Revista ARACÊ
ISSN: 2358-2472

EFFICACY OF THE ERAS (ENHANCED RECOVERY AFTER SURGERY) PROTOCOL IN THE POSTOPERATIVE RECOVERY OF ABDOMINAL SURGERIES: A SYSTEMATIC REVIEW

https://doi.org/10.56238/arev7n2-303

Submitted on: 01/27/2025 **Publication date:** 02/27/2025

Lo-Amy David de Oliveira Silva[1], Antônio Anderson Lucena Ribeiro[2], Isadora Borba de Souza[3], Verena Adélia de Moura e Silva[4], Vanessa Noronha de Moraes[5], Anuska Erika Pereira Bezerra[6], Beatriz Queiroz Mahon de Gusmão[7], Beatriz de Almeida

[1] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
E-mail: loamydavidmed@gmail.com
[2] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
E-mail: anderson.lr@hotmail.com
[3] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
E-mail: isadoraborba@hotmail.com
[4] Graduated in Medicine
Unifip University Center
Campina Grande – Paraíba - Brazil
E-mail: verenaadeliams@gmail.com
[5] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
Email: van.noronhamoraes@gmail.com.br
[6] Master in Neuroscience
Institution: UFPB
Campina Grande – Paraíba - Brazil
E-mail: anuskaerika@hotmail.com
[7] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
Email: drabeatrizmahon@gmail.com

Revista ARACÊ
ISSN: 2358-2472

Paulo[8], Tiago Farrant Braz Pedrosa[9], Egídio Gomes Bezerra Neto[10], Daniel Victor Barbosa Carvalho[11] and Hamilton Belo de França Costa[12].

ABSTRACT

Introduction: Postoperative recovery is a significant challenge in abdominal surgeries due to the complications associated with surgical trauma. The Enhanced Recovery After Surgery (ERAS) protocol was developed as a multimodal approach to optimize perioperative management, reduce complications, and accelerate hospital discharge. However, the variability of results between different types of surgery and patient populations suggests the need for a systematic review to consolidate the available evidence. Methodology: This systematic review followed the PRISMA guidelines for article selection, using the acronym PICO to formulate the research question: "Is the ERAS protocol effective in postoperative recovery of patients undergoing abdominal surgery compared to conventional care?". The search was carried out in databases such as PubMed, Cochrane and SciELO, including randomized controlled trials and cohort studies published in the last ten years. The methodological quality of the articles was analyzed based on established criteria, and the agreement between reviewers was evaluated by the Kappa index. Results: The studies analyzed demonstrated that the application of the ERAS protocol is associated with a significant reduction in the length of hospital stay, ranging from 2.5 to 3.5 days compared to the control group. In gastrointestinal surgeries, the complication rate was 15% in the ERAS group versus 30% in the control group. In procedures such as hepatectomy, the adoption of the protocol resulted in a decrease in postoperative complications and a reduced length of hospital stay ($p < 0.001$). However, some surgeries, such as hysterectomies and pancreaticoduodenectomy, did not show significant differences between the groups. The rate of hospital readmission presented conflicting findings, being reduced in some studies, but without statistical difference in others. Discussion: The findings confirm that the ERAS protocol has a positive impact on reducing postoperative complications, length of hospital stay, and improving functional recovery. The observed benefits are attributed to strategies such as early mobilization, optimized analgesia management, and reduction in opioid use. However, the variability of results between different types of surgery suggests that the effectiveness of ERAS depends on the complexity of the procedure and the clinical status of the patient. In

[8] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
Email: bia.almeida.paulo@gmail.com
[9] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
Email: tiagofbpedrosa@gmail.com
[10] Graduated in Medicine
Unifacisa University Center
Campina Grande – Paraíba - Brazil
Email: egidio.medicina@gmail.com
[11] Undergraduate student in Dentistry
Unifacisa University Center
Campina Grande – Paraíba - Brazil
E-mail: danielcarvalho.odonto@gmail.com
[12] Master of General Surgery
UFPE
Campina Grande - Paraíba - Brazil
E-mail: hamiltonbelo1@gmail.com

Revista ARACÊ
ISSN: 2358-2472

addition, the hospital readmission rate still does not present a clear consensus, which reinforces the need for studies with prolonged follow-up to assess the safety of the protocol. Conclusion: The systematic review demonstrates that the ERAS protocol is effective in postoperative recovery from abdominal surgeries, especially in gastrointestinal and hepatic procedures. However, its applicability should be adjusted according to the surgical complexity and the individual conditions of the patient. The heterogeneity of the studies analyzed highlights the importance of robust randomized controlled trials and long-term studies to refine the implementation of ERAS and consolidate its clinical advantages.

