LOKMAN HEKIM HEALTH SCIENCES

DOI: 10.14744/lhhs.2025.67503
Lokman Hekim Health Sci 2025;5(2):98–108

lokmanhekimhs.com

ORIGINAL ARTICLE

Evaluation of Elective Cesarean Surgery within the Scope of Enhanced Recovery After Cesarean (ERAS-CD) Protocol: Where we are in Türkiye

Sezaryen Sonrası Hızlandırılmış İyileşme (ERAS-CD) Protokolü Kapsamında Elektif Sezaryen Ameliyatlarının Değerlendirilmesi: Türkiye'de Neredeyiz?

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Abstract

Introduction: In this study, it was aimed to evaluate the perioperative practices according to the Enhanced Recovery After Surgery-Cesarean Delivery (ERAS-CD) protocol in women who underwent elective cesarean section.

Methods: The sample of the descriptive study consisted of 333 women who underwent elective cesarean section (CS) surgery between 01/12/2021 and 01/09/2022. A nurse observation form, anesthesia follow-up form, patient file and verbal expressions of women were used to collect data. Descriptive statistics (number, percentage, mean and standard deviation) and linear regression analysis used.

Results: The mean gestational week of the study group was 38.38±0.76, and cesarean indication was 58.9% had repeat and 38.7% multiple repeat CS. It was determined that all participants were informed about the perioperative procedure, given antibiotic prophylaxis, given intravenous fluids, and had skin cleansing. Analgesics were administered to almost all of the research group. All participants were informed about discharge. The initiating breastfeeding time was 88.38±35.11 minutes. Mobilization took place at mean of 6.21±0.67 hours, oral feeding was initiated at 6.22±0.63 hours, and the mean length of hospital stay was 51.02±8.53 hours. Factors affecting the time to initiate oral feeding and the time to initiate breastfeeding and length of hospital stay were the mobilization time ($p<0.001$), the need for analgesic medication at the time ($p<0.05$) and the application of drains, respectively ($p<0.001$).

Discussion and Conclusion: While the accelerated surgical recovery protocol was generally applied in our study, it was observed that the preoperative fasting time, the postoperative first oral intake time and the initiating breastfeeding time were long.

Keywords: Cesarean section; Enhanced recovery after surgery; Intraoperative; Postoperative; Preoperative

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Cite this article as: *Karataş Baran G, Kızıltepe K, Karadeniz RS. Evaluation of Elective Cesarean Surgery within the Scope of Enhanced Recovery After Cesarean (ERAS-CD) Protocol: Where we are in Türkiye. Lokman Hekim Health Sci 2025;5(2):98–108.*

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E-mail: goncabaran@gmail.com **Submitted:** 18.03.2025 **Revised:** 02.04.2025 **Accepted:** 26.05.2025

ERAS (Enhanced Recovery After Surgery) is used to describe the concept of multimodal, perioperative interventions to improve postoperative outcomes.[1,2] The ERAS protocol is a multidisciplinary approach that requires adaptation at every step of the surgical process, including preoperative, intraoperative and postoperative. If the protocol is implemented, rapid recovery is achieved after the surgery, health costs are reduced, the length of stay in the hospital is shortened, and the quality of life of the patient increases at the same time.[3]

The ERAS community has published the ERAS-CD (Enhanced Recovery After Surgery-Cesarean Delivery) guidelines,[4–6] which includes preoperative and intraoperative evidence-based practices in 2018 and postoperative evidence-based practices in 2019, and American Obstetric Anesthesia and The Perinatology Society also published the 'Rapid Recovery After Cesarean Delivery' (ERAC-Enhanced Recovery After Cesarean) protocol in 2019.[7] ERAC principles cover all phases of ERAS-CD, but there is wide variation in the elements of ERAC protocols. ERAS mission is to improve the global quality of care rather than an effort to shorten hospital stays or reduce costs. The success of ERAS depends on interdisciplinary cooperation.[7] Evidence-based practices and follow-up are very important for women to get through this process easily, to accelerate recovery, and to protect and improve maternal and child health.[8]

Although the results are important with the ERAS protocol, it may not be realistic to expect radical changes to become widespread in surgery, which is a tradition-based whole.[9] For this reason, there is a need to conduct evidence-based studies with a multidisciplinary approach and to discuss and evaluate the results in order to implement the ERAS protocol in our country. Based on this, our study aimed to evaluate perioperative practices in women who underwent elective cesarean section (CS) according to the ERAS-CD protocol. In this context, this study aimed to describe the implementation status of the recommendations regarding the ERAS protocol in CS operations, to identify the missing aspects of the ERAS-CD protocol and to raise awareness about its benefits.

