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Enhanced Recovery After Surgery Protocols: Can They Reduce Postoperative Opioid Use?

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Enhanced recovery after surgery; opioids; pain; surgery; cost; value

Approximately 51 million inpatient procedures are performed annually in the United States, and are an major target of quality improvement initiatives to enhance the safety and value of care.[1] Enhanced Recovery After Surgery (ERAS) pathways provide an evidence-based, multidisciplinary approach to integrating best practices for perioperative care. To date, guidelines have been provided for 21 types of surgery, including elective colorectal, breast reconstruction, cardiac, and oncologic surgery.[2,3] Recommendations center on key aspects of preoperative preparation, intraoperative care, and postoperative recovery, such as reduction in smoking and alcohol use, nutrition optimization, minimally invasive surgical approaches, early mobilization, and avoidance or early removal of drains and tubes. Encouragingly, ERAS pathways have been shown to decrease complications, minimize length of stay, reduce readmission rates, and enhance value.[3]

In recent years, there has been increasing attention to regulating opioid prescribing and reducing opioid use in response to escalating opioid-related morbidity and mortality.[4,5] With respect to pain management, ERAS protocols often endorse the avoidance of long acting opioids, and encourage the use of regional and local anesthetic techniques, as well as opioid alternatives such as nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and gabapentinoids.[6] In this retrospective cohort study of a single major healthcare system including 20 hospitals, Liu et al. examined the spillover effect after implementation of an ERAS pathway on long-term outpatient opioid use among a cohort of patients undergoing elective colorectal surgical procedures and non-elective hip arthroplasty.[7] The authors observed that opioid fill rates at 6 months and 1 year were significantly lower following ERAS pathway implementation for both patient cohorts among opioid-naïve patients. Furthermore, the magnitude of change was similar among patients directly targeted by the ERAS protocol, as well as patients treated by similar teams, but not directly exposed to the protocol. However, opioid use did not decline among patients with preoperative opioid exposure. It is possible, as the authors acknowledge, that exogenous factors, including increasing policy restrictions on opioid prescribing and increased attention on the risks of opioid prescribing in the scientific literature and lay press, contributed to the decrease in fill

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rates. Nonetheless, the authors note stable opioid use rates in the year leading up to ERAS implementation with steady declines in the period after the introduction, suggesting that the decrease in opioid fill rates may at least be partially attributed to ERAS implementation.

While ERAS protocols have been shown to decrease inpatient opioid use, the effect of ERAS protocols on long-term outpatient postoperative opioid use is less clear.[8] The mechanism by which ERAS pathways yield reductions in opioid use may be multifold. First, the ERAS protocol examined in this study incorporated the use of regional anesthesia as well as intravenous acetaminophen for pain control with an added option of either celecoxib or gabapentin. Celecoxib is a COX-2 NSAID which inhibits prostaglandin synthesis, a key mediator of pain and inflammation. NSAIDS, including celecoxib, have been shown to significantly enhance analgesia and augment opioid dose-sparing regimens while reducing opioid side effects.[7] Gabapentin functions as a calcium channel inhibitor of the $\alpha 2\delta{-}1$ subunit, reducing neurotransmitter release and postsynaptic excitability in response to pain, which has shown a clear effect on opioid dose-sparing.[9] However, despite these benefits, the use of opioid alternatives also require consideration of the adverse risks they may incur. Gabapentinoids have been associated with higher odds of non-invasive ventilation and naloxone use after surgery and NSAIDs have been associated with increased risk of re-intervention and readmissions related to anastomotic leaks.[10,11] Moreover, care pathways that detail the duration of prescribing and transition of prescribing for these medications to primary care providers at the completion of surgical care remain undefined.

Nonetheless, ERAS pathways may impact prescribing culture by promoting awareness of safe and judicious opioid use in providers, while modeling appropriate pain management techniques for patients. The principle interventions of the ERAS pathway, including minimally invasive surgery and avoidance of excessive drains, tubes, and catheters may also decrease surgical stress and associated inflammation and pain. These processes of care present an opportunity for meaningful intervention for providers in terms of judicious prescribing practices, but also for patients, in regards to education surrounding self-assessment and treatment of pain. Going forward, ERAS pathways may also provide an opportunity to advocate for safe disposal and storage of opioid medications when prescribed, and a mechanism to identify patients currently using opioids to promote safe transitions of care. The adoption of ERAS pathways by healthcare systems has grown exponentially, and are endorsed by multiple professional societies with the potential for wide dissemination into nearly all types of procedural care. To date, much of the attention on opioid prescribing in the context of the opioid epidemic has been focused on the outpatient setting. In this context, ERAS pathways are poised to provide a platform to optimize pain management across the continuum of surgical care.

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