A Comparative Study of Early Postoperative Feeding versus Conventional Feeding for Patients Undergoing Cesarean Section; A Randomized Controlled Trial

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Objective: *To compare the efficacy and side effects of early postoperative feeding versus conventional feeding for patients undergoing cesarean section.*
Material and Method: *Women undertaking uncomplicated cesarean section under regional anesthesia were randomly assigned to early feeding or conventional feeding groups. Early-fed women were offered a liquid diet within 8 hours after surgery, advanced to a soft diet on the next meal and then a regular diet. Conventional-fed women were prohibited from mouth-fed for the first 24 hours after surgery, advanced to a liquid diet on the first postoperative day, and then a soft diet on the second postoperative day.*
Results: *Two hundred patients were enrolled in the study; 107 patients were assigned to the early feeding group and 93 patients to the conventional feeding group. There were no significant differences in the demographic data between the two groups. In all cases, consistent anesthetic method was applied with no intraoperative adhesion and no post operative complications were observed. The rate of mild ileus symptoms in the early feeding group was significantly less than the conventional group (19.6% versus 31.1%, $p = 0.03$). The early feeding group also had significantly shorter time interval to bowel movement (16.7 hours versus 25.3 hours, $p < 0.001$), duration of intravenous fluid administration (20.5 hours versus 24.8 hours, $p < 0.001$), and overall length of hospital stays (3.3 days versus 4.0 days, $p < 0.001$).*
Conclusion: *The study results indicated that the early feeding after uncomplicated cesarean section had reduced the rate of ileus symptoms and offer potential benefits associated with shorter interval to bowel movement, intravenous fluid administration, and length of hospital stays. However, management of postoperative feeding requires proper counseling on details of both regimens and flexibilities should be provided to accommodate early feeding when requested by the patients.*

Keywords: *Cesarean section, Early postoperative feeding, Ileus symptoms*

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At King Chulalongkorn Memorial Hospital, the current protocol for postoperative management requires that oral feeding should be restricted during the first 24 hours. After this restricted period, a liquid diet is provided for the next meal, and a soft diet is prescribed on the second day after the cesarean section. The full regular diet is prescribed on the third day if the patients do not feel abdominal discomfort. The length of hospital stay is at least 4 days.

Most cesarean deliveries are performed under regional anesthesia, requiring little intestinal manipulation, short operative time, and typically involve younger patients. Early oral feeding after cesarean deliveries should not result in any complications and has other benefits, such as early ambulation and a shorter hospital stay.

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Regional anesthesia method that is normally used for cesarean section at King Chulalongkorn Memorial Hospital is a spinal anesthesia with small spinal needle which patients are not required to lie down for 12 hours after surgery to prevent the spinal headache[1]. In recent studies[2-10], patients who were fed 6-8 hours after cesarean deliveries had a shorter time interval from surgery to bowel movement, a shorter duration of intravenous fluid infusion, and shorter hospital stays. However, some of these studies did not have an adequate sample size to definitively assess safety concerns. Most of these recent studies had many confounding factors such as emergency cases, adhesions, blood losses, operative findings, and extended operative time. There are many regimens for post cesarean delivery management of postoperative feeding. The objective of this study was to compare the efficacy and side effects of early postoperative feeding versus conventional feeding for patients undergoing cesarean section.

Material and Method

The study recruited pregnant women who had cesarean section at King Chulalongkorn Memorial Hospital between May 2005 and March 2006. The institutional ethics committee approved the study protocol, and written informed consent was obtained from each participant. All patients were counseled by the authors and invited to enroll in the study. All subjects had more than 8 hours of NPO time before surgery and received cesarean section under spinal anesthesia using 0.5% heavy marcaine and morphine injected by a spinal needle No.27. Every step of the cesarean section was performed by an Obstetrics-Gynecology resident under the guidelines of the hospital[11] with operative time between 30-60 minutes for all cases. Subjects receiving general anesthesia were excluded from the study. Also excluded from the study were cases with bleeding disorder, intra-operative bowel or bladder injury, or other operations other than cesarean section with or without tubal resection. Patients who received magnesium sulfate treatment were also excluded as it may cause transient nausea.

