

Enhanced Recovery After Surgery (ERAS) for Cardiothoracic Surgery

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Purpose

The purpose of this project is to compare surgical outcomes associated with traditional perioperative care to outcomes associated with an ERAS protocol for patients undergoing cardiothoracic surgery.

Specific Aims:

- Determine if the use of an ERAS protocol shortens post-operative hospital length of stay (LOS) in comparison to the control group of traditional perioperative and recovery practices.
- Determine if the use of an ERAS protocol decreases post-operative complications in comparison to the control group of traditional perioperative and recovery practices.

Background

ERAS is a patient-centered, multi-disciplinary, evidence-based approach to perioperative patient care aimed to optimize recovery and reduce surgical outcome variability.

The concept of ERAS began with colorectal surgery, but has since shifted perioperative patient care practices among all surgical specialties, including cardiothoracic surgery. Evidence continues to support ERAS pathways for cardiothoracic surgery rather than traditional recovery practices. ERAS pathways contribute to improved overall patient outcomes, including reduced postoperative complications, accelerated recovery time with shorter postoperative hospital LOS, and reduced healthcare costs.

Methods

Study Design: Scoping Review

Literature review performed to evaluate traditional perioperative care versus ERAS protocol in cardiothoracic surgical patients to set inclusion and exclusion criteria based on current peer reviewed articles for qualitative data

14 articles were selected by group

- Based on inclusion criteria for review
- Placed findings in a synthesis table
- Evidence outcomes question based on relevance to PICOT question

Inclusion Criteria:

- Published between the period of 2012–2022
- Written in English
- Involve human participants over 18 years of age
- Describe a qualitative measure for at least one of the following outcome criteria relating to the ERAS pathway: inpatient hospital length of stay, postoperative pain scores, readmission rates, and postoperative complication rates.

Exclusion Criteria:

- Do not provide qualitative evidence as a basis for results
- Do not require informed consent from their study participants
- Do not describe a qualitative measure for at least one of the following outcome criteria relating to the ERAS pathway: inpatient hospital length of stay, postoperative pain scores, readmission rates, and postoperative complication rates.

Findings reviewed included compliance rate to protocol, length of stay (LOS), pain control, perioperative education, and complication rates.

Control groups involved patients undergoing similar procedures from the same facilities utilizing traditional perioperative care compared to those enrolled in an ERAS protocol at 1 month, 3 months, and 6 months post operative.

Results

The most significant result noted from the literature review was a decrease in length of postoperative hospitalization when utilizing an ERAS protocol in comparison with traditional surgical protocols.

- Of the 14 included studies, the most significant outcome from the evidence collection was a decreased postoperative hospital length of stay (LOS) associated with the ERAS protocol compared to traditional operative protocols.
- 93% of included studies reported a decrease in LOS with ERAS. The single remaining study reported no change in LOS.
- Postoperative complication rates decreased in 57% of the articles when perioperative procedures involved ERAS.
- Only half of the included articles reported cost data. Of these, all reported decreased hospitalization costs associated with ERAS protocol use.
- Hospital readmission rates were either maintained or decreased when associated with ERAS.
- Of the articles that addressed postoperative pain control, 100% reported improved postoperative pain control with ERAS protocol in comparison with traditional perioperative practices.

Implications for Practice

Decreased Incidence of Postoperative Complications

- Consider ERAS for every appropriate patient and procedure.
- Improved patient outcomes and experience.

Decreased Postoperative Length of Stay

- Benefits every patient demographic.
- Cost to the patient and the hospital are decreased.
- Resources are freed up for other patients.
- Decreased risk of healthcare acquired infections and delayed return to normal activities.

Multidisciplinary cooperation required

- Many healthcare teams must be educated and motivated.
- Pre-operative and outpatient facilities involved.

More studies needed in the future

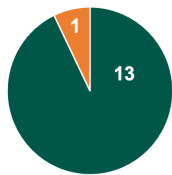
- Limited studies for advanced and higher risk surgeries.
- Many providers that still don't utilize ERAS may be convinced by further research.

