Patient Satisfaction and Quality of Life with Enhanced Recovery Protocols

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Abstract

While studies have demonstrated the benefits of Enhanced Recovery after Surgery (ERAS) programs in reducing length of stay and costs without increasing complications, fewer studies have evaluated patient satisfaction and quality of life (QOL) with enhanced recovery protocols. The aim of this project was to summarize the literature comparing satisfaction and quality of life after colorectal surgery following treatment within an ERAS protocol to standard postoperative care. The available evidence suggests patients suffer no detriment to satisfaction or quality of life with use of ERAS protocols, and may suffer less fatigue and return to activities sooner. Most publications reported no adverse effects on postoperative pain. However, a limited number of studies suggest patients may experience increased early postoperative pain with ERAS pathways, particularly following open colorectal procedures. Future research should focus on potential improvements in ERAS protocols to better manage postoperative pain. Overall, the evidence supports more widespread implementation of ERAS pathways in colorectal surgery.

Keywords
- Enhanced Recovery after Surgery
- fast track
- satisfaction
- quality of life
- postoperative care

Enhanced recovery after surgery (ERAS) protocols encompass a comprehensive approach to improving recovery and outcomes in patients undergoing major surgery.[1] The idea was first introduced by Henrik Kehlet in the 1990s as a series of interventions aimed at reducing the sequelae of surgical injury and physiological stress, leading to improved postoperative recovery.[2] Since then, ERAS protocols have become popular in several surgical specialties, with increasingly widespread adoption worldwide. Broadly defined, ERAS protocols are a series of multimodal, multidisciplinary, evidence-based care plans used within the preoperative, intraoperative, and postoperative periods to improve surgical outcomes and recovery.[3] Elements within ERAS protocols vary widely among institutions, but commonly include preoperative patient education, smoking cessation, use of carbohydrate-rich drinks, alvimopan, goal-directed fluid management, use of minimally invasive surgical techniques, limiting use of drains and lines, multimodal pain management, use of epidurals and regional blocks, and early postoperative oral feeding, ambulation, and catheter removal.[3] The use of ERAS protocols has been demonstrated to decrease length of stay and costs without increasing complications.[1,3–5]

Despite the large volume of data supporting improved clinical outcomes with use of ERAS pathways, relatively less has been published evaluating patient-reported outcomes such as satisfaction and quality of life (QOL).[6,7] Even less has been reported on surgeon or provider satisfaction with implementation of ERAS protocols. Use of ERAS pathways requires a large investment of time and effort on the part of both patients and care providers to achieve improved outcomes (►**Table 1**). Thus, it is necessary to demonstrate improvements in subjective outcomes that are important to patients and crucial to delivering high-quality patient-centered care. Being able to reassure patients and care providers that ERAS will not lead to any detrimental effects

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Table 1 Patient and provider investments in ERAS protocols

Patient investments
Time spent learning about protocol in clinic. Preoperative preparation—drinking of carbohydrate drink.
Frequent ambulation postoperatively.
Maintenance of journal and/or communication with staff regarding progress.
Use of adjunctive medications, e.g., NSAIDs, muscle relaxants, Alvimopan.
Assuming a greater proportion of recovery at home vs. in hospital.
Provider investments
Program conceptualization, implementation, and coordination with other disciplines.
Hospital and office staff education regarding protocol.
Development of specialized order sets and care pathway materials.
Procurement of supplies such as educational handouts and carbohydrate drinks.
Staff time to educate patients on protocol.
Relinquishment of prior patterns of care.
Time spent in evaluation and adjustment of protocol.

Abbreviation: NSAIDs, nonsteroidal anti-inflammatory drugs.

on these postoperative outcomes can help improve interest, implementation, and compliance with ERAS protocols. The goal of this study was to review the literature and compare ERAS protocols to standard postoperative care in those undergoing colorectal surgery in the following subjective outcomes: satisfaction, QOL, return to activities, postoperative fatigue, and pain.

