ORIGINAL ARTICLE

Length of Stay between Early versus Delayed Oral Postoperative Feeding after Gynecologic Surgery under General Anesthesia: Randomized Controlled Trial, Single Center

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Objective: The primary objective was to assess the length of hospital stay in patients receiving early feeding compared to delayed feeding under general anesthesia following gynecologic surgery. The secondary objective was evaluating complication incidence.

Materials and Methods: In a randomized controlled trial at Queen Savang Vadhana Memorial Hospital between April and September 2023, patients who underwent major benign gynecologic surgery were allocated to either early feeding, as initiating water at six hours post-surgery followed by soft diet, or delayed feeding as water on the first postoperative day, progressing to soft diet based on bowel function.

Results: Forty-two patients were randomized with 21 patients assigned to the delayed feeding group and 21 to the early feeding group. Results showed a significant reduction in hospital stay in the early feeding group compared to the delayed feeding group at 2.27 days versus 2.87 days ($p<0.05$), with similar rates of complications between the two groups. Bloating was the most common issue, occurring in 23.8% of patients in both groups, while nausea and vomiting were effectively managed.

Conclusion: The length of hospital stay was found to be significantly shorter in the early feeding group. Additionally, complications were mild and tolerable. These findings support the feasibility and benefits of early postoperative feeding protocols in improving patient recovery and resource utilization.

Keywords: Length of stay; Feeding; Gynecologic surgical procedures; Anesthesia; General; Postoperative complications

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Currently, postoperative care in the medical field has implemented the enhanced recovery after surgery (ERAS)[1] protocol to assist patients in recovering more quickly. This program suggests that patients can start eating sooner after surgery, allowing the patient's gastrointestinal tract to return to normal function faster. Consequently, this reduces the length of hospital stays, decreases costs, and increases patient satisfaction as they can return home sooner[2].

There is a prevailing belief in surgical practice that abdominal surgery often induces temporary intestinal stasis, referred to as paralytic ileus, which typically prompts clinicians to delay postoperative oral intake until the return of bowel function. However, recent physiological investigations suggest that postoperative ileus may not involve a complete cessation of bowel motility and is often transient and clinically inconsequential[3]. Consequently, the practice of withholding oral intake until the resolution of postoperative ileus lacks robust scientific support and may be unnecessary. Emerging evidence indicates potential clinical benefits associated with early postoperative oral intake, including enhanced wound healing, prophylaxis against stress ulcers, decreased risk of sepsis, improved patient comfort, and the potential for shorter hospital stays. Research from various surgical studies[2,4-6] consistently demonstrated the safety of early oral intake following surgery, with no significant increase in complications observed.

The systematic review in 2014[2] comparing patients undergoing obstetric surgeries receiving early versus delayed postoperative feeding found no

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significant difference in the incidence of postoperative ileus between the two groups (RR 0.47, 95% CI 0.17 to 1.29, p=0.14, in three randomized controlled trials that included 279 women) However, the number of hospital days was shorter in the early feeding group (MD –0.92 days, 95% CI –1.53 to –0.31, p=0.003, in four randomized controlled trials with 484 women) and overall patient satisfaction post-surgery was increased[5]. One study compared a group receiving early postoperative nutrition, defined as oral intake of fluids within six hours after surgery, with a group receiving traditional postoperative nutrition, defined as initiation of fluids one day post-surgery. They found no significant differences in the incidence of postoperative ileus, duration of intubation, time to first bowel movement, or length of hospital stay between the two groups at 86.4±21.0 hours versus 85.6±26.2 hours (p>0.05)[7]. This study demonstrated that patients who underwent major abdominal gynecologic surgery had no significant difference in the number of episodes of emesis or postoperative ileus, and there were more patients with ileus in the traditional feeding group than the early feeding group.

However, the ERAS program[1,8,9] requires detailed steps and relies on multidisciplinary teamwork to prepare patients before, during, and after surgery. The implementation may vary depending on the context and resources of each hospital.

Queen Savang Vadhana Memorial Hospital has a high proportion of patients covered by social insurance and a high rate of gynecologic surgeries (ICD-9 6849) of approximately 305 cases per year, each with an average daily cost of 9,901.29 THB and an average hospital stay of four days per person[10]. The present study aimed to assess the length of hospital stay between the group receiving early postoperative feeding and the group receiving delayed postoperative feeding. This could lead to the adoption of measures to reduce hospital stays, patient costs, and the financial burden of healthcare services. Additionally, reducing hospital stay duration would increase access to care for patients awaiting surgery.

