

2019 Hospital Quality Institute C. Duane Dauner Quality Award

Enhanced Recovery After Surgery: Impacting Postoperative Pain and the Opioid Crisis at a Quaternary Academic Care Center

Keck Medicine of University of Southern California
1450 San Pablo Street, Suite 3600, Los Angeles, CA 90033
<https://www.keckmedicine.org/>

Contact Persons: **Michael Kim, DO**
Clinical Assistant Professor of Anesthesiology
Michael.Kim2@med.usc.edu
415-798-4649

William Widjaja, BS
Business Data Analyst
William.Widjaja@med.usc.edu
909-753-3495

Topical Areas: Patient Safety – Keeping patients safe by preventing opioid overuse and overprescription.

Quality Improvement – Improving and sustaining performance with multidisciplinary, team-based strategies to promote and drive change.

Patient Experience – Reducing postoperative pain and enhancing postoperative recovery through evidence-based, multimodal protocols.

Executive Director Statement

Dear Colleagues,

I am writing in support of the Enhanced Recovery After Surgery (ERAS) team at Keck Medicine of USC. These individuals have worked tirelessly as a team to set up ERAS programs in a number of surgical specialty lines. These programs have led to improved outcomes for patients including greater patient and family involvement in their care. The team has helped define pathways of care and built these into Power Plans (a considerable piece of work); this type of approach is well recognized to reduce clinical variation and help improve outcomes. ERAS pathways have been demonstrated to reduce length of stay, reduce readmissions and improve patient satisfaction, and we have seen all of these since inception of our program. In addition, use of multimodal pain regimens as part of the ERAS programs, including regular Tylenol and local anesthetic blocks, has helped reduce opioid use. The reduction has been dramatic, opioid use has decreased on average by 50% for patients undergoing major surgical procedures. Patients are not only using less opioids, they are experiencing less pain and other opioid side effects such as nausea and vomiting and constipation. This approach is helping to protect patients and their families from the opioid epidemic sweeping America. As our patients use less opioids in hospital they need less to go home with, and long term prescriptions are much less likely to occur. As part of the program an opioid return program has been created so these drugs can be disposed of in a safe and environmentally friendly manner.

The core ERAS implementation team has been very inclusive and welcomed participation from all members of the clinical teams that encounter a patient, from surgical schedulers to MA's, physician assistants, nurses and surgeons. Everyone has had a voice and felt able to input – and a truly patient-centered multidisciplinary program has been created. The team has been dedicated to ensuring all staff members are educated and included in development of the program. One nurse lead came in at 4 am to ensure night staff were informed and had an opportunity to ask questions and give feedback.

Carol J. Peden MB ChB, MD, FRCA, FFICM, MPH.

Executive Director Center for Health System Innovation and Professor of Anesthesiology, Keck School of Medicine University of Southern California

Executive Summary

The Opioid crisis is a major public health issue. Drug overdose deaths involving prescription/illicit opioids are the number one cause of accidental death nationwide, and opioid prescriptions given perioperatively contribute to this. There is evidence that opioids are overused and overprescribed following surgery. In an effort to address one aspect of the opioid crisis we are tackling the source of the problem, pain. We sought to reduce postsurgical pain through use of fewer potent pain medications and with a multidisciplinary approach to perioperative patient care.

We implemented an ERAS (Enhanced Recovery After Surgery) program. After numerous meetings and educational sessions for all our multidisciplinary team members, we successfully launched the ERAS pathway for thoracic patients in April 2018. Since then, ERAS has grown to encompass seven more surgical lines. For 517 ERAS patients our results are very positive. Acute pain scores are down by 23%, opioid use has decreased by 47%, and length of stay by 21%. Readmission rates have also decreased. Going forward, we plan to reach all surgical specialties and focus more attention on prehabilitation and patient education.

Background and Relevance

Opioid addiction is a public health epidemic in our nation. Drug overdose deaths involving prescription and/or illicit opioids have increased six-fold since 1999 and have surpassed motor vehicle crashes as the number one cause of accidental death nationwide.^{1,2}

Chronic opioid use frequently begins with exposure to prescription narcotics, often prescribed for postsurgical pain. Large cohort studies have found that 3-7% of patients continue to use opioids 90 days after surgery.^{3,4,5} Many surgical patients receive opioid prescriptions in excess of their anticipated need. Up to 90% of surgical patients keep their unused medication, and 75% report no plans for safe storage or disposal.⁶ As a result, these unsecured opiates place other household members at increased risk for nonmedical use. One survey of young heroin injection drug users found that more than 80% reported misusing prescription oral opioids, often obtained from family and friends, prior to injecting them.⁷

Therefore, reducing opioid prescriptions and implementing proper disposal procedures will decrease the amount available for diversion and mitigate the risk of first-time users developing an opioid abuse disorder.⁸ Our Enhanced Recovery After Surgery (ERAS) program has approached reducing postoperative pain and opioid use with a multimodal analgesic protocol and a perioperative pathway which focuses on patient preparation for surgery, patient goals, and multidisciplinary team based management.⁹ This approach has been proven by decreased patient pain scores, reduced length of stay and significantly decreased opioid use in surgical patients.

