

The Comparative Study of Enhanced Recovery after Surgery Protocol vs Conventional Care in Patients Undergoing Caesarean Section in a Tertiary Care Centre

Sabah Hussain¹, Rathnamma. P²

¹Post Graduate Student, Department of Obstetrics and Gynecology, Sri Devaraj URS Medical College, R.L. Jalappa Hospital and Research Centre, Tamaka, Kolar, Karnataka, India

²Professor, Department of Obstetrics and Gynecology, Sri Devaraj URS Medical College, R.L. Jalappa Hospital and Research Centre, Tamaka, Kolar, Karnataka, India

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Corresponding author: Dr. Rathnamma. P

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Abstract

Aim: The aim of the present study was to assess effects of enhanced recovery after surgery protocol vs conventional care in patients undergoing caesarean section in a tertiary care centre.

Methods: This was a prospective comparative study conducted in the department of obstetrics and gynecology, Sri Devaraj URS Medical College, R.L. Jalappa Hospital And Research Centre, Tamaka, Kolar, Karnataka, India, following approval from institutional ethical committee of R. L. Jalappa Hospital and Research Centre, over a period of one year from January 2021 to December 2022. Based on the calculation a total of 150 pregnant women divided in to ERAS group (n=75) and conventional group (n = 75). Grouping was done using alternate sequence.

Results: The bulk of the subjects in both the conventional and ERAS groups were between the ages of 19 and 24. Majority of subjects in both conventional and ERAS groups were primigravida. Between the two groups, there was no statistically significant difference in age and parity. 97.3% of subjects in conventional got catheter removed after 24hours and all in ERAS group has catheter removed after 8 hours. 4 (5.3%) subjects in conventional and 3 (4.0%) subjects in ERAS group reported to have abdominal distention. However the association was not found to be statistically significant. 4 (5.3%) subjects in conventional and 2 (2.7%) subjects ERAS group reported to have persistent nausea. The difference between the two groups in nausea was found to be statistically significant. 4 (5.3%) subjects in conventional and none in ERAS group reported to have urinary tract infection. 4 (5.3%) subjects in conventional and none in ERAS group reported to have wound complication. The difference between the two groups in UTI and wound complication was found to be statistically significant.

Conclusion: The present study showed that ERAS protocol can be effectively and safely implemented for caesarean section with less postoperative complications without an increase in the hospital readmission rates. It was observed that ERAS protocols when implemented on patients, it was observed that there was reduced urinary tract infection and wound complication in post-operative patients.

Keywords: caesarean, surgery protocol, conventional care.

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Introduction

Enhanced recovery after surgery (ERAS) is a concept that combines various evidence-based aspects of perioperative care to accelerate patient recovery. It standardizes perioperative management and achieves a reproducible improvement in the quality of care. [1] Initial studies on ERAS protocols conducted in colorectal surgery reported a reduction in hospital stay, readmissions, and postoperative complications coupled with improved patient satisfaction. [2–4] Since then, there has been widespread adoption of ERAS protocols in other surgical specialties with similar outcomes reported. [5–8] The specific components of ERAS protocols differ among surgical specialties and institutions, but the core principles remain the same. These principles involve interventions that span the preoperative, intraoperative, and postoperative periods. It addresses the common reasons that delay patient recovery from surgery and prolong hospital stay such as inadequate analgesia, slow return of bowel function, and delayed ambulation. [9]

Cesarean section (CS) is a common operation performed worldwide with approximately 18.5 million procedures being performed annually. Recent global data estimate that nearly 20% of pregnant women give birth via cesarean delivery. [10] The CS rate has large variations in different countries and regions, ranging from merely 5% in South Sudan to 58.9% in the Dominican Republic. [11] ERAS has gone popular and well adopted in Western countries but in developing countries like India the implementation is facing network and infrastructural issues. The main obstacles to the adoption of ERAS for this segment of the population are the low literacy rate of the target population, the wide rural-urban divide, the inability to recognise early warning indicators, and a lack of qualified staff for ERAS protocols. [12]

