

A comparative study of early postoperative feeding versus delayed feeding of patients undergoing cesarean section:

A randomized control trial

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Abstract

Background and Aims: The objectives of the study are to compare early oral feeding with conventional delayed feeding and evaluate its safety and effectiveness in patients undergoing Cesarean section.

Methodology: A Prospective, double blind, randomized control study was conducted for 1000 Cesarean section cases treated in our institution in the year November 2020 to November 2021 for a period of 12 months. Women’s in early feeding group were encouraged to take sips of water within 12 hours post-operatively and in delayed Oral feeding group, oral intake was restricted till 12 hours postoperatively. The study outcome measures include time interval to return of bowel movements, the rate of ileus symptoms, time

interval to return to regular diet, length of hospital stay, and post-operative complications. Statistical analysis of 2 groups was done by chi-square test, Z-test and t-test.

Results: The early feeding group had a shorter mean post-operative time interval to bowel sounds 2.90 ± 1.44 h compared to delayed feeding group 3.62 ± 1.44 hours respectively. The Mean duration of postoperative hospital stay in early feeding group was 4.58 ± 0.72 versus delayed feeding group 4.77 ± 0.89 days respectively, which was statistically significant. Postoperative paralytic ileus symptoms were statistically significant in delayed feeding group compared to early feeding group.

Conclusion: Early oral feeding after uncomplicated cesarean delivery is well tolerated and associated with more rapid return to normal diet without an increase in adverse outcome. It is suggested that maternal satisfaction is greater in early feeding regimen which can be implemented, as it offers benefits to patients such as less suffering from thirst and hunger, shorter hospital stay and cost saving.

Keywords: Cesarean delivery, early oral feeding, delayed oral feeding, paralytic ileus, hospital stay, bowel sounds.

Introduction

Incidence of cesarean section has been increasing all over the world; It is one of the most commonly performed major abdominal surgeries in obstetrics.[1] Postoperative feeding of women who delivered by caesarean section has been noted to impact reasonably on the morbidities associated with caesarean delivery. Traditionally, after caesarean delivery a woman is given fluids and calories through intravenous infusion..Subsequently, these patients are given oral feeds with clear fluids and then gradually reverted to normal diet.[2]

The rationale behind this traditional approach for initiation of oral feeding after caesarean delivery was based on the presumption that if oral feeds were started earlier, the patient may develop postoperative ileus. However, available studies have not supported such assumption.^[3] Patients undergoing cesarean, commonly the young and healthy and their bowel functions returned rapidly following surgery. This early return of post cesarean bowel function has been attributed to minimal bowel manipulation, short duration of surgery, low rate of peritonitis. Early oral intake initiation after cesarean delivery improves postpartum recovery in

gastrointestinal function and does not increase occurrence of gastrointestinal complications. [4]

However, early feeding has been advocated not only for its nutritional value, also for its positive effect on gastrointestinal tract, decreases infection rates, improves wound healing, decreased cost and shorter hospitalization.[2]The objective of the study is to evaluate the safety and effectiveness of early feeding with that of delayed feeding after uncomplicated cesarean section.

Materials and Methods

Sampling technique: A prospective study conducted for eligible 1000 pregnant women with term gestation undergoing cesarean section under spinal anesthesia operated in our institution in the year November 2020 to November 2021 for a period of 12 months. A total of 1000 eligible women were randomised in the immediate postoperative period into two equal groups, with ratio of 1:1 which includes early oral feeding group [EOF] (n=500) <12 hours of cesarean delivery, and delayed oral feeding group[DOF] (n=500) > 12 hours of cesarean delivery. A statistician blinded to the study's objectives generated the allocation sequence by simple randomization using computer-generated random numbers.The sealed envelopes were secured and placed in post-natal ward, from where they were serially taken from the nurse who was not included in the study to assign the sequential number to the participants of the study group (EOF or DOF) based on the allocation paper in the envelope.