Describe the effort, including the scope, process, strategies and tactics utilized, challenges encountered and how they were addressed

Multidisciplinary team-based approach.

As we sought to develop a multi-faceted protocol to address pain management and opioid overuse, we formed a multidisciplinary ERAS team – consisting of our surgical service lines, anesthesiology, nutrition services, pharmacy services, our pre-operative anesthesia clinic (PreOp Clinic), and

postoperative nursing services. The key to developing this multidisciplinary team-based approach lies in the ability to provide a defined care infrastructure (through care protocols and electronic system support) that meets the needs of the entire team. To accomplish this, we set up numerous meetings and educational sessions over the course of several months to achieve two things:

1. Create defined care protocols and develop a supporting electronic infrastructure to utilize, and
2. Foster an open-communication relationship with the entire team as the vehicle for providing timely updates and receiving feedback on a continuous basis.

Once the infrastructure was established, we identified a set of outcome metrics to gauge our progress: acute pain scores, opioid use, and length of stay. Rather than using labor-intensive data audits, automated reports have been built to provide per-patient and population data on a real-time basis. We began our implementation of the ERAS system with our thoracic department in April 2018.

The ERAS system

Our ERAS system has three major components, with the first being care protocols. Using evidence-based practices, we developed a set of standard care expectations throughout the pre-operative, intra-operative, and post-operative areas specific to each surgical line. This included principles of preparatory preoperative medications, carbohydrate-loading preoperative drinks, intraoperative and postoperative opioid-sparing techniques (including nerve blocks and multimodal analgesia), early ambulation, early food intake and the promotion of sleep.

The second component of our ERAS system is patient education, with a strong focus on developing expectations of care. There is no stronger influence on patient care delivery than patients requesting ERAS care for themselves. Preoperatively, patients are educated about the ERAS care plan, and the steps they need to follow with associated “goal sheets” in the surgical clinics and the Pre-Op Clinic. Goal sheets are a care tool used so patients can track their recovery progress in their defined pathway. Postoperatively, patients are given visual reinforcement of their ERAS pathway via their goal sheets, specific ERAS patient wristbands, and door signs.

The third component of our ERAS system is the customized electronic infrastructure to support the system’s function. In today’s healthcare world it is nearly impossible to perform standardized care or analyze outcomes without any sort of user-friendly interface. With our IT department, we created a set of “PowerPlans” (one-click options in the electronic medical record) for the perioperative care team to allow for easy flagging and care planning for ERAS patients. In a similar fashion, an automated dashboard was built to provide outcome metrics on a per-patient and population basis.

Challenges

Our first challenge was developing our ERAS protocols. Although there are many evidence-based protocols that have been shown to improve perioperative outcomes, the actual development of this process within an academic setting in the US has been limited. Moreover, actual implementation of an ERAS protocol can be challenging, as every hospital area has different systems, infrastructures, and ancillary support. Our solution was to devise our protocols in a fashion that was customized to each of our surgical lines and their procedure types, then build the supporting care infrastructure around the tailored protocols. This required us to meet with the surgical lines and IT partners on a

regular basis to keep the front-end practices and back-end support aligned.

Another challenge was getting staff to implement these new standards in their care delivery. We found that most care providers did know what ERAS was, but didn't know its exact principles or delivery methods. To address this, we organized various educational and planning meetings with every possible care team who would need to change their care for ERAS patients, particularly for the postoperative care team. This included feedback forums, weekly rounding, in-services, and scheduled training sessions, including at night for night teams. Staff who were successful with integrating ERAS protocols in their care teams were recognized in the monthly ERAS highlights bulletin. Patients and their families were engaged with the care team from the get-go, and they received patient-friendly materials (goal sheets, flyers, informational handouts) to complement the education they received. Monthly and quarterly data, including patient narratives, were shared at various meetings throughout the institution to keep both the staff and administrative leadership engaged and motivated.