Materials and Methods

A descriptive study was conducted in the baby friendly Gynecology and Obstetrics branch hospital between 01/12/2021-01/09/2022. The universe of the study consisted of pregnant women who underwent elective cesarean section at the relevant hospital. In the reference study of Ibrahem et al, it was determined that enhanced recovery after caesarean delivery protocols were applied in an average of 59% in the perioperative period (preoperative 59%, intraoperative 79%, postoperative 40%).[10] When the universe is known, considering that 2500 births occur per year with the sample calculation method formula, the number of participants required for the study sample is 324. The study was completed with 333 participants.

$$n = \frac{N\,t^2\,p\,q}{d^2(N-1)+t^2\,p\,q} = \frac{2500(1.96)^2\,(0.59\;0.41)}{(0.05)2\,(2500-1)+(1.96)^2(0.59\;0.41)} = 324$$

(N: Number of individuals in the population (2500), p: Proportion of practice of ERAS (0.59), q: 1 – p (0.41), t: Certain theoretical value found in the "t" table at the degree of freedom and the detected error level (1.96), d: Sensitivity to be made according to the incidence of the event (0.05), 0.95 confidence interval, 0.05 margin of error).

The period of the study group was followed from hospitalization to discharge. The data collection form prepared by scanning the literature[1–6] was used to collect the research data. The data collection form consisted of two parts. The first part included data on the socio-demographic and obstetric characteristics of the participant, and the second part included data on the components of the ERAS-CD protocol. ERAS-CD recommendations are summarized in the table (Table 1). Nurse observation form, anesthesia follow-up form, patient file and verbal expressions of women were used to collect data. In the research, data related to health practices were taken from the file and recorded. Data not included in the file were collected verbally from the women to complete the data. Interviews with women were conducted in the clinic before discharge. All elective CS cases who agreed to participate in the study were included in the study regardless of whether they were at-risk pregnancies. Exclusion criteria for the study were determined as women who had not undergone elective cesarean section (emergency cesarean section), were admitted to the intensive care unit, and did not accept to participate in the study.

Ethics committee approval was obtained from the Etlik Zübeyde Hanım Woman's Health Training and Research Hospital Clinical Research Ethics Committee (approval number:119, date: 24.11.2021) for the study and informed consent was obtained from the participants. The study complied with the Helsinki rules.

Statistical Analysis

The analysis of the data was carried out by SPSS (Version 23.0, SPSS Inc., Chicago, IL, USA) statistical software. In the evaluation of the data, number, percentage, mean and standard deviation were used as descriptive statistics.

Table 1. Recommendations of enhanced recovery after surgery program in cesarean delivery[4–7]

Antenatal/Preoperative
Antenatal education and councelling- preoperative information[1,2]
Limit fasting interval (Solid 6 hour, clear 2 hour)[1,2]
Liquid carbohydrate loading[1,2]
Preoperative antibiotic prophylaxis[1,2]
Preoperative optimization[1,2]; Haemoglobin optimization[2]
Lactation/Breastfeeding preparation and support[2]
Bowel preparation[1]
Rutine Venous thromboembolism prophylaxis[1]
Sedative premedication[1]
Intraoperative
Anesthetic management (regional anesthesia)[1,2]
Skin cleansing with chlorhexidine[1]
Cesarean delivery surgical techniques (transverse or oblique incision, as short as possible)[1,2]
Perioperative Intravenous fluid optimization-euvolemia[1,2]
Prevention of intraoperative hypothermia (warming devices forced air warming, intravenous fluid warming, and increasing operating room temperature)[1,2]
Nausea and vomiting prophylaxis and treatment[1,2]
Multimodal analgesia[2]
Newborncare (delayed cord clamping, maintenance of normothermia, facilitating the breathing, mother-newborn skin-to-skin contact, and neonatal resuscitation if needed should be carried out in the operating room)[1,2]
Neonatal oral suctioning or increased inspired oxygen[1]
Routine use of drains[1]
Postoperative
Promotion of resting periods and monitoring[2]
Early oral intake (advance to regular diet ideally within 4 hrs post cesarean)[1,2]
Promotion of return of bowel function (minimize opioid consumption, consider chewing gum)[1,2]
Glycemic control (maintain normoglycemia (<180–200 mg/dL), check maternal/neonatal glucose as per hospital protocol)[1,2]
Optimal uterotonic[2]
Haemoglobin optimization (screen and treat anemia)[2]
Breastfeeding support[2]
Pain analyzed by visual analogue scale (VAS) - multimodal analgesia[1,2]
Early catheter removal (6–12 hours)[1,2]
Venous thromboembolism prophylaxis (mechanical and pharmacological methods)[1,2]
Nausea and vomiting prophylaxis and treatment[1,2]
Facilitate early discharge-follow-up and audit of results[1,2]
Discharge counseling[1,2]