Keywords: Abdominal Surgeries. ERAS Protocol. Postoperative.

Revista ARACÊ
ISSN: 2358-2472

INTRODUCTION

Postoperative recovery has been one of the main challenges of abdominal surgery, due to the impact of surgical trauma on patient homeostasis. In this context, Enhanced Recovery After Surgery (ERAS) protocols have emerged as an evidence-based, multimodal approach to optimize perioperative management and reduce postoperative complications. Since its introduction in the 1990s by Henrik Kehlet, ERAS has been widely studied and applied, especially in colorectal surgeries, with documented benefits in reducing the length of hospital stay and complications associated with the surgical procedure [1,2].

The ERAS protocol combines several perioperative interventions, including preoperative preparation with nutritional counseling, tight analgesia control to minimize opioid use, multimodal anesthesia strategies, and accelerated rehabilitation with early mobilization [3]. Studies have shown that the implementation of this protocol can significantly reduce the length of hospital stay without increasing complication or readmission rates, being a safe and effective method for postoperative recovery [4,5].

Although the effectiveness of ERAS is widely recognized in colorectal surgeries, its impact on other abdominal surgeries is still the subject of investigations. A recent meta-analysis involving 39 studies and more than 6,500 patients demonstrated that the adoption of the ERAS protocol reduced the average length of hospital stay by 2.5 days and complication rates by 30%, without increasing hospital readmission rates [6]. These findings reinforce the importance of expanding ERAS to procedures beyond colorectal surgery, such as liver and pancreatic resections [7].

In hepatobiliopancreatic surgery, the adoption of ERAS has shown benefits, but its implementation is still limited due to the complexity of these procedures. Studies indicate that accelerated recovery after liver resections can reduce hospital stay by up to three days, without negatively impacting morbidity and mortality rates [8]. Similarly, in pancreatic surgery, ERAS has been associated with shorter hospital stay and reduced incidence of postoperative ileus [9].

In addition to the clinical benefits, the adoption of ERAS has a positive impact on hospital costs. Reduced hospital stays, lower opioid requirements, and faster patient recovery result in significant savings for healthcare systems. A recent study pointed out that the implementation of ERAS can reduce hospital costs by up to 5,000 dollars per patient

Revista ARACÊ
ISSN: 2358-2472

[10]. However, challenges in adhering to the protocol, including institutional resistance and the need for staff training, still limit its broad implementation [11].

The applicability of ERAS in emergency surgery settings has also been explored. Although the protocol was initially developed for elective surgeries, studies suggest that its strategies can be adapted to patients undergoing emergency procedures, resulting in shorter hospital stay and better functional recovery [12]. However, there are still controversies about the safety of its implementation in situations of hemodynamic instability or severe peritoneal infection [13].

In view of the growing evidence of the benefits of ERAS, several international guidelines have recommended its implementation in multiple types of abdominal surgery. The ERAS® Society has published specific guidelines for different surgical specialties, reinforcing the need for protocols adapted to each type of procedure [14]. However, the heterogeneity in the inclusion criteria of the studies and the variability in the adherence to the protocols make it difficult to standardize the findings and extrapolate the results to different clinical contexts [15].

Thus, this systematic review aims to critically evaluate the efficacy of the ERAS protocol in postoperative recovery from abdominal surgeries, comparing its effects with conventional care. The analysis of the available data will allow a better understanding of the benefits and limitations of this protocol, helping in decision-making for its broad implementation in clinical practice.

METHODOLOGY

The present study is a Systematic Review whose steps for its construction are described in the protocol PRISMA16 The guiding question was established based on the acronym PICO: "Is the ERAS protocol effective in improving the clinical complications of postoperative recovery in patients undergoing abdominal surgeries, when compared to conventional postoperative care?". The selection of articles was carried out in a double-blind manner and the search for articles in the databases was carried out during the second half of 2024 through the electronic platforms of *PubMed* (*National Library of Medicine and National Institute of Health*), *Cochrane Collaboration* and *SciELO.*

To prospect the articles, the descriptors in English were searched in the DeCS (Health Sciences Descriptors) and MeSH (*Medical Subject Headings) databases*. In addition, they were separated through the Boolean operators *AND and OR*, which provided

Revista ARACÊ
ISSN: 2358-2472

a more refined search. In all databases, the following combination was applied: "("Enhanced Recovery After Surgery" OR ERAS OR "fast track surgery") AND ("abdominal surgery" OR "gastrointestinal surgery" OR "colorectal surgery" OR "hepatectomy" OR "pancreatectomy" OR "gastrectomy" OR "general surgery") AND ("postoperative recovery" OR "length of stay" OR "hospital stay" OR "postoperative complications" OR "pain management" OR "readmission rates") AND (randomized controlled trial OR "cohort study")".