Sustainability and Scaling

Creating practice change for an enormous patient care staff is difficult, spreading that practice change throughout an academic quaternary medical center is even more intimidating. But, we were up to the challenge. From our organic roots, we started ERAS with small physician partnerships who already had interests in the protocols published in literature. As our program grew, our team expanded to include multidisciplinary working groups to drive our progress:

1. ***Clinical Leadership*** – developed and tailored our care protocols for various surgical lines (thoracic, cardiothoracic, urology, otorhinolaryngology, gynecology-oncology, colorectal, vascular, orthopedic oncology).
2. ***Core Team*** – manages the direction of the program, day-to-day activities, and its growth projections while maintaining the sustainability of the program.
3. ***IT Supporting Team*** – build the infrastructure for order sets and standardized identification of ERAS patients.
4. ***Clinical Rounding Team*** – A small cohort from the core team that rounds the clinical floors to assist with education, throughput, and assisting care team floor process improvement,

Results

Our ERAS protocol implementation began with our Thoracic service line's video-assisted thoracoscopic surgeries (VATS). For the VATS ERAS patients, pain scores dropped significantly when compared with the Pre-ERAS population on Postoperative Day 0 (Pre 6.729 vs Post 5.578, $p = 0.035$), Postoperative Day 1 (Pre 6.936 vs Post 5.4 $p = 0.005$), and Postoperative Day 2 (Pre 5.55 vs Post 3.972, $p = 0.009$). The reduction in pain scores for the opioid patients was associated with a large reduction in the average opioid usage per patient measured in morphine milligram equivalents (MME), this dropped by 47% (Pre 54.62 MME vs Post 28.97 MME, $p = 0.0001$). There was a slight decrease in length of stay (3.94 vs 3.84, $p = 0.366$) even with an increased case volume, while postoperative atrial fibrillation rates decreased significantly (Pre 16.67% vs Post 4.44%, $p = 0.033$).

Using these results, we were able to attract other service lines to approach us, and we have achieved an 850% increase in our monthly ERAS patient population from April 2018 to March 2019 by including more procedures and more service lines. Currently, our ERAS program encompasses

Thoracic, Cardiothoracic, Urology, Colorectal, Spine, and Otorhinolaryngology surgical service lines. We will soon be expanding to include Orthopaedic and Vascular service lines. Preliminary results are promising; based on current performance, we project future savings of 290 excess hospital days* and \$7.4M annually**.

Significance and Achievements demonstrated by Results

Prior to implementation of the ERAS program, opioids were regularly prescribed without a routine protocol to control the prescription of addictive drugs. Through our ERAS program, we have addressed the most critical factor to opioid prescription: postoperative pain. With our multimodal protocols and team based approach involving nurses, pharmacists and physicians assistants as well as physicians, we have significantly reduced postoperative pain and opioid usage, with a very positive impact for our patients and health system.

The multidisciplinary, team-based approach has driven cultural and systemic change in how we practice medicine. We have created a relationship across teams and specialties that promotes patient safety, staff engagement, and adaptability. This culture change has been so widespread that we have expanded ERAS practices across eight surgical lines over the course of a short nine months. The results of our ERAS program were presented in May 2019 at the 7th ERAS World Congress held in Europe. While ERAS protocols have been widely implemented for more routine surgery such as joint replacement and colorectal procedures, we have shown that the approach can be successfully used for complex thoracic and cardiac operations in a quaternary academic medical center with the highest case mix index in the US.

Key Lessons

Know who's available to you, what resources you have, and rally them together. We utilized administrative and clinical leadership, frontline staff, project managers, and many others. We also considered time effectiveness for all our staff when deciding how to disseminate information. You may not have the same personnel or resources at hand as we do, so your methods for implementing ERAS in your healthcare setting may need to reflect that difference. Once you determine your methods, you need to find an avenue to gather your troops! Nothing promotes change better than collective talk about taking action, and food!

Define your protocol and infrastructure together: people need acceptable and clear guidelines to act by. This will engage those who do the work and educate them on how the protocol is changing at the same time! Explain how much value they contribute in improving patient safety and quality of care. Let them "co-manage" the implementation process of the practice changes into the current workflow. One of our nurse managers built an easily accessible binder with ERAS materials for nurses to educate their peers and patients with. Just doing this led to increased patient participation and improved understanding of ERAS materials!

Maintain an active loop for communication with the ERAS teams. Our ERAS protocols are dynamic, we are very open to feedback and continuously looking for ways to improve. After all, the success of ERAS lies in providing the best evidenced based care we can. Similarly, the success of change relies on those whom we are asking to change. A detailed plan that includes keeping a constant dialogue with the teams will pay off with an improved culture of patient safety, staff

* Extrapolated current length of stay improvements over 10,000 patients

** Estimated using \$1,000 cost per last day of hospital stay for surgical patients

engagement, quality improvement, and adaptability to systemic change.

Involve patients and their families in their care along the whole pathway, and get them involved before surgery. Patients are keen to ensure they have the best outcome, we have educated them that they will experience some pain, we will pro- actively manage it with a range of pain killers and only use opioids when necessary. We have educated patients and their families about what to expect on each step of their surgical journey and how they can contribute to achieving the best possible outcome.

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