



EVIDENCE BASED STUDY OF ENHANCED RECOVERY AFTER CESAREAN SECTION OF ELECTIVE CASES IN OUR TERTIARY HEALTH CARE CENTRE

Obstetrics & Gynaecology

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ABSTRACT

Background: Concept of enhanced recovery after surgery (ERAS) has been applied in various surgical branches. Evidence regarding the necessary components of ERAS for obstetric population is limited. Therefore, objective of this study was to test the application of ERAS in patients undergoing elective caesarean section on the post-operative recovery process. **Methods:** A total of 100 patients were included with 50 in the interventional group (ERAC) and 50 in the routine group. (Non-ERAC). **Results:** All the baseline characteristic such as age, residence, socioeconomic status, parity, gestational age and indication for LSCS was similar in both the groups. ($p>0.05$) Overall the patient satisfaction among the ERAC group (8 out of 10) was also better than non-ERAC group (6 out of 10). **Conclusions:** The post-operative pain and duration of hospital stay was lesser in ERAC group than non-ERAC. Moreover, patient satisfaction with ERAC was also better. Thus, implementing ERAC in our setting will prove to be beneficial to the patients.

KEYWORDS

Caesarean section, post-operative complications, post-operative care, ERAS.

INTRODUCTION

India is experiencing an increase in the number of cesarean delivery rates similar to the rest of the world. As per the NFHS data the caesarean rates have doubled from 8% in 2005-2006 to 17% in 2015-2016.¹ The World Health Organization has recommended that a countries caesarean delivery rate should not exceed 10 to 15% of the total delivery. Unfortunately, India has exceeded that cutoff. Apart from the absolute indication for C-section such as small pelvis, eclampsia, placenta previa, fetal asphyxia etc, there are other non-essential reason such as comfort for doctor and mother etc. Due to lack of specialist in obstetric and anaesthesia, available at odd times, planned cesarean is conducted to avoid risk.

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 ERAS protocol was first initiated by Professor Henrik Kehlet in the 1990s for colorectal surgery.² Later on it was implemented in other surgical branches like urological, pancreatotomy, liver resection including obstetric and gynaecologic surgery. These programmes mainly aim to modify the physiological and psychological response to major surgery resulting in decreased post-operative complication and speedy recovery. The major principles of ERAS protocol include the following 1) Pre-operative counselling 2) Preoperative nutrition 3) Avoiding perioperative fasting 4) Loading carbohydrate up to 2 hours preoperatively 5) Providing standardized anesthetic and analgesia regimens (nonopioid and epidural analgesia) 6) Early mobilization. These basic principles can be applied in all surgical field.

In recent years several studies and research has been done in implementing ERAS in cesarean delivery and they have recommended it implementation.^{3,4} The stated benefits on ERAS in cesarean delivery are reduced length of hospital stay, accelerated patient recovery, decrease in complication rate, earlier return of bowel function, decreased analog pain score, no increased mortality, better patient satisfaction, reduced reoperation, re-admission and cost. There are three components of ERAS while implementing in Cesarean delivery. These are steps taken before delivery, on the day of delivery and after delivery. There are several requirement at each step that has to be practiced in order to obtain the desired outcome. It is a multimodal approach to enhance speedy recovery of mother.

Implementing ERAS requires a Perioperative Surgical Home (PSH) where a patient centred care provided by multidisciplinary physician in a team based manner throughout the entire surgical experience.⁵ The

function of PSH extends beyond the perioperative period till the out-patient setting. Growing evidence from several randomized control trial, systemic reviews and meta-analysis shows the benefit from ERAS protocol but implementing in routine practice shows major challenges. Introducing such standards in developing country like India seems to be a more difficult task.^{6,7} Data on this regard is also limited in India especially in the obstetric branch.

The present study has been undertaken to assess the feasibility of introducing ERAS protocol in an Indian set and monitor its outcome in comparison to the routine practice. Results of this study will highlight the benefits ERAS in our setting and its challenges.

