



Enhanced recovery through fast-track pathway for patients undergoing emergency appendectomy: a quality improvement study

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Abstract

Introduction: The average hospitalization duration for patients undergoing laparoscopic appendectomy is 2 days, compared to 3 days for open appendectomy cases. The main objective of the study was to analyse the postoperative hospital stay in patients undergoing urgent appendectomy (open or laparoscopic) after introduction of an Enhanced Recovery After Surgery (ERAS) bundle.

Materials and methods: A prospective observational study of consecutive patient undergoing appendectomy was conducted at the Hospital Universitari Parc Taulí, in Sabadell, Barcelona, from May 2021 to February 2022. The results of the patients included in the study were compared with a retrospective cohort (January 2018 to April 2021) of consecutive patients with the same inclusion criteria.

Results: Between May 2021 and February 2022, 50 patients (24 men and 26 women) were included. Laparoscopic appendectomy was performed in 47 patients and open surgery in 3 cases. The mean postoperative stay in the group was 23 hours, compared to 38 hours in the historical control group, with this difference being statistically significant (p 0.03). There was no observed increase in morbidity or readmissions.

Conclusion: The use of an ERAS pathway in patients undergoing urgent surgery for acute appendicitis reduced the average hospital stay without an associated increased the risk of complications or readmissions, accepting the small numbers in this study.

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Introduction

Acute appendicitis is a prevalent condition, affecting millions worldwide annually (1). Surgical treatment, primarily through laparoscopic appendectomy, is common, with varying hospital stays (2). Enhanced Recovery After Surgery (ERAS) protocols, introduced in 1997 by Kehlet, have revolutionized postoperative care, promoting rapid recovery in elective surgeries. These protocols emphasize preoperative instructions, immediate postoperative mobilization and feeding, optimal pain management, minimally invasive techniques, and avoiding drains and catheters (3). ERAS has shown to reduce hospital stays without increasing complications. Early discharge programs, initiated in 1994 (4), have proven safe for uncomplicated appendicitis (5-7). Ambulatory laparoscopic appendectomy, facilitated by strict selection criteria and ERAS protocols, has gained popularity for its cost-effectiveness (2). However, implementing ERAS in emergency settings, where perioperative management is challenging, remains a hurdle. Studies evaluating ERAS effectiveness in open appendectomy are lacking. Despite ERAS protocol developments for emergency interventions, clinical pathways are uncommon in emergency surgery. Our study aims to assess the impact of ERAS protocols, including a clinical pathway, on postoperative stay, morbidity, and mortality in emergency appendectomies.

Methods

A prospective, single-center observational quality improvement study was carried out at Universitari Parc Taulí Hospital, Barcelona, Spain. Inclusion criteria comprised patients aged 18 and above diagnosed with uncomplicated acute appendicitis, while exclusion criteria encompassed pregnancy, oral anticoagulant therapy, dependence on Activities of Daily Living (ADLs), impaired higher functions, and severe comorbidities. Sample size calculation indicated the need for 43 patients in the study group. Results were compared with those of 43 patients from a historical cohort (spanning January 2018 to April 2021) of the hospital, meeting identical inclusion criteria. A modified Enhanced Recovery After Surgery (ERAS) protocol was adhered to, encompassing preoperative assessments, intraoperative measures, and a postoperative clinical pathway. Outcomes assessed included complications assessed through the Comprehensive Complication Index and readmissions. Data analysis utilised SPSS

v25, with significance set at $p < 0.05$.

Results

Between May 2021 and February 2022, 50 patients, selected consecutively, underwent emergency appendectomy (Figure 1), predominantly laparoscopic. Patients following the ERAS clinical pathway had significantly shorter postoperative stays (23 hours) compared to historical controls (38 hours, $p = 0.03$). Early initiation of diet (5.4 hours) and ambulation (9 hours) was achieved (Figure 2). The mean pain score according to the VAS scale at 2, 6, and 12 hours was 2.2, 3.0, and 2.6, respectively. (Figure 3). Complication rates were lower in the ERAS group (mean Comprehensive Complication Index of 9 vs 14.6, $p < 0.05$), with no readmissions, with two readmissions and six emergency consultations in the historical cohort.

Discussion

Acute appendicitis is a significant global surgical emergency, with a notable lifetime risk in the United States (8). While laparoscopic appendectomy remains the standard treatment, conservative antibiotic therapy has been proposed as an alternative. However, the COMMA Trial in 2021 revealed higher recurrence rates and diminished quality of life with antibiotic treatment (9).

Recent studies have explored the ambulatory management of laparoscopic appendectomy using Enhanced Recovery After Surgery (ERAS) protocols, showing it to be safe and associated with shorter hospital stays, comparable morbidity, and readmission rates to traditional management (10, 11, 12). For instance, Trejo-Avila et al. and the Wijkerslooth group demonstrated the efficacy of ERAS protocols in reducing hospital stays while maintaining safety (10,13). A randomized study by the Digestive Surgery Department of the Joan XXIII Hospital also supported the feasibility of ambulatory management, highlighting its lower complication rate, shorter hospital stay, and reduced costs compared to traditional management (11).

Our study aligns with these findings, showing a significant reduction in hospital stay in the fast-track group, without increased readmissions or complications. Our study included patients undergoing both laparoscopic and open surgery in the fast-track group, demonstrating the feasibility of ERAS protocols in diverse surgical approaches.