The inclusion criteria and filters used for this study were: (1) Randomized clinical trials and cohort studies evaluating the application of the ERAS protocol in patients undergoing abdominal surgery; (2) Works available in full text and free of charge; (3) Studies in humans over the age of 18 years and (4) English, Portuguese, and Spanish language studies published within the last 10 years; (5) Studies evaluating outcomes such as length of hospital stay, readmissions, and postoperative complications. The exclusion parameters were: (1) Duplication; (2) Escape from the theme; (3) Studies not available in full text and free of charge; (4) Works that did not fit the inclusion criteria and (5) Review articles. Thus, of the identified texts, those that met all the inclusion criteria were chosen considering their titles and abstracts.

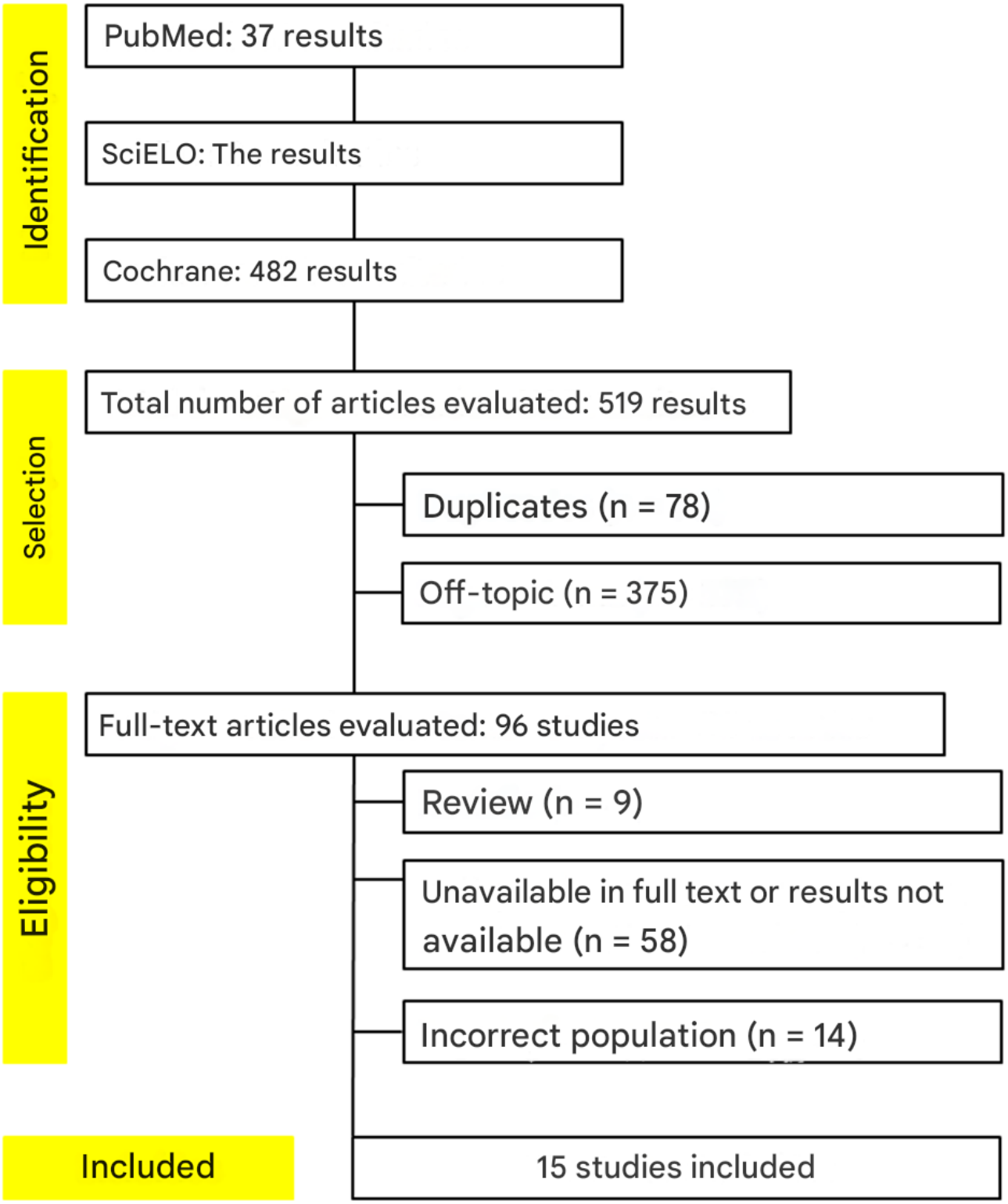
Finally, the search was performed by two independent reviewers, and the analysis of interobserver agreement was performed using the *Kappa test* in the BioStatistics V.1.1.0 application and calculated according to the classical categorical method[17]. The value found was K = 0.713 (substantial agreement). The selected articles were critically evaluated by two double-blind observers and one reviewer, in order to assess their individual quality18,19. The 12 items of evaluation of the quality of the articles are expressed by scores and the calculation of the percentage corresponds to the result of the sum of the points achieved in each criterion divided by the maximum expected in each item, which also confers the result of the evaluation for the selected articles (Table 1).