While the ERAS idea was first put forth in the context of obstetric surgery, its application to CS has been adopted more slowly. Some maternity hospitals are currently attempting to adopt the ERAS protocol in their clinical practise, demonstrating some benefits above traditional care in CS. [13] In the past five years, a number of observational studies and randomised controlled trials (RCTs) have both been published to assess the effectiveness and practicality of ERAS for CS. These studies have improved our understanding of the relationship between ERAS implementation and maternal outcomes, such as shorter hospital stays, fewer complications, and quicker functional recovery. [14,15]

The aim of the present study was to assess effects of enhanced recovery after surgery protocol vs conventional care in patients undergoing caesarean section in a tertiary care centre.

Materials and Methods

This was a prospective comparative study conducted in the department of obstetrics and gynecology, Sri Devaraj URS Medical College, R.L. Jalappa Hospital and Research Centre, Tamaka, Kolar, Karnataka, India, following approval from institutional ethical committee of Sri Devaraj URS Medical College, R.L. Jalappa Hospital and Research Centre, Tamaka, Kolar, Karnataka, India, over a period of one year from January 2021 to December 2022. Based on the calculation a total of 150 pregnant women divided in to ERAS group (n=75) and conventional group (n = 75). Grouping was done using alternate sequence.

The study included pregnant women visiting hospital who fulfilled the inclusion criteria. Demographics, perioperative traits, and medical comorbidities were comparable between the groups. Improved postoperative recovery was not linked to a

statistically higher proportion of postoperative day 2 discharges (8.6% vs 3.3%; odds ratio, 2.74; 95% confidence interval, 0.51-14.70). Written informed consent was obtained from all participants who met the inclusion criteria after a thorough explanation of the study's goal, procedure, and anticipated results was given to each participant before the study began..

Data Collection

Study subjects were enrolled on the day of caesarean delivery and after obtaining informed consent they are divided into two groups by selecting the patient in each group with alternate sequence. In one group enhanced recovery after surgery (ERAS) protocol was implemented and other group conventional care was given. Preoperative surgical preparation and antibiotic prophylaxis followed standard institutional protocols of cesarean section.

Inclusion Criteria

- Females admitted with Gestational age of 37 0/7 completed weeks or greater with an indication for delivery by emergency / elective caesarean section under spinal anaesthesia.
- Lower segment caesarean section.

Exclusion Criteria

- Subjects with gestational less than 37 weeks.
- Caesarean section done under general anaesthesia.
- Intraoperative and postoperative postpartum haemorrhage,
- Antepartum haemorrhage
- Coagulation disorder
- Moderate to severe anemia
- Sepsis
- Haemodynamic instability
- Severe pre-eclampsia and eclampsia
- Gestational diabetes mellitus, overt diabetes mellitus,
- Severe cardio-respiratory disease
- Pre-existing gastrointestinal disorders

Methodology

The components of the enhanced recovery protocol included several evidence-based recommendations: early diet initiation, early ambulation early removal of urinary catheter.

Enhanced recovery after Caesarean section comprised of

- Women in the early feeding were given 200–250 mL of liquid (water, tea, milk, packed fruit juice) 6 hours after surgery.
- If the liquid diet was well tolerated, a solid diet was started within 24 hours after surgery.
- Early Ambulation-within the first eight hours following surgery, the side of the bed with her feet dangling and sat in a chair, then walking at least once within the first 24 hours, then walking three to four times per day after that.
- Early removal of urinary catheter-Removal of urinary catheter after 8 hours.
- Conventional care protocol comprised of: -
- Ambulation after 24 hours, initiation of clear fluids by 12 hours, regular diet initiation after 24 hours, urinary catheter removal after 24 hours.

Outcome measures Primary outcomes

Gastrointestinal and renal outcomes include pain abdomen, anorexia, abdominal distension, persistent nausea and/or vomiting.

Secondary outcomes

- Postoperative complications include urinary tract infections, wound complication and hospital readmission.

Investigations

- Urine routine
- CBC prior and post procedure Urine culture and sensitivity Wound swab culture.