Methods

Search Strategy and Selection Criteria

A literature search was performed within PubMed using the following keywords: "enhanced recovery" or "fast track" or "ERAS" AND "satisfaction" or "QOL" or "outcome" AND "colorectal" or "colon" or "rectal." Search results were limited to English language publications involving human subjects, and published after 1990. Additional searches were manually performed from reference lists of related articles as well as Google Scholar. Studies were included if they (1) compared satisfaction, QOL, or related postoperative recovery outcomes such as pain, fatigue, or return to activities for patients undergoing colorectal surgery using an ERAS protocol to similar patients not treated using an ERAS protocol or (2) reported surgeon or care provider satisfaction in using ERAS protocols for patients undergoing colorectal surgery. Studies reporting duplicate data in multiple publications were excluded.

Data Extraction

Abstracts meeting the search criteria were reviewed by the primary author (D.L.) and those not meeting selection criteria were excluded. The remaining abstracts were reviewed by both authors and any discrepancies regarding selection were discussed and mutually agreed upon. Data were collected in a standardized manner from each included study, and summarization and interpretation of results were performed by both authors.

Results

Included Publications

The search strategy yielded 310 potential publications, 288 of which were excluded for not meeting the predetermined selection criteria. The remaining 22 publications were reviewed and a further 3 publications were excluded for the following reasons: comparison groups were not similar in operation type[8] and the number of patients treated within each group was not reported.[9,10] Of the remaining 19 publications, 4 were found to discuss or report on surgeon opinions or perceived barriers in implementing ERAS protocols without any comparison of surgeon satisfaction with ERAS protocols compared with standard postoperative care.[11–14] The remaining 15 studies met our inclusion criteria in comparing postoperative patient satisfaction, QOL, return to activities, pain, and/or fatigue. No studies were identified that compared surgeon or provider satisfaction with ERAS protocols to satisfaction with standard postoperative care. A summary of the included publications is presented in ►**Table 2**.

Patient Satisfaction

Four of the 15 publications specifically reported comparisons of patient satisfaction following use of an ERAS protocol to satisfaction following standard postoperative care in colorectal surgery. ►**Table 3** includes a summary of these publications and results. Overall, there was no worsening of patient satisfaction with ERAS in any of the studies. Two studies demonstrated no difference in satisfaction,[15,16] one study demonstrated higher satisfaction with oral intake but no difference in overall satisfaction,[17] and one study demonstrated significantly improved overall satisfaction scores and patients' subjective feelings of readiness for discharge.[18]

Quality of Life and Return to Activities

A total of seven publications compared QOL or return to activities for patients after undergoing colorectal surgery using an ERAS protocol to that after standard postoperative care. A summary of findings is presented in ►**Table 4**. Four studies reported no difference.[16,19–21] Jakobsen et al[22] and Mari et al[23] reported faster return to activities within the ERAS group. Only Delaney et al[15] reported worse emotional and mental health scores at discharge in the ERAS group as measured by the SF-36 instrument, which is likely attributed to earlier time of discharge (shorter length of stay) in the ERAS group. This difference disappeared by postoperative day (POD) 10.

Pain and Fatigue

Thirteen publications have reported comparisons in subjective pain and/or fatigue outcomes between patients treated

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Table 2 Included publications

Author	Year	Study design	Number of patients		Reported outcomes			
			ERAS	SC	QOL	Return to activities or ADLs	Fatigue	Pain
Basse et al[24]	2002	CCT	14	14	No	No	Yes	Yes
Henriksen et al[25]	2002	RCT	20	20	No	No	Yes	Yes
Anderson et al[26]	2003	RCT	14	11	No	No	Yes	Yes
Delaney et al[15]	2003	RCT	31	33	Yes	No	Yes	Yes
Raue et al[27]	2004	CCT	23	29	No	No	Yes	Yes
Gatt et al[19]	2005	RCT	19	20	Yes	No	Yes	Yes
Jakobsen et al[22]	2006	CCT	80	80	Yes	Yes	Yes	No
King et al[20]	2006	CCT	60	86	Yes	No	Yes	Yes
Polle et al[17]	2007	CCT	55	52	No	No	No	No
Wichmann et al[29]	2007	CCT	20	20	No	No	No	Yes
Zargar-Shoshtari et al[28]	2009	CCT	26	26	Yes	No	Yes	No
Vlug et al[16]	2011	RCT	193	207	Yes	No	Yes	Yes
Mari et al[23]	2014	RCT	25	25	Yes	Yes	Yes	Yes
Thiele et al[18]	2015	CCT	109	98	No	No	No	Yes
Forsmo et al[21]	2016	RCT	61	61	Yes	No	No	No

Abbreviations: CCT, prospective controlled trial; ERAS, Enhanced Recovery after Surgery; QOL, quality of life; RCT, randomized controlled trial; SC, standard care.

