

# A Prospective Comparative Study of Application of Enhanced Recovery After Surgery (ERAS) in Patients Undergoing Elective Caesarean Section

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**Abstract:** Background: The objective of the present study was to test the application of enhanced recovery after surgery (ERAS) in patients undergoing elective caesarean section on the post-operative recovery process. Method: A prospective comparative analytical study was conducted in RGMC & CSMH, Kalwa Thane over the study duration of 18 months. Total 100 patient which were further divided into two equal groups randomly ERAS group (n=50) and Conventional group (n=50) as per inclusion and exclusion criteria. Relevant data was collected from PROFORMA filled by investigator & caesarean outcome was assessed in ERAS & non-ERAS group. Structured questionnaire was developed from previously used survey tools, and validated in our patient's group. Results: The study found that the majority of subjects were aged 26 - 30 years, with a majority being multigravida. The ERAS group had shorter passage times and mobilization times compared to the conventional group. The ERAS group had better satisfaction scores but had lower hospital stay duration. Both groups received pre-operative antibiotic prophylaxis, anesthesia, PONV/IONV prophylaxis, and DVT prophylaxis. Post-operative laxative needs were observed in 4% of conventional group subjects. The strategy of enhanced recovery for elective cesarean sections could reduce hospital stay, healthcare costs, and patient satisfaction. Conclusion: The study reveals that ERAS patients experience shorter hospital stays and higher satisfaction scores, with fewer complications. The study suggests that enhanced recovery after surgery can reduce hospital stays, financial burdens, and bed occupancy, benefiting hospitals, patients, and healthcare facilities. This could increase patient treatment and resource utilization.

**Keywords:** Cesarean Delivery, Enhanced Recovery After Surgery

## 1. 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. <sup>[1]</sup>

Initial studies on ERAS protocols conducted in colorectal surgery reported a reduction in hospital stay, readmissions, and postoperative complications coupled with improved patient satisfaction. Since then, there has been widespread adoption of ERAS protocols in other surgical specialties with similar outcomes reported. <sup>[2-3]</sup>

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. <sup>[4]</sup>

There has been slower embrace of the benefits of ERAS in patients undergoing cesarean delivery. However, with increased pressure on maternity services, several centers in

Europe have begun implementing ERAS protocols for scheduled cesarean delivery, and this concept has recently started to gain popularity in the USA. The aim of this review is to highlight evidence-based perioperative interventions that should be considered as part of an ERAS protocol for scheduled cesarean delivery. <sup>[5]</sup>

Enhanced recovery after surgery (ERAS) was firstly introduced by Kehlet in 1997 to reduce the length of hospital stay in open sigmoid resections. <sup>[1]</sup> In China, the first ERAS Congress was established in 2015 and since then a series of Chinese Experts Consensus has been published regarding this topic. Today, ERAS has infiltrated a broad range of surgical specialties and these years various guidelines have been published and updated by experts from all over the world. Although ERAS protocols have been successfully implemented across many subjects and institutions, the uptake of ERAS in obstetrics is lagged behind. Not until 2018, ERAS society released guidelines for cesarean delivery (CD) and to date relevant data are limited in the literature. <sup>[6]</sup>

Hence the present study was conducted to assess the efficacy of ERAS in comparison with Standard care among elective caesarean deliveries postoperative care, to compare the outcomes, length of hospital stays among ERAS and conventional methods of management, and to assess the

complications associated with ERAS and conventional methods.

## 2. Material and Methods

A prospective comparative analytical study was conducted in RGMC & CSMH, Kalwa Thane over the study duration of 18 months. Total 100 patient which were further divided into two equal groups randomly **ERAS group (n=50)** and **Conventional group (n=50)** as per inclusion and exclusion criteria.

### Inclusion Criteria:

- 1) Women with gestational age of 37 completed weeks or greater
- 2) Undergoing a scheduled or non - emergency caesarean delivery,
- 3) In the age group of 20 - 35 yrs. were included in the study.

### Exclusion Criteria

Patients were excluded if

- 1) Less than 37 weeks of gestation,
- 2) Those undergoing an emergency caesarean birth, or
- 3) Had a pregnancy complicated by an active infection, morbidly adherent placenta, pre - existing hypertension, or pregnancy - induced hypertension, diabetes, coagulopathy preoperatively that would potentially prolong their hospitalization.

