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Original Research Article

Comparative study with or without application of enhanced recovery after surgery protocols in patients undergoing elective cesarean section

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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 cesarean section on the post-operative recovery process.

Methods: The study was conducted in the Department of Obstetrics and Gynecology, NMCH, Patna from January 2014 to December 2014. A total of 100 patients (n=100) undergoing elective cesarean section were included in the study. Cases were allocated into two groups a) Study group included 60 patients (n=60) and ERAS protocol was followed b) Control group included 40 patients (n=40) and standard post-operative care protocol was followed. Two groups were compared with respect to recovery parameters, post-operative complications and satisfaction rates.

Results: More patients in the ERAS group were discharged on post-operative day 4 than the standard postoperative care group (90% vs 12.5%, $p<0.0001$). More patient in the ERAS group were significantly satisfied with the protocol compared to standard post-operative care (77% vs 70%, $p<0.04$). Approximately 77 percent of the patients in the ERAS group rated the satisfaction score between 8-10 compared to 70 percent of the patients in control group ($p<0.04$). There was no difference between two groups with respect to recatheterization rate, readmission rate and post-discharge complaints.

Conclusions: In this study with application of ERAS protocol, we reported reduced hospital stay which may reduce financial burden of patients and healthcare facilities.

Keywords: Cesarean section, Post-operative complications, Post-operative care

INTRODUCTION

Globally caesarean delivery (CD) rates have been increasing during the last two decades.¹ In India there is a slowgrowth of cesarean deliveries since the late 1980s.² A recent survey done by National Family and Health Survey (NFHS-4) has documented the overall caesarean birth is about 17.2%.³ The majority of women undergoing cesarean section are young and healthy and therefore have the capacity for rapid recovery during the postoperative period.

Enhanced recovery was first described in 1997 by Wilmore and Kehlet. The concept of enhanced recovery after surgery was introduced first in colorectal surgery and now it is practiced across surgical specialties that include gynaecology, urology and orthopaedics.^{4,5}

There is a wide variation in the components of enhanced recovery after surgery among different specialties but the principles remain same.⁶⁻⁸ The various components of enhanced recovery after surgery include provision of preadmission information to expectant mothers, good perioperative nutrition and hydration, minimally invasive surgical technique, efforts to maintain normothermia,

prevention of post-operative nausea and vomiting, effective post operative pain relief, early post operative oral intake, early removal of urinary catheter, early post operative mobilization.⁹

These components work in conjunction to synergize each other that reduce stress and cytokine levels, promote trauma repair, and reduce complications.^{10,11} The strategy of enhanced recovery (ER) for elective cesarean section would have the advantages of reduce hospital stay, health care cost and improve patient satisfaction.

To date very little evidence is available regarding the necessary components of Enhanced recovery after surgery for the obstetric population, so further research is needed to develop and evaluate pathways for enhanced recovery in elective cesarean section.

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.

METHODS

The study was conducted in the Department of Obstetrics and Gynecology, NMCH, Patna, Bihar, from January 2014 to December 2014. The study was approved by Institutional Ethics Committee (No:). Written informed consent was taken from all the participants prior to enrollment. A total of 100 patients (n=100) undergoing elective caesarean section after satisfying the inclusion and exclusion criteria were included in the study (Table 1).

Inclusion criteria

25-45 years women having gestation age >38 weeks were included in the study.

Exclusion criteria

Women with prior medical illness like anemia, cardiac disease, diabetes mellitus, renal disease, obstetric complications like hypertensive disorder of pregnancy, gestational diabetes, complications during surgery like postpartum haemorrhage, bladder injury, bowel injury were excluded from the study.

The cases were allocated into two groups as follow. Patients who readily agree to accept enhanced recovery after surgery were kept under case group and control group were the patients not convinced about it.

Study group included 60 patients (n=60) and enhanced recovery after surgery protocol was followed. Control group included 40 patients (n=40) and standard post-operative care protocol was followed.