Table 3 Patient satisfaction

Author	Year	Study design	Number of patients		Satisfaction measure	Summary of findings
			ERAS	SC		
Delaney et [15]	2003	RCT	31	33	SF36 and CGQL satisfaction scores at POD 10 and POD 30.	No difference in satisfaction with hospital stay. No difference in happiness with discharge.
Polle et al[17]	2007	CCT	5	52	Self-report satisfaction questionnaire by POD 30.	No difference in total satisfaction. ERAS group reported higher satisfaction with Intake.
Vlug et al[16]	2011	RCT	193	207	Self-report satisfaction questionnaire at 2 wk and4 wk	No difference.
Thiele et al[18]	2015	CCT	109	98	Press Ganey's satisfaction survey postdischarge.	Satisfaction score increased from 26th percentile to 59th percentile after ERAS. Extent to which patients felt ready for discharge increased from 41st to 99th percentile after ERAS.

Abbreviations: CCT, prospective controlled trial; ERAS, Enhanced Recovery after Surgery; POD, postoperative day; RCT, randomized controlled trial; SC, standard care.

within an ERAS protocol and those treated with standard care following colorectal surgery. A summary of publications and findings is presented in ►**Table 5**.

Eleven studies reported on comparisons in fatigue. Six reported no difference in fatigue,[15,16,19,20,24,25] whereas five reported reduced fatigue for those treated in an ERAS pathway.[22,23,26–28] No studies reported worsened fatigue within an ERAS pathway.

Results from the 11 publications that compared postoperative subjective pain scores were variable. Five of 11 studies reported no difference in pain scores.[16,19,20,25,27] Three studies reported lower pain scores in the ERAS group,[24,26,29] whereas three studies reported higher pain scores for patients treated in an ERAS pathway or a mixed effect of the ERAS pathway on pain scores.[15,18,23] Delaney et al[15] reported higher pain scores in the ERAS group at

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Table 4 Quality of life and return to activities

Author	Year	Study design	Number of patients		QOL instrument and activities outcome	Summary of findings
			ERAS	SC		
Delaney et al[15]	2003	RCT	31	33	SF36, CGQL score pre-operation, discharge/POD 10 and POD 30.	SF-36 emotional and mental health scores lower in ERAS group at discharge, but no difference by POD 10 or POD 30. No difference in any other aspects of QOL or quality of health.
Gatt et al[19]	2005	RCT	19	20	Hospital anxiety and depression questionnaire pre-operation, at discharge, POD 7and POD 30.	No difference.
Jakobsen et al[22]	2006	CCT	80	80	Sleep, BADL/IADL, return to leisure activities, and work pre-operation, POD 14 and POD 30.	No difference in BADL, IADL worse in SC group. More patients in ERAS group returned to leisure activities by POD 14. More patients in ERAS group returned to work by POD 30.
King et al[20]	2006	CCT	60	86	QLQ C30, QLQ CR38 pre-operation, 2 wk, 3 mo.	No difference.
Vlug et al[16]	2011	RCT	193	207	SF36, GIQLI 2 wk and 4 wk.	No difference.
Mari et al[23]	2014	RCT	25	25	BADL, IADL, function POD 14, and POD 30.	Faster ability to resume normal pre-operation activities and reduced fatigue in ERAS group by POD 14, no difference by POD 30.
Forsmo et al[21]	2016	RCT	61	61	HRQOL 15D score Pre-operation, POD 10 and POD 30.	No difference.