Materials and Methods

Trial design

The present study was a parallel, randomized controlled trial conducted between April and September 2023 in the Department of Obstetrics and Gynecology, Queen Savang Vadhana Memorial Hospital, Chonburi, Thailand. The study was adhered to consort guidelines. Computerized randomization with a 1:1 allocation ratio was the method used to assign participants to two different treatment groups.

Participants

Eligible patients for participation must not be undergoing laparoscopic surgeries or cesarean sections and should have no evidence of cancer or pre-existing gastrointestinal diseases. Furthermore, patients requiring special diets, those with intestinal obstruction, or individuals with a history of gastrointestinal surgeries except for appendectomies were excluded from the study.

The patients who were considered for postoperative admission to the intensive care unit (ICU) and those requiring intubation or nasal tubes after surgery were also excluded. Additionally, patients experiencing postoperative complications such as fever, fatigue, or surgical wound infections and individuals unwilling to participate in the research study were excluded.

Intervention

After six hours postoperative, the research assistant assessed the patient's level of consciousness, bowel sounds, time of passing flatus, and any complaints such as nausea and vomiting. Patients in the experimental group were then allowed to drink 250 mL of water even if bowel sounds were not audible. After drinking 250 mL of water during the first six hours, patients received a soft diet in the next meal, or six hours after the first meal, provided there were no gastrointestinal side effects, disregarding bowel movement sounds and passing flatus. Patients in the control group were considered for a water intake of 250 mL after 24 hours postoperative, a liquid diet in the next meal, followed by a soft diet in the subsequent meal if bowel sound was present and there were no gastrointestinal side effects. Patients were assessed daily for bowel functions and any discomfort and data were recorded. Patients who fulfilled the study criteria were then discharged.

Outcomes

The primary objective was to evaluate the length of hospital stay between the group receiving early feeding compared to delayed postoperative feeding under general anesthesia. The length of hospital stay was defined as number of days in the hospital, starting from the completion of surgery until the time the patient was discharged. Discharge criteria included 1) presence of bowel sound and/or passing flatus and/or defecation. Bowel sound was assessed

by auscultating bowel sounds with a stethoscope over the abdomen in four quadrants collectively for one minute. Normal bowel function was 5 to 30 sounds per minute[11], 2) ambulation, and 3) absence of severe complications. The second objective was to study the incidence of complications.

Sample size

The determination of the required sample size was predicated on the measure of length of hospital stay in both groups. Notably, the mean length of postoperative stay after major gynecological surgery in the authors' institution, operating within a public healthcare framework was typically three days. The principal aim of the present study was to scrutinize whether the implementation of early feeding protocols could help in reducing the length of postoperative stay to two days.

For sample size calculation, a significance level (alpha) was set at 0.05, accompanied by a statistical power of 80%. Furthermore, to account for potential loss to follow-up, a conservative estimate of 20% was incorporated. It was ascertained that a minimum of 21 participants would be needed in each experimental group to sufficiently power the study. Therefore, 42 participants were planned for randomization. By adhering to these systematic steps, an informed decision regarding the adequacy of the sample size for the two-sample means test analysis was attained, considering the anticipated loss to follow-up and striving to achieve the desired statistical power of 0.80.

Randomization

Patients who met the selection criteria upon admission would be randomly assigned to treatment groups, which was performed by a research assistant by selecting a sealed envelope and attach it to the patient's chart. Computerized randomization with a 1:1 allocation ratio was the method used to assign participants to two different treatment groups generated by an investigator. This sealed envelope contained a treatment order form either A, as delayed feeding or B, as early feeding, being obscured from an external view. After completion of surgery, the physician would document the feeding and treatment instructions as per the treatment protocol enclosed in the envelope (Figure 1).

Blinding

The data analyst was unaware of the treatment assignments.

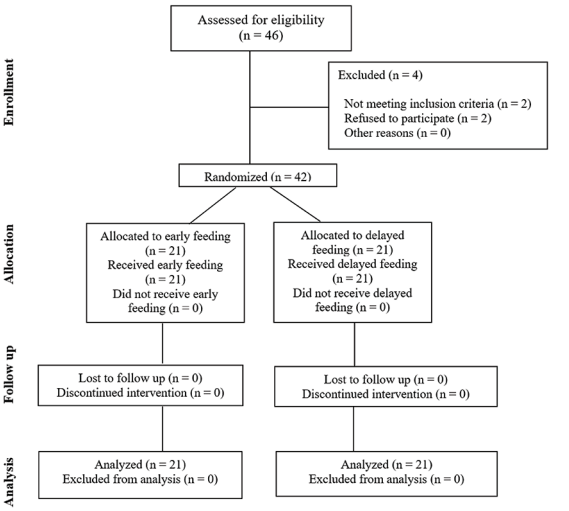

Figure 1. Consort flow diagram.