MATERIAL AND METHODS

A Prospective case control study was conducted in Department of Obstetric and Gynecology at our tertiary health care center among 100 antenatal mother visit the hospital for regular check-up and planning to delivery at the same institution. Which were further divided equally into two groups Non-ERAC and ERAC group 50 patients each group. The study was conducted only after obtaining ethical clearance from the Institutional Ethical Committee (IEC) of our tertiary health care center.

Inclusion Criteria:

1. All pregnant women scheduled for elective cesarean section without any co-morbidities.
2. Those mothers willing to give consent.

Exclusion Criteria:

1. All pregnant women requiring termination of pregnancy on emergency basis.
2. Pregnant women having medical and obstetric co-morbidities like PIH/ severe pre-eclampsia/ eclampsia, gestational diabetes/ overt diabetes, thyroid dysfunction, underlying heart disease, abruption placenta, placenta previa, IUD, fetal distress, cord prolapse.

Based on review of literature a structured questionnaire with details of demographic information and obstetric data was collected. The questionnaire has been divided into two parts. The first part had general details of the patients while the second part had three section i) Pre-operative ii) intra-operative and iii) post-operative assessment along complication and adverse effects. Using ERAS protocol data were recorded and analysed.

Demographic data, history, examination and relevant investigations of patients were noted. Operative note were taken. Routine post-

operative management was done as per hospital protocol.

Continuous variables are presented as mean $\pm$ SD and these variables between the two groups were compared by using Student's t-test. Categorical variables are presented as absolute numbers and percentage and these variables between the two groups were compared using Chi-squared test. The statistical analysis was done by using SPSS version 17.0. A p value <0.05 was considered statistically significant.

RESULTS

The present case- control study was done to assess the feasibility of implementing ERAC protocol in our setting and also to compare the outcome with routine protocol (non-ERAC) in terms of length of hospital stay, patient satisfaction and maternal complication.

A total of 100 patients were included with 50 in the interventional group (ERAC) and 50 in the routine group. (Non-ERAC). The patients in ERAC and non-ERAC group were matched with regards to their age, parity, gestational age, residence, socioeconomic scale and indication for LSCS.

There was no significant difference between the two groups with respect to baseline parameters. Both the groups were comparable with respect to age, Residence, Socioeconomic status, gestational age, and parity.

Pre- admission counselling was given to all patients of ERAC group while among the non-ERAC group only 24% received counselling. This difference was statistically significant at $p < 0.05$. All patients in ERAC group were made to fast pre-operatively for 6, 4 and 2 hours for solid, semisolid and liquids respectively. On the other hand, for the non-ERAC group the time period for fast prior to surgery was 12, 10 and 6 for solid, semisolid and liquids respectively. This difference was statistically significant at $p < 0.05$.

Table No. 01: Comparison duration of fasting during pre-operative period between non-ERAC and ERAC group

Fasting (hour)	Non-ERAC		ERAC		P value
	Mean $\pm$ SD	Median	Mean $\pm$ SD	Median	
Solid	12 $\pm$ 0	12	6 $\pm$ 0	6	0.00
Semisolid	10 $\pm$ 0	10	4 $\pm$ 0	4	
Liquid	6 $\pm$ 0	6	2 $\pm$ 0	2	

Other pre-operative intervention such as carbohydrate loading, no mechanical bowel preparation was implemented in ERAC group. Antibiotic and DVT prophylaxis were given to all in the ERAC group, while in non-ERAC group antibiotic was given but not DVT prophylaxis. High concentration oxygen, hypothermia prevention and goal directed fluid therapy was given to all in ERAC group but not to the non-ERAC. Minimal tissue handling and TAP block was practiced for all ERAC patients but not among the control group.

