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Enhanced recovery after surgery (ERAS) a multimodal perioperative care pathway in cesarean deliveries

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ABSTRACT

Background: Enhanced Recovery After Surgery (ERAS) is an evidence based perioperative program applied for early recovery of patients after surgery to reduce the postoperative surgical stress and hasten early physiological and functional recovery. The present study is focused on application of ERAS protocol in the branch of obstetrics following cesarean sections.

Aims: The primary objective is to compare the efficacy between post-operative recommendations of ERAS protocols and traditional post-operative care in cesarean sections.

Materials and Methods: A total of 300 patients were included in this study from November 2020 to October 2022 from the inpatient department of Obstetrics and Gynaecology of Pradyumna Bal Memorial hospital, KIMS, Bhubaneswar.

Results: Out of 300 patients, 150 were in ERAS group and 150 were in control (conventional) group. The median Length of stay (LOS) of ERAS and control group were 3 and 5 days respectively ($p < 0.01$). The median patient satisfaction score on Likert scale was 4 and 3 for ERAS and control group respectively ($p < 0.01$).

Conclusion: The application of ERAS in post-operative period after cesarean has showed significant results in decreasing length of stay and better patient satisfaction score.

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1. Introduction

Enhanced recovery after surgery (ERAS) is an evidence based multidisciplinary perioperative care program to increase the quality of patient care and to achieve early recovery for patients after major surgeries.¹ These guidelines were developed with the goal of maintaining normal physiology in the perioperative period, thus optimizing patient outcomes without increasing postoperative complications or re-admissions.²

Enhanced recovery after cesarean (ERAC) expands ERAS principles to obstetric specific issues. ERAC

guidelines were introduced in 2018, after the development of ERAS protocols in many other surgical specialties.³ There is steady increase in rates of lower uterine segment cesarean section (LSCS) in past few decades due to which there is a burden on health care system as well as on patient's family in terms of both physically and financially. According to World Health Organization (WHO) this figure will increase further to 28.5% by the year 2030.⁴ Therefore, increased interest on study of perioperative health care in peripartum patients is not surprising.

Although individual ERAS programs differ, the majority address this goal through the limitation of preoperative fasting, intraoperative individualized fluid management,

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opioid-sparing analgesia, early postoperative ambulation and feeding. These components facilitate a faster return to the patient’s preoperative functional state.^{5,6}

While ERAC has gained popularity and been widely embraced in Western nations, it is having network and infrastructure problems in emerging nations like India. The main obstacles to the adoption of ERAC for this segment of the population are; low literacy rate of the target population, the wide rural-urban divide, the inability to recognize early warning indicators, and a lack of qualified staff for ERAS protocols.⁷ Hence we undertook this study to prove the success of ERAS protocols in our setting.

The primary aim is to compare the efficacy of post-operative recommendations of ERAS protocols with conventional post-operative care in cesarean sections and to assess the total length of hospital stay and maternal satisfaction at time of discharge. The secondary objectives are time taken to pass flatus, time taken to pass stools, complaints of UTI, nausea and vomiting.

2. Materials and Methods

This was a prospective observational study, from November 2020 to October 2022 in the inpatient department of Obstetrics and Gynaecology. After the ethical approval from Institutional Ethics Committee (KIIT/KIMS/IEC/456/2020), a convenient sample of 300 patients were included in the study after taking consent. They were further divided into ERAS group (n=150) and control group (n=150).

2.1. Inclusion criteria

- 1. To 39 years aged women were included who underwent elective or emergency cesarean section.

2.2. Exclusion criteria

LSCS under general anaesthesia, Severe pre-eclampsia on Magnesium sulphate therapy, Gestational diabetes or Type 2 DM, any pre-existing UTI, Pregnancy complicated by any active infection, Postpartum haemorrhage and prolonged catheterization because of any intraoperative complication, patients who had prolonged hospital stay because of baby’s NICU admission were also excluded.