Statistical Analysis

Data was entered in Microsoft Excel. Statistical analysis was performed by the SPSS program for Windows, version 17.0 (SPSS, Chicago, Illinois). Continuous

variables were presented as mean \pm SD, and categorical variables were presented as absolute numbers and percentage.

Results

Table 1: Demographic details

Age (years)	Groups		Total	χ^2	p
	ERAS	Conventional			
19-24 years	39 (52.0)	45 (60.0)	84 (56.0)	0.974	0.324
25-34 years	30 (40.0)	36 (48.0)	66 (44.0)		
Total	75	75	150		
Parity					
Primigravida	40 (53.3)	39 (52.0)	79 (52.7)	0.027	0.870
Multigravida	35 (46.7)	36 (48.0)	71 (47.3)		
Total	75	75	150		
Catheter removal					
NO	0 (0.0)	2 (2.7)	2 (1.3)	2.027	0.497
YES	75 (100.0)	73 (97.3)	148 (98.7)		
Total	75	75	150		
Abdominal Distention					
NO	72 (96.0)	71 (94.7)	143 (95.3)	0.150	0.699
YES	3 (4.0)	4 (5.3)	7 (4.7)		
Total	75	75	150		

The bulk of the subjects in both the conventional and ERAS groups were between the ages of 19 and 24. Majority of subjects in both conventional and ERAS groups were primigravida. Between the two groups, there was no statistically significant difference in age and parity. 97.3% of subjects in conventional got

catheter removed after 24 hours and all in ERAS group has catheter removed after 8 hours. 4 (5.3%) subjects in conventional and 3 (4.0%) subjects in ERAS group reported to have abdominal distention. However the association was not found to be statistically significant.

Table 2: Other details of the patients

Nausea	Group		Total	χ^2	P
	ERAS	Conventional			
NO	71 (94.7)	73 (97.3)	144 (96.0)	0.694	0.405
YES	2 (2.7)	4 (5.3)	6 (4.0)		
Total	75	75	150		
Urinary tract infection					
NO	75 (100.0)	71 (94.7)	146 (97.3)	4.110	0.043
YES	0 (0)	4 (5.3)	4 (2.7)		
Total	75	75	150		
Wound complication					
NO	75 (100.0)	71 (94.7)	146 (97.3)	4.110	0.043
YES	0 (0)	4 (5.3)	4 (2.7)		
Total	75	75	150		

4 (5.3%) subjects in conventional and 2 (2.7%) subjects ERAS group reported to have persistent nausea. The difference between the two groups in nausea was found to be statistically significant. 4 (5.3%) subjects in conventional and none in ERAS group reported to have urinary

tract infection. 4 (5.3%) subjects in conventional and none in ERAS group reported to have wound complication. The difference between the two groups in UTI and wound complication was found to be statistically significant.

Table 3: Distribution of variables in ERAS group

Variables	Yes	No	Total
Early Feeding (Liquid) 6 Hours After Surgery (sips)	73	2	75
Solid diet within 24 hours of surgery	75	0	75
Early ambulation- dangling feet within 8 hours	72	3	75
Walking 1-2 times within 24 hours post operative	75	0	75
Walking 3-4 times after 24 hours	75	0	75
Early removal urinary catheter after 8 hours post operatively	75	0	75

All the subjects in ERAS group, could have solid diet within 24 hours of surgery, walking 1-2 times within 24 hours post-operative, walking 3-4 times after 24 hours and early removal urinary catheter after 8

hours post operatively. 73 subjects could initiate early feeding of liquids as sips 6 hours after surgery and 72 subjects could have early ambulation- dangling feet within 8 hours.

Table 4: Distribution of variables in Conventional group

Variables	Yes	No
Initiation of clear fluids after 12hours	75	-
Initiation of regular diet after 24 hours	75	-
Ambulation after 24 hours	73	2
Removal of catheter after 24 hours	73	2

All the subjects in conventional group, could have Initiation of clear fluids after 12hours, Initiation of regular diet after 24 hours, 73 subjects could ambulate after 24 hours and removal of catheter after 24 hours.

