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A comparative study of enhanced recovery after surgery (ERAS) versus non enhanced recovery after surgery (Non-ERAS) pathway for caesarean deliveries

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Abstract
Enhanced recovery is to optimize multiple aspects of patient care to improve recovery thereby facilitating earlier discharge, without a reduction in patient satisfaction or the quality of care. Currently, there are limited randomized studies exist in the literature specifically addressing the potential impact of an enhanced recovery pathway among women undergoing caesarean delivery on postoperative outcomes and postoperative length of stay. The study was done to determine efficacy of ERAS in comparison with Standard care among caesarean deliveries in perioperative care outcome i.e. length of hospital stay, complications. This is a Prospective Randomized Control study was conducted on the subjects who were undergoing scheduled caesarean Delivery at a tertiary care centre from August 2020 to September 2020. A total of 80 study subjects, 40 in each group by randomization were allocated into Group A (ERAS group) and Group B (Standard of Care group). All the study subjects in both the groups received pre-operative prophylaxis like antibiotic administration 30 min prior to surgery, Administration of anaesthesia, and post & intraoperative nausea vomiting (PONV/IONV) prophylaxis, DVT prophylaxis. Whereas active warming during section was given to subjects who were in ERAS Group only. In the study there was significant difference in Median duration of IV infusion, Oral intake for liquids & for solids, catheter removal, first ambulation after CS and duration of hospital stay between two groups. All the above parameters were delayed in Non-ERAS group compared to ERAS group. To conclude that ERAS is the way to promote maternal and neonatal healthcare through proper utilization of protocols and guidelines. Implementation of ERAS programmes along with continuous performance reports will help in improved delivery care of the both the mother and child.

Keywords: Delivery, ERAS, pregnancy, mother and child

Introduction
Enhanced recovery after surgery (ERAS) is a standardized, perioperative care program that is embedded firmly within multiple surgical disciplines that include colorectal, urologic, gynaecologic, and hepatobiliary surgery. ERAS has been shown to result in both clinical benefits (reductions in length of stay, complications, and readmissions) and health system benefits (reduction in cost) [1].

The rate of elective Caesarean Section (CS) is rising in many countries [2]. The majority of women undergoing caesarean delivery are young and healthy and therefore have the potential for rapid recovery following delivery. Furthermore, being able to care for their new-born provides an added motivation to return to normal physiological function [3].

The principles of enhanced recovery cover the entire perioperative care pathway and component interventions occur during the preoperative, intraoperative, and postoperative phases of care.

ERAS protocol for women planned for elective Caesarean Section is effective in controlling perioperative gastrointestinal symptoms, postoperative pain control and encourages early ambulation offering earlier resumption of intestinal motility, higher satisfaction and fewer days of admission [4, 5].

Non ERAS group i.e. the standard care/conventional method include early admissions, prolonged fasting about 8-10 hours prior to surgery, postoperative catheter removal after 24 hours, resuming normal diet after 24 hours delaying ambulation this hinders faster recovery & thereby overall patient satisfaction [4, 5, 6].

This study aims at comparing the implementation of ERAS protocols with the Non ERAS which can be beneficial for patient's caesarean outcome & improving delivery of quality health care.

The objective of this study was to determine efficacy of ERAS in comparison with Standard care among caesarean deliveries in perioperative care outcome i.e. length of hospital stay, complications

Material and Methods

A prospective Randomized Control study was conducted on the subjects who were undergoing caesarean Delivery at a tertiary care centre from August 2020 to September 2020 after obtaining approval from the Institutional Ethical Committee.

Sample Size was estimated by using the difference in Mean Duration of hospitalization between ERAS group and Standard of Care group from the study A. Rousseau *et al*. as 4.34 ± 0.71 days and 3.92 ± 0.61 days. Using these values at 95% Confidence limit and 80% power sample size of 40 subjects was obtained in each group.

Randomization was done to allocate subjects to Group A (ERAS group) and Group B (Standard of Care group). Randomization plan was obtained by randomization.com website. Randomization was concealed to the subject and opened by researcher to allot the next patient as per randomization plan. Relevant data was collected from PROFORMA filled by investigator & caesarean outcome was assessed in ERAS & non ERAS group.

Women with gestational age of 37 completed weeks or greater undergoing a scheduled or non-emergency caesarean delivery, in the age group 0f 20-35yrs were included in the study.

Patients were excluded if less than 37 weeks of gestation, those undergoing an emergency caesarean birth, or 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

The key principles of the ERAS protocol include pre-operative counselling, preoperative nutrition, standardized anaesthetic and analgesic regimens (non-opioid analgesia), active warming, DVT prophylaxis, preoperative & intraoperative nausea & vomiting prophylaxis, early removal of catheter, early oral intake for liquids & solids & early mobilization.

Non ERAS group i.e. the standardized care includes preoperative NPO for 12 hours, bowel preparation, preloading IV fluids, antacids, antibiotic & DVT prophylaxis, regional anaesthesia, postoperative opioid /non opioid analgesia, 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 <0.05 was considered as statistically significant.

