one month due to vaginal stump dehiscence.

In the subgroup analysis, patients with an estimated blood loss greater than 1,000 mL had benefit from the intervention as indicated by a shorter time required to tolerate the oral diet (20.0 ± 1.4 in E group vs 45.5 ± 3.5 in C group, p = 0.011) (Table 4). However, no difference in the primary outcome was observed when patients were divided into groups based on the intraoperative procedure, amount of blood component transfusion, and operative time.

Table 3. Study outcomes.

Study outcomes	Control (n = 18)	Walking exercise (n = 17)	p value
Time to first tolerance of an oral diet (hours)*	26.3 ± 10.3	22.0 ± 5.9	0.144
Time to first achieve normoactive bowel sound (hours)*	10.3 ± 4.5	8.1 ± 3.6	0.121
Time to first passage of flatus (hours)*	30.0 ± 8.4	45.4 ± 23.3	0.018
Time to first passage of stool (days)*	4.1 ± 1.6	4.5 ± 1.7	0.510
Diagnosis of pathologic ileus; n (%)	0	0	N/A
Postoperative complication; n (%)	0 (0)	1 (5.9)	0.296
Length of hospital stays (hours)*	46.1 ± 11.8	52.9 ± 20.8	0.239
Readmission to hospital within 1 month; n (%)	0 (0)	1 (5.9)	0.296
Additional antiemetic requirement (mg)*	1.7 ± 3.8	2.9 ± 5.9	0.450
Additional intravenous analgesic requirement (mg)*	191.7 ± 49.3	185.3 ± 34.3	0.662

* mean ± standard deviation

Table 4. Subgroup analysis of effecting factors for postoperative bowel ileus.

Study outcomes	Time to tolerate oral diet		p value
	Control (n = 18)	Walking exercise (n = 17)	
Intraoperative procedure*			
Adnexal surgery	22.0 ± 2.8	21.8 ± 2.1	0.909
Hysterectomy	27.8 ± 12.1	22.4 ± 7.7	0.254
Surgical staging	31.5 ± 16.3	19.0	0.643
Blood component transfusion*			
Yes	40.5 ± 8.7	19.0	0.113
No	22.2 ± 6.5	22.2 ± 6.1	0.997
Estimate blood loss *			
< 500 mL	20.3 ± 2.1	22.7 ± 7.0	0.294
500 – 1,000 mL	31.6 ± 11.1	20.7 ± 2.1	0.151
> 1,000 mL	45.5 ± 3.5	20.0 ± 1.4	0.011
Operative time*			
< 90 min	21.2 ± 1.9	26.2 ± 9.1	0.216
90-180 min	26.1 ± 10.3	20.2 ± 3.4	0.126
> 180 min	37.0 ± 14.9	20.3 ± 2.3	0.190

mL: milliliter, min: minutes

* mean ± standard deviation

Discussion

Walking exercise has been demonstrated to reduce gastric emptying time by increasing bowel motility via various neuro-hormonal mechanisms[11]. A previous study revealed the benefits of intervention in shortening the time to recovery of bowel motility

and the time taken to tolerate solid food in patients with gynecological cancer[10]. However, our randomized controlled trial showed no effects from preoperative walking exercise on postoperative bowel function, as represented by the time taken to tolerate an oral diet in patients undergoing major gynecological surgery. We did not use the rate of bowel ileus as the primary outcome because most of the definitions are composite outcome measurements and are difficult to measure objectively. Additionally, the ERAS protocol encourages oral intake as tolerated regardless of bowel sound.

In the previous trial, all patients were diagnosed with gynecological cancer and scheduled for surgical staging. In contrast, our trial included patients with various generally benign diagnoses and undergoing less invasive procedures, such as adnexal surgery and/or hysterectomy. Only a minority of patients in our study underwent surgical staging. Additionally, the operative time in the previous study was considerably longer than in our study (4.2 hours in the previous study vs 1.9 hours in our study). Therefore, the population in the previous study was at a higher risk of postoperative bowel ileus than the population in our study, which was reflected in the incidence of postoperative bowel ileus. The previous study reported a 28% prevalence of pathologic ileus, whereas no patient in our study was diagnosed with this condition.