Abbreviations: BADL, basic activities of daily living; CCT, prospective controlled trial; ERAS, Enhanced Recovery after Surgery; GIQLI, gastrointestinal quality of life index; HRQOL, health-related quality of life; IADL, instrumental activities of daily living; POD, postoperative day; QLQ C30, quality of Life Questionnaire C30; QLQ CR38, quality of Life Questionnaire CR38; QOL, quality of life; RCT, randomized controlled trial; SC, standard care.

discharge, which is likely attributed to earlier day of discharge (shorter length of stay) in the ERAS group compared with the standard care group, and those differences disappeared by POD 10. Mari et al[23] reported that patients within the ERAS group had higher pain at 1 hour after surgery, but this difference disappeared by 5 hours, and by POD 1 the ERAS group actually reported lower pain scores than the standard care group. Thiele et al[18] reported higher pain scores on PODs 1 to 3 in the ERAS group for patients undergoing open colorectal surgery, but no difference in pain scores was found for those undergoing laparoscopic surgery.

Surgeon Satisfaction with ERAS

The search identified zero studies comparing surgeon satisfaction with use of ERAS protocols to standard care within colorectal surgery. Publications assessing surgeon preferences or feedback on ERAS protocols have focused on perceived facilitators and barriers to implementation of an ERAS protocol, and have demonstrated widespread support for ERAS principles and strong interest from multiple provider groups in initiating ERAS protocols within their institution.[11–14]

Discussion

While the available literature has demonstrated that use of ERAS protocols can lead to significant reductions in length of stay and costs without adverse effects on complications,[4,5] fewer studies have evaluated subjective patient-reported outcomes with use of ERAS protocols, or surgeon satisfaction with the protocols. This article aimed to review the literature in comparing patient satisfaction and QOL following treatment with an enhanced recovery protocol after colorectal surgery to that following standard postoperative care. The

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Table 5 Postoperative pain and fatigue

Author	Year	Study design	Number of patients		Fatigue and pain instrument/outcomes	Summary of findings
			ERAS	SC		
Basse et al[24]	2002	CCT	14	14	Fatigue and pain score until 4 wk.	SC group reported more pain at rest during the first 2 d. No difference in pain during mobilization. No difference in fatigue.
Henriksen et al[25]	2002	RCT	20	20	Fatigue and pain VAS score pre-operation, 7 d, 1 mo, 2 mo.	No difference in fatigue or pain.
Anderson et al[26]	2003	RCT	14	11	Fatigue and pain VAS 1, 7, 30 d.	Lower pain scores in ERAS group on POD 1, largely no difference by POD 7. Fatigue scores lower in ERAS group on POD 7.
Delaney et al[15]	2003	RCT	31	33	SF36, CGQL, VAS, McGill's pain score pre-operation, at discharge/ POD 10 and POD 30.	No difference in VAS pain scores on POD 2, discharge, POD 10, or POD 30. ERAS group had higher pain scores via MGPQ at discharge but no difference by POD 10. No difference in level of energy.
Raue et al[27]	2004	CCT	23	29	Fatigue and pain VAS score. Pre-operation and until POD 8.	No difference in pain. ERAS patients reported lower fatigue on POD 1 and POD 2.
Gatt et al[19]	2005	RCT	19	20	Fatigue and pain VAS score. POD 1, POD 7, and POD 30.	No difference
Jakobsen et al[22]	2006	CCT	80	80	Fatigue pre-operation, POD 14 andPOD 30.	Increased fatigue in SC group at POD 14 but no difference by POD 30. SC group spent more time asleep on POD 14 versus pre-operation, whereas ERAS group did not.
King et al[20]	2006	CCT	60	86	Fatigue and pain elements within QLQ C30, QLQ CR38 pre-operation, 2 wk, 3 mo.	No difference.
Wichmann[29]	2007	CCT	20	20	Pain VAS score until POD 5.	No difference in pain at rest. ERAS group reported less pain with movement and coughing.
Zargar-Shoshtari et al[28]	2009	CCT	26	26	Fatigue only within ICSF score up to 60 d.	ERAS group had less fatigue at discharge, no difference by POD 30 or POD 60. ERAS group had lower fatigue consequence scores at discharge and POD 30, no difference by POD 60.
Vlug et al[16]	2011	RCT	193	207	SF36, GIQLI 2 wk, 4 wk.	No difference.
Mari et al[23]	2014	RCT	25	25	Fatigue and pain verbal scale preoperation, POD 14, POD 30.	Pain at 1 h higher in ERAS group, no difference by 5 h, and ERAS group reported less pain from POD 1. Fatigue lower in ERAS group at POD 14.