While our study is limited by its single-centre and observational nature, and thus small numbers, the evidence suggests that the application of fast-track protocols in emergency appendectomy surgery is viable and effective. Despite its limitations, our study contributes to the growing body of literature supporting ERAS protocols in reducing hospital stays, lowering economic costs, and maintaining patient safety in emergency appendectomy cases. Further multi-center studies are needed to validate these findings and promote the widespread adoption of ERAS protocols in emergency surgery.

Figure 1. Patient flowchart

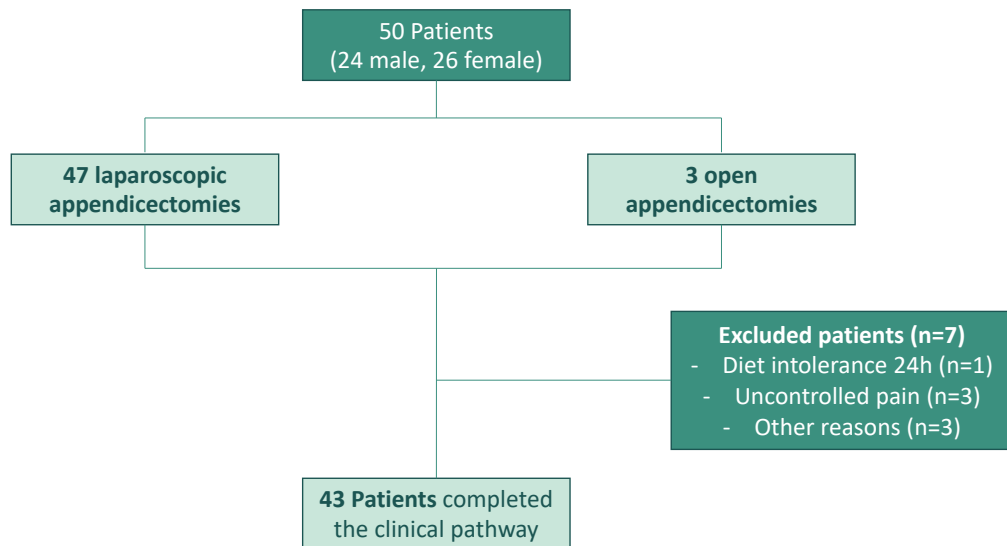
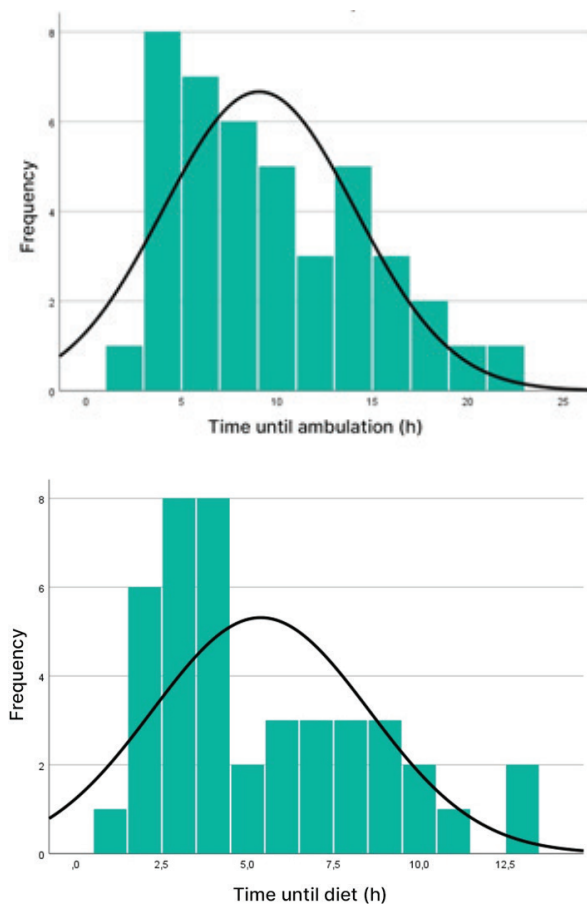


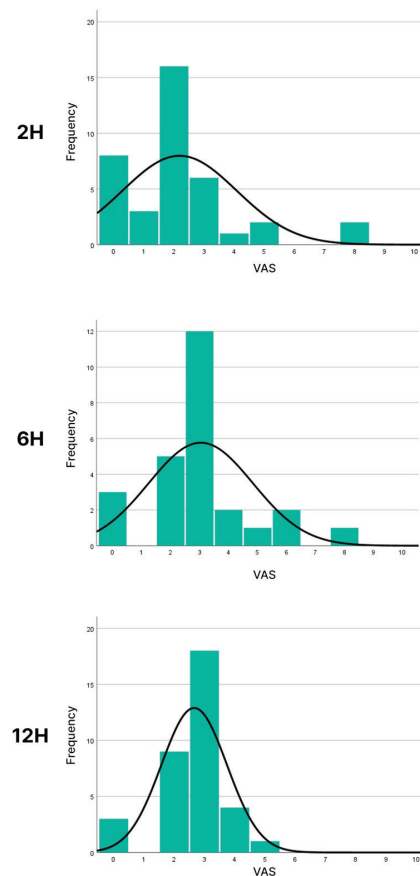
Figure 2: time until start of diet and ambulation



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Figure 3. Chart of pain (Visual Analogue Scale, VAS) scale at 2, 6 and 12 hours after surgery.



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