

Simplified ERAS Program for Elective Colorectal Surgery at Suratthani Hospital

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Abstract

Background: Enhanced recovery after surgery (ERAS) program in colorectal surgery is a multimodality protocol that could effectively reduce the length of hospital stay and complication rates. However, data on the effectiveness of ERAS in Thailand is still limited.

Objective: The objective of the present study is to evaluate the effectiveness and safety of ERAS program for elective colorectal surgery at Suratthani Hospital.

Methods: In the present study, we included all patients who underwent elective colorectal surgery under the ERAS program by one of the authors at Suratthani Hospital from July 2016 to June 2018. We obtain patients in the traditional care group by matching patients who underwent elective colorectal surgery by other surgeons, using age, height, body weight, BMI, and surgical procedure, to patients in the ERAS group, in the ratio of 2 to 1.

Results: Patients in ERAS group were found to have significantly shorter length of hospital stay, with an average of 6.9 days compared to 9.2 days ($p < 0.001$) in the traditional care group. There were no statistically significant differences in complications and the rate of readmission within 30 days between the two groups.

Conclusion: The ERAS program was effective in reducing the length of hospital stay without affecting complication rates and was easy to apply. We encourage surgeons in regional and general hospitals to adopt and use the ERAS program to help reduce the overcrowding problem in hospitals.

Keywords: Colorectal surgery, ERAS program, Length of hospital stays.

INTRODUCTION

ERAS or Enhanced recovery after surgery program is an evidence-based multimodality protocol that was developed to challenge the traditional care dogma. It was first outlined by a Danish surgeon, Dr. Henrik Kehlet in 1995 for colorectal surgery¹. Numerous publications have subsequently validated the efficacy and safety of the ERAS program. A meta-analysis of six randomized controlled trials in 2010 showed significant reductions in hospital stay (average decrease of 2.6 days; 95% CI: 1.9 to 3.2 days) and complication rate (RR: 0.53; 95% CI:

0.44 to 0.64)². ERAS protocols have also been adopted in other fields of surgery³⁻⁷.

Data on the effectiveness of the ERAS program in Thailand is limited. A few studies done within the context of academic medical centers have been published^{8, 9, 10}, all of which reported favorable outcomes. We wish to report a validation of this protocol within the context of a provincial hospital. Suratthani Hospital is a public, tertiary-care, southern regional hospital with an official capacity of 800 beds. Overcrowding is a major problem in our hospital, with patients regularly occupying

more than 1000 beds, exceeding the official capacity. The ERAS program may help solve the overcrowding problem by reducing the length of hospital stay.

The purpose of the present study is to evaluate the effectiveness and safety of the ERAS program as adopted and used for elective colorectal surgery at Suratthani Hospital.

METHODS

Patients included in the present study were scheduled for elective colorectal surgery, more than 18 years of age, had malignant or benign colorectal diseases requiring major colorectal surgery, and had complete follow-up.

Our ERAS protocol was adapted from the ERAS Society Guidelines, detailed in Table 1¹¹. In the present study, we included all patients under the ERAS program who had undergone elective colorectal surgery by one of the authors (Dr. Sorawat Janwanitchstaporn) at Suratthani Hospital from July 2016 to June 2018.

The comparative, traditional care group, were

obtained by matching patients who underwent elective colorectal surgery by other surgeons, using age, height, body weight, BMI, and surgical procedure, to those in the ERAS group, in the ratio of 2 to 1. All patients' relevant data were recorded. Patients were followed at the out-patients department on the second and fourth week after discharge. A sample size calculation showed that the minimal sample sizes required were 42 patients in the ERAS group, and 84 patients in the traditional group. Ethical approval of the study was obtained from Suratthani Hospital's Ethics Review Board.

Outcome measures included the length of hospital stay, time to resumption of oral (soft) diet, the need for re-admission, and postoperative morbidity and mortality. Continuous data were presented as mean or median and standard deviation or interquartile range (IQR) as appropriate. Postoperative length of hospital stay and ICU stay were compared between groups using the Mann-Whitney U test. Reoperation, reintervention, complication, and mortality were compared between groups using the Chi-square test. A p-value less than