Selection criteria of the study: Inclusion Criteria: Women between 19 – 35 years age, booked or unbooked cases, Primary/Repeat cesarean sections, LSCS only, irrespective of presentation and gravida, No medical or obstetrical antenatal complications-

Example: Diabetes Mellitus, Pre - eclampsia, antepartum hemorrhage, Spinal Anesthesia.

Exclusion criteria: Women receiving insulin, Presence of active bowel disease, Obstetric antenatal complications like antepartum hemorrhage, intra partum /postpartum hemorrhage, eclampsia, DM/cardiac disease/chronic renal disease, endocrine dysfunction/ pre-existing inflammatory bowel disease, prolonged PROM, Obstructed labor, Requiring intensive postoperative care for any reason, General anesthesia, Cesarean hysterectomy.

Ethical consideration: Ethical clearance was obtained for the study from ethical clearance committee of our institution. All participants were counselled about the study and informed about the possible complication that may arise. If any complication arises, the patients were given prompt treatment and the study was continued. All the participants voluntarily accepted to be part of the study. Informed consent taken from patients who met inclusion criteria.

Surgery technique: Participants (n=1000) who fulfilled the above selection criteria were included in the present study.

After preoperative evaluation, study subjects had received spinal anesthesia using intrathecal 10mg hyperbaric Bupivacaine. Cesarean deliveries were performed via low segment transverse incision. Immediately after surgery, patients were assigned to early feeding group and delayed feeding group by simple random sampling method.

Data collection of study variables

Early oral feeding group- water intake encouraged as soon as women was shifted to postoperative ward, within 12 hours after surgery. First postoperative oral feeding of residue free pudding provided between 6-8

hours and every 6-8 hours thereafter. Regular diet was started upon patient demand.

Delayed oral feeding group allowed sipping small amount of water only 12 hours after surgery. Solid diet was permitted only if abdomen is not distended, bowel sounds auscultated and flatus is passed. Regular diet was allowed subsequently upon patients demand. 10 mg of metoclopramide administered intravenously on "as required" basis for vomiting. No antiemetics were prescribed for nausea. Patients were reviewed in ward 2 hours post operatively, feeding was advanced to fluids or solids as tolerated. Standard first fluid was water, and first solid was bowl of residue free pudding.

Primary outcomes measures of the study: time interval for return of bowel movements, postoperative ileus which includes vomiting, nausea >4 times per day, abdominal distension, diarrhea, after feeding following Caesarean section. (Time frame: within 24 hours after surgery).Length of hospital stays from day of surgery till discharge with minimal pain, postoperative ileus symptoms, on regular diet with passage of stools and flatus.

Secondary outcomes measures include: Time interval for passage of flatus, passage of stool interval, to start regular diet, patient ambulation, Intravenous fluids consumption, (time frame: within 3 days after surgery), and Maternal satisfaction by the questionnaire asked by the evaluator. Abdominal circumference checked daily using standard technique, using a measuring tape, recorded in centimeters and reported as maximum minus minimum values. Intravenous fluids stopped when patients were capable of consuming adequate liquid diet.

Statistical analysis of study variables

Assessment of outcome variables - primary outcome measure was the time interval from the end of surgery to the return of bowel sound, while secondary outcome measures included rate of ileus symptoms and maternal satisfaction, and time interval to become eligible for discharge. Other secondary outcome measures include passage of flatus, passage of stool, return to regular diet, patient ambulation.