Table No. 02: Comparison Of Pre-operative Intervention Done Between Non-ERAC and ERAC group

Pre-operative intervention		Non-ERAC	ERAC	P value
Mechanical bowel preparation	No	0 (0%)	50 (100%)	0.00
	Yes	50 (100%)	0 (0%)	
Carbohydrate loading	No	50 (100%)	0 (0%)	0.00
	Yes	0 (0%)	50 (100%)	
Antibiotic prophylaxis	No	0 (0%)	0 (0%)	-
	Yes	50 (100%)	50 (100%)	
DVT prophylaxis	No	50 (100%)	0 (0%)	0.00
	Yes	0 (0%)	50 (100%)	

The mean operative time 31.8 $\pm$ 7.40 minutes in ERAC group was lesser than non-ERAC group 54.9 $\pm$ 9.66 minutes. This difference was statistically significant at $p < 0.05$. PONV prophylaxis and restriction of i.v. fluids were implemented among all in ERAC group but not in the non-ERAC group.

Table No. 03: Comparison Of Operative Intervention Between Non-ERAC and ERAC group

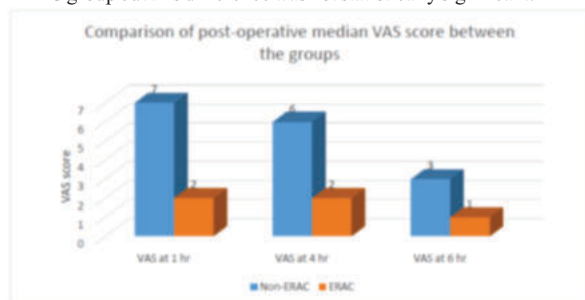
Operative intervention		Non-ERAC	ERAC	P value
Minimal tissue handling ^a	No	50 (100%)	0 (0%)	0.00
	Yes	0 (0%)	50 (100%)	
TAP block given ^a	No	50 (100%)	0 (0%)	0.00

Operative time ^b (minutes)	Yes	0 (0%)	50 (100%)	0.00
	Mean $\pm$ SD	54.9 $\pm$ 9.66	31.8 $\pm$ 7.40	
	Median	55	30	

a-chi-square, b- Mann-whitney U test

The time to catheter removal (64.8 $\pm$ 19.5 mins), time for first ambulation (246.20 $\pm$ 21.08), time for first oral feed (161.60 $\pm$ 18.33) post-operatively was earlier in ERAC group than the control. This difference was statistically significant at $p < 0.05$. The time for passing flatus (13.26 $\pm$ 1.46 hours) and stool (42.84 $\pm$ 2.67 hours) was also earlier for the ERAC group than non ERAC and this difference was statistically significant at $p < 0.05$.

The VAS score at 1,4 and 6 hours post-operative and need for rescue analgesia was lesser in the ERAC group than non-ERAC. Post-operative complications such as surgical site infection, abdominal distension, paralytic ileus and UTI was seen more among the non-ERAC group but this difference was not statistically significant.



Graph No.01: Comparison of post-operative VAS score and need for analgesia between non-ERAC and ERAC group

The mean duration of hospital stay, (4.14 $\pm$ 0.49 days) and POD for discharge (2.88 $\pm$ 0.55 days) in the ERAC group was lesser than non-ERAC group (7.5 $\pm$ 1.09 days and 6.3 $\pm$ 0.88 respectively) and this difference was statistically significant at $p < 0.05$.

Early initiation of Breast feeding was done in the ERAC group (31.20 $\pm$ 4.79 mins) than the control group (79.0 $\pm$ 15.68 mins) which was statistically significant at $p < 0.05$. Overall, the patient satisfaction among the ERAC group (8 out of 10) was also better than non-ERAC group (6 out of 10).

DISCUSSION

Enhanced recovery after surgery (ERAS) has been practiced by various surgical specialty in the developed countries. It was first published for colorectal surgeries and later implemented across several specialty such as bariatric, plastic, cardiac, breast, oesophageal, orthopedics, neurosurgical, hepatic, pancreatic, head and neck, thoracic and urologic surgery.^{8,9} The guidelines for perioperative care given during caesarean delivery was published by the ERAC society only in August 2019.¹⁰ Its implementation in a developing country like ours is a big challenge especially due to the limited resources available.¹¹

The present study was done to assess the feasibility of implementing ERAC in our setting and evaluate its outcome in comparison with the routine protocol.

