OPTIMIZE RECOVERY AND IMPROVE QUALITY OF CARE: A REVIEW OF THE APPLICATION OF THE ERAS MODEL IN ENT SURGERY

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ABSTRACT

Objective: Review of the application of the ERAS model in otolaryngology and head and neck surgery**.** ***Method:*** A Scoping review**.** ***Results:*** Of the 67 relevant articles, 4 articles that met the inclusion criteria were included in the study. The studies showed that ERAS significantly reduced hospital stay, costs, pain, anxiety, and postoperative depression. At the same time, some studies also showed a significant reduction in overall complications such as nausea/vomiting, facial edema, low back pain, urinary retention, and bleeding. **Conclusion:** The study showed that ERAS brought significant benefits in otolaryngology, including significantly reduced hospital stay, costs, pain, anxiety, and postoperative depression. ERAS was proven to be effective and safe, without increasing the rate of complications.

Keywords: ERAS, otolaryngology, head and neck surgery

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1. Overview

The Enhanced Recovery After Surgery (ERAS) model has become a multidisciplinary, integrated, and effective care program designed to optimize perioperative management, reduce surgical trauma, and the body's natural response to promote early recovery and improve outcomes [1, 2]. ERAS has been widely practiced and shown encouraging benefits in many major surgical specialties such as colorectal, hepatobiliary, gynecological, gastroenterological, urological, vascular, and bariatric surgery [1-3]. Demonstrated benefits include reduced complication rates, shorter hospital stays, reduced postoperative pain, and improved patient quality of life [1-3]. In the field of Otorhinolaryngology (ENT) and Head and Neck Surgery (HTS), where surgeries are often complex, intensive, and can cause significant morbidity, severely impacting the patient's quality of life, optimizing postoperative recovery through multimodal interventions is of utmost importance [4].

However, the implementation and development of ERAS protocols in ENT in general has been relatively slow, and there are currently no widely accepted specific recommended guidelines for this field [1]. Although there has been a significant increase in research on the application of ERAS for patients with chronic rhinosinusitis (CRS) undergoing endoscopic sinus surgery (ESS) in the last 5 years, no comprehensive meta-analysis has been published on this topic to clarify the true efficacy and safety of ERAS in this setting [1]. Existing studies on ERAS in outpatient ENT surgery are limited and have only initially shown promising results in reducing hospital stay, costs, pain and postoperative anxiety [5]. For major head and neck surgery with free flap reconstruction, although the ERAS Consortium has issued consensus recommendations, the specific evidence remains variable, and many recommendations must be extrapolated from other surgical procedures [4]. Therefore, there is a great need for comprehensive synthesis and evaluation of the arguments for ERAS application in ENT and PTDC, especially when clinicians sometimes focus only on surgical technique and ignore the overall nursing management of the patient's psychological and physiological aspects throughout the entire perioperative period, which may affect the recovery process [1].

Recognizing this gap and the great potential of the ERAS model, a synthesis of existing evidence is necessary to provide a more solid evidence base and promote the widespread adoption of ERAS in the ENT and PTDC subspecialty [1]. The aim of this

study is to conduct a systematic review of the application of the ERAS model in otolaryngology and head and neck surgery. This review will evaluate the efficacy and safety of ERAS protocols, and analyze the specific benefits that this model brings. Furthermore, the study will also identify success factors and challenges in implementing ERAS, thereby suggesting directions for future research and supporting the development of more specialized, appropriate guidelines for this specific surgical field.

2. The research subject and method

2.1. Research subject

The research subjects are scientific articles and documents related to the application of the ERAS model in otolaryngology and head and neck surgery.

Inclusion criteria: Publications and research articles related to the application of the ERAS model in otolaryngology and head and neck surgery; Location: Worldwide; Language: English; Publication: 2015-2025.

Exclusion criteria: Duplicate publications and articles; Publications and articles that do not provide original data; Publications and articles that do not have full-text articles.

2.2 Method, search strategies and data sources

- This survey was conducted according to the PRISMA-ScR (PRISMA exension for Scoping Reviews) guidelines, which is a checklist for conducting a review study.
- Research design: A Scoping review.
- We systematically searched PubMed, Embase and CINHAL databases with the search keywords: (Enhanced Recovery After Surgery) AND ((ENT surgery) OR (Otolaryngology surgery)).