### Detailed Methodology

- Randomization was done to allocate subjects to Group A (ERAS group) and Group B (Standard Care group). Relevant data was collected from PROFORMA filled by investigator & caesarean outcome was assessed in ERAS & non - ERAS group. Structured questionnaire was developed from previously used survey tools, and validated in our patient's group.
- The key principles of the ERAS protocol include pre - operative counselling, preoperative nutrition clear liquid before 2 hours of surgery, single antibiotic shot 30 min before skin incision, post operative early removal of catheter within 6 hours, early oral intake for liquids & solids & early mobilization. Non - ERAS group i. e., the standardized care includes preoperative NPO for 12 hours, antibiotic prophylaxis for 3 days, regional, postoperative catheter removal after 24 hours, normal diet by 24 - 48 hours.
- Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi - square was the test of significance. Continuous data was represented as mean and standard deviation. Independent t test was the test of significance to identify the mean difference between two groups. P value less than 0.05 will be considered for statistical significance.

## 3. Observations and Results

- In the present study we assessed the Age distribution among the study subjects. We observed that majority of the study subjects belonged to the age group of 26 to 30

years (46% and 44% in group 1 and 2), followed by 20 to 25 years (32% and 30% in group 1 and 2).

- In the present study we assessed the parity among the study subjects. We observed that majority of the subjects were multigravida (80% and 84% in groups 1 and 2).
- In the present study we assessed the post operative hospital stay among the study subjects. We observed that post operative stay was comparatively larger in conventional group as compared to ERAS group. We analyzed the duration among either group using Chi - square test, and found that ERAS group had significantly lower hospital stay duration. (The chi - square statistic is 28.1744. The p - value is < 0.00001. The result is significant at  $p < 0.05$ .)

**Table 1:** Distribution of patients as per hospital stay

Hospital stays	ERAS group		Conventional group	
	Number of subjects	Percentage	Number of subjects	Percentage
Less than 5	39	78	13	26
6 to 8	10	20	27	54
More than 8	1	2	10	20
Total	50	100	50	100
Significance	The chi - square statistic is 28.1744. The p - value is < 0.00001. The result is significant at $p < 0.05$ .			

In the current study we assessed the Time for passage of first flatus among the study subjects. We observed that the Time for passage of first flatus was comparatively lesser among ERAS group subjects as compared to conventional group.

**Table 2:** Distribution of patients as per time for passage of first flatus

Time for passage of first flatus	ERAS group		Conventional group	
	Number of subjects	Percentage	Number of subjects	Percentage
Less than 6 hours	5	10	1	2
6 to 12 hours	10	20	7	14
12 to 24 hours	16	32	12	24
24 to 48 hours	13	26	20	40
More than 48 hours	6	12	10	20
Total	50	100	50	100

In the current study we assessed the Time for first mobilization. We observed that Time for first mobilization was lesser among ERAS group as compared to conventional group subjects.

**Table 3:** Distribution of patients as per time for first mobilization

Time for first mobilization	ERAS group		Conventional group	
	Number of subjects	Percentage	Number of subjects	Percentage
Less than 6 hours	4	8	1	2
6 to 12 hours	15	30	6	12
12 to 24 hours	21	42	13	26
24 to 48 hours	8	16	20	40
More than 48 hours	2	4	10	20
Total	50	100	50	100

In the present study we assessed the Patient satisfaction score among the study subjects. We observed that majority

of the subjects had score between 9 and 10 (72% and 56% in groups 1 and 2). ERAS group subjects showed comparatively better satisfaction scores. However, the results were not found to be statistically significant. (The chi - square statistic is 2.8667. The p - value is 0.238513. The result is not significant at  $p < 0.05$ .)

**Table 4:** Distribution of paper as per complications

Complications	ERAS group		Conventional group	
	Number of subjects	Percentage	Number of subjects	Percentage
Postop Laxatives	0	0	2	4
Puerperal Fever	0	0	0	0
DVT	0	0	0	0
Paralytic Ileus	0	0	0	0

In the present study we assessed the complications among the study subjects in either group. We observed that post operative need of laxatives among 4% conventional groups subjects. In this study we did not observe any development of Puerperal Fever, DVT, Paralytic Ileus.