2.3. Methods

All the patients undergoing cesarean section irrespective of indications are included as per the inclusion and exclusion criteria. After counselling and explaining about the risks and benefits, consent was taken. Preoperative counselling was done and patient party was also explained about the post-operative application of ERAS protocols. Nurses and hospital staffs also play pivotal role as doctors in application of this program. All the hospital staffs were explained about

the study and complications that can occur. Protocols are applied in respective groups as mentioned below:

ERAS group: In this group standard guidelines of ERAC are applied post operatively after mothers were explained about the risks. Patient is encouraged for early ambulation of 8hours after surgery in form of movement of legs and hands followed by sitting out of bed for few hours later and normal movement is started from next day like patient going to washroom by walk, sips of water was started after 4 hours following surgery, after 6 hours having a cup of tea and one biscuit is allowed and semi solid diet are followed by normal food which was started within 12 hours following surgery. Catheter was removed within 12 hours of surgery. Open dressing was done after 48hours of surgery i.e., on pod 2.

CONTROL group: In this group traditional older postoperative protocols were applied, i.e., delayed ambulation was started from next day (patients starts sitting out of bed from next day of surgery), delayed catheter after 24 hours of surgery and patients were kept nil per oral (npo) for 8 hours post-surgery followed by having sips of water and solid food is allowed from next day of surgery. Open dressing weredone on pod 3 after 72 hours of surgery.

Table 1: Application of factors in both groups

	ERAS	Conventional group
Early feeding	Npo for 4 hours followed by sips of water and food is allowed by 12 hours	Npo for 6-8 hours and normal food started on next day
Early ambulation	Ambulate within 6-8hours movement by next day	Ambulation is started from next day
Early catheter removal	Catheter removed within 12 hours	Catheter removed after 24 hours
Open Dressing	On pod 2	On pod 3

In light of the aforementioned factors, the length of the hospital stay is calculated starting from the day of surgery, and patient satisfaction was measured using a Likert scale: very unsatisfied, unsatisfied, normal, satisfied, and very satisfied. Time taken to pass flatus and stools were noted, asked for any complaints such as nausea or vomiting and any signs of UTI.

2.4. Statistical analysis

Quantitative data were presented by median and inter quartile range (IQR). Qualitative data were presented by frequency & percentage. For measuring the association among categorical variables were assessed by Fisher’s exact test or chi-square test. Student t-test or Mann Whitney

U test was used to compare the continuous variable. The p value < 0.05 is considered as statistically significant. IBM SPSS version 25 was used for data analysis and graphical representations were done in MS- EXCEL 2016.

3. Results

A total of 300 patients who underwent CS, 150 were kept in ERAS group and 150 were in control group. From Table 2, the median age in ERAS group was 27 (26 - 32) and for control group was 26 (23.75 - 29) which is statistically not significant. The median BMI in ERAS group was 25.4 (24.60 - 26.72) and in control group was 25.10 (24.60 - 26.62) which is not significant.

Table 2: Demographic characteristics

	ERAS (n=150)	Control (n=150)	P Value
Age	27 (26 - 32)	26 (23.75 - 29)	0.085
BMI	25.4 (24.60 - 26.72)	25.10 (24.60 - 26.62)	0.405

In Table 3, on application of ERAS protocols, the median length of stay in ERAS group was 3 days (3 - 3) against control group was 4 days (2 - 3) which was statistically significant (p value = 0.023). Most number of patients were discharged on day 2 in ERAS group while others were discharged on day 4 in control group. The median patient satisfaction score in ERAS group was 4(4 - 4) and in control group was 3 (2 - 3), which is statistically significant (p < 0.001). Percentage of patients scoring 4 in the groups (ERAS, 68% vs Conventional, 10%) showed ERAS patients were more satisfied. The median time taken to pass flatus in ERAS group was 10 (8 - 12) and 22 (24 - 20) in control group which is also statistical significant with p value < 0.001. Median time to pass stool in both groups were 22 (20 - 24) and 62 (54 - 69) with p value < 0.001, which showed the patients in ERAS group passed flatus and stool faster when compared with control group having statistically significant difference.