2.3. Study selection

Two researchers performed independently in 2 steps:

Step 1: Abstracts of the found articles will be deduplicated and entered into Endnote X7 document management software. The researchers will carefully read the titles and abstracts. Articles that meet the criteria will be selected, articles that do not meet the criteria will be excluded.

Step 2: Studies with suitable titles and abstracts will be read in full text, if determined to be suitable for the research objectives, they will be selected and information collected.

In these 2 steps, if there is a conflict between the two researchers, both will discuss and reach a consensus.

2.4. Data Extraction

Authors, year of publication, study design, study subjects, sample size, main results and limitations of the study.

3. Results

A total of 67 articles were found in the database, after exclusion, 4 articles were selected for full text reading and found to meet the selection and exclusion criteria and were included in the study (diagram below).

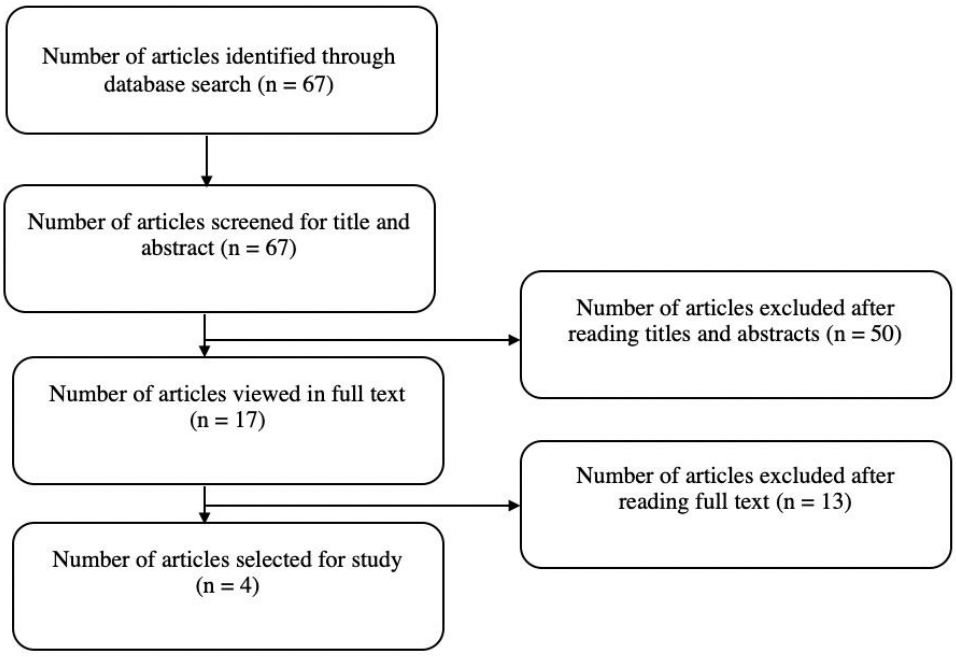

Table 1. Main results from eligible articles

Author(s), Year	Design	Sample size	Subjects	Results, limitations
Yuqi Wu et al, 2023 [1]	Systematic review and meta-analysis of Randomized Controlled Trials (RCTs)	28 studies, 2636 patients	Patients with Chronic Rhinosinusitis (CRS) undergoing Endoscopic Sinus Surgery (ESS)	Significant reduction in Length of Stay (LOS) (MD = -2.50 days). Reduced overall complication rate (RR = 0.28) (including nausea/vomiting, facial edema, low back pain, urinary retention, bleeding). Reduced pain score (MD = -1.07). Reduced anxiety score (SMD = -2.13) and depression (SMD = -2.42). Improved Quality of life (QoL). Reduced hospital stay costs (according to one study). Improved satisfaction, olfactory function, nasal resistance, and comfort. Limitations: Overall methodological quality of the included studies is limited. Applied ERAS protocols varied (6-14 elements) and showed high