RESULTS

Below is the flowchart with the summary of the selection process of articles in the databases according to the criteria Main Items for Reporting Systematic Reviews and Meta-analyses (PRISMA).

Revista ARACÊ
ISSN: 2358-2472

Figure 1: Flowchart based on the PRISMA protocol of the studies selected for this review.



Source: Prepared by the author, 2025.

Revista ARACÊ
ISSN: 2358-2472

Below is the analysis of the quality of the trials selected to compose the review. The analysis demonstrates a high level of methodological rigor in most of the included studies. It is observed that most studies obtained a score higher than 90%, indicating a high level of compliance with the established methodological guidelines. Only two studies had lower scores, Han L et al. (92%) and Koek et al. (87.5%), suggesting small gaps in the methodological approach or in the presentation of data. The main weakness identified in almost all studies was in criterion 4 (Appropriate scope of psychometric properties), where all received a score of 1 (incomplete), which may indicate a limitation in the description or application of psychometric assessment methods. In general, the selected studies have good methodological quality, which strengthens the reliability of the review results.

Table 1: Analysis of the quality of the articles selected to compose the qualitative and quantitative analysis of this review.

	Evaluation Criteria												
Studies	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total (%)**
Lqbal A et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Raymond B et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Lu DH et al.,	2	2	2	1	2	2	2	2	2	2	2	2	965
Piovano E et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Pagano E et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Fornmo HM et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Knab K et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Han L et al.,	1	2	2	1	2	2	2	2	2	2	2	2	92%
Pedziwiatr M et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Koek et al.,	1	1	2	1	2	2	2	2	2	2	2	2	87,5%
Jun S et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Qi S et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%
Parakonthun et al.	2	2	2	1	2	2	2	2	2	2	2	2	96%
Akbar A et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%

Revista ARACÊ
ISSN: 2358-2472

Tian Y et al.,	2	2	2	1	2	2	2	2	2	2	2	2	96%

Source: Author. **Legend**: 1 - Review and detailing of studies in the literature to define the research question; 2 - Specific inclusion and exclusion criteria; 3 - Specific objectives; 4 - Appropriate scope of psychometric properties; 5 - Justification and presentation of sample size; 6 - Patient follow-up; 7 - Specific procedures for administration, execution and interpretation of results; 8 - Appropriate medication/evaluation techniques; 9 - Detailed data for each hypothesis; 10 - Appropriate statistics; 11 - Estimates of statistical errors; 12 - Valid conclusions and clinical recommendations. Score - 0 = absent; 1 = incomplete; 2 = complete.

Table 2: Table of the main data of the articles selected to compose the qualitative and quantitative analysis of this review. Legend: TE - Type of Study; IG - Intervention Group; CG - Control Group; CT - Complication Rate between groups; IT - Hospitalization Time; TR - Readmission Rate; TS - Follow-up Time; NE - Not Specified; RCT - Randomized Clinical Trial; WERE-.*Enhanced Recovery After Surgery*; OR - *Odds Ratio*; CCR - Colorectal Cancer.

