ERAS program expedites recovery for congenital heart surgery patients

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Select patients born with heart defects and who undergo congenital heart surgery recover with few complications and reduced opioid use when a comprehensive, evidence-based enhanced recovery after surgery (ERAS) program is used, according to research presented at the 57th Annual Meeting of The Society of Thoracic Surgeons.

"We have embarked on a new paradigm for patient care with the goal of improving recovery, patient experience, and the value of care that we provide," said Nathalie Roy, MD, from Boston Children's Hospital in Massachusetts. "The early findings show promise that such programs can be a game-changer in cardiovascular care."

Dr. Roy and colleagues collected data from eligible patients who had elective surgery for simple or moderately complex congenital heart defects at Boston Children's Hospital from October 2018 to February 2020. During the study period, 559 patients underwent congenital heart surgery as part of a protocol-driven, multidisciplinary ERAS cardiac surgery program. The ERAS patients were identified before surgery, while the decision to remain in the program was based on surgical results.

The patient outcomes were reviewed by implementation period (P1): October 2018 to February 2019, and the early experience period (P2): March 2019 to February 2020.

Overall, researchers found that several factors significantly improved

from P1 to P2, as the program became more sophisticated and advanced with time, familiarity, and experience. The study showed an increase in operating room extubation, which is the removal of the breathing tube, with 27% of P2 patients being extubated in the OR versus 16% of P1 patients. Patients in the P2 group also experienced shorter ventilation time in the intensive care unit (ICU): 6.1 hours for P2 versus 7.6 hours for P1.

In general, the ICU and postoperative lengths of stay were not significantly different between the two groups, except in the case of lower-risk procedures. Congenital heart operations are grouped by complexity of the procedure in what is known as STAT Categories. STAT Category 1 includes the least complex operations, and STAT Category 5 includes the most complex operations. For STAT Category 2 operations, fewer hours were spent in the ICU: 25.7 hours for P2 patients versus 34.6 hours for P1.

Importantly, the data also demonstrated excellent pain control with an opioid-sparing approach that included adjunct medications and regional anesthetic approaches in certain cases. Reducing opioid utilization has potential benefits for quickening recovery, while research studying regional anesthesia is ongoing at Boston Children's Hospital.

Further, the study showed steady low rates of complications, reoperations, or readmissions.

"Our program defined a comprehensive approach of care throughout the surgical journey," said Dr. Roy. "We were able to remove the breathing tube earlier after surgery and manage pain well with opioid-sparing strategies—these are key components of an enhanced recovery program after congenital cardiac surgery."

ERAS is a set of predetermined activities, steps, and guidance designed

to achieve quicker recovery and the best possible outcomes for patients undergoing major surgery. First popularized in Denmark in the 1990s, it since has become more accepted. Over the past several years, ERAS protocols have been incorporated into many surgical specialties, with congenital heart surgery now joining the movement.

"ERAS has been shown to improve important metrics in perioperative surgical care and result in beneficial patient outcomes," said Lauren C. Kane, MD, from Children's Hospital New Orleans in Louisiana, who was not directly involved in this research. "Through the work of Dr. Roy and colleagues, using ERAS programs with pediatric and adult congenital heart patients is closer to universal adoption throughout the country."

Even with the encouraging early results of this step-based approach, the researchers acknowledged that there still is much to do. For example, despite using this comprehensive ERAS program, compliance and use were not optimal for all steps of the program. The challenges of introducing new protocols in a large institution are many, but the regular feedback reviews with multidisciplinary team members are critical to improving the program, compliance, and provider acceptance. In addition, empowering patients and their families by providing education before and throughout the program also is important.

However, this ERAS program, in the early stages, showed promise for decreased variability in care, the optimization of resource use, and expedited recovery after surgery—all of which ultimately have the potential to enhance overall family and patient experiences and improve patient outcomes.

Launched in 2018, the ERAS Cardiac Program at Boston Children's Hospital involves all phases of the patient's surgical care, from before surgery to at-home postsurgical follow-up. The program offers important strategies such as less fasting, multiple approaches to treat pain, smaller

surgical incisions when appropriate, blood conservation, early extubation, removal of lines, tubes, and catheters as soon as possible, getting out of bed early after surgery, and a quick return to a normal diet. Expanded surgical follow-up with early virtual visits and patient reported outcomes surveys to monitor for complications also are included in the program.

The Boston Children's ERAS program continues to evolve based on feedback collected in monthly quality improvement meetings. In addition, in order to help enable lasting programmatic improvements, Dr. Roy and colleagues created an interactive dashboard, which is connected to the Boston Children's Hospital ERAS Database. The dashboard, updated in real time, allows visualization of performance metrics that can be filtered by parameters such as age group and surgical complexity for in-depth analyses.

"An ERAS program requires institutional commitment and stakeholder involvement at all levels of the heart center," said Dr. Roy. "In congenital cardiac surgery, our program is in its early phase. Data are promising, but more research is needed, especially related to specific components of care for which there sometimes is low evidence in this population."

Future studies and ongoing efforts by the researchers will focus on pain and opioid-sparing strategies, factors associated with postoperative nausea and vomiting, the effects of transfusions on outcomes, and prehabilitation.

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