

Enhanced recovery after cardiac surgery reduces racial and ethnic disparities following coronary artery bypass

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Background

- Enhanced recovery after surgery (ERAS) protocols reduce length of stay (LOS) following cardiac surgery.^{1,2}
- The effect of the protocols on racial and ethnic disparities following cardiac surgery is not known.³
- We sought to determine if ERAS affected racial and ethnic LOS disparities following coronary artery bypass surgery (CABG).

Study Design and Methods

- We conducted a single-site retrospective study for patients undergoing isolated CABG.
- Data were collected from the Society of Thoracic Surgery Adult Cardiac Surgery Database and the institutional electronic medical record.
- Patients were stratified into subgroups:
 - Minorities (i.e., African American, non-Caucasian Hispanic, Asian, American Indian, Native Hawaiian/ Pacific Islander).
 - Caucasian.
- Statistical analyses compared outcomes for all patients during two time periods:
 - Prior to implementation of ERAS (2016-2017).
 - Following implementation of ERAS (2018-2020).
- Continuous variables were summarized with mean and standard deviation, categorical variables with total number and proportions. Median and interquartile range were used for continuous variables when assumptions for normal distribution were not met.
- A chi-squared test was used to compare categorical values and a t test was used for comparison of continuous variables.
- Wilcoxon Ranked Sum was used for continuous variables that did not meet assumptions of normal distribution and for ordinal variables.
- Results were considered significant at $P < 0.05$. Analyses were performed with SPSS 21.0 (SPSS, Chicago, Illinois).

Results

Table 1. Patient demographics and enhanced recovery after cardiac surgery protocol outcomes. Significant differences between cohorts have bolded P -values.

Parameter	All Patients, Pre-ERAS (n = 656)	All Patients, Post-ERAS (n=1,238)	P-Value	Caucasian, Pre-ERAS (n = 566)	Minorities, Pre-ERAS (n = 90)	P-Value	Caucasian, Post-ERAS (n = 1,063)	Minorities, Post-ERAS (n = 175)	P-Value
Demographic Data									
Race/Ethnicity, n(%)									
Caucasian	566 (86.3)	1063 (85.9)	.480	566 (100)			1063 (100)		
African American	24 (3.7)	41 (3.3)			24 (30.0)			41 (23.4)	
Hispanic, non-Caucasian	52 (7.9)	96 (7.8)			52 (57.8)			96 (54.9)	
Asian	12 (1.8)	37 (3.0)			12 (13.3)			37 (21.1)	
American Indian	1 (0.2)	1 (0.1)			1 (1.1)			1 (0.6)	
Native Hawaiian OR Pacific Islander	1 (0.2)	0 (0.0)			1 (1.1)			0 (0.0)	
Primary ERAS Outcomes									
Extubation < 6 hours, n(%)	272 (41.5)	605 (48.9)	.002	239 (42.2)	33 (36.7)	.320	538 (50.6)	67 (38.3)	.003
Ventilation, hours, median (IQR)	6.4 (5.1-10.6)	6.1 (4.9-9.3)	<.001	6.4 (5.1-10.6)	7.9 (5.6 – 13.9)	.037	6.0 (4.9 – 9.3)	6.5 (5.3 – 9.7)	.010
Re-intubation, n(%)	23 (3.5)	26 (2.1)	.067	18 (3.2)	5 (5.6)	.255	22 (2.1)	4 (2.3)	.853
ICU LOS, hours, median (IQR)	42.8 (24.5-85.3)	43.6 (22.9-71.4)	.061	37.3 (23.0 – 62.5)	43.0 (24.3 – 87.5)	.089	43.6 (22.9 – 71.5)	45.0 (23.1 – 76.3)	.327
ICU readmission, n(%)	22 (3.4)	25 (2.0)	.076	15 (2.7)	7 (7.9)	.012	22 (2.1)	3 (1.7)	.763
Postoperative LOS, days, median (IQR)	5 (4-7)	5 (4-7)	.001	5 (4-7)	6 (5-8)	.022	5 (4-7)	5 (4-7)	.114
Deep sternal wound infection, n(%)	5 (0.8)	2 (0.2)	.053	4 (0.7)	1 (1.1)	.523	2 (0.2)	0 (0.0)	1.000
Secondary ERAS Outcomes									
Total MME (POD 1,2), mean ± SD	106.1 ± 70.9	75.7 ± 117.5	<.001	98.8 ± 56.5	106.1 ± 70.9	.344	75.7 ± 117.5	78.2 ± 64.4	.783
30-Day Mortality, n(%)	10 (1.5)	14 (1.1)	.466	8 (1.4)	2 (2.2)	.635	10 (0.9)	4 (2.3)	.123