The protocol for enhanced recovery after surgery and standard post-operative care are mentioned in Table 1.

Table 1: Enhanced recovery after surgery and standard post-operative care.

	Enhanced recovery after surgery	Standard post-operative care
Oral intake	Encouragement for early oral intake Patients were given chewing gums to chew every two hours for 5 to 10 min beginning two hours postoperatively	Oral intake allowed after passage of flatus
Postoperative mobilization	Early mobilization preferably within 6 hours	Ambulation on postoperative day 1
Removal of urinary catheter	Early removal of urinary catheter preferably within 12 hours	Removal of urinary catheter once patient ambulated
Dressing of wound	Dressing of wound after 48 hours	Same as ERP
Discharge	Discharge after dressing (at 48 hours) if all well*	Discharge on day 8 after total stitch removal, however if the patient is well and wish early discharge can also be allowed in this group

*No discharge and induration in the wound. Postoperative haemoglobin more than 8 gm/dL and vitals were stable

The two groups were compared with respect to various parameters like discharge day, time of first passage of flatus, time for mobilization, day 8 post discharge follow up (any complaints, wound complication, treatment satisfaction), recatheterization rate, readmission rate and patient's treatment satisfaction.

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.

Hypothermia was prevented by active warming of patients and warmed intravenous fluids. Post-operative nausea and vomiting was treated by anti-emetic agents such as ondansetron. Diclofenac or acetaminophen were used for the management of postoperative analgesia.

Participants of both the group were asked to rate the treatment satisfaction on 8th postoperative day. Patient's satisfaction was noted in terms of numerical score,

minimum satisfaction was given a score of 0 and maximum satisfaction was given a score of 10.

Continuous variables are presented as mean±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 statistical significant.

RESULTS

There was no significant difference between the two groups with respect to baseline parameters. Both the groups were comparable with respect to age, weight, gestational age, parity and blood loss during cesarean section.

Table 2: Discharge days in both groups.

Discharge days	Study group (n=60)	Control group (n=40)	P-value
4	54 (90%)	5 (12.5%)	<0.0001
5	5 (8.33%)	1 (2.5%)	0.1025
6	1 (1.66%)	-	
7	-	-	
8	-	31 (77.5%)	Comparison group is not present
>8	-	3 (7.5%)	Comparison group is not present

Hospital stay

A total of 54 cases were discharged postoperative day 4 in the study group (ERAS) while only five cases were discharged in the control group (standard perioperative care) as shown in Table 2. The difference was statistically significant (p<0.0001). Five patients were discharged on day 5 and 1 patient was discharged on day 6 in the study group (ERP). Thirty one cases (77.5%) were discharged on postoperative day 8 in the control group (standard perioperative care).

Time for first flatus and mobilization

The time take for first flatus between the both the groups is depicted in Table 3. The time for first mobilization between the both the groups is depicted in Table 4.

Post-discharge complaints (Day 8)

Total eight patients in the study group (13.33%) complained of stitch line pain in the study group

compared to 10 patients (25%) in the control group (p=0.64).

The stitch line discharge was present in seven patients (11.66%) in the study group compared to six patients (15%) in the control group (p=0.78).

Table 3: Time for first passage of flatus.

Time for first passage of flatus (hours)	Study group (n=60)	Control group (n=40)	P Value
6	6 (10%)	1 (2.5%)	0.06
12	10 (16.66%)	4 (10%)	0.11
18	14 (23.33%)	7 (17.5%)	0.13
24	20 (33.33%)	11 (27.5%)	0.11
30	7 (11.66%)	11 (27.5%)	0.34
36	2 (3.33%)	2 (5%)	1
42	1 (1.66%)	2 (5%)	0.5637
48	-	2 (5%)	-

Table 4: Time for first mobilization.