Statistical analysis of 2 groups done by chi-square and Z-test used to compare mean levels between 2 groups and chi-square test for categorical data. $P < 0.05$ was

Table 1: Maternal age distribution in 2 groups

Age	Groups			
	EOF		DOF	
	Frequency	Percent	Frequency	Percent
20 & below	64	12.80	64	12.80
21-25	263	52.60	260	52.00
26-30	142	28.40	149	29.80
31-35	31	6.20	27	5.40
Total	500	100	500	100

Age	EOF	DOF	Chi square test
20 & below	64	64	0.46, $P < 0.93$, not significant
21-25	263	260	
26-30	142	149	
31-35	31	27	

Table 1: shows maternal age distribution in both the groups. The mean age of women both EOF and DOF group is between 21 - 25 years (52%) followed by 26 – 30 years (29%) respectively. The difference between the two groups was not found to be statistically significant ($p < 0.93$).

considered statistically significant. Analysis was done in SPSS software package.

Results

Women eligible for the study was 1000 who met the inclusion criteria. They were randomly divided into 2 groups of 500 cases each, Early feeding group (EOF) with sample size of ($n=500$) and delayed Feeding Group (DOF) with sample size of ($n=500$). All the participants completed the study and were analysed. Demographic variables were collected and analysed in table 1.

Graph 1: Maternal age distribution in 2 groups

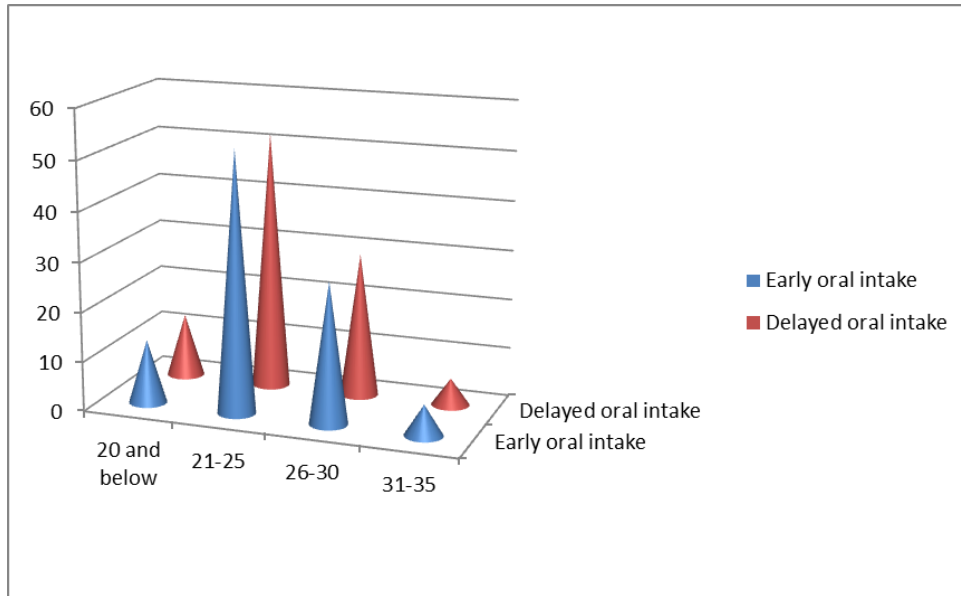


Table 2: Postoperative hospital stays (days)

Duration of stay	Mean	Std. deviation	Z value	P value	Significance
Group EOF	4.59	0.72	7.92	P<0.000	Highly significance
Group DOF	4.77	0.89			

Table 2 shows that EOF group has shorter duration of hospital stay. As per results, the mean duration of postoperative hospital stay in EOF group and group DOF was 4.59 ± 0.72 and 4.77 ± 0.89 days respectively. $P < 0.000$, it was found that statistical difference was highly significant. [Table 2]

Table 3: Time to return of bowel sounds (hours)

Duration of oral intake	N	Mean	Std. deviation	Z value	P value	Significance
Group EOF	500	2.90	1.44	7.92	P<0.000	Highly significant
Group DOF	500	3.62	1.44			

Participants in early feeding group had significantly shorter postoperative time interval to return of bowel sound (2.90 ± 1.44 and 3.62 ± 1.44 hours; Z value 7.92, $P < 0.000$) which is statistically highly significant. Similar findings were observed for the time interval to passage of flatus and stool. The details are shown in [Table 3].