1: ERAS-CD; 2: ERAC; Recommended; Not recommended.

Results

The mean age of the research group was 30.59±5.83 and the mean BMI was 30.16±4.08. 39.0% of the research group was high school graduate, 34.2% was a primary school graduate, 91.3% did not work and 65.5% had a nuclear family structure. Table 2 contains data on socio-demographic characteristics.

Table 3 contains data on obstetric characteristics. The indication for CS in the study group was a history of CS at a rate of 97.6% (second CS 58.9%, three or more CS 38.7%).

In Table 4, and Table 5 are given preoperative, intraoperative and postoperative applications, repectively. The most striking application in the preoperative period was Solid

Table 2. Socio-demographic and obstetric characteristics

Socio-demographic characteristics	Mean±SD	Min–Max
Age	30.59± 5.83	17-43
BMI	30.16±4.08	20.28-43.28
Education level	**n=333**	**%=100.0**
Illiterate	10	3.0
Literate	45	13.6
Primary education	114	34.2
High school	130	39.0
University and above	34	10.2
Working status		
Working	29	8.7
Not working	304	91.3
Health insurance		
Yes	317	95.2
No	16	4.8
Income status		
Income less than expenses	285	85.6
Income equal to expenses	41	12.3
Income more than expenses	7	2.1
Family type		
Core	218	65.5
Wide	115	34.5
Living place		
Province	264	79.3
District	67	20.1
Town/Village	2	0.6
Health problems accompanying pregnancy		
Yes	33	9.9
No	300	90.1
Presence of anemia in pregnancy		
Yes	58	17.4
No	275	82.6
Smoking during pregnancy		
Yes	47	14.1
No	286	85.9
Regular check status		
Yes	319	95.8
No	14	4.2

SD: Standard deviation; Min: Minimum; Max: Maximum; BMI: Body Mass Index.

Table 3. Obstetric features

Obstetric features	n=333	%=100.0
Number of births		
1	3	0.9
2	153	45.9
3	116	34.8
4 and above	61	18.3
Number of miscarriages/abortions		
0	246	73.9
1	69	20.7
2	14	4.2
3 and above	4	1.2
Number of cesarean sections		
1	8	2.4
2	196	58.9
3	97	29.1
4 and above	32	9.6
Cesarean section indication		
Repeated cesarean section (three or more)	129	38.7
C-section (second)	196	58.9
Malpresentation	8	2.4
	Mean±SD	**Min–Max**
Gestational week	38.61±0.80	35–40
Weight gained during pregnancy (kg)	10.30±4.73	(-3) – (30)

SD: Standard deviation; Min: Minimum; Max: Maximum.

food restriction period (hour) 11.14±1.74 7–24, Liquid food restriction period (hour) 11.01±1.66 4–24. In the intraoperative period, the type of anesthesia was regional anesthesia at a rate of 97.3%. In the postoperative period, it was determined that the pain score was 3 at a rate of 70.6%, analgesics were applied to 99.1% and the analgesic used was NSAID at a high rate (97.9). The mean time of the initiating breastfeeding was 88.38±35.11 (minutes).

Factors affecting the time to initiate oral feeding and the time to initiate breastfeeding after surgery, and the length of hospital stay, which are the basic components of ERAS protocols, were examined using linear regression analysis (Table 6). It was determined that the most important factor was the mobilization time at the time of starting oral feding ($p<0.001$), the need for analgesic medication at the time initiating breastfeeding ($p<0.05$), and the application of drains during the hospitalization period ($p<0.001$).

