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Postoperative Length of Stay Following Enhanced Recovery After Surgery Protocol Implementation for Scheduled Cesarean Deliveries

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Background

Cesarean delivery is the most common major surgery worldwide.[1] In 2018, 1.2 million cesarean deliveries occurred in the United States, accounting for nearly 32% of all deliveries.[2] Research has shown ERAS benefits include decreased length of stay, improved pain control, and improved patient satisfaction.[2,3] Despite its use in numerous surgical specialties, ERAS implementation within obstetrics has been slow.[2] The ERAS Society released a three-part guideline specific to cesarean deliveries in 2018 and 2019,[4,5,6] yet few studies have assessed the impact of ERAS on cesarean postoperative outcomes.[2] An improved perioperative course would be particularly beneficial for mothers undergoing cesarean delivery as they require a quick recovery in order to care for their newborn.

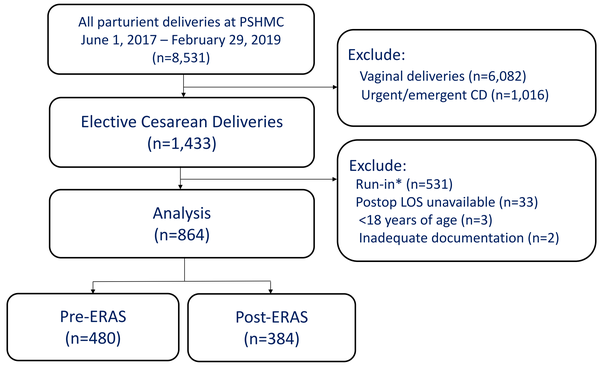
The purpose of this retrospective, observational study was to determine how the recovery process following cesarean delivery may be improved by standardizing the perioperative care pathway, with the primary outcome of interest being postoperative length of stay.

Methods

- Design: Retrospective, observational cohort study at Providence Sacred Heart Medical Center (PSHMC)
- This project was approved by the PSHMC Clinical Innovation and Research Council and deemed exempt from human subjects research by Providence Health Care Institutional Review Board.
- Human subjects protection: Patient demographic and surgical data from electronic medical records were extracted, deidentified, and encrypted using a REDCap data collection tool
- Inclusion Criteria*:* parturients 18 years of age or older who underwent scheduled cesarean delivery between June 1, 2017 to May 31, 2018 for pre-intervention group and June 1, 2019 to February 29, 2019 for post-intervention group.
- Exclusion Criteria*:* urgent or emergent cesarean deliveries, cesarean deliveries occurring in the run-in time period of June 1, 2018 through May 31, 2019, and mothers under the age of 18 years.
- Outcome measurement: postoperative length of stay, defined as time of end of surgery to time of discharge
- Exposure measurement: defined as post-ERAS protocol implementation following April 1, 2019.
- Other variables considered included: age, weeks gestation, BMI, ASA, primary vs repeat cesarean, weeks gestation, and multiparty births.
- Statistical analysis: a-prior power analysis, univariate analysis, bivariate analysis, and multivariate analysis

Findings

Figure 1. Flow Diagram of Patient Selection



PSHMC = Providence Sacred Heart Medical Center, CD = Cesarean delivery, LOS = Length of Stay, ERAS = Enhanced Recovery After Surgery. Pre-ERAS time frame defined as June 1, 2017 through May 31, 2018. Post-ERAS time frame defined as June 1, 2019 through February 29, 2019. *Run-in time period defined as June 1, 2018 through May 31, 2019.

Figure 2. Time Series of Median Postoperative Length of Stay for Scheduled Cesarean Deliveries

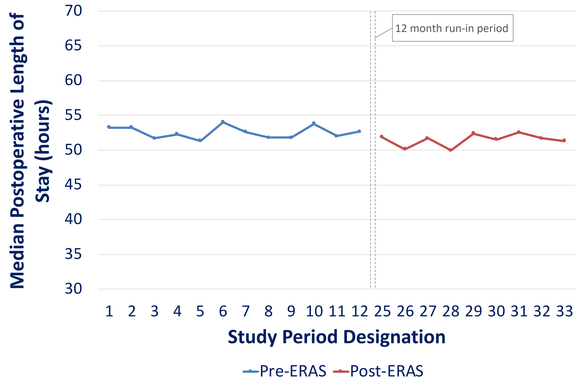


Table 1. Maternal Demographics and Case Characteristics (N=864)

