

## INFORMATION TECHNOLOGY

### DIGITAL PATIENT ENGAGEMENT PLATFORM FOR ENHANCED RECOVERY IMPROVES HEALTHCARE VALUE

Cheryl Crisafi, MA, RN, Baystate Medical Center, Springfield, MA

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Enhanced Recovery After Surgery (ERAS) initiatives require significant patient participation, including following prehabilitation, carbohydrate loading and early mobilization.<sup>1</sup> While ERAS programs have traditionally relied on booklets and verbal education, many are now adopting Digital Patient Engagement Platforms (DPEPs) to further improve patient engagement.<sup>2</sup> This involves patients accessing ERAS care plans via smartphone, tablet, or computer in

the form of reminders, to-do-lists, interactive education and Patient-Reported Outcomes (PROs) tracking (e.g. protocol compliance, symptoms, pain, etc.). PROs provide valuable insight into how a patient is progressing after a healthcare encounter. The American Society for Enhanced Recovery recommends ERAS programs collect PROs with validated surveys to better understand patients' recovery journey.<sup>3</sup> Healthcare providers understand the importance of PROs to

impact value, but often lack methods to capture them.<sup>4</sup> A DPEP allows providers to collect PROs directly from patients, receive alerts and view PROs on dashboards for quicker intervention and population insights. DPEP collected PROs are collected directly from a patient and available to be acted on in real-time. Patient engagement tools such as a DPEP are recommended by Cardiac ERAS guidelines as they foster patient knowledge, decrease anxiety, and standardize care.<sup>5</sup>

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## MAGNESIUM

### SHOULD WE BE MEASURING IONIZED MAGNESIUM IN CARDIAC SURGERY?

Dennis Begos, MD, FACS Associate Medical Director, Nova Biomedical

Serum magnesium (Mg) is reduced in cardiac surgery patients for several reasons—hemodilution, increased renal excretion, and citrate binding from transfused blood products being the main causes<sup>1</sup>. Accordingly, Mg is given liberally in this patient group. It is well established that Mg supplementation helps prevent atrial tachyarrhythmias<sup>2-4</sup>, and it may also provide myocardial protection during ischemia<sup>5</sup>. Magnesium

administration is recommended in Canadian and European guidelines to prevent atrial fibrillation following cardiac surgery<sup>6</sup>. Even though Mg administration and other measures are used prophylactically, atrial fibrillation still occurs in up to 50% of cardiac surgery patients<sup>8</sup>, increasing morbidity, length of stay, and other complications. Typically, Mg is administered empirically without checking levels, because the turn-

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## POST-OP

### MANAGEMENT OF POST-OPERATIVE NAUSEA

Ara Klijian, MD Sharp Healthcare, San Diego, CA

Post-Operative nausea and vomiting (PONV) commonly occurs in the first twenty-four hours after surgery. Some cardiac surgery patients report persistent GI symptoms. Therefore, PONV impacts both immediate perioperative outcomes and post-discharge quality of life, quality of recovery, and return to functionality. However, the side effects related to anti-emetic

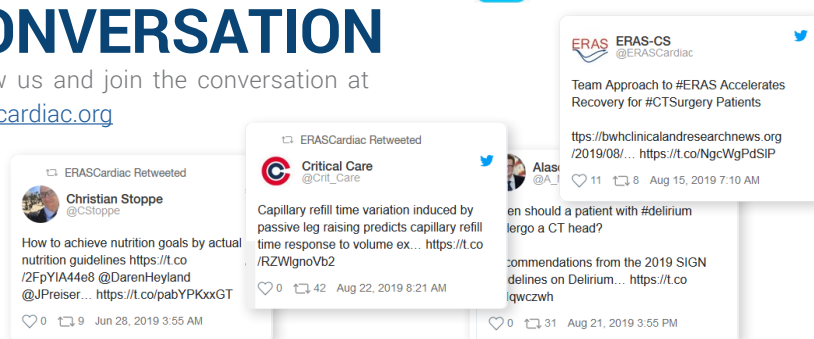
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## MORE INSIDE

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At Baystate Health we have used a DPEP to automate the delivery of our ERAS pathway, collect PROs and monitor patient recovery which has led to achieving ↓0.9 days LOS, ↓72% 30-day readmissions, and ↓60% discharge to SNF (Fig 1). We are hopeful our outcomes will further improve with the launch of a prehabilitation platform using our DPEP.