Discussion

In this study, data were collected within the scope of ERAS-CD protocols. In the discussion, they were within the scope of ERAS-CD and ERAC.

Table 4. Preoperative and Intraoperative applications

Preoperative applications	**n=333**	**%=100.0**	**Intraoperative applications**	**n=333**	**%=100.0**
Preoperative information			Type of anesthesia		
Yes	333	100.0	Spinal	324	97.3
No	0	0.0	General	9	2.7
Sedative premedication			Skin cleansing with chlorhexidine		
Yes	0	0.0	Yes	333	100.0
No	333	100.0	No	0	0.0
Preoperative IV fluid			NG cathetere application		
Yes	333	100.0	Yes	3	0.9
No	0	0.0	No	330	99.1
Preoperative LMWH aplication			Urinary catheterization application		
Yes	0	0.0	Yes	331	99.4
No	333	100.0	No	2	0.6
Preoperative antibiotic prophylaxis			Drain application		
Yes	333	100.0	Yes	2	0.6
No	0	0.0	No	331	99.4
Bowel preparation			Epidural analgesia administration		
Yes	2	0.6	Yes	12	3.6
No	332	99.4	No	321	96.4
ASA classification			Antiemetic agent administration		
1	283	85.0	Yes	175	52.6
2	49	14.7	No	158	47.4
3	1	0.3			
	Mean±SD	**Min–Max**		**Mean±SD**	**Min–Max**
Solid food restriction period (hour)	11.14±1.74	7–24	Intraoperative IV fluid amount (mL)	2189.94±531.53	1000–4000
Liquid food restriction period (hour)	11.01±1.66	4–24	Incision length (cm)	11.23±0.99	9–14

SD: Standard deviation; Min: Minimum; Max: Maximum; IV: Intravenous; LMWH: Low-molecular-weight heparin; ASA: American Society of Anesthesiologists; NG: Nasogastric.

CS is one of the most frequently performed surgical procedures in the World.[11,12] In the study of Kiremitli et al.,[13] the reason for elective CS was 85.5% of the previous CS, and in our study, the reason was a history of previous CS with a rate of 97.6%. In our country, since 2012, cesarean deliveries in all health institutions have been categorized according to the Robson classification system. In the study of Sanisoğlu et al.,[14] in which 2016 Türkiye CS data were evaluated according to the Robson classification, the CS rate of this group was found to be 96.7%. One of the most important reasons for giving birth by CS is the logic that after giving birth by CS, a CS must be done again.

The purpose of pre-operative counseling is to determine the expectations regarding the surgery and anesthetic procedures and to provide information about the postoperative care plan.[4] The empowerment of patients for active participation in health care is vital to improving health outcomes.[7] Preoperative education and psychological preparation can reduce anxiety and increase patient satisfaction, which can improve fatigue and facilitate early discharge.[15] In accordance with the ERAS-CD and ERAC protocols,[8] peroperative information was provided to the entire research group in our study.

Routine bowel preparation is not recommended.[4,15] One study determined that preoperative enema did not prevent postoperative gastrointestinal complications and did not ensure return of bowel movements in elective CS.[16] In our study, it was determined that preoperative bowel preparation was not performed in cases other than two women in accordance with the ERAS-CD protocol.

Table 5. Postoperative applications

Postoperative applications	**n=333**	**%=100.0**
Nausea		
Yes	4	1.2
No	329	98.8
Heating with a heater		
Yes	118	35.4
No	215	64.6
Pain score (VAS)		
3	235	70.6
4	59	17.7
5	32	9.6
6	7	2.1
Analgesic administration		
Yes	330	99.1
No	3	0.9
Type of analgesic		
NSAID	326	97.9
Opioids	7	2.1
Venous thromboembolism prophylaxis (LMWH)		
Yes	327	98.2
No	6	1.8
Gum chewing app		
Yes	0	0.0
No	333	100.0
Status of providing discharge training		
Yes	333	100.0
No	0	0.0
Information on control		
Yes	333	100.0
No	0	0.0
	Mean±SD	**Min–Max**
Time to initiate breastfeeding (minute)	88.38±35.11	10–240
Time to postoperative gas release (hour)	10.28±2.58	2–24
Time to postoperative stool output (hour)	14.53±4.32	5–72
Time to mobilization (hour)	6.21±0.67	3–8
Time to urinary catheter removal (hour)	6.22±0.63	6–8
Time to oral initiation (hour)	6.22±0.63	6–8
Length of hospital stay (hour)	51.02±8.53	24–96

SD: Standard deviation; Min: Minimum; Max: Maximum; VAS: Visual Analogue Scale; NSAID: Non-steroidal anti-inflammatory drug; LMWH: Low-molecular-weight heparin.