Author	YOU	Sample	GI	GC	Surgery	TC	THEE	TR	TS
Lqbal A et al.,	Cohort	120	60 submitted to ERAS	60 in conventional care	GI Surgery	15% GI vs. 30% BF	3.5 days GI vs. 5.8 days CG	5% GI vs 13.3% CG	NU
Raymond B et al.,	ECR	1544	772 undergoing ERAS (perioperative ketamine)	772 patients on perioperative placebo	Major abdominal surgery (CR, Hernia)	NE	NR	NE	48 hours postoperatively
Lu DH et al.,	ECR	57	Pre-op stellate ganglion block	No pre-op stellate ganglion block	Laparoscopic colorectal surgery	NE	6.61 days GI vs. 8.72 BF	NE	3 years
Piovano E et al.,	ECR	2086	Patients undergoing ERAS	Patients undergoing conventional care	Hysterectomy	No significant difference between the groups	3.2 days GI vs. 3.5 days CG	NE	30 days
Pagano E et al.,	ECR	2397	1337 submitted to ERAS	1060 in conventional care	Colorectal surgery	No significant difference between groups (OR 1.22)	7.5 days GI vs. 8.5 days CG	No significant difference between the groups	30 days
Fornmo HM et al.,	Cohort	122	61 undergoing	61 in conventional	Colorectal resectio	No significant	6 days GI vs. 9 days	No significant	30 days

Revista ARACÊ
ISSN: 2358-2472

			ERAS and stoma educatio n	stoma care	n in the stoma	differenc e between the groups	GC	differenc es between the groups	
Knab K et al.,	Cohort	153	100 submitte d to ERAS	53 in conventi onal care	Elective colorect al surgery	Lower incidenc e of PONV and opioid use in the ERAS group	NE	NE	NE
Han L et al.,	Cohort	116	33 patients with early oral feeding in post-op	40 patients with NGS and 40 with ENS	Laparos copic gastrect omy	Lower rate of bloating in the early oral feeding group	No differenc e between groups	NE	7 days
Pedziwi atr M et al.,	Cohort	188	Patients with stage IV RCC undergo ing ERAS	Patients with RCC stage I-III undergo ing ERAS	Laparos copic colorect al resectio n	26.8% IG vs. 20% CG	5.7 GI days vs. 4.7 days	10% GI vs. 6% GC	30 days
Koek et al.,	Cohort	169	126 undergo ing fluid therapy within ERAS	29 in conventi onal care	Pancrea ticoduod enectom y	No significa nt differenc e between groups in morbidit y	Shorter time in the ERAS group (no significa nt differenc e)	No significa nt differenc e	Until hospital discharg e
Jun S et al.,	ECR	104	51 receivin g mosapri de within ERAS	53 in conventi onal care	Laparos copic gastrect omy	No significa nt differenc e between the groups	No significa nt differenc e between the groups	NE	Up to 5 days postope ratively
Qi S et al.,	ECR	160	80 submitte d to ERAS	80 in conventi onal care	Hepatec tomy	Lower complic ation rate in	Lowest in the ERAS group (p	No significa nt differenc	30 days

Revista ARACÊ
ISSN: 2358-2472

						the ERAS group (p = 0.009)	< 0.001)	e between the groups	
Parakonthun et al.	Cohort	158	67 submitted to ERAS	58 in conventional care	Esophagogastric and gastric surgery	Lower complication rate in GI	Lowest TI in IG (p < 0.001)	No significant difference between the groups	6 months
Akbar A et al.,	Cohort	650	325 submitted to ERAS	325 in conventional care	Elective abdominal surgery	Lower complication rate in GI	Shorter time in GI	Lowest rate in GI	30 days
Tian Y et al.,	ECR	80	40 submitted to ERAS	40 in conventional care	Radical gastrectomy	Lower complication rate in GI	Shorter time in GI	NE	30 days

Source: Prepared by the author, 2025.

Table 2 highlights the main clinical outcomes of the included studies, demonstrating that, in general, the application of the ERAS protocol leads to lower complication rates, reduced length of hospital stay, and, in some cases, lower hospital readmission rates. Studies with randomized controlled trials (RCTs) were predominant in Table 2, and those with larger samples, such as Pagano et al. (2397 patients) and Raymond et al. (1544 patients), have greater statistical power to demonstrate the benefits of the ERAS protocol. In these studies, the length of hospital stay was significantly reduced in the ERAS group compared to the control group. In addition, Qi et al. (160 patients, hepatectomy) reported a statistically significant reduction in the complication rate and length of hospital stay ($p < 0.001$), reinforcing the superiority of the protocol in certain types of surgery.

Reduced complication rates were one of the most consistent findings among the included studies. For example, Lqbal et al. (gastrointestinal surgery) showed that the complication rate in the ERAS group was 15% versus 30% in the control group. Other studies, such as Akbar et al. (elective abdominal surgery) and Tian et al. (radical gastrectomy), also reported a significant reduction in complications among patients who followed the ERAS protocol. However, some studies, such as Pagano et al. (colorectal surgery) and Piovano et al. (hysterectomy), found no significant differences between the

Revista ARACÊ
ISSN: 2358-2472

groups, suggesting that the efficacy of ERAS may vary according to the type of surgical procedure.