Author(s), Year	Design	Sample size	Subjects	Results, limitations
				heterogeneity in results. Lack of long-term follow-up data. Only included studies published in English and Chinese. Differences in patient disease severity may cause bias
Xifu Wu et al, 2019 [6]	Prospective randomized controlled clinical trial	74 patients (36 ERAS group, 38 control group)	Patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP) undergoing Endoscopic Sinus Surgery (ESS)	Improved perioperative Quality of Life (QoL), especially on days 1 and 3 post-surgery (significantly lower SNOT-22 scores in the ERAS group). Did not increase complication rate (nausea/vomiting, bleeding, aspiration, dizziness). Reduced pain and improved sleep post-surgery, reduced costs and length of stay (from the same authors' previous study). Limitations: Study from a single center, small sample size. SNOT-22 score (Sinonasal Outcome Test-22) only reflects subjective assessment of QoL. Lack of objective assessments (e.g., C-reactive protein). Patients and staff were not blinded.
Kevin Chorath et al, 2022 [5]	Systematic literature review	8 studies included. Sample size of each study ≥ 50 patients	Patients undergoing Outpatient ENT surgery (tonsillectomy/ adenoidectomy (Vegetation Adénoïde), endoscopic sinus surgery, tympanoplasty/	Significant reduction in Length of Stay (LOS). Reduced hospital costs. Significantly improved levels of postoperative pain and anxiety. Did not increase complication or readmission rates. One study showed a significant reduction in complication rates after tonsillectomy/adenoidectomy. Limited number of studies on ERAS for outpatient ENT surgery (only 8 studies). Very few studies were RCTs (4/8). Significant differences in ERAS components and heterogeneity in reporting quality.

Author(s), Year	Design	Sample size	Subjects	Results, limitations
			mastoidectomy, septoplasty)	No mention of adherence to ERAS protocols. Surgeries mainly for benign conditions
Giacomo Bertazzoni et al, 2022 [7]	Prospective implementation study with matched-pair analysis	80 patients (40 ERAS group, 40 non-ERAS group)	Adult patients undergoing surgery for stage III/IV squamous cell carcinoma of the oral cavity, pharynx, larynx, or hypopharynx	Significant reduction in Length of Stay (LOS) (median 14 days vs. 17.5 days). Average reduction of 3 days compared to the 2017 control group. Protocol implementation was feasible with a high adherence rate (70-100%). No significant difference in complication rates (40% in ERAS group vs. 50% in control group). Limitations: Low sample size, not strong enough to evaluate complications. Complications might be reported more cautiously in the ERAS group. Difficulties in recruitment and full protocol implementation. No economic analysis of cost savings. Cannot evaluate the impact of individual procedures separately. LOS was affected by non-clinical organizational factors

ERAS significantly reduces hospital stays (specifically, from an average of 2.50 days for endoscopic sinus surgery, and from 17.5 days to 14 days for major head and neck cancer surgery). This directly translates into lower hospital costs. At the same time, ERAS protocols have been shown to not increase complication rates. In fact, studies have shown a significant overall reduction in complications (RR = 0.28) such as postoperative nausea/vomiting, facial edema, low back pain, urinary retention, and bleeding.

4. Discussion

4.1. Discussion of study population characteristics

Studies on Enhanced Recovery After Surgery (ERAS) in otolaryngology have included a wide variety of populations and designs. A recent systematic review and meta-analysis of the application of ERAS in patients with chronic sinusitis (CRS) undergoing endoscopic sinus surgery (ESS) included 28 studies with a total of 2636 patients, of which 1321 patients were in the ERAS group and 1315 patients were in the

standard care (SC) group [1]. The majority of these studies focused on CRS patients with and without nasal polyps (CRSwNP and CRSsNP), with four studies specifically targeting CRSwNP patients [1]. In addition, a study specifically on ESS surgery randomly divided 74 CRSwNP patients into an ERAS group (36 patients) and a control group (38 patients) [6]. In the field of head and neck cancer, a prospective study in Italy analyzed 80 patients (40 ERAS and 40 non-ERAS) undergoing surgery for stage III/IV squamous cell carcinoma of the oral cavity, pharynx, larynx, or hypopharynx through matched-pair analysis [7]. In terms of design, these studies were mainly randomized controlled trials (RCTs) and cohort studies [5], with the requirement that the intervention group apply at least six elements of the ERAS protocol, and the number of elements varied from 6 to 14 in the reviewed studies [1].

The diversity of study subjects, from common endoscopic sinus surgery (ESS) to complex head and neck cancer surgeries, suggests that ERAS can be widely applied in ENT hospitals in Vietnam. RCTs and meta-analyses provide strong evidence for large hospitals, especially cancer surgery centers, to refer to and develop ERAS protocols suitable for their actual conditions. Studies with small sample sizes and cohort designs can also be models for provincial or regional hospitals to start piloting ERAS, gradually collecting data and building internal evidence.