Characteristics	Pre-ERAS (n=480)	Post-ERAS (n=384)	P-value
Age (year)	31 ± 5	31 ± 6	0.44
BMI (kg/m^2)	33 (29-38)	33 (29-39)	0.46
ASA, n (%)			
1 + 2	382 (80%)	315 (82%)	0.69
≥ 3	91 (19%)	63 (16%)	0.38
Missing	8 (1%)	6 (2%)	0.90
Weeks Gestation	38.6 ± 2.1	38.7 ± 1.8	0.32
Gravida, n (%)			
1	112 (23%)	99 (26%)	0.47
2+3	253 (53%)	194 (51%)	0.66
≥4	115 (23%)	91 (24%)	0.94
Parity, n (%)			
0+1	160 (33%)	137 (36%)	0.56
2+3	267 (56%)	211 (55%)	0.89
≥4	53 (11%)	36 (9%)	0.45
Multiple Births, n (%)	10 (2%)	6 (2%)	0.57
Cesarean Delivery Type			
Primary, n (%)	287 (60%)	206 (54%)	0.23
Repeat, n (%)	193 (40%)	178 (46%)	0.17

Data are presented as mean ± standard deviation, median (IQR) if distribution skewed, or number (%). BMI: Body mass index. ASA: American Society of Anesthesiologists physical status classification.

Table 2. Average Change in Postoperative Length of Stay at Varying Run-in Period Lengths

Run-In Period Length	Average Change in LOS	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
2 months	0.19	0.73	0.26	**0.80**	-1.31	1.69
4 months	-0.60	0.80	-0.75	**0.46**	-2.24	1.04
6 months	-1.26	0.93	-1.35	**0.19**	-3.18	0.66
8 months	-1.81	1.08	-1.68	**0.11**	-4.05	0.42
10 months	-1.93	1.21	-1.60	**0.13**	-4.45	0.59
12 months	-1.40	1.48	-0.95	**0.36**	-4.50	1.71

Discussion

In this retrospective observational study, this facility's postoperative LOS following cesarean delivery was found to be low, with a median of 52.4 hours. Following ERAS implementation, the median postoperative LOS decreased to 51.2 hours but was not found to be statistically significant in an adjusted model. Cesarean deliveries comprised nearly 29% of all births at this facility, 58.5% of which were scheduled or elective cesarean deliveries. Characteristics of parturients were very similar among the pre- and post-ERAS patient groups; most patients were classified as ASA 2 and a mean age of 31 years. Repeated multivariate analysis using run-in periods of varying lengths and controlling for time consistently showed no significant difference in postoperative LOS between the pre-ERAS and post-ERAS groups.

With the postoperative LOS at PSHMC being low prior to protocol implementation, it is likely that other facilities with longer postoperative LOS may see a greater benefit of ERAS implementation. Additional work is still required to further the understanding of ERAS for cesarean deliveries and its impact on postoperative recovery. Future studies of interest includes determining 30-day readmission rates and emergency room visits following discharge. In order to determine the true effect ERAS may have on postoperative length of stay and the recovery process following cesarean delivery, large prospective control trials are needed.

References

1. Jauniaux, E., & Grobman, W. (2016). Textbook of Caesarean Section. Oxford University Press.
2. Peahl, A. F., Smith, R., Johnson, T. R. B., Morgan, D. M., & Pearlman, M. D. (2019). Better late than never: Why obstetricians must implement enhanced recovery after cesarean. *American Journal of Obstetrics and Gynecology*, *221*(2), 117.
3. Ljungqvist, O., Scott, M., & Fearon, K. C. (2017). Enhanced recovery after surgery a review. *JAMA Surgery*, *152*(3), 292–298.
4. Caughey, A. B., Wood, S. L., Macones, G. A., Wrench, I. J., Huang, J., Norman, M., … Wilson, R. D. (2018). Guidelines for intraoperative care in cesarean delivery: Enhanced Recovery After Surgery Society Recommendations (Part 2). American Journal of Obstetrics and Gynecology, 219(6), 533–544.
5. Macones, G. A., Caughey, A. B., Wood, S. L., Wrench, I. J., Huang, J., Norman, M., … Wilson, R. D. (2019). Guidelines for Postoperative care in Cesarean Delivery: Enhanced Recovery After Surgery (ERAS) Society Recommendations (Part 3). American Journal of Obstetrics and Gynecology, (April), 1–9.
6. Wilson, R. D., Caughey, A. B., Wood, S. L., Macones, G. A., Wrench, I. J., Huang, J., … Nelson, G. (2018). Guidelines for Antenatal and Preoperative care in Cesarean Delivery: Enhanced Recovery After Surgery Society Recommendations (Part 1). American Journal of Obstetrics and Gynecology, 219(6), 523.