Following cesarean delivery, the patients were assigned to the early feeding group (at 8 hr) or the conventional feeding group (at 24 hr) by simple random sampling method using the table of random numbers[12]. None of the recruited patients was excluded from the study because of intra-operative complications. The early feeding group started drinking water and received a liquid diet approximately 8 hours after surgery, followed by a soft diet and then a regular diet. The conventional feeding group started drinking water approximately 24 hours after surgery, received a liquid diet for the next meal, followed by a soft diet for three subsequent meals and then a regular diet.

Although dietary prescriptions were offered to patients, the actual amount of food ingested was not quantified by the use of a food diary or by calorie count. In this study, it was considered acceptable if the patients ingested more than 80% of all offered food for one meal.

The time of onset of surgery was designated as zero hour. The day of surgery (day 0) was considered to be the first 24 hours, the first postoperative day (day 1) encompassed the next 24-48 hours, the second postoperative day (day 2) covers the next 48-72 hours. The operative time was defined as the time from the onset of surgery to the completion of skin closure. Duration of intravenous fluid administration was defined as the time from the onset of surgery to the removal of intravenous catheter. Intravenous fluid was stopped when patients were capable of consuming adequate liquid diet. The Foley's catheter was removed at the same time as intravenous catheter. Time interval to bowel movement is defined as the time from the onset of surgery until the first detection of active bowel sound.

Mild ileus symptoms included symptoms of anorexia, abdominal cramping, non-persistent nausea and vomiting as well as mild abdominal distension on physical examination[7]. Severe ileus symptoms were defined as marked abdominal distension with more than three episodes of vomiting in a 24-hour period or an inability to tolerate oral liquids and a need to delay the stepped up diet. Patients who required a nasogastric tube or abdominal radiography were also designated as having severe ileus symptoms[7].

The length of hospital stay was counted from the day of surgery (day 0) to the day that the patients were allowed to be discharged from the hospital and signed by the physician under the conditions that they were able to tolerate a regular diet without emesis, passed flatus or had a bowel movement, and demonstrated no febrile morbidity for at least 24 hours[7]. Postoperative febrile morbidity was considered to be an oral temperature equal to or exceeding 38°C or 100.4°F on 2 or more occasions, at least 6 hours apart, occurring greater than 24 hours after the surgery[13].

The patients were examined twice a day by one of the author (Chantarasorn V). The patients' complaints and symptoms were recorded in the progress note form. The patients were interviewed about their

satisfaction with the postoperative care followed by a questionnaire before being discharged from the hospital. The questionnaires consist of information about abdominal discomfort after the first meal, nausea vomiting, timing for initiation of the diet, satisfaction on the overall length of hospital stays, ability to ambulate after surgery, and patients' desire to replicate the program. The assessment of the outcome includes the symptoms and signs of mild or severe ileus symptoms as the primary outcome, duration of intravenous fluid administration, length of hospital stay, postoperative time interval to bowel movement, and hospital readmission rate and the patients' satisfaction.

Categorical data were analyzed using the Chi-Square test. Continuous data were analyzed by using a Two-tailed test. Normally distributed data were reported by mean and standard deviation, and means were compared by independent T-test. SPSS version 12.0 was used for analyzing the data with p value ≤ 0.05 chosen as being significant.

The sample size was calculated with reference to the previous study[7]. In the previous study, the rate of mild ileus symptoms in the early feeding group was 47%, and the rate of mild ileus symptoms in the conventional feeding group was 27%. The formula, which was used for calculating the sample size, was the one that was used for two independent group categorical data[14]. A target sample of 200 patients was established.