#### 4. Discussion

ERAS is an idea that consolidates different proof - based tools of operative care to quicken tolerant recuperation. It equalized perioperative management and accomplished a beneficial enhancement in the nature of care.

The particular steps of ERAS regimen vary among responsible caregivers and organizations; however, the center standards were always included. These standards include intercessions that are implemented throughout preoperative, intraoperative and postoperative periods. It tends to follow normal reasons that defer understanding convalescence from a medical condition or surgical procedure, for example, insufficient pain management, slow return of gastrointestinal work and deferred ambulation.

In the present study we observed that majority of the study subjects belonged to the age group of 26 to 30 years (46% and 44% in group 1 and 2), followed by 20 to 25 years (32% and 30% in group 1 and 2). We also observed that majority of the subjects were multigravida (80% and 84% in groups 1 and 2).

In the current study we observed that the Time for passage of first flatus was comparatively lesser among ERAS group subjects as compared to conventional group. Time for first mobilization was lesser among ERAS group as compared to conventional group subjects.

Satisfaction scores of the patients were done using a scale from 0 - 10 where 0 was not satisfied at all and 10 was very satisfied, from which the overall mean satisfaction score was significantly higher in ERAS cases than those of conventional one. We observed that majority of the subjects had score between 9 and 10 (72% and 56% in groups 1 and 2). ERAS group subjects showed comparatively better satisfaction scores. However, the results were not found to be statistically significant. (The chi - square statistic is 2.8667. The p - value is 0.238513. The result is not significant at  $p < 0.05$ .)

Nelson et al., [7] 2014 where in their study they concluded also significant difference in satisfaction score between the two groups of study in contrast to what Polle et al.2007 concluded that the patients' satisfaction scores were comparable ( $p = 0.84$ ) between studied groups. [8]

Hospital stay reduction is also one of the goals of ERAS protocols where in the present study we assessed the post operative hospital stay among the study subjects. We observed that post operative stay was comparatively larger in conventional group as compared to ERAS group.

We analyzed the duration among either group using Chi - square test, and found that ERAS group had significantly lower hospital stay duration. (The chi - square statistic is 28.1744. The p - value is  $< 0.00001$ . The result is significant at  $p < 0.05$ .) Mostafa et al [9] in their study observed that the mean hospital stay time was found to be  $841.146 \pm 112.54$  min with range from 660 min (11 hours) to 1110 min (18.5 hours) in group (A) and  $1356.25 \pm 80.43$  min with range from 1125 min (18.75 hours) to 1495 min (24.97 hours) in group (B) indicating a significant difference between the two groups of patients. These results were supported by those results published by Pilkington et al. [10] 2016 which showed a decline in the length of hospital stay from three to six days pre-ERAS protocols to be one to five days post use with an average of 2.5 days after implementation of those protocols. Also, Wrench et al.2015 study has similar results where the percentage of patients sent home on the 1st postoperative day (Day 1) raised from 1.6% in the 1st quarter of 2012 to reach 25.2% in the 1st quarter of 2014. [11] All the study subjects in both the groups received pre - Operative antibiotic prophylaxis

30 min prior to delivery, Administration of anaesthesia, PONV/IONV prophylaxis & DVT prophylaxis. Whereas Active Warming during Section was given to subjects who were in ERAS Group only. In the present study we assessed the complications among the study subjects in either group. We observed that post operative need of laxatives among 4% conventional groups subjects. In this study we did not observe any development of Puerperal Fever, DVT, Paralytic Ileus.

#### 5. Conclusion

The study found that the time for passage of the first flatus and mobilization was shorter in the ERAS group compared to the conventional group. The overall mean satisfaction score was higher in ERAS cases. Hospital stay reduction is a goal of ERAS protocols, and the post - operative stay was larger in the conventional group compared to the ERAS group. Complications were assessed, and only 4% of conventional group subjects needed laxatives post - operatively. Puerperal Fever, DVT, and Paralytic Ileus were not observed. The study suggests that using enhanced recovery after surgery can reduce hospital stay, which could reduce financial burden for patients and healthcare facilities. This would allow mothers to care for their babies earlier without compromising their safety and satisfaction. Hospitals would also benefit from decreased bed occupancy, increasing the number of patients treated and utilizing healthcare resources more efficiently.

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