Abbreviations: ERAS, enhanced recovery after surgery protocols; ICU, intensive-care unit; IQR, interquartile range; LOS, length of stay; MME, morphine milligram equivalent; SD, standard deviation.

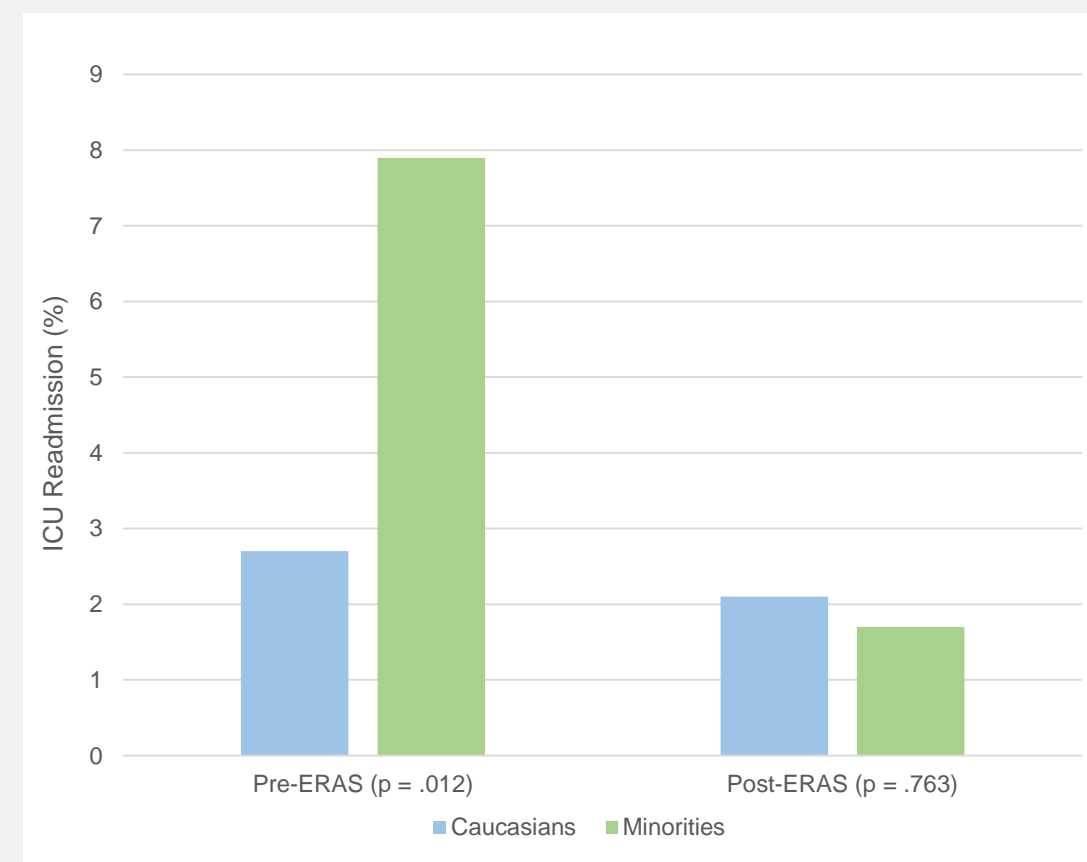


Figure 1. Intensive care unit readmission rate.