In rapid recovery protocols after surgery, it is stated that clear liquids such as pulp-free fruit juice, milk-free coffee or tea can be consumed up to 2 hours before the surgery, and a light meal can be eaten up to 6 hours before.[4,7,15] In our study, the duration of solid food restriction was 11.14±1.74 and liquid food restriction time was 11.01±1.66 hours,

Table 6. Linear regression of time to initiate oral feeding, time to initiate breastfeeding and length of stay with sociodemographic, obstetric characteristics and ERAS-CD recommendations variables

Variables	b	SE	B	t	p	95% CI		VIF
						Lover	Upper	
Time to oral itiation (hour)								
(Constant)	0.608	0.099		6.153	0.000	0.414	0.802	
ASA score (1,2,3)	0.088	0.031	0.052	2.819	0.005	0.027	0.150	1.307
Time to postoperative mobilization (hour)	0.874	0.018	0.923	49.443	0.000	0.839	0.909	1.351
Time to postoperative gas release (hour)	0.008	0.004	0.034	2.086	0.038	0.000	0.016	1.040
F=1181.611	**p=0.000**		**Adj. R^2=0.914**			**Dubin Watson: 1.935**		
Time to initiate breastfeeding (minute)								
(Constant)	88.803	89.624		0.991	0.323	-87.520	265.125	
BMI (kg/m^2)	-0.906	0.377	-0.105	-2.401	0.017	-1.648	-0.164	1.076
Parity	-6.604	2.212	-0.145	-2.986	0.003	-10.956	-2.252	1.320
Gestational week	-3.785	2.105	-0.081	-1.798	0.073	-7.927	0.356	1.150
Incision length (cm)	5.929	1.668	0.168	3.554	0.000	2.647	9.211	1.244
Antiemetic agent requirement (no-yes)	13.177	3.431	0.188	3.841	0.000	6.427	19.927	1.337
Intraoperative IV fluid amount (mL)	0.020	0.003	0.306	6.450	0.000	0.014	0.026	1.262
Heating with a heater	-8.177	3.168	-0.112	-2.581	0.010	-14.410	-1.944	1.046
Postoperative IV fluid amount (mL)	0.007	0.004	0.075	1.683	0.093	-0.001	0.015	1.127
Postoperative VAS score	6.500	2.335	0.139	2.784	0.006	1.907	11.094	1.400
Analgesic requirement (no-yes)	38.234	16.170	0.103	2.365	0.019	6.422	70.045	1.064
F=23.787	**p=0.000**		**Adj R^2=0.407**			**Dubin Watson=1.744**		
Length of hospital stay (hour)								
(Constant)	11.700	5.213		2.244	0.025	1.443	21.956	
Age	0.120	0.070	0.082	1.721	0.086	-0.017	0.258	1.066
Parity	1.471	0.575	0.133	2.556	0.011	0.339	2.603	1.266
Incision length (cm)	2.312	0.428	0.269	5.407	0.000	1.471	3.153	1.159
Drain application (no-yes)	24.949	5.183	0.226	4.813	0.000	14.752	35.147	1.036
Weight gained during pregnancy (kg)	0.159	0.084	0.088	1.883	0.061	-0.007	0.325	1.026
Health problems accompanying pregnancy (no-yes)	5.375	1.406	0.189	3.824	0.000	2.610	8.141	1.140
ASA score (1,2,3)	4.215	1.164	0.182	3.620	0.000	1.925	6.506	1.188
F= 20.510	**p=0.000**		**Adj. R^2=0.291**			**Dubin Watson: 2.050**		