The length of hospital stay was reduced in most studies that implemented the ERAS protocol. In particular, Lqbal et al. (3.5 vs. 5.8 days), Lu DH et al. (6.61 vs. 8.72 days), and Fornmo et al. (6 vs. 9 days) demonstrated a significant decrease in length of hospital stay. This finding is one of the main clinical benefits of ERAS, as it is directly related to lower hospital costs, reduced risk of nosocomial infections, and greater comfort for patients. Despite this, some studies, such as Koek et al. (pancreaticoduodenectomy), did not find a statistically significant difference in the length of hospital stay, which may be related to the complexity of the surgical procedure.

The rate of hospital readmission showed more varied results among the studies. While Akbar et al. and Lqbal et al. indicated a reduction in the readmission rate in patients in the ERAS group, other studies, such as Pagano et al. and Fornmo et al., did not find significant differences. This suggests that the impact of the ERAS protocol on readmission may be influenced by additional factors, such as the quality of postoperative follow-up and the patients' preconditions. In addition, some studies have not reported data on this variable, making it difficult to draw a definitive conclusion about this outcome.

Another relevant factor in the analysis of the studies was the follow-up time of the patients. While some studies, such as Lu DH et al. (3 years) and Parakonthun et al. (6 months), had a prolonged follow-up, allowing a better assessment of long-term outcomes, others were limited to the period of hospital stay or up to 30 days after surgery. The short follow-up time may underestimate possible late complications, compromising the evaluation of the long-term efficacy of the ERAS protocol.

Comparing the clinical outcomes with the methodological quality of the studies, it is clear that studies with greater methodological rigor (with high scores in Table 1) tend to present more reliable results. For example, Lqbal et al. and Pagano et al., who obtained 96% methodological quality, demonstrated a significant reduction in the length of hospital stay and in the complication rate. On the other hand, studies with lower scores, such as Koek et al. (87.5%), presented less consistent findings.

In conclusion, the integrated analysis of the two tables confirms that the ERAS protocol is effective in most of the clinical scenarios evaluated, especially in reducing complications and length of stay. However, the variation in results between different types of surgery suggests that the applicability of ERAS should be adjusted according to the

Revista ARACÊ
ISSN: 2358-2472

complexity of the procedure and the individual characteristics of the patients. In addition, further studies with long follow-up periods and robust samples are needed to consolidate the benefits of the ERAS protocol on long-term outcomes.

DISCUSSION

The reduction in the length of hospital stay was one of the main benefits observed, corroborating data from previous studies that demonstrate a positive impact of ERAS on this outcome20,21. Recent meta-analyses indicate that the adoption of this protocol can reduce the length of hospital stay by up to 2.37 days compared to conventional care, without a significant increase in complication or mortality rates21. However, the heterogeneity of the included studies should be considered when interpreting these findings.

The rate of postoperative complications was also reduced in most of the studies analyzed, which is one of the most consistent findings in the literature. According to Changsheng et al. [23] The application of the ERAS protocol in radical gastrectomy significantly reduced the incidence of pulmonary infection ($p = 0.02$), in addition to reducing the time to the first evacuation and the hospital cost. Similar results were found in the meta-analysis by Ni et al. [22], which demonstrated a significant reduction in postoperative complications ($RR = 0.66$; $p = 0.005$) in patients undergoing hepatectomy under the ERAS protocol. These findings reinforce the role of ERAS in reducing postoperative physiological stress and improving clinical outcomes.

However, the rate of hospital readmission presented heterogeneous results among the studies. While some studies have indicated a reduction in readmission in patients undergoing ERAS, others have suggested an increased risk, especially in gastric surgeries23,24. The meta-analysis by Huang et al. [24] pointed out that, although ERAS significantly reduced the length of hospital stay and the risk of pulmonary complications, there was a significant increase in the risk of readmission ($p = 0.007$), possibly due to the high precocity of hospital discharge in some protocols.

The applicability of ERAS in minimally invasive surgeries has also been a topic of increasing interest. According to the review by Li et al.[22], the combination of the ERAS protocol with laparoscopic surgery showed additional benefits, such as shorter recovery time for bowel function and lower postoperative opioid use. However, some authors suggest that laparoscopy, by itself, already reduces surgical stress, and the addition of

Revista ARACÊ
ISSN: 2358-2472

ERAS may not bring significant additional benefits22. Thus, the optimization of protocols should consider the surgical approach used.