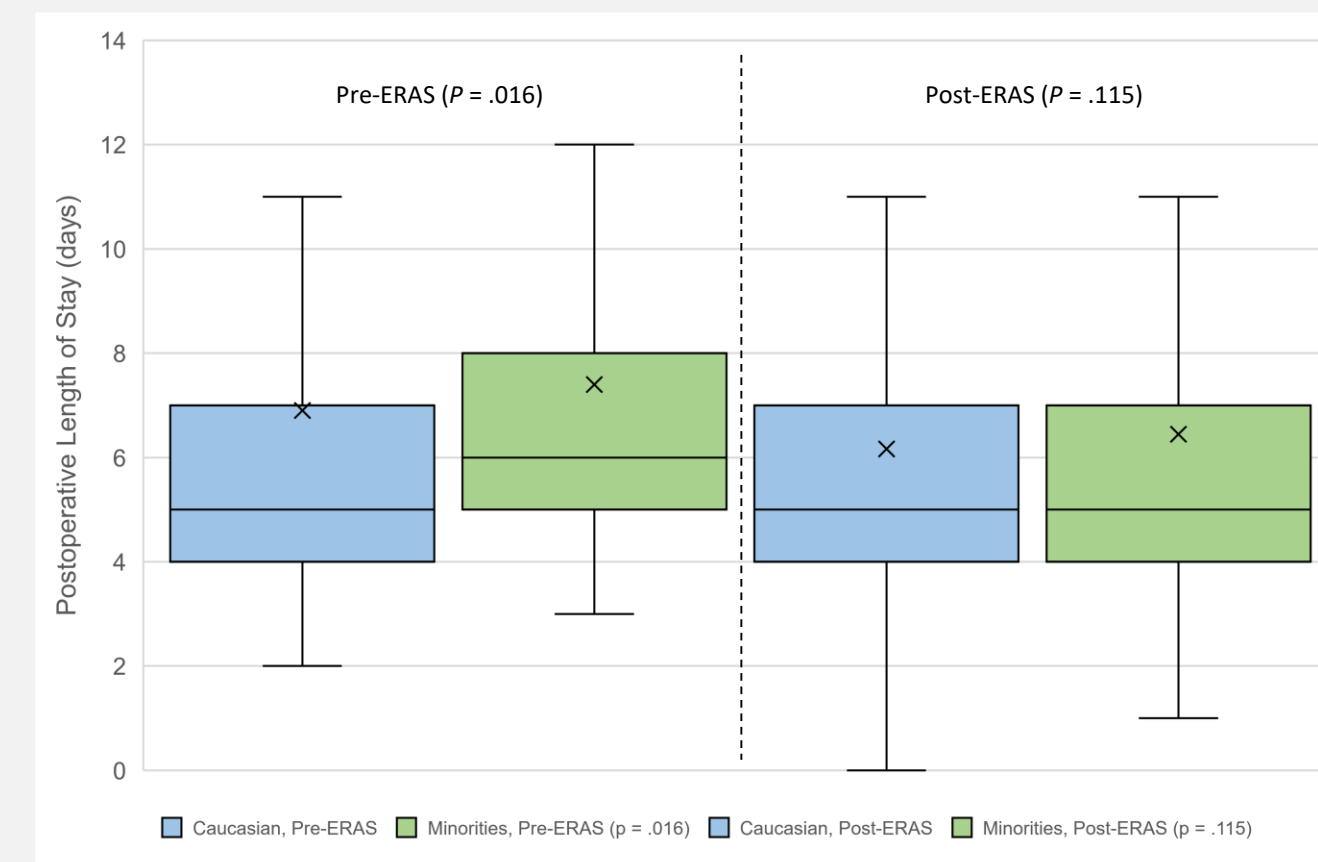


Figure 2. Postoperative length of stay.

Analysis

- Demographic similarity was established between the Pre-ERAS and Post-ERAS cohorts.
- Decreased postoperative morphine milligram equivalent (MME) consumption, ventilation time, and likelihood of reintubation indicated that ERAS protocols had successfully been implemented for both Caucasian and Minority patients.
- Disparities were eliminated between Caucasian and Minority patients with respect to intensive care unit (ICU) readmission and postoperative length of stay (LOS).

Conclusions

- We present a novel study that examines racial and ethnic disparities associated with the implementation of ERAS protocols for CABG.
- The results indicate that ERAS protocols may be suitable for promoting health equity for cardiac surgery.
- Future studies may expand their scope to encompass impacts of ERAS on racial, ethnic, gender, and socioeconomic outcome disparities for other cardiac surgery procedures.

References

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