ASA: American Society of Anesthesiologists; BMI: Body Mass Index; ERAS-CD: Enhanced recovery after cesarean; CI: Confidence interval; IV: Intravenous; SE: Standart error; VAS: Visual Analogue Scale; VIF: Variance Inflation Factor.

and the duration of solid and liquid food restriction in the preoperative period was found to be longer than the time recommended in the protocols. The reason for this long period is it is considered as routine to tell all these women to fast beginning from midnight and delay the entrance to the surgery. Oral administration of carbohydrate drinks two hours before surgery reduces postoperative insulin resistance and increases comfort by reducing thirst, hunger and anxiety in the prenatal period,[17] however, it is thought that healthcare professionals' adherence to traditional practices and their reluctance to change may cause difficulties in enhanced recovery practice.

Preoperative sedative premedication for planned CS is also not recommended in both guidelines due to the potential for harmful effects on the mother and newborn.[4,7] In parallel with this recommendation, it was determined in our study that sedative premedication was not applied to any pregnant woman to reduce anxiety.

In skin preparation, it is aimed to reduce the amount of bacterial flora present on the skin before the incision. This can be accomplished by preoperative use of skin preparation prior to incision in the operating room, as well as by taking a bath at home.[15] ERAS-CD and WHO (World Health Organization) recommends the use of alcohol-based

chlorhexidine gluconate for skin preparation before CS.[18] Skin cleansing was done with chlorhexidine to all of the research group. According to ERAS-CD and ERAC protocols, it is recommended to administer IV (Intravenous) antibiotics (first generation) within 60 minutes before the skin incision for antibiotic prophylaxis.[5,7,15] NICE (National Institute for Health and Care Excellence) recommends antibiotic prophylaxis before skin incision in CS. In our study; ıt was determined that antibiotic prophylaxis was administered to all pregnant women just before going to the operating room, and a second dose of antibiotic was administered to all patients on the same day in the postoperative period. WHO reports that antibiotics and antiseptics are effective interventions to prevent maternal infection-related morbidity and mortality.[18]

Cesarean delivery brings with it the risk of VTE (venous thromboembolism).[19] In our study, low molecular weight heparin or unfractionated heparin venous trobophylaxis was not applied to all pregnant women in the preoperative period. The need for medical prophylaxis should be determined according to ERAC protocols.[4–7] Modern VTE prophylaxis targets in cesarean delivery include mechanical thromboprophylaxis for all women who are not currently receiving pharmacological thromboprophylaxis with low molecular weight heparin or unfractionated heparin, unless contraindicated.[7] For this reason, varicose stockings are worn by all pregnant women. As a result, it is recommended that medical thromboprophylaxis be applied according to need, not routinely.[6]

Regional anesthesia is recommended to be preferred in abdominal surgeries.[4,7] It has been reported that pain control, organ function, ambulation are better, nausea-vomiting and hospital stay are reduced with regional anesthesia compared to general anesthesia.[15,20] In parallel with this literature information, it was found that spinal anesthesia was administered to 97.3% of women in our study. 85% of the participants were in the ASA 1 (American Society of Anesthesiologists classification) group and the rate of spinal anesthesia was 97.3%. Although epidural analgesia is recommended,[21] in our study, 96.4% of the study group did not receive epidural analgesia.

Minimally invasive surgery and avoidance of long-term NG (Nazogastric) catheter use is an important consideration for rapid recovery after surgery.[5,7] While urinary catheterization was applied to all of the women in our study, NG and drains were not inserted in the majority of them.

It is recommended to avoid very restrictive or very free fluid regimens in order to maintain fluid and electrolyte balance in surgeries performed under elective conditions.[4–7] In the ERAC protocol, it is recommended that the amount of IV fluid be up to 3 liters in routine CS operations.[7] In our study, IV fluid was given at a level (mean 500 mL) to keep the vascular access open in the preoperative period, while the amount of IV administered IV in the intraoperative period was 2189.94±531.53 mL, which is compatible with the ERAC protocol.

In our study, transverse incision was made in all women, and the surgical incision length was 11.23±0.99 cm. Transverse incisions have been associated with less postoperative pain, greater wound durability, and better cosmetic results than vertical incisions.[22]

Nausea did not occur in 98.8% of the study group in the postoperative period. It is thought that this situation occurs in parallel with the anti-emetic agent administered in the intraoperative period. In our study, the rate of administration of antiemetic agents in the intraoperative period was 52.6%.