Collaboration with other cardiac surgery programs to share PROs and best ERAS practices has been shown to be useful and likely will help set benchmarks as more cardiac surgery programs adopt methods to collect PROs such as a DPEP.<sup>6</sup> Collaborations and dissemination of best practices is the mission of the ERAS Cardiac Society and PROs can help highlight what is successful and opportunities for improvement.

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	Control	Patient Engagement Platform	Relative Change
Sample Size	207	178	–
Readmissions	25 (14.0%)	7 (3.9%)	↓72%
Observation Stays	10 (5.6%)	3 (1.7%)	↓69%
ED Visits	8 (4.5%)	7 (3.9%)	↓13%
Post-op LOS (days)	8.4	7.5	↓10%
Discharge to SNF	25%	10.0%	↓60%

Figure 1: Matched, simultaneous cohort analysis from Baystate Medical Center's Cardiac ERAS program



Figure 2: Cheryl Crisafi presents Baystate's Cardiac ERAS results using its patient engagement and PRO platform at AATS 2019

multi-center collaborative project. Retrieved from [https://www.aats.org/aatsimis/AATSWeb/Association/Meetings/Annual\\_Meeting/99th\\_Annual\\_Meeting\\_Abstracts/2019-A-1874-AATS-28.aspx](https://www.aats.org/aatsimis/AATSWeb/Association/Meetings/Annual_Meeting/99th_Annual_Meeting_Abstracts/2019-A-1874-AATS-28.aspx)

## PATIENT AND CAREGIVER PREFERENCES AND PRIORITIZED OUTCOMES FOR CARDIAC SURGERY

Nebojsa Oravec, BSc, University of Manitoba, Winnipeg, Canada

## Results of a scoping review and focus group workshop

Though the importance of patient "buy-in" has been identified as integral to the success of many of the ERAS® Cardiac Surgery recommendations, the original process used to develop the guideline did not involve contributions from patient or caregiver representatives. To address this gap, we devised a study which sought to identify patient and caregiver preferences for the perioperative period of cardiac surgery, and the postoperative outcomes they prioritized.

A scoping review of the literature identified 43 relevant articles, representing 3772

stakeholders from 15 countries. Preferences and outcomes were analyzed thematically and used to design a three-day focus group workshop with cardiac surgery patients and their caregivers at the St. Boniface Hospital in Winnipeg, Canada, aimed at validating the review findings and soliciting novel perspectives. Between the review and workshop, 140 unique patient and caregiver preferences and 19 prioritized outcomes were identified. There is overlap between patient and caregiver-derived preferences and ERAS® Cardiac Surgery recommendations targeting preoperative risk reduction strategies, prehabilitation, patient engagement technology, and intra- and post-operative strategies to reduce discomfort. The

large amount of non-overlapping preferences demonstrates that patient and caregiver values do not always align with those of clinicians. Our study contributes an extensive list of novel, patient and caregiver-derived values relating to the perioperative period and can be used to initiate a patient-centered approach to the development of enhanced recovery protocols for cardiac surgery. In addition, we demonstrate that the patient and caregiver's lived experience is a form of expertise distinct from that of the clinician, and that valuable insights can be gained by involving these stakeholders in research aimed at improving their care and recovery. The full results will be available pending peer-reviewed publication.