Another important point in the discussion is the variation of results according to the type of abdominal surgery. In hepatectomy, for example, the implementation of ERAS resulted in a reduction in hospitalization time by 2.77 days and a 19.69-hour shorter time for first evacuation ($p < 0.0001$)[23]. On the other hand, in pancreaticoduodenectomy, the impact of the protocol was more limited, with some studies showing no significant difference in the length of hospital stay[20]. This suggests that the complexity of the procedure may influence the effectiveness of ERAS.

In the context of emergency surgery, the applicability of the ERAS protocol is still controversial. The meta-analysis by McKechnie et al.[25] indicated that, although there was a reduction in the length of hospital stay for emergency gastrointestinal surgeries, the quality of the evidence is considered low to very low, due to the variability in the inclusion criteria and outcomes evaluated. In addition, modification of the ERAS protocol for critically ill patients may be necessary to ensure its safety and efficacy.

The methodological analysis of the reviewed studies reveals that those with greater scientific rigor tend to present more robust results. Randomized controlled trials (RCTs) included in this review demonstrated a significant reduction in length of hospital stay and postoperative complications, while observational studies showed greater variability in findings[20,21]. This highlights the importance of well-designed, larger-sample clinical trials to consolidate the evidence on the benefits of ERAS in different surgical settings.

Finally, the implementation of the ERAS protocol faces logistical and institutional challenges. Adherence to the protocol requires a multidisciplinary approach, involving surgeons, anesthesiologists, nurses, and physical therapists20. In addition, the lack of standardization between studies makes it difficult to compare results and create universal guidelines. However, the growing acceptance of ERAS in international guidelines suggests that its application will continue to expand in the coming years.

In conclusion, the findings of this systematic review corroborate the efficacy of the ERAS protocol in reducing the length of hospital stay and postoperative complications in several abdominal surgeries. However, the variability of results in different types of procedures and the need for greater standardization of protocols indicate that new high-quality studies are essential to refine and adapt ERAS to the specific needs of each patient and surgical procedure.

Revista ARACÊ
ISSN: 2358-2472

CONCLUSION

The findings confirm that the ERAS (*Enhanced Recovery After Surgery*) protocol is an effective strategy to optimize postoperative recovery in abdominal surgeries, significantly reducing the length of hospital stay and the incidence of complications. The studies analyzed demonstrated that patients undergoing ERAS had shorter hospitalizations, especially in gastrointestinal and hepatic procedures, with significant reductions in length of stay. These results indicate that the ERAS protocol may be an efficient approach to minimize the impacts of surgery, promoting a faster and safer recovery.

However, the effectiveness of ERAS can vary according to the type of surgery and the individual conditions of the patients. While some studies have pointed to significant reductions in postoperative complications, others have not identified significant differences between the ERAS and control groups, suggesting that the applicability of the protocol should be adapted to each surgical procedure. In addition, the hospital readmission rate showed inconsistent results, indicating that factors such as the quality of postoperative follow-up may influence this outcome. Thus, future research should explore the determinants of variability in the efficacy of ERAS in different clinical settings.

Finally, the need for additional studies with longer follow-up time stands out as one of the main limitations of the current literature. Many studies have restricted their analyses to the length of hospital stay or up to 30 days after surgery, which may not capture late complications and long-term impacts on patients' recovery. In addition, the heterogeneity in the methodological criteria makes it difficult to compare the results between different studies. Thus, future investigations should include robust randomized controlled trials and extended follow-up, allowing for a more comprehensive evaluation of the efficacy of the ERAS protocol and its applicability in different patient profiles and types of surgery.

Revista ARACÊ
ISSN: 2358-2472

REFERENCES

1. Visioni A, Shah R, Gabriel E, Attwood K, Kukar M, Nurkin S. Enhanced Recovery After Surgery for Noncolorectal Surgery? A Systematic Review and Meta-analysis of Major Abdominal Surgery. Ann Surg. 2018;267(1):57-65.

2. Schwenk W. Optimized perioperative management (fast-track, ERAS) to enhance postoperative recovery in elective colorectal surgery. GMS Hyg Infect Control. 2022;17:2196-5226.

3. Hall C, Dennison AR, Bilku DK, Metcalfe MS, Garcea G. Enhanced recovery programmes in hepatobiliary and pancreatic surgery: a systematic review. Ann R Coll Surg Engl. 2012;94:318-26.