Table 1 The Enhanced Recovery after Surgery (ERAS) Protocol

Preoperative	- Give operative information - Nutritional screening by using NRS-2002 score and treatment - Give antidepressant as needed - No routine mechanical bowel preparation
Intraoperative	- Control excessive bowel exposure or MIS surgery - Locoregional anesthesia - Epidural block - Local injection - Abdominal tap block - Avoid unnecessary drain and catheter - Nasogastric intubation - Peritoneum drainage
Postoperative	- Promote early ambulation - 24hr after surgery – sit or upright position - 48hr after surgery – walk - Promote respiratory exercise - Early taking oral diet - 24hr after surgery – oral fluid intake - 48hr after surgery – soft diet - Minimized intravenous fluid, keep urine output at 0.5-1ml/kg/hr - Multimodality analgesia - Acetaminophen prescribed every 4 hours - NSAIDs for selected case - Reduced opioid use - Remove Foley's catheter and drain as soon as possible

0.05 was considered to be statistically significant. Data were analyzed using SPSS® version 16.0 for Windows®.

RESULTS

There were 48 patients who underwent elective colorectal surgery under the ERAS protocol from July 2016 to June 2018. During the same period, 106 patients who underwent elective colorectal surgery under the traditional care program by other surgeons, were matched to the ERAS group, but 6 patients had missing or invalid data and had to be excluded. Therefore, a total of 100 patients were included in the traditional care group. The characteristics of both groups are shown in Table 2. Because of the matching, there were no significant differences in age, gender, BMI, comorbid disease, type of disease, and surgical procedures.

Patients in the ERAS group were found to have a significantly shorter length of hospital stay with an average (median) of 6.9 days, when compared to 9.2 days

in the traditional group ($p < 0.001$), and demonstrated good functional recovery, with a significant reduction in the time to resumption of oral diet. Postoperative complications in the traditional group included surgical site infection in 6 cases (6%), anastomosis leakage in 2 cases (2%), and other complications in 3 cases (3%). Postoperative complications in the ERAS group included surgical site infection in 1 case (2%), anastomosis leakage in 1 case (2%), and other complications in 1 case (2%). Readmission within thirty days of discharge was seen in 2 cases (2%) in the traditional group, due to surgical site infection and early post-operative gut obstruction, and in 1 case (2%) in the ERAS group, due to early post-operative gut obstruction. One patient in the traditional group died from sepsis following anastomosis leakage. There were no statistically significant differences in complication and the readmission rates between the two groups (Table 3).

Table 2 Characteristics of patients

	ERAS group (N=48)	Traditional care group (N=100)	P-value
Age, years (mean)	55.94	58.46	0.325
Body weight, kg. (mean)	61.22	55.95	0.994
Height, cm (mean)	163	159.07	0.968
BMI (mean)	22.97	23.09	0.949
Sex			
- Male (%)	30 (63)	56 (56)	0.453
- Female (%)	18 (37)	44 (44)	
Underlying disease			
- Type 2 Diabetes (%)	2 (4)	11 (11)	0.164
- Primary hypertension (%)	7 (15)	21 (21)	0.410
- Dyslipidemia (%)	5 (10)	11 (11)	0.518
- Other (%)	9 (19)	17 (17)	0.816
Type of disease			
- Malignancy (%)	46 (96)	97 (97)	0.953
- Diverticulum disease (%)	2 (4)	3 (3)	
Location of disease			
- Right side colon (%)	12 (25)	20 (20)	0.511
- Transverse colon (%)	6 (13)	12 (12)	0.761
- Left side colon (%)	20 (42)	39 (39)	0.619
- Rectum (%)	10 (22)	27 (27)	0.975
Laparoscopic assist surgery (%)	4 (8.3)	7 (7)	0.621
Other organ resection (%)	7 (15)	8 (8)	0.213
- Cystectomy (%)	3 (6)	3 (3)	
- Hysterectomy (%)	2 (4)	2 (2)	
- Small bowel resection (%)	2 (4)	3 (3)	

Table 3 Comparison of outcomes

	ERAS group (N=48)	Traditional care group (N=100)	P-value
Length of hospital stay (days)	6.9	9.2	< 0.001
Returning to soft diet (days)	3.1	5.1	< 0.001
Complication (%)	4 (8)	11 (11)	0.428
- Surgical site infection (%)	2 (4)	6 (6)	
- Anastomosis leakage (%)	1 (2)	2 (2)	
- Other (%)	1 (2)	3 (3)	
Readmission within 30 days (%)	1 (2)	2 (2)	0.98
Mortality (%)	0 (0)	1 (1)	0.22

DISCUSSION

Similar to many previous studies of the ERAS program, our study showed that patients in the ERAS program had a shorter length of hospital stay, by 2 to 3 days when compared to patients in the traditional care program. The average length of hospital stay in our study is comparable to that of Supsamutchai from Ramathibodi Hospital (6 days)⁸, but is longer than those of some previous studies (3 to 6 days) found in several systematic reviews and meta-analyses¹¹⁻¹⁵. The complication rates and readmission rates trended to be lower in the ERAS group compared to those of the traditional group, but no statistical significance could be demonstrated, possibly due to the small sample size.