Statistical analysis

Fisher's exact test or chi-squared test was used for analysis as appropriate when comparing categorical and categorical variables to determine difference between intervention and control groups in both demographic and clinical data. When comparing continuous variables, independent samples t-test or Mann-Whitney U test was used to determine significant differences. The significance difference was established at p-value less than 0.05.

Ethical approval

The present study was approved by the Institutional Ethics Committee (IRB No. 002/2566), registered in the ClinicalTrials.gov database (NCT05955495), and signed informed consents were obtained before participants were enrolled in the study.

Results

Between April and September 2023, 42 patients were randomized at Gynecology ward, Queen Savang Vadhana Memorial Hospital. Twenty-one patients were assigned to the delayed postoperative oral feeding group and twenty-one patients to the early feeding group. All patients in both groups successfully completed the study without any loss to follow-up. There were no significant differences in the demographic information of patients between both groups (Table 1). Blood loss and operative times were comparable between the groups.

In the delayed feeding group, one patient experienced a blood loss of 2,000 mL, however,

Table 1. Baseline characteristics

Baseline Characteristics	Early feeding (n=21)	Delayed feeding (n=21)	p-value
Age (year); mean±SD	39.5±7.76	44.4±9.92	0.278
Weight (kg); mean±SD	53.8±9.60	56.9±12.0	0.465
BMI (kg/m^2); mean±SD	21.3±4.10	23.1±4.97	0.263
Conditions; n (%)			0.506
Myoma uteri	12 (57.1)	12 (57.1)	
Adenomyosis	3 (14.3)	4 (19.0)	
Mature cystic teratoma	3 (14.3)	2 (9.5)	
Hematosalpinx	1 (4.8)	0 (0.0)	
Tubal pregnancy	1 (4.8)	1 (4.8)	
Endometriotic cyst	1 (4.8)	0 (0.0)	
Partubal cyst	0 (0.0)	1 (4.8)	
Serous cystadenoma	0 (0.0)	1 (4.8)	
Operation; n (%)			0.622
TAH with BSO	8 (38.1)	8 (38.1)	
TAH	3 (14.3)	4 (19.0)	
TAH with unilateral SO	2 (9.5)	1 (4.8)	
TAH with BS	2 (9.5)	4 (19.0)	
Unilateral SO	5 (23.8)	3 (14.3)	
Bilateral salpingectomy	1 (4.8)	1 (4.8)	
Operative time (minutes); mean±SD	94.3±36.6	93.3±33.6	0.970
Estimated blood loss (mL); mean±SD	239±302	297±437	0.781
NPO time (hours)	9.48	9.00	0.184
Bowel preparation; n (%)			
Major surgery	17 (81.0)	15 (71.4)	0.469
Minor surgery	4 (19.0)	6 (28.6)	0.469

BMI=body mass index; TAH=total abdominal hysterectomy; SO=salpingo-oopherectomy; BSO=bilateral salpingo-oopherectomy; BS=bilateral salpingectomy; NPO=nothing by mouth; SD=standard deviation

p-values calculated using the chi-square test, independent student t-test, and Mann-Whitney U statistic test

Table 2. Length of hospital stays and complications

Outcome	Early feeding (n=21)	Delayed feeding (n=21)	p-value
Length of hospital stays (days); mean±SD	2.27±0.67	2.87±0.24	<0.001*
Complications; n (%)			
Bloating	5 (23.8)	5 (23.8)	1.000
Vomit	1 (4.8)	4 (19.0)	0.172
Diarrhea	0 (0.0)	1 (4.8)	0.500
Average time to recovery; n (%)			
Bowel sounds			
• Day 0	15 (71.4)	9 (42.8)	0.119
• Day 1	6 (28.6)	11 (52.4)	0.209
• Day 2	0 (0.0)	1 (4.8)	1.000
Flatus			
• Day 0	15 (71.4)	1 (4.8)	<0.001*
• Day 1	6 (28.6)	15 (71.5)	0.013*
• Day 2	0 (0.0)	4 (19.0)	0.107
• Day 3	0 (0.0)	1 (4.7)	1.000

SD=standard deviation

p-values calculated using the chi-square test, independent student t-test, and Mann-Whitney U statistic test, * Statistical significance

no complications following step feeding, except for requiring a blood transfusion. Another patient was readmitted due to wound dehiscence. In the early feeding group, one patient underwent total abdominal hysterectomy (TAH) and bilateral salpingo-oophorectomy (BSO) with adhesiolysis due to severe adhesion, experiencing bloating and requiring medications. However, this patient did not require a change in feeding protocol and only needed medication for relief.