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Table 5 (*Continued*)

Author	Year	Study design	Number of patients		Fatigue and pain instrument/outcomes	Summary of findings
			ERAS	SC		
Thiele et al[18]	2015	CCT	109	98	Pain only daily score until POD 3.	ERAS reported lower pain scores on POD 0. For open cases, ERAS group had higher pain scores on POD 1–3 than SC group. No difference in pain scores on POD 1–3 for laparoscopic cases.

Abbreviations: CCT, prospective controlled trial; ERAS, Enhanced Recovery after Surgery; ICSF, identity consequence fatigue scale; POD, postoperative day; RCT, randomized controlled trial; SC, standard care; VAS, visual analog scale.

available literature confirms that patients feel just as satisfied with care within an ERAS pathway, and, in fact, may actually have higher satisfaction and feel more ready for discharge despite going home earlier following surgery. The review also confirms that patients suffer no detriment to QOL, and may suffer less fatigue and return to activities sooner when being treated within an ERAS protocol. The results comparing subjective postoperative pain following ERAS to standard care are mixed. Although most publications reported equivalent or reduced pain, a small number of studies have reported mixed or higher early postoperative pain scores with ERAS,[15,18,23] albeit with small differences in outcome that disappear over time. The cause of higher pain scores in the early postoperative period in these select studies remains unclear, and could possibly be related to more enforced early mobilization, lack of routine use of regional or epidural pain management, or decreased administration of oral or intravenous opioid pain relief in favor of nonopioid multimodal therapy. Adequacy of pain control using ERAS protocols may also be dependent on the extent of the surgery itself. Thiele et al[18] reported higher pain scores in the early postoperative period for the ERAS group for patients undergoing open colorectal surgery, but no difference in pain scores was found for those undergoing laparoscopic surgery.

This search revealed zero publications that have assessed surgeon or care provider satisfaction with ERAS pathways in comparison to standard postoperative care. It may be assumed that surgeons are eager to adopt ERAS pathways if the evidence suggests it can lead to shorter length of stay without compromising clinical outcomes, but many surgeons may still have reservations about specific elements of ERAS protocols that diverge from traditional practice or teaching. Assessing surgeon satisfaction and feedback with ERAS protocols may reveal elements that care providers feel less comfortable with (such as omission of bowel prep, early oral feeding, routine epidural or regional block use, and use of nonsteroidal anti-inflammatories in the postoperative period) and may help identify and address surgeon-specific barriers to ERAS implantation as well as suggestions for protocol improvement.

This review is limited by the quality of the studies included. Many studies were not randomized or randomized but not blinded; most reported on single institution results with small sample sizes. Satisfaction and QOL were frequently reported as a secondary outcome and response rates to surveys and questionnaires were variable, and studies may have been under-powered to detect significant differences. While some studies used validated QOL instruments and visual analog scales, others employed nonstandardized questionnaires and surveys that have not been validated. The variability in the patient population, use of different elements of ERAS protocols, nonuniform management within the comparison standard care group, study methodology, and choice of outcome measures between studies makes comparison and summary difficult. Variability among studies makes data aggregation and meta-analysis impossible in this review.

In conclusion, this review has demonstrated that the application of ERAS pathways following colorectal surgery does not lead to worse outcomes in patient satisfaction, fatigue, return to activities, or QOL. The impact of ERAS on subjective postoperative pain is more complex, with mixed results. Future studies that are sufficiently powered and that use validated pain assessment instruments should focus on evaluating specific elements of the ERAS protocols in managing postoperative pain to ensure that use of a "fast-track" pathway does not result in less adequate control of patients' pain.

While ERAS has gained popularity, and has been increasingly adopted by individual institutions, it may come as a surprise that in a recent 2016 survey of SAGES members only 49% of respondents regularly use some elements of enhanced recovery pathways, and 30% had either not heard of ERAS or were not very familiar with it.[14] This suggests that further education and promotion of the benefits of ERAS is necessary so that more patients can benefit from improved recovery and to decrease healthcare costs. In addition to the clinical benefits that have already been established, demonstration of no adverse effects and possible improvements in subjective patient-reported outcomes such as satisfaction and QOL should encourage more care providers to adopt ERAS protocols within their institutions.

Conflict of Interest
None declared.

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Acknowledgment
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