Time for first mobilization (hours)	Study group (n=60)	Control group (n=40)	P value
6	12 (20%)	-	
12	25 (41.66)	5 (12.5%)	0.0003
18	10 (16.66)	8 (20%)	0.6374
24	11 (18.33%)	15 (37.5%)	0.4328
30	2 (3.33%)	12 (30%)	0.0075

Readmission and recatheterization

Eight patients (13.33%) in the study group were readmitted compared to seven patients (17.5%) in the control group (p=0.06). Recatheterization was done in 5 patients (8.33%) in the study group compared to 4 patients (10%) in the control group (p=0.73).

Patient satisfaction (Table 5)

Approximately 77 percent of the patients in the ERAS group rated the satisfaction score between 8-10 compared to 70 percent of the patients in the control group (p<0.04).

Table 5: Patient satisfaction score.

Pt's satisfaction score	Study group (n=60)	Control group (n=40)	P Value
<5	1 (1.66%)	2 (5%)	0.56
5-8	13 (21.66%)	10 (25%)	0.53
8-10	46 (76.66%)	28 (70%)	0.04

DISCUSSION

The present study assess the effectiveness of ERAS on elective caesarean section, we found that more patients in the ERAS group were discharged on post-operative day 4 than the standard postoperative care group (90% vs 12.5%, $p < 0.0001$). Maximum cases in the standard post-operative care group were discharged on postoperative day 8 ($n=31$, 77.5%). Various other studies have reported different findings. Baluku et al statistically significant shorter length of stay for the ERAS arm compared to standard of care in cases of emergency cesarean section, with a difference of 18.5hours ($p < 0.001$).¹²

Teigen et al reported that ERAS was not associated with a significantly increased rate of postoperative day 2 discharges when compared with standard care in cases of elective cesarean section.¹³ The difference in the findings may be due to the different ERAS protocols being followed. In the UK, the National Institute for Health and Care excellence states that women who do not have any complication during cesarean section, are afebrile and recovering well, should be offered early discharge (after 24 hours) from hospital as it leads to decreased readmission rate.¹⁴

Compared to the control group, the ERAS group had significantly more patients who mobilized earlier at 6 hours and the difference was significant (12.5 vs 41.66, $p < 0.0003$). More patients in the ERAS group pass the first flatus compared to standard postoperative care group, however, the difference was not significant.

The incidence of complications of stitch line pain and discharge was lower in the ERAS group compared to standard postoperative group however the difference was not significant. Similarly, there was no difference between the two groups with respect to readmission and recatheterization rates.

More patient in the ERAS group were significantly satisfied with the protocol compared to standard post-operative care (77% vs 70%, $p < 0.04$). One study on early discharge in cases of cesarean delivery showed higher maternal satisfaction in the early discharge group compared to women in a routine care group.¹⁴ Two surveys conducted in UK among anesthesiologists and maternity unit supported the concept of ERAS.^{16,17}

One major challenge in implementing the ERAS protocol in India in the illiteracy rate.¹⁸ If there is a complication, a literate patient may not able to notice the warning sign compare to literate person. Therefore, patient education status and level of understanding should be assessed before practicing ERAS.

Limitations

First, the sample size was small this is because the study was conducted as per the availability of the resources and

looking into the duration available for the project. Second, we were not able to blind the subjects and investigator however utmost care was taken in reporting the data. The findings of the study should be supported by large trial in future.

In this study with application of enhanced recovery after surgery, we reported reduce hospital stay which may reduce financial burden both of the patients and healthcare facilities. This would help a mother to care for her baby much earlier without compromising her safety and satisfaction. Hospital will have advantage in terms of decreased bed occupancy and thus number of patients being treated is increased and health care resources will be efficiently used.

CONCLUSION

In this study with application of enhanced recovery after surgery, we reported reduce hospital stay which may reduce financial burden both of the patients and healthcare facilities. This would help a mother to care for her baby much earlier without compromising her safety and satisfaction. Hospital will have advantage in terms of decreased bed occupancy and thus number of patients being treated is increased and health care resources will be efficiently used.

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