Results

Two hundred patients with uncomplicated cesarean section were enrolled in the study; 107 women were assigned to the early feeding regimen and 93 women were assigned to the conventional feeding regimen. Women in both groups had similar demographic characteristics; including age, parity, gravidity, gestational age, NPO time before surgery, cesarean indications, operative finding, estimated blood loss, and mean duration of surgery. There were no significant intraoperative adhesions in any of the cases (Table 1, 2). The early feeding group started their diet 8 hours after the onset of the surgery with some exception that in some cases the start of the diet was slightly more than 8 hours to match with regular mealtime.

Compared with those in the conventional feeding group, the early feeding group was given a liquid diet soon after surgery, 8.4 ± 1.7 hours versus 23.5 ± 2.5 hours. Mild ileus symptoms occurred in 21 (19.6%) early-fed patients and 29 (31.1%) conventional-fed patients, which was statistically significant. All patients

Table 1. Demographic characteristics

Characteristics	Early feeding group (n = 107)	Conventional feeding group (n = 93)	p-value
Age (years)	29.6 ± 5.7	29.2 ± 6.1	0.65
Gestational age (weeks)	38.6 ± 1.5	38.5 ± 1.8	0.69
Preoperative NPO time (hours)	9.6 ± 1.4	9.6 ± 1.6	0.91
Duration of surgery (minutes)	44.6 ± 8.4	46.6 ± 7.7	0.08
Birth weight (gram)	3129.0 ± 526.8	3149.3 ± 537.4	0.78
Estimated blood loss (ml)	457.0 ± 64.6	474.2 ± 77.9	0.09
Time interval to start diet (hours)	8.4 ± 1.7	23.5 ± 2.5	<0.001

Table 2. Indications for cesarean section

Indications	Early feeding group (n = 107)	Conventional feeding group (n = 93)
Cephalopelvic disproportion	41 (38.8%)	40 (43.0%)
Breech presentation	21 (19.6%)	21 (22.5%)
Previous cesarean section	31 (29.0%)	15 (16.1%)
Unfavorable cervix	11 (10.3%)	8 (8.6%)
Intrauterine growth restriction	3 (2.8%)	0 (0%)
Oligohydramnios	0 (0%)	7 (7.5%)
Placenta previa	0 (0%)	2 (2.2%)

who developed mild ileus symptoms were spontaneously resolved or improved by oral antiflatulence within 1-2 days. There was one patient in conventional feeding group experiencing severe ileus symptoms, marked abdominal distension and the stepped up diet was delayed. After supportive treatment, the patient improved within 3 days. None of the patients in early feeding group had severe ileus symptoms. The amount of estimated blood loss was not correlated with the development of ileus symptoms. The patients in the early feeding group had a shorter mean postoperative hospital stay, a shorter mean postoperative time interval to bowel movement and a shorter mean duration of intravenous fluid administration after surgery. There were no hospital readmissions for any of the patients in either group (Table 3).

Data from an interview by questionnaire before the patients were discharged from the hospital revealed that feeling of abdominal discomfort, nausea and vomiting after the first meal were not statistically different between the two groups. The patients in early feeding group were satisfied with timing of the initiation of the diet, duration of hospital stay, and ability to ambulate after surgery. Most of the patients in the early feeding group (satisfactory 72.8%, very satisfactory 27.1%) want to receive this postoperative care regimen again if they have another cesarean section in the future (Table 4).

Discussion

All of the patients included in this study were generally young and healthy with low risk, uncomplicated cases. The midline skin incision was consistently applied with short operative time, no adhesion, and no postoperative complications. Unlike the previous studies, there were cases of adhesions[7], medical complications[6], different methods of anesthesia[2,5,6,8,10], and different types of skin incision[7]. These factors may have been responsible for different and inconclusive results.