The ERAS program may be of value by reducing hospital stay, reducing hospital costs, as well as providing a solution to the overcrowding problem, which is a serious problem in regional hospitals and general hospitals. The present study is a pilot study for our ERAS program, which was easily applied and showed a favorable outcome.

However, the present study had several limitations. Firstly, patients in the ERAS group were under the care of one surgeon, while patients in the traditional care group were looked after by several surgeons, and although patients in the latter group were manually matched to the former group, generalizability of the study may be limited and residual selection bias may still exist. Secondly, the number of patients in the study was relatively small. Finally, the adherence of the patient to the ERAS protocol was not considered.

In the future, the ERAS program should be endorsed by other surgeons. With more information and cooperation with medical personal from other departments, we can improve our ERAS program for the benefit of the patients and the hospital.

CONCLUSION

This ERAS program for elective colorectal surgery was shown to be effective in reducing the length of hospital stay without increasing complications and readmissions. This information should encourage other surgeons in regional hospitals and general hospitals to use the ERAS program to help reduce overcrowding problems in hospitals.

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บทคัดย่อ การดูแลผู้ป่วยด้วยโปรแกรม ERAS อย่างง่ายหลังการผ่าตัดลำไส้ใหญ่แบบไม่ฉุกเฉินในโรงพยาบาลสุราษฎร์ธานี

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กลุ่มงานศัลยกรรม โรงพยาบาลสุราษฎร์ธานี

ความเป็นมา: โปรแกรมส่งเสริมการฟื้นฟูลังผ่าตัด (Enhanced recovery after surgery หรือ ERAS program) ในการผ่าตัดลำไส้ตรงและลำไส้ใหญ่ได้รับการยอมรับอย่างกว้างขวางและมีหลักฐานทางวิชาการมากมายว่าสามารถลดการเกิดภาวะแทรกซ้อน ลดอัตราเสียชีวิตหลังผ่าตัด ลดระยะเวลาอนโรงพยาบาล และลดค่าใช้จ่ายในการรักษาพยาบาลได้ แต่ข้อมูลในเมืองไทยยังมีจำกัด

วัตถุประสงค์: เพื่อประเมินประสิทธิภาพและความปลอดภัยของ ERAS program ที่ปรับเพื่อมาใช้ในโรงพยาบาลสุราษฎร์ธานี

วิธีการศึกษา: เป็นการศึกษา cohort แบบไปข้างหน้าโดยนำคนไข้ที่จะได้รับการผ่าตัดลำไส้ใหญ่และลำไส้ตรงและใช้ ERAS program ในการดูแลคนไข้ โดยศัลยแพทย์ผู้นิพนธ์ 1 ท่าน ตั้งแต่ กรกฎาคม 2559 ถึง มิถุนายน 2561 และเลือกผู้ป่วยที่ได้รับการดูแลโดยศัลยแพทย์ท่านอื่นเป็นกลุ่มควบคุมในอัตราส่วน 2:1 โดยใช้ อายุ, เพศ, ส่วนสูง, โรค และวิธีผ่าตัด เป็นตัวแปรจัดคู่

ผลการศึกษา: ผู้ป่วยที่ได้รับการดูแลโดย ERAS program มีระยะเวลาการนอนโรงพยาบาลเฉลี่ย 6.9 วัน ต่ำกว่ากลุ่มควบคุม (เฉลี่ย 9.2 วัน) อย่างมีนัยยะสำคัญทางสถิติ มีภาวะแทรกซ้อนและการกลับมานอนโรงพยาบาลไม่แตกต่างกันในกลุ่ม

สรุปผลการศึกษา: ERAS program ของโรงพยาบาลสุราษฎร์ธานีมีความปลอดภัยสามารถลดเวลาการนอนโรงพยาบาลของผู้ป่วยได้เฉลี่ย 2 วัน โดยจากผลการศึกษาของข้อมูลนี้สนับสนุนให้ศัลยแพทย์พัฒนาและใช้ ERAS program ที่เหมาะสมกับโรงพยาบาลแต่ละแห่ง