Graph 2: Time to return of bowel sounds (hours)

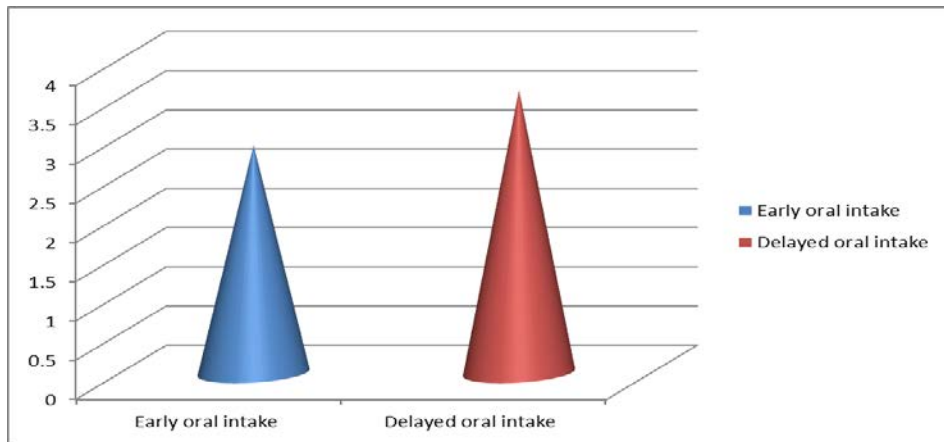


Table 4: Time interval to Regular diet, IVF consumption and patient ambulation.

	Groups	N	Mean	Standard deviation	Independent sample t-test
Regular diet	EOF	500	17.8	3.4	t- value = -60.1 p-value < .001
	DOF	500	37.2	6.4	
IVF consumption	EOF	500	2000	312	t- value = -54.8 p-value < .001
	DOF	500	3088.2	316	
Time interval for ambulation	EOF	500	21.2	2.8	t- value = -64.5 p-value < .001
	DOF	500	41.6	6.5	

When compared with women in DOF (37.2±6.4 h) group EOF (17.8±3.4 h) group had shorter duration to return to regular diet which was statistically significant.

As per the study analysis, EOF group (2000±312 ml) was associated with shorter duration of IV fluid administration compared to DOF group (3088±316 ml) which was statistically significant.

The women in the EOF group were able to ambulate early compared to DOF group (21.24±2.8 h vs 41.6±6.5 h) respectively. The results were statistically significant.[Table 4].

Table 5: Postoperative morbidity (GI complications)

GI Complications	Group A		Group B		Chi square test
	Frequency	Percent	Frequency	Percent	
Ileus symptoms	8	2	17	3	98.90, P<0.000
Vomiting	52	10	97	19	
Nausea	48	10	86	17	
Abdominal distension	13	3	53	11	
Diarrhea	4	1	20	4	
No complications	375	75	227	45	
Total	500	100	500	100	