Intraoperative hypothermia is a surgical risk and requires careful monitoring during surgical procedures.[23] ERAS-CD and ERAC protocols recommend heating with compressed air, heating IV fluids, and increasing the operating room temperature to prevent hypothermia in CS surgeries.[6,7] 35.4% of the research group was heated with compressed air. The remaining patients were warmed with materials such as blankets and quilts due to the inadequacy of the heating device.

The combined use of non-opioid drugs is recommended in order to reduce the side effects of opioid use in order to relieve moderate pain in postoperative pain management.[15] Combined use of NSAIDs (Non-steroidal anti-inflammatory drug) and paracetamol is recommended for pain relief after CS operations.[6,7] In our study, 70.6% of the research group had a pain score of 3 in the first two hours, and almost all of them were administered analgesics and the type of analgesic administered was NSAID at a rate of 97.9%. The fact that the rate of opioid use is limited to 2.1% indicates that the ERAS-CD and ERAC protocol is followed.

In the NICE guideline and ERAC protocol, it is recommended that women who have had CS breastfeed their babies as soon as possible.[7,24] In our study, the mean initiating breastfeeding time was 88.38±35.11 minutes after surgery. The reason why this breastfeeding initiation time is longer than ERAC protocols is due to the initiation of breastfeeding in the clinic. Due to these results, the practice of performing the initiation of breastfeeding in the recovery room in the hospital where the research was conducted was started.

The importance of early mobilization has been emphasized to ensure accelerated recovery after surgery.

[6,7] Early mobilization of postoperative patients is safe and effective in reducing the risk of complications and adverse events.[25] In our study, mobilization occurred at mean of 6.21±0.67 hours and was consistent with the recommendations of two protocols.

In the ERAS-CD guideline, it is recommended to remove the urinary catheter as soon as possible after CS, and at 6–12 hours in the ERAC protocol.[6,7] In our study, the mean time of urinary catheter removal was 6.22±0.63. hours, which is consistent with the guideline. Early removal of the urinary catheter after elective CS is associated with reduced urinary tract infection and earlier postoperative ambulation.[26]

A meta-analysis found that early oral feeding after CS improved bowel function recovery and did not increase the frequency of postoperative complications.[27] Postoperative gas release, which is among the post-operative oral nutrition criteria, was 10.28±2.58 hours from the time of birth, and oral nutrition was started at mean of 6.22±0.63 hours. However, oral nutrition is only in the form of liquid food until gas release is achieved. After the gas is released, the patient is allowed to take soft food. Stool output was 14.53±4.32 hours by the time of birth. One of the recently advocated theories for bowel movements is chewing gum, known as the pseudo-eating behavior. Chewing gum activates the vagus nerve, stimulating and activating intestinal motility.[28] When the study of Göymen et al.[29] was examined, it was stated that in the group chewing gum in post-CS patients, bowel sounds were heard earlier, gas and stool were removed in a shorter time, and therefore the duration of hospital stay was shortened. The fact that the chewing gum rate was 0.0% in our study may have indirectly caused the prolongation of the gas release time and, accordingly, the prolongation of the transition to full oral feeding.

The Turkish Ministry of Health also recommends that women be discharged at least 48 hours after CS.[30] In our study, it was determined that the majority of women were discharged on the second postoperative day because they met the clinical discharge criteria, and the mean length of hospital stay was 51.02±8.53 hours. Follow-up and supervision of patients discharged after surgery is recommended in terms of detection and evaluation of clinical results and continuity of health care. In our study, it was determined that all of the participants were informed about discharge and control, and all of them were given control appointments on the 10th day and 6th week postoperatively.

In this study, ıt was observed that the preoperative fasting period, the time to initiate oral feeding postoperatively, and the time to initiate breastfeeding were longer than the protocol. The preoperative fasting period was due to the continuation of the fasting routine after midnight. ASA score, mobilization time and postoperative gas release were among the influencing factors for time to initiate oral feeding. These factors are directly related to the patient's general health status, the rate of recovery after surgery, and the resumption of gastrointestinal functions. In particular, rapid mobilization promotes the return of normal bowel function, while flatus output indicates how well the digestive system is functioning. After this type of abdominal surgery, patients' gas and bowel sounds may influence the decision to initiate oral feding.[31] A meta-analysis by Guo et al.[32] found that early feeding was associated with early first flatus and early defecation. In this case, while mobilization and bowel movements affect the time of first oral intake, oral intake can also affect bowel function.