A case-control study was done with 50 antenatal mothers being given the routine care in the control and 50 patients were given ERAC protocol in the intervention group. All the baseline characteristic such as age, residence, socioeconomic status, parity, gestational age and indication for LSCS was similar in both the groups. ($p > 0.05$) The ERAC protocol was divide into four phase i.e., pre-operative, perioperative, postoperative and post-discharge. Each phase had several components that has to be implemented in a systematic manner.

Pre-admission counselling should be done for all antenatal mothers. The essential components that need counselling or health education are the indication of LSCS, type of surgery and anesthesia, its possible complications both short term (e.g., injury to intra-abdominal organ, postoperative pain, infection, venous thromboembolism) and long-

term (e.g., severe hemorrhage, risk of uterine rupture etc.) Information regarding the importance of breast feeding should also be given during this period.¹²

The median time of catheter removal among the ERAC group in our study was 1 hour while among the control group it took 10 hours. Shifa et. al.¹⁴ in their study removed the catheter at 12 and 24 hours for the ERAC and non- ERAC group respectively. Mostafa et. al.¹³ also mentions early removal of catheter without mentioning the time. But ideally it should be removed before 12 hours to prevent infection.

Oral intake post-operative was done within a mean duration of 161.60 minutes among the ERAC group while among the non-ERAC it took 381.8 minutes. Shifa et. al.¹⁴ encourages oral intake at 720 mins (12 hours) under the ERAC protocol and 1440 mins (24 hours) for the control group. The ERAS society recommends early feeding within 2 hours postoperatively, liquid intake at 1 hour and regular diet within 4 hours after cesarean delivery.¹⁵ Early feeding improves bowel activity, maternal satisfaction and reduces the duration of hospital stay without increasing gastrointestinal complication.¹⁶

In our study the time to 1st ambulation was 246.20 ± 21.08 minutes among the ERAC group while among the non-ERAC group it took double the time i.e., 494.00 ± 35.05 minutes. Similar Results were observed in other study.¹⁴

Early ambulation following any abdominal surgery is encouraged as it decreases the risk of venous thromboembolism, pulmonary complication and also the duration of hospital stay.¹⁷ In our study the time to 1st ambulation was 246.20 ± 21.08 minutes among the ERAC group while among the non-ERAC group it took double the time i.e., 494.00 ± 35.05 minutes. Similar Results were observed in other study.^{13,14}

In our study most of the patients in ERAC group had passed flatus and stool within 13 and 42 hours respectively while in control group took a longer time of 24 and 96 hours. Kanniga et al.⁴ in the study also documented early return of bowel movements in ERAC than non-ERAC group.

The mean duration of hospital stay in the present study was much lesser among the ERAC group i.e., 4.14 ± 0.49 days than control group 7.5 ± 1.07 days. This difference was statistically significant at $p < 0.05$. Similar findings were also documented in other studies.^{13,14}

Patient satisfaction on a scale of 1 to 10, was found to be better among the ERAC group (8.40 ± 0.69) than non-ERAC group (6.2 ± 0.45) in our study. A study by Mostafa et. al.,¹³ found the patient satisfaction among ERAC group to be 8.22 ± 0.72 and 5.64 ± 0.76 in the control. Patient satisfaction is also an important consideration in the need to implement ERAC protocol in our setting.

CONCLUSION

The present study has compared the use ERAC protocol with non-ERAC in our setting. We could successfully implement the key elements of ERAC protocol such as pre-admission counselling, decreased period of fasting prior to LSCS, avoidance of mechanical bowel preparation, carbohydrate loading, antibiotic and DVT prophylaxis, avoidance of hypothermia, goal directed fluid therapy, use of appropriate surgical technique with minimal tissue handling, use of TAP block, early oral feed and ambulation post-surgery with prophylaxis for nausea and vomiting and early initiation of breast feeding among mother undergoing LSCS was possible.

The post-operative pain and duration of hospital stay was lesser in ERAC group than non-ERAC. Moreover, patient satisfaction with ERAC was also better. Thus, implementing ERAC in our setting will prove to be beneficial to the patients.

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