In this study, women in the early feeding group had fewer ileus symptoms when compared with the conventional feeding group. This might be the result of early ambulation, as the patient had to get up

Table 3. Outcomes of both groups

Outcomes	Early feeding group (n = 107)	Conventional feeding group (n = 93)	p-value
Mild ileus symptoms	21 (19.6%)	29 (31.1%)	0.03
Duration of intravenous fluid administration (hours)	20.5 $\pm$ 2.3	24.8 $\pm$ 2.1	<0.001
Time interval to bowel movement (hours)	16.7 $\pm$ 5.0	25.3 $\pm$ 5.4	<0.001
Hospital stay (days)	3.3 $\pm$ 0.5	4.0 $\pm$ 0.2	<0.001

Table 4. Patients' satisfaction of both groups

Patients' satisfaction Scale: 1: minimum 5: maximum	Early feeding group (n = 107)	Conventional feeding group (n = 93)	p-value
Abdominal discomfort after first meal (1: none - 5: severe)	1.3 $\pm$ 0.6	1.4 $\pm$ 0.7	0.06
Nausea and vomiting (1: none - 5: > 7 times)	1.0 $\pm$ 0.2	1.0 $\pm$ 0.2	0.86
Timing of the initiation of the diet (1: not satisfactory - 5: very satisfactory)	4.2 $\pm$ 0.5	3.9 $\pm$ 0.6	0.002
Duration of hospital stay (1: not satisfactory - 5: very satisfactory)	4.2 $\pm$ 0.4	4.0 $\pm$ 0.3	<0.001
Ability to ambulate after surgery (1: not satisfactory - 5: very satisfactory)	4.1 $\pm$ 0.4	3.8 $\pm$ 0.5	<0.001
Want to receive this regimen again (1: not satisfactory - 5: very satisfactory)	4.3 $\pm$ 0.4	4.0 $\pm$ 0.4	<0.001

within 8 hours after surgery to start a liquid diet. This study also demonstrated that women in the early feeding group had a more rapid return of bowel function, with a substantially shorter mean postoperative time interval to the first active bowel movement, which was similar to many of the previous studies[4-10]. This might be the positive effect on the gastrointestinal tract, where such stimulation may decrease the length of postoperative ileus. The duration of intravenous fluid administration in this study were, in most cases, longer than necessary as the intravenous fluid was typically continued after the first meal through the night time to prevent possible dehydration.

The length of hospital stay was found to be significantly shorter in the early feeding group as the patients had more rapid return of bowel function, early ability to ambulate, and receive regular diet sooner than the conventional group[3,4,7]. This study also confirmed that the early feeding regimen for patients after uncomplicated cesarean section can be well tolerated. Although the rate of mild ileus symptoms in the early feeding group was less than conventional group, this result was just barely statistically significant (p-value = 0.03). Further study with larger sample size may be needed to confirm statistically significant.

In conclusion, early feeding after uncomplicated cesarean section had reduced the rate of ileus symptoms, mean time interval to bowel movement, duration of intravenous fluid administration, and length of hospital stay. It is suggested that the early feeding regimen be considered as it offers benefits to the patients such as less suffering from thirst and hunger, shorter hospital stay and save cost. However, the management of postoperative feeding is dependent on the patients' desire after they have been counseled about the detail of both regimens. Flexibilities should be provided to accommodate early feeding for all uncomplicated cases when requested by the patients.

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การศึกษาเปรียบเทียบระหว่างการเริ่มรับประทานอาหารหลังผ่าตัดได้เร็วกว่าปกติและตามขั้นตอนแบบเดิม ในผู้ป่วยที่ได้รับการผ่าท้องทำคลอด: การศึกษาแบบสุ่ม

วริศรา จันทรศร, เยื้อน ตันนิรันดร

วัตถุประสงค์: *เพื่อเปรียบเทียบประสิทธิภาพ และอาการข้างเคียง ระหว่างการเริ่มรับประทานอาหารหลังผ่าตัดได้เร็วกว่าปกติ และตามขั้นตอนแบบเดิม ในผู้ป่วยที่ได้รับการผ่าท้องทำคลอด*