Antiemetic and analgesic agent requirement, VAS score and incision length were associated with delayed breastfeeding; while warming, parity and gestational age shortened the time to initiate breastfeeding. Longer incision lengths and medications used during this process can both affect the mother’s comfort and make breastfeeding more difficult. Warming helps the mother feel more comfortable and physically recover. Parity, when considering experience, may mean that mothers who have given birth before may be more confident and quicker in breastfeeding. Gestational age is also linked to the baby’s maturity; more mature babies are generally more willing to breastfeed. As a result, it is important for healthcare professionals to create individualized care plans that take these factors into account.

It was determined that drain application, health problems accompanying pregnancy, ASA score and parity increased the length of hospital stay. One study reported that early feeding, early mobilization, early catheter removal, multimodal pain management, and preventive analgesia and antibiotic administration resulted in rapid recovery. Factors such as prolonged catheterization, delayed intravenous hydration, and delayed feeding have been found to be effective in prolonging the length of hospital stay.[33]

Conclusion

The main purpose of the ERAS approachs are to reduce the hospital stay after surgery and to encourage the patient to return to their normal activities quickly, thereby reducing the complication rate and the costs associated with the surgery. To achieve this goal, the ERAS programs focuse

on perioperative surgical stress reduction, early patient mobilization, restoration of gastrointestinal tract function, and satisfactory pain control.

As a result, it was evaluated that most of the applications in CS operations performed in the clinic where the study was conducted are suitable according to rapid recovery protocols. However, some findings were observed to differ from these recommendations. It was observed that the preoperative fasting period, the time to initiate oral feeding postoperatively, and the time to initiate breastfeeding were longer than the protocol.

In the prenatal-preoperative period, it was found that the fasting period should be calculated according to the surgery time to ensure the minimum fasting period, and oral liquid carbohydrate intake 2 hours before operation are areas that need to be improved.

It was found that the general compliance with ERAS protocols during intraoperative period was good, but the use of epidural analgesia was very rare.

Early postoperative oral intake, support for rest periods and follow-up, prophylaxis of venous thromboembolism, breastfeeding support, and support for return of bowel function were found to be areas for improvement.

In line with these findings, the re-evaluation of the women who have no complications in the postoperative period for oral feeding without waiting for the gas release, and in addition, the necessary arrangements for initiating breastfeeding in the operating and/or the recovery room for the women who received spinal anesthesia may be recommended.

Finally, we recommend providing education on ERAS protocols, their components, and their benefits to ensure multidisciplinary teamwork, investigating the causes of noncompliance, and investigating the consequences of implementing these protocols.

Study Limitations: Study data were collected as of the admission of pregnant women, the status of the ERAS-CD protocols was determined, and no intervention was made in the implementation of the protocols. Since the benefit of the ERAS protocols have been proven, a comparison could not be made because it would not be ethical to prospectively deprive patients of the use of this protocol. The majority of the data was obtained from the records, so there is observer diversity, which is among the limitations of the study. Fasting after midnight before the operation was the general fasting period applied in the hospital. Therefore, the fasting period was similar in all surgeries. Since the hospital is baby-friendly, providing prenatal breastfeeding education is one of its strengths.

Ethics Committee Approval: The The Etlik Zübeyde Hanım Woman's Health Training and Research Hospital Clinical Research Ethics Committee granted approval for this study (date: 24.11.2021, number: 119).

Informed Consent: Informed consent was obtained from the participants.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study has received no financial support.

Use of AI for Writing Assistance: The author declared that artificial intelligence (AI) supported technologies were not used in the study.

Authorship Contributions: Concept: GKB, KK, RSK; Design: GKB, KK, RSK; Supervision: GKB, KK, RSK; Materials: GKB, KK, RSK; Data Collection or Processing: GKB, KK; Analysis or Interpretation: GKB; Literature Search: GKB; Writing: GKB; Critical Reviews: GKB, KK, RSK.

Acknowledgments: The authors would like to thank all participants.

Peer-review: Double blind peer-reviewed.

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