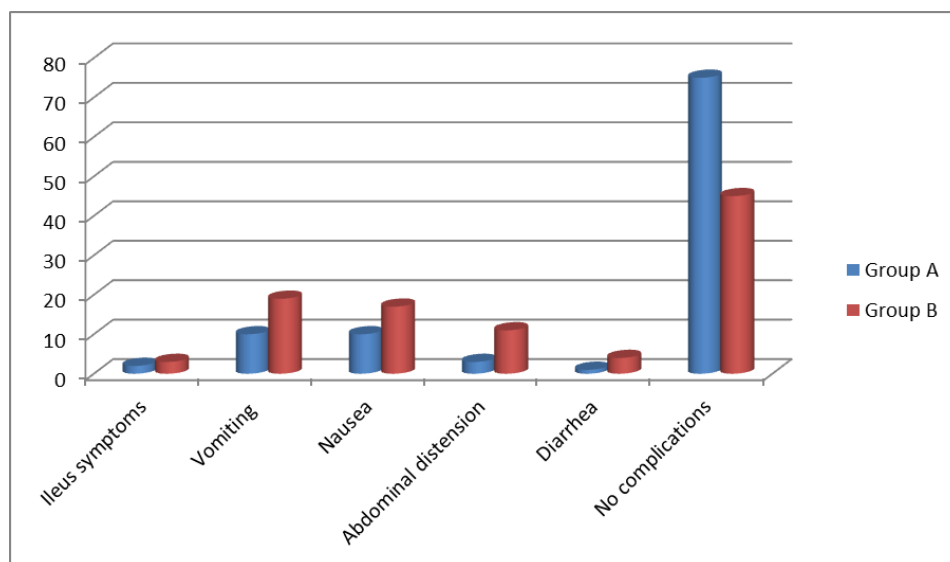
The study results show the effects of time of initiation of oral feeding after caesarean delivery on gastrointestinal complications. There was significant difference between the early and delayed feeding groups with respect to gastrointestinal complications following initiation of oral feeding.[Table 5].

As per the analysis, 375(75%) cases in EOF group had no GI complications compared to 227(45%) cases in DOF group. The difference is statistically significant.

Postoperative ileus symptoms in EOF group 8(2%) cases whereas 17 (3%) cases in DOF group which was not statistically significant.

Postoperative vomiting in EOF group was 52 (10%) compared to DOF group 97 (19%). The difference is found to be statistically not significant.

Graph 3: Postoperative Morbidity (GI complications)



Discussion

Traditionally women have been confined from oral feedings in the initial postoperative period, until flatus is passed, even though they feel starved. Gynecologists use this method based on the argument that EOF can result in the postoperative complications such as nausea, vomiting, and abdominal distension, which has to be reviewed. Our study results support for

Postoperative nausea in EOF group was 48(10%) cases versus 86(17%) cases in DOF group which is statistically significant.

Abdominal distention in EOF group was 13(3%) patients in comparison to 53(11%) patients in DOF group were observed respectively. The difference is statistically significant.

Postoperative diarrhea in EOF group is 4(1%) cases whereas it is 20(4%) cases in DOF group which is statistically not significant.

gynecologists that EOF is safe and effective after cesarean section and doesn't increase the risk of postoperative complications .[5].

This study was confined to elective c section cases presenting to us for delivery under spinal anesthesia. All of the patients included in this were generally young and healthy with low risk, uncomplicated cases.

Study found that there was early return of the function of the bowel with shorter time to passage of flatus in those who were given early feeds compared to those women in the delayed feeding group had a positive impact on the early stimulation of GI tract, reducing the incidence of paralytic ileus. Our study results coincides with the study conducted by Neeraja et al states that study conducted among 200 women, the mean time interval of return of bowel sounds was very early in the early feeding group compared to conventional feeding group.[6]

The study also found that early return of bowel function in the early feeding group showed significantly lesser requirement of IV fluids and earlier acceptance of regular diet compared to delay feeding group. Early introduction of oral fluids after surgery permitted effective hydration, which meant intravenous fluids could be discontinued sooner which made women more likely to walk freely and also helped for early removal of catheter. Similar findings were observed in the study conducted by Chantarasorn V et al studied 200 patients out of which, 107 were in early feeding group and remaining in the conventional group. results indicated that shorter time interval of early fed women group by the following hours, bowel movement (16.7 hours versus 25.3hours), duration of intravenous fluid administration (20.5 hours versus 24.8 hours), and overall length of hospital stays (3.3 days versus 4.0 days)which was significantly lesser, compared to conventional fed women group.[7]

Ray SA et al also found that early initiation of oral fluids after laparotomy surgery allowed effective hydration and earlier discontinuation of Intravenous fluids. The shorter duration of IV hydration could protect the mother from the discomfort of frequent IV

cannula changes, risks of fluid extravasation, and phlebitis. IV cannula removal was primarily determined by the requirement to give antibiotics in our institution, but the impact of early feeding on its duration cannot be discounted.[8]