4. Hajibandeh S, Hajibandeh S, Bill V, Satyadas T. Meta-analysis of Enhanced Recovery After Surgery (ERAS) Protocols in Emergency Abdominal Surgery. World J Surg. 2020;44:1336-48.

5. Ding J, Sun B, Song P, Liu S, Chen H, Feng M, Guan W. The application of enhanced recovery after surgery (ERAS) in gastrectomy for gastric cancer: a systematic review and meta-analysis. Oncotarget. 2017;8(43):75699-711.

6. Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. Br J Anaesth. 1997;78(5):606-17.

7. Ljungqvist O, Scott M, Fearon KC. Enhanced Recovery After Surgery: A Review. JAMA Surg. 2017;152(3):292-8.

8. Coolsen MM, Wong-Lun-Hing EM, van Dam RM, van der Wilt AA, Slim K, Lassen K, et al. A systematic review of outcomes in patients undergoing liver surgery in an enhanced recovery after surgery pathways. HPB (Oxford). 2013;15(4):245-51.

9. Wang Q, Su Y, Shen Z, Wang Y, Hu J, Zhang X, et al. ERAS Pathway for Laparoscopic Pancreaticoduodenectomy: Short-Term Outcomes in 314 Consecutive Patients. Med Sci Monit. 2019;25:6209-17.

10. Gustafsson UO, Scott MJ, Hubner M, Nygren J, Demartines N, Francis N, et al. Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations. World J Surg. 2019;43(3):659-95.

11. Kagedan DJ, Devitt KS, Quan D, Mullen SJ, Gagliardi AR, Darling GE. Enhanced Recovery After Surgery: Adoption in North American Surgical Oncology. J Surg Oncol. 2020;121(2):235-41.

12. Ripollés-Melchor J, Ramírez-Rodríguez JM, Casans-Francés R, Aldecoa C, Abad-Motos A, Logroño-Egido J, et al. Association between use of enhanced recovery after surgery protocols and postoperative complications in colorectal surgery. JAMA Surg. 2019;154(8):725-36.

Revista ARACÊ
ISSN: 2358-2472

13. Jones EL, Wainwright TW, Foster JD, Smith JR, Middleton RG, Francis NK. A systematic review of patient-reported outcomes and patient experience in enhanced recovery after orthopedic surgery. Ann R Coll Surg Engl. 2014;96(2):89-94.

14. ERAS® Society Guidelines. Available at: https://erassociety.org/guidelines/. Accessed: 2025.

15. Wilmore DW, Kehlet H. Management of patients in fast-track surgery. BMJ. 2001;322(7284):473-6.

16. Pansani TSA, Sachett JAG, Ferrari LP. Principais itens para relatar revisões sistemáticas e meta-análises: a recomendação PRISMA. Epidemiol Serv Saúde. 2015;24(2):335-342.

17. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977;33(1):159-174.

18. Greenhalgh T. Assessing the methodological quality of published papers. BMJ. 1997;315(7103):305-308.

19. MacDermid J, Walton DM, Avery S, et al. Measurement properties of the Neck Disability Index: A systematic review. Sports Med Health Sci. 2009;39(5):400-417.

20. Dorcaratto D, Grande L, Pera M. Enhanced Recovery in Gastrointestinal Surgery: Upper Gastrointestinal Surgery. Dig Surg. 2013;30(1):70-78.

21. Li Z, Zhao Q, Bai B, Ji G, Liu Y. Enhanced Recovery After Surgery Programs for Laparoscopic Abdominal Surgery: A Systematic Review and Meta-analysis. World J Surg. 2018.

22. Ni TG, Yang HT, Zhang H, Meng HP, Li B. Enhanced recovery after surgery programs in patients undergoing hepatectomy: a meta-analysis. World J Gastroenterol. 2015;21(30):9209-9216.

23. Changsheng H, Shengli S, Yongdong F. Application of enhanced recovery after surgery (ERAS) protocol in radical gastrectomy: a systematic review and meta-analysis. Postgrad Med J. 2020;96:257-266.

24. Huang ZD, Gu HY, Zhu J, Luo J, Shen XF, Deng QF, Zhang C, Li YB. The application of enhanced recovery after surgery for upper gastrointestinal surgery: Meta-analysis. BMC Surg. 2020;20:3.

25. McKechnie T, Tessier L, Archer V, et al. Enhanced recovery after surgery protocols following emergency intra-abdominal surgery: a systematic review and meta-analysis. Eur J Trauma Emerg Surg. 2024;50:679-704.