Results

Table 1: Demographic profile comparison between two groups

		Group				P value
		ERAS		Non ERAS		
		Count	%	Count	%	
Age	21 to 25 years	10	25.0%	6	15.0%	0.479
	26 to 30 years	26	65.0%	28	70.0%	
	>30 years	4	10.0%	6	15.0%	
Parity	Primigravida	2	5.0%	4	10.0%	0.396
	Multigravida	38	95.0%	36	90.0%	

Among the study subjects, in the ERAS group majority of them were in the age group of 26 to 30 years (65%) where as in the Non-ERAS Group 70% of them were in the similar age group and it was found to be statistically non-significant. Among ERAS Group nearly 95% of them were Multigravida and in the Non –ERAS group it was 90%. This association was also found to be statistically insignificant.

Table 2: Preoperative Prophylaxis comparison between two groups

		Group			
		ERAS		Non ERAS	
		Count	%	Count	%
Antibiotic Prophylaxis 30 mins Prior	Yes	40	100.0%	40	100.0%
Spinal / General Anaesthesia	Spinal	40	100.0%	40	100.0%
Active Warming During Cs	Yes	40	100.0%	0	0.0%
DVT Prophylaxis	Yes	40	100.0%	40	100.0%
PONV/IONV Prophylaxis	Yes	40	100.0%	40	100.0%

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.

Table 3: Post-Operative events comparison between two groups

	Group						P value #
	ERAS			Non ERAS			
	Mean	SD	Median	Mean	SD	Median	
IV Fluids/ Infusion (hrs)	24.00	.00	24	48.00	.00	48	<0.001*
Oral Intake For Liquids (hrs)	6.00	.00	6	24.00	.00	24	<0.001*
Oral Intake For Solids(hrs)	12.00	.00	12	24.00	.00	24	<0.001*
Catheter Removal (hrs)	12.00	.00	12	24.00	.00	24	<0.001*
First Ambulation After CS (hrs)	12.00	.00	12	24.00	.00	24	<0.001*
Hospital Stay In Days	4.00	.00	4	5.70	.46	6	<0.001*

Mann Whitney U test

In the study there was significant difference in Median duration of IV Fluids/ Infusion, Oral intake for liquids, oral intake for solids, catheter removal, first ambulation after CS and duration of hospital stay between two groups. All the above parameters were delayed in Non-ERAS group compared to ERAS group.

Table 4: Post-Operative complications comparison between two groups

		Group				P value
		ERAS		Non ERAS		
		Count	%	Count	%	
Postop Laxatives	No	40	100.0%	32	80.0%	0.003*
	Yes	0	0.0%	8	20.0%	
Puerperal Fever (UTI / LRTI)	No	40	100.0%	40	100.0%	-
DVT	No	40	100.0%	40	100.0%	-
Paralytic Ileus	No	40	100.0%	40	100.0%	

In the ERAS group, none required post Op laxatives and in Non-ERAS group, 20% required Post OP laxatives. There was significant difference in requirement of Post Op laxatives between two groups.

Discussion

The Concept of ERAS is a proof based tool to evaluate and to reduce the pain and suffering of the pregnant mothers and to reduce the morbidity among the mothers and gives a beneficial enhancement in the nature of care. The various organization have given various steps in the ERAS Regimen keeping in mind

the standards which are predefined and practised.

The age group of study subjects in both the groups were found to be similar and it was comparable to study findings of Sara Tasha Mostafa [7]. In our study both the groups were given antibiotics as per guidelines to prevent the occurrence of infection. In the study done by Smaill *et al.* [8] and Saeed *et al.* [9] too administration of antibiotics to all the subjects who were undergoing caesarean section was done as per the guidelines.

In our study the administration of food in the form of liquid & solid was started to subjects within 6 hours and 12 hours post-operative respectively in ERAS group where in the non-ERAS group it was 24 hours respectively for liquid and solid foods with statistically significant association. Similar results were also seen in the study done by Huang *et al.* [10] study where early oral hydration among ERAS group prompted early recovery of gastrointestinal functions. In the ERAS group the liquid food was started after 6 hours and in control group conventionally. Our results were comparable with the above study regarding early food administration, early recovery among study group when compared with control group. In another study done by Lee *et al*. [11], Guo *et al*. [12] early administration of Food resulted in rapid resumption of intestinal sounds, bowel motions and regular oral intake in ERAS Group and the association was also found to be statistically significant.

In the study done by Aluri S and Wrench J [13], 72% mobilised patients within 12 hours of surgery under ERAS & 28% removed urinary catheter after 12 hours which is in comparison with our study findings where Mean duration for urinary catheter removal was lesser in ERAS group than Non ERAS group.

In the study done by Sara Taha Mostafa [7] the overall hospital stay was found to be much lesser in ERAS Group when compared with Non ERAS Group and it was found to be statistically significant which is similar to our study findings. Even in the study done by Lee *et al*. [11] women who underwent ERAS Protocols had earlier discharge from hospital when compared with control group. Pilkington *et al.* [14] also showed a lesser duration of hospital stay from 3-5 days in ERAS Group when compared to 5-7 days in control group which is similar to our study findings.

Abel *et al.* also reported decreased length of stay in hospital from 3.3 days to 2.1 days in ERAS Group. Borislava Pujic *et al*. [15] also showed that mothers in ERAS Group got discharged early than Non ERAS Group.

Sarah Joanne *et al.* in their study also found that the subjects who had received Fast track Pathway were discharged earlier than the subjects who were followed standard protocol which can be comparable to our study findings.

Conclusion

Overall we can conclude that ERAS is the way to promote maternal and Neonatal healthcare through proper utilization of protocols and guidelines. Implementation of ERAS programmes along with continuous performance reports will help in improved care of the both the mother and child.

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