4.2. Discussion of ERAS application results

Results from studies show that ERAS brings many significant benefits in ENT surgery. In particular, the ERAS protocol has been shown to be effective and safe in CRS patients undergoing endoscopic sinus surgery [1]. The ERAS group had a significantly shorter length of stay (LOS) (mean reduction of 2.50 days) compared to the standard care group [1], and this also led to a reduction in hospital costs [1, 5]. Furthermore, ERAS significantly reduced pain scores (MD = -1.07), as well as anxiety scores (SMD = -2.13) and depression scores (SMD = -2.42) in patients [1]. The rate of adverse events was also significantly lower in the ERAS group, including total complications (RR = 0.28), postoperative nausea and vomiting (RR = 0.33), facial edema (RR = 0.20), low back pain (RR = 0.28), urinary retention (RR = 0.12), and bleeding (RR = 0.19) [1]. In terms of quality of life (QOL), several studies have shown that ERAS has a positive impact on improving the QOL of CRS patients after ESS [1, 6]. The application of ERAS has also been reported to increase overall satisfaction in the perioperative period and significantly improve olfactory function

and nasal resistance [1]. In head and neck cancer, the introduction of the ERAS protocol resulted in a significant reduction in LOS (median 14 days vs. 17.5 days in the non-ERAS group) without a significant increase in the complication rate [7].

The reduction in length of stay (LOS) and costs is extremely important for the Vietnamese healthcare system, where hospitals are often overcrowded. Shortening LOS increases bed turnover, allowing more patients to be treated. At the same time, reducing hospital costs will reduce the financial burden on patients and their families. The fact that ERAS is proven to be safe and reduces complications is also particularly meaningful, helping to improve the quality of treatment and reduce risks for patients. In Vietnam, focusing on multimodal pain control, anxiety management and improving quality of life are practical goals to improve the patient experience, which is a major challenge in the current context.

4.3. Discussion of study limitations

Despite promising results, current studies on ERAS in ENT surgery still have some limitations that need to be considered. The overall methodological quality of the studies included in the meta-analysis is often limited, requiring caution in interpreting the results [1]. One of the major challenges is the high heterogeneity between the ERAS protocols applied and between the study results, which may lead to bias [1]. Subgroup analyses (e.g., by age or number of ERAS factors) often do not eliminate this heterogeneity, suggesting that other potential sources of heterogeneity need to be further investigated [1]. Many studies lack long-term follow-up data, thus making it impossible to assess the long-term effectiveness of ERAS, for example, quality of life has not been adequately assessed in the long term [1, 6]. Other limitations include the limited number of studies published in English and Chinese, which may introduce language bias [1], and differences in disease severity between CRS patient subtypes that may also influence the results [1]. In addition, the implementation of ERAS in clinical practice faces many organizational and compliance challenges, with some studies indicating that adherence to ERAS elements may be low and that compliance data are underreported in many studies [5, 7].

The limitations of international studies present an opportunity for scientists and clinicians in Vietnam to contribute to the global evidence base. It is necessary to conduct studies in Vietnam with high methodological quality, appropriate sample sizes, and long-term follow-up to build solid evidence. This will help hospitals

obtain specific data that are appropriate to the pathology, culture, and health care model of Vietnamese people. In addition, the lack of uniformity in ERAS protocols suggests that there is a need for a joint effort to develop and standardize a set of ERAS guidelines suitable for Vietnamese conditions, and then evaluate the effectiveness and compliance rate when applied in practice.

5. Conclusions

The ERAS model is a multi-modality care program designed to optimize patient management in the perioperative period, thereby promoting early recovery and improving outcomes. Research has shown that ERAS provides significant benefits in ENT and head and neck surgery, including significant reductions in length of stay, costs, pain, anxiety, and post-operative depression. ERAS has been shown to be effective and safe, with no increased complication rates. Some studies have even shown significant reductions in overall complications such as nausea/vomiting, facial edema, low back pain, urinary retention, and bleeding. The model has also been associated with improvements in quality of life, olfactory function, nasal resistance, and overall patient satisfaction.

However, implementation of ERAS in ENT has been slow and lacks widely accepted guidelines. Current studies have some limitations such as low methodological quality, heterogeneity between protocols, lack of long-term follow-up data and language limitations. Therefore, more comprehensive studies, especially in Vietnam, are needed to build solid evidence and standardize ERAS guidelines suitable for real-life conditions, thereby promoting the widespread application of this model.

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