The mean time, in days, to the presence of bowel sound was comparable between the groups. However, the mean time, in days, for passing of flatus was significantly lower in the early feeding group.

The length of hospital stay was 2.27 days in the early feeding group and 2.87 days in the delayed feeding group, resulting in a significant reduction in hospital stay for the early feeding group ($p<0.05$). There were no significant differences observed in the occurrence of postoperative complications including bloating, vomiting, and diarrhea between the groups (Table 2).

Discussion

The authors compared the outcomes of implementing an early feeding protocol versus a delayed protocol following major gynecologic surgery. The present study findings indicate that patients exhibited good tolerance towards early postoperative feeding. Furthermore, the analysis revealed a significant outcome, reduction in length of hospital stay in the early feeding group.

The present study's findings regarding the length of hospital stay differ from those of a previous randomized controlled trial[5] that included 119 patients and showed no significant difference in length of stay (LOS) between early and delayed postoperative feeding groups. In Bayla et al., 2015 the mean time to bowel movement was reported as 64.5±13 hours in the early feeding group and 68.8±10 hours in the delayed feeding group. Conversely, the present study observed a much quicker mean time to bowel sounds in both groups, with durations of 0.3 days and 0.6 days in the early and delayed groups, respectively. Another study[6] also showed a statistically significant reduction in the length of hospital stay for those patients on the early feeding regimen. The median LOS for group A was 6.0 days and for group B was 4.0 days ($p=0.0001$). Although

the specific period for calculating length of hospital stay was not stated, a 2-day bowel preparation period was mentioned. Clarification on the exact period used would ensure accuracy in data interpretation and subsequent clinical decisions.

The present study presents strengths that enhance the validity and applicability of the authors' findings. Despite all surgeries being performed under general anesthesia, the study observed that the length of hospital stay remained unaffected by common side effects such as limited bowel function and constipation, indicating robustness in the present study outcomes. Moreover, meticulous recording of all key data points, including the passage of flatus and bowel movements, under the direct supervision of healthcare professionals, ensures the reliability and accuracy of the findings, thereby bolstering the credibility of the present study results.

The limitations of the present study should be considered when interpreting the results. Firstly, the small sample size may restrict the generalizability of the findings to broader populations. Secondly, as the present study was conducted within a single institution, the applicability of the results to other healthcare settings may be limited due to potential variations in postoperative feeding protocols and anesthesia methods. Despite these limitations, the present research holds significant potential for improving patient care and healthcare resource utilization within the authors' hospital setting. Based on the positive outcomes of this research, if the facility implements the findings according to the ERAS guidelines, and extends the scope to include preoperative, intraoperative, and postoperative phases by establishing a specialized team, it will facilitate further research in this field with larger sample sizes to enhance generalizability and validate the findings. Implementation of the findings could lead to a reduction in the number of days patients spend in the hospital, thereby lowering patient expenses and alleviating the burden on the healthcare service budget. Furthermore, shorter hospital stays could increase access to care for surgical patients awaiting treatment, enhancing overall patient outcomes.

Conclusion

In the present study, the introduction of early postoperative feeding was well tolerated by patients who underwent major gynecological surgery. The length of hospital stay was significantly shorter in the early feeding group. Additionally, complications were mild and tolerable, with no significant differences observed between groups. Moving forward, further studies should aim to conduct a comprehensive cost-benefit analysis of implementing this intervention.

What is already known about this topic?

Studies have demonstrated that patients in the postoperative early feeding group experienced shorter hospital stays compared to those in the delayed feeding group. However, the difference in hospital stay duration between the two groups was not statistically significant. Additionally, there were variations in the methods of anesthesia.

What does this study add?

This study primarily focused on abdominal gynecologic surgeries for non-malignant conditions and exclusively utilized general anesthesia. Despite all procedures being conducted under general anesthesia, the length of hospital stay was not significantly affected by common side effects such as limited bowel function and constipation. Notably, this research demonstrated a significant reduction in hospital stay duration in the postoperative early feeding group, with the number of days being less compared to other feeding strategies and findings from other studies at 2.27 days versus 2.87 days ($p<0.05$).

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Conflicts of interest

The authors have no conflicts of interest.

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