## MAGNESIUM:

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around time for getting a level back can be over an hour. Although for many patients this does not seem to be an issue, it is possible that we could be doing better: hypermagnesemia can lead to muscle weakness, neurologic changes, and prolonged respiratory failure<sup>9</sup>, and it is also possible that some patients are being underdosed and that subtherapeutic levels are accounting for some of the high rates of arrhythmia.

Central to the ERAS philosophy is to develop refinements in practices to provide for real-world, quantifiable improvements in outcomes. Certainly a simple measure such as titrating Mg supplementation, if it is proven to be effective at reducing postoperative atrial arrhythmias, would fulfill this tenet. It is an area that is fertile ground for a straightforward study with well-defined outcomes that could have a

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**EMPIRIC ADMINISTRATION, OR EVEN CHECKING tMg LEVELS MAY NOT BE GETTING THE JOB DONE. IN A SURGICAL SUBSPECIALTY WHERE PRECISION AND ACCURACY ARE FUNDAMENTAL PRINCIPLES, THIS SEEMS OUT OF CHARACTER.**

This is where ionized Mg (iMg) comes in. Just like calcium, Mg exists in bound and unbound forms, with the physiologically active portion being the unbound, or ionized component. For some reason, while most clinicians now routinely measure ionized Ca, the same is not true for Mg. Most laboratories measure total Mg (tMg), which comprises both the bound and unbound forms. There is now ample evidence that iMg and tMg do not correlate in up to 30% of patients<sup>10, 11</sup>, especially in critically ill patients. For this reason, empiric administration, or even checking tMg levels may not be getting the job done. In a surgical subspecialty where precision and accuracy are fundamental principles, this seems out of character. Although there is no prospective data yet, studies are planned to assess the impact of titrating Mg supplementation to achieve adequate iMg levels. Since iMg can now be measured using a point-of-care device in around a minute, it is practical for intra-operative use. It has already been shown to be effective in rapidly establishing therapeutic levels in torsade-de-points<sup>12</sup>.

significant impact on recovery.

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## POST-OP:

# MANAGEMENT OF POST-OPERATIVE NAUSEA AND VOMITING IN THE CARDIOTHORACIC SURGERY PATIENT

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medications, such as delirium, extrapyramidal symptoms, and sedation may result in extended lengths of stay and poor patient experience, which both directly and indirectly affect costs to the health care system<sup>1</sup>.

Apfel, et al have shown several factors such as female sex, history of motion sickness

ger (ERAS) pathways we must follow evidence-based approaches to control PONV. This may help lower PACU duration (a single episode of PONV may increase PACU duration by greater than 20 minutes), improve patient satisfaction, and may ultimately improve quality of care.

## AMISULPRIDE PRESENTS CARDIOTHORACIC SURGICAL TEAMS WITH A SAFE AND POTENTIALLY EFFECTIVE OPTION FOR RESCUE TREATMENT WHEN PROPHYLAXIS FAILS.

and/or PONV, non-smoker, increased age, obesity, type of anesthetic agents, and type and duration of surgery as predictors of PONV<sup>2</sup>. However more simplified risk assessment tools by Apfel, et al provide better discrimination for predicting PONV in patients about to undergo surgery. In a prospective study of patients included in enhanced recovery protocol with early extubation cardiac surgery, risk factors for PONV included: age less than 60 years, female sex, and previous history of PONV. Koizumi et al reported a 70% incidence of PONV in female patients post-cardiac surgery<sup>3</sup>. Alternatively, Grap et al found that antiarrhythmic, diuretic, and antihypertensive medications, as well as depression were significantly associated with nausea post-cardiac surgery<sup>4</sup>. Risk stratification and development of protocols for the prophylaxis and treatment of PONV in this population remains important, however, little data have been published specifically regarding cardiac surgery. The prevention of PONV has been challenging for care providers, as the factors thought to increase the risk of these symptoms are difficult, if not impossible, to modify. Although various researchers have explored both pharmacological and alternative treatments for the prevention of PONV following cardiac surgery, the incidence remains high.