References

- Brown, J. K., Singh, K., Dumitru, R., Chan, E., & Kim, M. P. (2018). The benefits of enhanced recovery after surgery programs and their application in cardiothoracic surgery. *Methodist DeBakey Cardiovascular Journal*, 14(2), 77–88. <https://doi.org/10.14977/mdc14-2-77A>
- Coolsen, M., Dam, R., Wilt, A., Slim, K., Lassen, K., & Dejong, C. (2013). Systematic Review and Meta-analysis of Enhanced Recovery After Pancreatic Surgery with Particular Emphasis on Pancreaticoduodenectomies. *World Journal of Surgery*, 37(8), 1909–1918.
- Damadi, A. A., Lax, E. A., Smithson, L., & Pearfman, R. D. (2019). Comparison of therapeutic benefit of bupivacaine HCl transversus abdominis plane (TAP) block as part of an enhanced recovery pathway versus traditional oral and intravenous pain control after minimally invasive colorectal surgery: A prospective, randomized, double-blind trial. *The American Surgeon*, 85(12), 1363–1368. <https://pubmed.ncbi.nlm.nih.gov/31908219/>
- Elayat, A., Jena, S. S., Nayak, S., Sahu, R. N., & Tripathy, S. (2021, March 19). "Enhanced recovery after surgery – ERAS in elective craniotomies – a non-randomized controlled trial." *BMC Neurology*, 21, Article 127. <https://doi.org/10.1186/s12883-021-02150-7>
- Forsmo, H. M., Pfeiffer, F., Rasdal, A., Østgaard, G., Mohr, A. C., Körner, H., & Erichsen, C. (2016, January 6). Compliance with enhanced recovery after surgery criteria and preoperative and postoperative counselling reduces length of hospital stay in colorectal surgery: Results of a randomized controlled trial. *Colorectal Disease: The Official Journal of the Association of Coloproctology of Great Britain and Ireland*, 18(6), 603–611. <https://doi.org/10.1111/codi.13253>
- He, F., Lin, X., Xie, F., Huang, Y., & Yuan, R. (2015). The effect of enhanced recovery program for patients undergoing partial laparoscopic hepatectomy of liver cancer. *Clinical & translational oncology: official publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico*, 17(9), 694–701. <https://doi.org/10.1007/s12094-015-1296-9>
- Ji, H. B., Zhu, W. T., Wei, Q., Wang, X. X., Wang, H. B., & Chen, Q. P. (2018). Impact of enhanced recovery after surgery programs on pancreatic surgery: A meta-analysis. *World journal of gastroenterology*, 24(15), 1666–1678. <https://doi.org/10.3748/wjg.v24.i15.1666>
- Kalogera, E., Glaser, G. E., Kumar, A., Dowdy, S. C., & Langstraat, C. L. (2019). Enhanced recovery after minimally invasive gynecologic procedures with bowel surgery: A systematic review. *The Journal of Minimally Invasive Gynecology*, 26(2), 288–298. <https://doi.org/10.1016/j.jmig.2018.10.016>
- Kang, S. H., Lee, Y., Min, S. H., Park, Y. S., Ahn, S. H., Park, D. J., & Kim, H. H. (2018). Multimodal Enhanced Recovery After Surgery (ERAS) Program is the optimal perioperative care in patients undergoing totally laparoscopic distal gastrectomy for gastric cancer: A prospective, randomized, clinical trial. *Annals of surgical oncology*, 25(11), 3231–3238. <https://doi.org/10.1245/s10434-018-6625-0>
- Li, M., Zhang, J., Qin, G., Wang, L., Zhu, M., Zhang, Z., Pan, Y., Ye, Z., Zhang, F., Chen, X., Lin, G., Huang, L., Luo, W., Guo, Q., & Wang, E. (2018). Enhanced recovery after surgery pathway for patients undergoing cardiac surgery: A randomized clinical trial. *European Journal of Cardio-Thoracic Surgery*, 54(3), 491–497. <https://doi.org/10.1093/ejcts/evz100>
- Liang, X., Ying, H., Wang, H., Xu, H., Liu, M., Zhou, H., Ge, H., Jiang, W., Feng, L., Liu, H., Zhang, Y., Mao, Z., Li, J., Shen, B., Liang, Y., & Cai, X. (2017). Enhanced recovery care versus traditional care after laparoscopic liver resections: A randomized controlled trial. *Surgical Endoscopy*, 32(6), 2746–2757. <https://doi.org/10.1007/s00464-017-5373-3>
- Ni, X., Jia, D., Chen, Y., Wang, L., & Suo, J. (2019). Is the Enhanced Recovery After Surgery (ERAS) program effective and safe in laparoscopic colorectal cancer surgery? A meta-analysis of randomized controlled trials. *Journal of gastrointestinal surgery: Official journal of the Society for Surgery of the Alimentary Tract*, 23(7), 1502–1512. <https://doi.org/10.1007/s11605-019-01170-3>
- Peters, A., Siripong, N., Wang, L., & Dennellan, N. M. (2020). Enhanced recovery after surgery outcomes in minimally invasive nonhysterectomy gynecologic procedures. *American Journal of Obstetrics and Gynecology*, 223(2), 234.e1-234.e8. <https://doi.org/10.1016/j.ajog.2020.02.008>
- Rogers, L. J., Bleetman, D., Messenger, D. E., Joshi, N. A., Wood, L., Rasburn, N. J., & Batchelor, T. J. P. (2018). The impact of Enhanced recovery after surgery (ERAS) protocol compliance on morbidity from resection for primary lung cancer. *The Journal of Thoracic and Cardiovascular Surgery*, 155(4), 1843–1852. <https://doi.org/10.1016/j.jtcvs.2017.10.151>
- Xu, C., Zhu, M., Li, Z., Zhu, J., Xiao, F., Liu, F., Wang, Y., & Liu, C. (2020). Enhanced recovery after surgery protocols in patients undergoing liver transplantation: A retrospective comparative cohort study. *International Journal of Surgery*, 78, 108–112. <https://doi.org/10.1016/j.ijsu.2020.03.081>

Postoperative Hospital Length of Stay

- Studies Reporting Decreased LOS
- Studies Reporting No Change in LOS



Postoperative Complication Rates

- Studies Reporting Decreased Postoperative Complication Rates
- Studies Reporting No Change in Postoperative Complication Rates