Discussion

A multidisciplinary perioperative care system called "Enhanced Recovery after Surgery" (ERAS) integrates evidence-based methods to accelerate and enhance patients' recovery. The ERAS pathway minimises the stress associated with surgery afterward and expedites early physiological and functional recovery. It has reduced readmission rates, the duration of hospital stays, potential complications, and the expense to the healthcare system. [16-19] An international, interdisciplinary,

the ERAS Society, a nonprofit organisation (www.erassociety.org), has developed recommendations and criteria for all surgical disciplines. [20] For better improvement of the mother and foetal health outcomes after Caesarean births (CD), The society suggests emphasising a patient-centric strategy and using some ERAS components during the perioperative period. [21-23]

The majority of the individuals in both the traditional and ERAS groups were between the ages of 19 and 24. There was no statistically significant difference between the two groups. Regarding parity, there was no statistically significant difference between the two groups. All the women in both the groups were having term gestation. In concurrence with the present study, In the study by Sara Taha

Mostafa et al. [24] The patients' ages ranged from 18 to 35 years old, per the demographic data on the patients in both groups, with no statistically significant difference between the two groups. The gestational ages of the two groups were examined in the same study, but no statistically significant difference was discovered.

4 (5.3%) subjects in conventional and 3 (4.0%) subjects in ERAS group reported to have abdominal distention. However the association was not found to be statistically significant. 4 (5.3%) subjects in conventional and 2 (2.7%) subjects in ERAS group reported to have persistent nausea. The difference between the two groups in nausea was found to be statistically significant. According to Sara Taha Mostafa et al [24] research the improved recovery after surgery (ERAS) group experienced much reduced post-operative nausea and vomiting. Also, among women who started early oral intake in the ERAS protocol, the duration between the initial oral intake and the first intestinal sounds was shorter. In addition, women participating in the ERAS programme were able to begin walking far faster than those receiving standard management.

4 (5.3%) subjects in conventional and none in ERAS group reported to have urinary tract infection. 4 (5.3%) subjects in conventional and none in ERAS group reported to have wound complication. The difference between the two groups in UTI and wound complication was found to be statistically significant. Prophylactic antibiotic use, wound preparation and vaginal preparation should be carried out to reduce the surgical site infection risk after cesarean delivery. Although a cesarean delivery without chorioamnionitis or rupture of membrane is considered as clean incision, cesarean delivery in active phase of labor or second stage of labor, with rupture of membrane or chorioamnionitis is considered as clean

contaminated incision. [25] Contamination with vaginal flora in addition to skin flora increases the risk of infection. The first-generation cephalosporin plus azithromycin prophylaxis in these women provides additional reduction in postoperative infection. [26] ERAS Society advised giving antibiotics 60 minutes before making a skin incision, instead of administration after cord clamping. [22]

2 (2.7%) subjects in conventional and none in ERAS group had hospital readmission between two groups, there was no statistically significant difference. ERAS protocols reduce LOS and cost savings without an increase in unfavorable outcomes like 30-day readmission rates. [27] Though readmission rates were not observed in current study but Meng X et al. [28] concluded that implementation of ERAS does not increase the readmission rate, rather it decreases the readmission rate and also reduction in LOS reduces the hospital cost, Complication rates, postoperative pain rating, and painkiller usage. All the patients in the ERAS group had an early removal urinary catheter after 8 hours post operatively. All the subjects in conventional group had removal of catheter after 24 hours. The length of stay is shortened when the urinary catheter is removed after surgery. [23] Although there are some worries that this could cause urine retention and a possibility of lifelong bladder injury, no proof of this has yet to materialise. [29]

Conclusion

The present study showed that ERAS protocol can be effectively and safely implemented for caesarean section with less postoperative complications without an increase in the hospital readmission rates. It was observed that ERAS protocols when implemented on patients, it was observed that there was reduced urinary tract infection and wound complication in post-operative patients. All the patients in the ERAS group had sense of satisfaction

which encouraged them to get better sooner. There was no readmission under ERAS group and every patient ambulated well. There was sense of wellness among ERAS group patient and there was quick recovery back to pre-pregnancy status.

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