As per the 2020 4th Consensus Guidelines for the Management of PONV, the estimated occurrence of PONV in the general population is 30%. That incidence can go upwards of 80% in high-risk populations<sup>5</sup>. As we strive to implement Enhanced Recovery after Sur-

The 2020 Consensus Guidelines for the Management of PONV endorse a multimodal approach to management based on risk stratification. Patients with 1-2 risk factors are recommended to receive 2 agents for prophylaxis and patients with >2 risk factors are recommended 3-4 agents. For rescue treatment after failed prophylaxis, the use of an antiemetic from a different class than prophylactic drug is recommended. Re-dosing patients with ondansetron for treatment after it has been used for prophylaxis, a common practice, is not an effective strategy.

Several approaches have been incorporated in cardiothoracic surgical cases including avoidance of volatile anesthetics, employing the Awake Video Assisted Thoracic Surgery (AVATS) approach when applicable, early post-operative initiation of enteral nutrition, and minimization of opioids with reliance on IV acetaminophen and ketorolac<sup>6</sup>. Also, of note is that many of the patients undergoing AVATS have significantly impaired lung function, often with significantly lower forced expiratory volumes. The use of post-operative medications with sedation risk factors is not feasible in these cases due to risk of suppression of already compromised respiratory drive. Thus, agents such as droperidol (which also carries an FDA black box warning due to risk of sudden cardiac death/ QT prolongation), haloperidol, promethazine, and metoclopramide (which since 2009 also carries the FDA black box warning due to risk of Tardive Dyskinesia/extrapyramidal effects) are not ideal drugs for use in these

patients. In fact, the 2020 Consensus Guidelines state "Metoclopramide may be useful in institutions where other dopamine antagonists are not available, but otherwise may not be very efficacious." A new IV dopamine D2/D3 antagonist, amisulpride was recently FDA-approved in 2020 and has been shown to be effective for both prophylaxis and treatment of PONV after failed prophylaxis<sup>7</sup>. An advantage of dopamine antagonists is the reduction of nausea, while 5HT3s reduce vomiting. A particular advantage of amisulpride is a favorable safety profile and low potential for drug-drug interactions<sup>8</sup>. The 2020 guidelines also point out that "studies have reported that antiemetic dose of amisulpride was not associated with sedation, extrapyramidal side effects or QTc prolongation." Amisulpride presents cardiothoracic surgical teams with a safe and potentially effective option for rescue treatment when prophylaxis fails.

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## PUBLICATIONS:

&gt;&gt; Click titles for online links

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## UPCOMING MEETINGS:



September 9-10, virtual  
[The Society of Thoracic Surgeons Critical Care Conference](#)



Aug 27-28, Boston  
[ERAS Cardiac Sponsor Invitational](#)



September 22-23, virtual from Chicago  
[Evidence Based Perioperative Medicine: USA Masters Course](#)



September 29-30, virtual  
[American Society for Enhanced Recovery Fall Conference](#)



Nov 10-12, New Orleans  
[Joint 8th ERAS USA Annual Congress](#)



Dec 3-5, New York, NY  
[International Coronary Congress](#)



January 29- February 1, 2022, Miami  
[The Society of Thoracic Surgeons 58th Annual Meeting](#)



May 14 -17, Boston  
[American Association for Thoracic Surgery](#)

## PRESENTATIONS:

## &gt;&gt; VIDEO

### [Opioid Reduction Strategies in Cardiac Surgery - STS 8 in 8 Series](#)

Michael C. Grant MD, MSE  
Johns Hopkins Medicine  
September 1, 2020

Cardiac surgery is an underappreciated contributor to the opioid crisis, with patients commonly utilizing opioid prescriptions months after their index procedure. This video addresses the historical basis for opioid-based anesthesia and analgesia in cardiac surgery and describes five programmatic strategies to reduce the perioperative use of opioids.