Our study also observed that early diet resumption of women became eligible for discharge, as adequate calories provided energy for early ambulation of the patient, which could minimize the surgical stress response and inhibition of lactation thereby accelerating the recovery. As per the meta analysis conducted by Jin guo et al 20 studies were included, including 4584 women who had undergone cesarean. Compared with DOF, EOF promoted a quicker return of bowel sounds, flatus, bowel movement, and regular diet (P b 0.001 for all). Statistical Significant reductions were noted in duration and amount of intravenous fluids, length of hospital stay, and time to first breastfeeding.[9]

Early feeding women may also improve the acceptability of c section as a mode of delivery by our women thereby reducing the aversion towards the procedure. Reduced postop care and early discharge of the patient will have psychological impact, economic impact among developing countries woman to opt the procedure. Maternal satisfaction also noted to be higher among early fed women. This agrees with similar studies conducted by ogbadua et al conducted on 152 cases showed significantly shorter postoperative time interval to return of bowel sounds, hospital stay with early fed woman have higher satisfaction levels.[10]

Women fed earlier were ready for discharge at a mean of 12 days earlier than the control group (3.7 ± 0.6 days versus 4.9 ± 0.6 days). The length of hospital stay was found to be significant shorter in the early feeding group as early return of bowel function, receive of

regular diet, and early ability to ambulate compared to delayed feeding group and saves the cost. Mehta et al reported in their study conducted on 200 women under regional anesthesia early return of bowel movements, early passage of stools and shorter hospital stay which statistically significant with the following hours in early fed group (59 ± 7.3 and 88 ± 9.5 , hours, respectively; $p < 0.001$) compared to late fed group.[11]

We found a low incidence of ileus in a homogenous population of patients participated in our study when they were fed early. Other studies reported rates of ileus ranging from 26-31% in a heterogeneous population. Laboring women receiving opioid analgesics are known to have delayed gastric emptying;⁵ and obstetric interventions to augment labour namely oxytocin infusions, are emetogenic. Additionally all our patients received our institution's standard antiemetic prophylaxis for caesarean section and sympathetic blockade that may contribute to the maintenance of bowel motility.

Early postoperative feeding of caesarean patients does not appear to increase the incidence of postoperative paralytic ileus or of gastrointestinal symptoms in our study. In fact, patients who were fed in the immediate postoperative period were more likely to report an absence of any symptoms associated with ileus, although this difference was not statistically significant. Studies conducted by Masson et al on 148 women undergoing elective c section reported that there was no significant difference in the gastrointestinal complications between the groups (p value 0.978).[12]. However rare findings of significant incidence of nausea in early feeding recipients has been reported in study conducted by Teoh WHL et al in 2007, but still maternal satisfaction is higher early fed group.[13].

Although severe nausea can affect the maternal satisfaction in consuming the diet and prolonging the duration of hospital stay, we have not noticed such incidence in our study.

There was no significant difference in postoperative pain and opioid consumption in women provided with either a midline or Pfannenstiel incision, the distance of the surgical site from abdomen does affect the duration of ileus and time to motility.[14]

The limitations of the study is further study include larger sample size, emergency cases and look more closely at the effects of the surgical site on key metrics.

Conclusion

Early oral intake of food after uncomplicated caesarean delivery is well tolerated and is associated with a more rapid return to a normal diet, better outcomes with no significant increase in postoperative paralytic ileus. It had an benefits to the patients such as less suffering from thirst and hunger, shorter hospital stay and save cost. As there is no justification to withholding oral feeds as is traditionally done. It is suggested that the early feeding regimen be considered as safe and advocated for both its nutritive value and positive, effects on the gastrointestinal tract which results in better patient satisfaction. Therefore for the women undergoing c section can be given the option of early initiation of oral intake in obstetrics set up.

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