วัสดุและวิธีการ: *สตรีที่ได้รับการผ่าท้องทำคลอดโดยไม่มีภาวะแทรกซ้อน ถูกสุ่มแบ่งออกเป็น 2 กลุ่ม กลุ่มหนึ่งได้รับอาหารหลังผ่าท้องทำคลอดเร็วกว่าเวลาปกติที่เคยปฏิบัติ อีกกลุ่มหนึ่งได้รับอาหารตามขั้นตอนแบบเดิม โดยกลุ่มที่ได้รับอาหารเร็วกว่าเวลาปกติจะได้รับอาหารเหลวภายใน 8 ชั่วโมง หลังการผ่าตัด มื้อถัดไปเป็นอาหารอ่อน และอาหารธรรมดาตามลำดับ ส่วนกลุ่มที่ได้รับอาหารตามขั้นตอนแบบเดิม จะเริ่มจิบน้ำได้ 24 ชั่วโมงหลังผ่าตัด มื้อถัดไปเป็นอาหารเหลว และในวันที่สองหลังผ่าตัดจะได้รับอาหารอ่อน และอาหารธรรมดาในวันถัดไป*

ผลการศึกษา: *จากจำนวนผู้ที่ได้รับการผ่าท้องทำคลอด 200 คนที่เข้าร่วมโครงการศึกษานี้ จำนวน 107 คน ถูกจัดให้อยู่ในกลุ่มที่ได้รับอาหารเร็วกว่าปกติที่เคยปฏิบัติ และจำนวน 93 คนอยู่ในกลุ่มที่ได้รับอาหารตามขั้นตอนแบบเดิม ผู้ที่เข้าร่วมโครงการทั้งสองกลุ่มนี้ ไม่มีความแตกต่างกันอย่างมีนัยสำคัญในเรื่องอายุ จำนวนครั้งของการตั้งครรภ์ อายุครรภ์ น้ำหนักเด็ก ระยะเวลาที่งดน้ำและอาหารก่อนผ่าตัด ผู้ทำผ่าตัด ขั้นตอนการผ่าตัด ระยะเวลาทำผ่าตัด และวิธีระงับความรู้สึกขณะผ่าตัด ไม่พบว่ามีภาวะแทรกซ้อน ทั้งในขณะผ่าตัด และในระยะพักฟื้น กลุ่มที่ได้รับอาหารเร็วกว่าปกติมีอัตราการเกิดอาการท้องอืดแบบไม่รุนแรงน้อยกว่ากลุ่มที่ได้รับอาหารตามขั้นตอนแบบเดิมอย่างมีนัยสำคัญ (19.6 % ต่อ 31.1%) และยังพบว่าลำไส้ทำงานเป็นปกติได้เร็วกว่า (16.7 ชั่วโมงต่อ 25.3 ชั่วโมง) ระยะเวลาในการได้รับน้ำเกลือหลังผ่าตัดสั้นลง (20.5 ชั่วโมงต่อ 24.8 ชั่วโมง) รวมทั้งสามารถลดระยะเวลาพักในโรงพยาบาลได้อย่างมีนัยสำคัญ (3.3 วันต่อ 4.0 วัน)*

สรุป: *ผลการศึกษาพบว่า การเริ่มรับประทานอาหารเร็วกว่าปกติหลังการผ่าท้องทำคลอดที่ไม่มีภาวะแทรกซ้อน ทำให้สามารถลดอัตราการเกิดอาการท้องอืดแบบไม่รุนแรงได้ และได้รับประโยชน์อื่นๆ เช่นทำให้ลำไส้ทำงานเป็นปกติได้เร็วขึ้น ระยะเวลาในการได้รับน้ำเกลือหลังผ่าตัด และระยะเวลาพักในโรงพยาบาลสั้นลงเป็นต้น จึงเสนอแนะว่าน่าจะพิจารณานำมาใช้กับผู้ที่ได้รับการผ่าท้องทำคลอดที่ไม่มีภาวะแทรกซ้อน โดยที่ผู้ป่วยควรได้รับการแนะนำถึงข้อดีและข้อเสียของวิธีการให้อาหารหลังผ่าตัดโดยละเอียด และแพทย์สามารถอนุญาตให้ผู้ป่วยได้รับอาหารเร็วกว่าปกติได้ถ้าผู้ป่วยต้องการ*