>> Click to [Watch the Video](#)

## &gt;&gt; VIDEO

### [Standardizing Evidence Based Best Practice in Perioperative Cardiac Surgical Care](#)

Daniel Engelman MD  
Baystate Medical Center  
November 18, 2020

In this talk, given at Baystate Health Medical Grand Rounds, Dr. Engelman provides a comprehensive summary of ERAS for cardiac surgery. Beginning with an overview of the concepts on which enhanced recovery are built, the presentation continues with highlights of the current ERAS Cardiac Society Recommendations and future directions.

>> Click to [Watch the Video](#)

## IN THE NEWS:

## &gt;&gt; ARTICLE

### [A Friendship Close to the Heart.](#)

**UF Health cardiac surgeon performs a rare, yet successful, triple-bypass surgery on a patient.**

ERAS Cardiac Society member Dr. Jack Pirris is in the news following successful completion and excellent patient-centered outcomes of a multi-arterial CABG and rigid sternal fixation in a long-time friend. "A friendship close to the heart" is fantastic example of putting patients first.

>> Click to [Read the Article](#)

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## OUR MISSION

*The mission of the ERAS® Cardiac Society is to develop protocols to improve recovery through research, education, audit and implementation of evidence-based practice.*

## Who we are

ERAS® stands for Enhanced Recovery after Surgery, and we improve surgical care and recovery through research, education, audit, and implementation of evidence-based practices. In early 2017, a group of cardiac surgeons, anesthesiologists, and intensivists first met to establish the Enhanced Recovery After Cardiac Surgery (ERACS®) Society to achieve these goals for patients undergoing heart surgery. This initial organization's work led to the publication of the first-ever expert consensus recommendations for a cardiac surgical enhanced recovery protocol. We have since joined with the ERAS® Society and have established an organization of multinational experts representing all aspects of healthcare delivery. ERAS® Cardiac is a non-profit organization with the mission to develop evidence-based expert consensus statements promoting best practice recovery practices. The goal is to provide hospitals with better guidance for developing local protocols that are part of a continuous quality improvement process for better patient care, and reduce postoperative complications and costs after heart surgery.

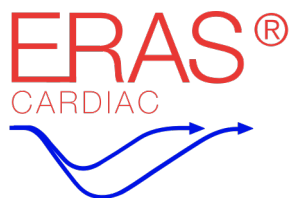
## ERAS® Society

The ERAS® Society is an international organization with enhanced recovery guidelines for several surgical sub-specialties. Beginning as the ERAS® Study Group in 2001, team leaders Professor Ken Fearon (University of Edinburgh) and Professor Olle Ljungqvist (Karolinska Institutet) spearheaded the developments made in multimodal surgical care. The ERAS® Study Group soon discovered that there were a variety of local traditions in practice, as well as an inconsistent application of evidence-based best practices. This prompted the group to examine the process of change from tradition to best-practice. Since its inception, the ERAS® Society has expanded to include several subspecialties, emphasized the benefits of standardized best-practices across the continuum of the perioperative period, highlighted the importance of data-driven self-evaluation, and promoted the improvement of patient care.

## Our Organizational Structure

Our ERAS® Cardiac Society is made up of experts from around the world, including participation from all members of the healthcare team. Our members strive to implement enhanced recovery principles at their local institutions while advancing improved patient care internationally through collaboration, education, and dissemination of up-to-date knowledge regarding optimal perioperative care. Our organization is divided into an Executive Board, Advisory Board, and a pool of Subject Matter Experts.

## FOR MORE INFORMATION:



To learn more about our organization, including our board members and upcoming meetings:  
[www.erascardiac.org](http://www.erascardiac.org)



Corporate financial support will be used to promote the mission of the ERAS® Cardiac Society. We are committed to standardizing best practice surrounding the preoperative and perioperative care of cardiac surgical patients through expert consensus, review of the literature and open communication. This unrestricted support does not represent the ERAS® Cardiac Society's support or agreement to promote any pharmaceutical, device, or technology related to the sponsors.

For more information and to become a sponsor please contact:  
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