Table 3: Patient outcome

	ERAS (n=150)	Control (n=150)	P Value
Length of stay	3 (3-3)	4 (2-3)	0.023
Patient satisfaction	4 (4-4)	3 (2-3)	<0.001
Time to pass flatus	10 (8 - 12)	22 (20 - 24)	<0.001
Time to pass stool	22 (20 - 24)	62 (54 - 69)	<0.001

UTI when compared in both groups 2% vs 10%, p value < 0.001 found significant in Table 4. Patients complained of nausea and vomiting in both groups ERAS vs control was 4% vs 10% which is better controlled in ERAS group.

Table 4: Patient complications

	ERAS (n=150)	Control (n=150)	P Value
Nausea and vomiting	6 (4)	15 (10)	0.04
UTI	3 (2)	15 (10)	<0.001

4. Discussion

The primary objective of this study by application of ERAS protocols is to achieve faster mobility and physical function of patients and to reduce the post-operative complications. Variance in the care of patients has been identified as a contributor to disparate hospital length of stay, medication utilization, outcomes, and costs.

The median length of stay for the ERAS group is 3 (3-3) whereas for the control group it is 4(2-3) indicating a significant reduction in length of stay in cases with p value < 0.001 which found similarity in one study.⁸ Reduced hospital stay of patients is associated with reduction of the hospital costs and increase in mother-child bond.

Patient satisfaction in both the groups when compared statistical analysis 4(4-4) versus 3 (2-3), p value < 0.001. Score of 4 are given by 68% patients in ERAS group vs 10% in controls. Thus, the ERAS group had significantly greater levels of patient satisfaction and overall wellness. Similar results were found in a study on elective cesareans, where patient satisfaction was substantial (77% vs. 70%) having the p value < 0.01.^{9,10}

Secondary outcomes, average flatus clearance duration was 10 (8 - 12) in the ERAS group compared 22 (20 - 24) in conventional group. Significantly less time was necessary for flatus to pass in the ERAS group. Based on a survey of a study where early vs late feeding had flatus passage times that were on mean 44.8 hours versus 60.5 hours, respectively.^{11,12} Average time it takes to pass stools is 22 (20 - 24) in patients of ERAS group versus 62 (54 - 69) in conventional group for rapid bowel movement. Another study indicates that there is a significant difference in the duration of time required for stool passage between the early feeding and late feeding groups, 67.8 hours vs. 75.8 hours.¹³

In this study, early mobilization was done for the ERAS group patients, who were shown to be more active than controls, who had traditional delayed mobilization. Physical performance is enhanced with early ambulation, according to a similar study.¹⁴

Before these protocols, we followed the traditional ways which were not standardized and depended on surgeon and it was burden on patient's family and hospital. Although ERAS programmes have shown gains in care quality, outcomes, and costs for a number of surgical procedures, their use and adoption for the population of cesarean deliveries have been limited. Having proven effectiveness of the protocol we will implement the protocols in our

department to extend its benefit.¹⁵

The care providers unwillingness to follow new protocols, the allocation of resources, notably for patient education, lack of man power, lack of cooperation with the staff, post-discharge follow-up, are all potential limitations to the successful implementation of an ERAS protocol for cesarean delivery. To prevent delays in release due to problems with newborn testing and evaluations or breastfeeding teaching, coordination with the neonatology staff and lactation experts are essential.

5. Conclusions

We draw the conclusion from this study that adoption of standardized postoperative protocols for Enhanced Recovery after surgery in Cesarean deliveries (ERAS) has been found to be more helpful for women since it shortens their hospital stay, speeds up mother recovery. Patients are more satisfied and are in better overall health.

6. Source of Funding

None.

7. Conflict of Interest

None.

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