Our study had no incidence rate of postoperative bowel ileus, which was undoubtedly lower than the incidence rates reported in previous studies of benign gynecologic surgery (2.9% - 9.2%)[6, 7]. Li et al[6] reported an incidence of 9.2% of postoperative ileus, defined as the absence of flatus and defecation for more than 2 days with the presence of one or more of the following symptoms: nausea, vomiting, and abdominal distention. In contrast, our study used a different definition, which considered a diagnosis of pathologic bowel ileus at 4 days postoperatively. About half (57%) of our patients underwent hysterectomy, while all of Li's population had hysterectomy performed. The routine implementation of the ERAS protocol in our institute may also play an important role in the lower rate of postoperative pathologic bowel ileus. However, given the smaller population in our study, the effect of the intervention on bowel ileus remains unclear.

The precise mechanism underlying the impact of preoperative walking on postoperative bowel function remains unclear. Numerous studies have indicated that different forms of exercise can improve postoperative bowel function. For instance, Peng et al[15] conducted a study revealing the benefits of a preoperative rehabilitation-based enhanced recovery protocol encompassing exercises targeting the upper and lower extremities, thoracic and abdominal breathing, as well as abdominal muscles, in facilitating gastrointestinal function recovery among patients undergoing colorectal surgery. Similar potential benefits may exist for gynecological patients; however, further prospective research is warranted to explore this aspect in more detail.

Other secondary outcomes in the study were collected due to their impact on laboratory investigations, treatment, and hospital costs, including time to first achievement of normoactive bowel sound, time to the first passage of stool, postoperative complications, length of hospital stay, readmission rate within one month, and additional antiemetic or intravenous analgesic requirements, which were all similar in both groups. The only significant difference was the shorter time to the first passage of flatus in the control group. Flatulence was one of the diagnostic criteria for pathologic bowel ileus, but it had to occur in conjunction with additional symptoms such as nausea or vomiting, inability to tolerate an oral diet, abdominal distension, or the presence of bowel ileus radiographic features[3]. However, we concluded that this outcome was not clinically significant, especially since the other outcomes were not different and the symptoms did not cause any discomfort to the patients.

Our study revealed that the intervention had specific benefits for patients who encountered intraoperative hemorrhage surpassing 1,000 mL, as

they faced an elevated risk of postoperative bowel ileus. Literature has previously documented variable rates of hemorrhage following abdominal hysterectomy, ranging from 0.2% to 3.7%[16].

In clinical practice, we advocate for preoperative walking exercise among patients scheduled to undergo elective gynecological cancer surgery, particularly those identified as being at risk of significant intraoperative hemorrhage. Although accurately predicting blood loss before surgery poses challenges, certain factors have been associated with a higher probability of increased blood loss in benign gynecological surgery. These factors encompass an operation duration exceeding 180 minutes, an American society of Anesthesiologists (ASA) class IV, the presence of anemia, prior transfusion history, and surgery performed for fibroids[17].

This study had several strengths. It was the first prospective randomized design to include a largely benign patient population, which represents the majority of gynecological department patients. The demographics and surgical characteristics of the two groups were similar in this study. Furthermore, our primary outcome was objective and clinically relevant, and there was no missing data due to loss to follow-up. Because the trial involved the rational recruitment of participants with appropriate inclusion and exclusion criteria, the time to first toleration of an oral diet in the control group patients was similar to that in the control group of the other study (26.3 ± 10.3 in our study vs 27.4 ± 11.0 in the other study)[18].

However, our study had several limitations. Firstly, the study design did not allow for blinding, which may have influenced the findings. Secondly, the surgical operation was not performed by the same surgical team, which could have introduced variability in the surgical techniques and outcomes. Thirdly, we could not completely restrict walking in the control group during the night before surgery, which could have potentially affected the results. Finally, the study was conducted in a single center, and the findings may not be generalizable to other settings or populations.

Conclusion

Our randomized controlled trial showed no effects from preoperative walking exercise on postoperative bowel function, as represented by the time taken to tolerate an oral diet in patients undergoing major gynecological surgery. Therefore, there is still insufficient data to encourage routine preoperative walking exercise before surgery in patients with benign gynecological conditions. However, preoperative walking exercise may be beneficial for patients who are at high risk of extensive blood loss during surgery.

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Potential conflicts of interest

The authors declare no conflicts of interest.

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