

Who tolerates early enteral feeding after colorectal surgery?

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Introduction

Enhanced Recovery after Surgery (ERAS) protocols are multi-faceted perioperative care bundles for the management of surgical patients. (1) They are associated with improved recovery, reduced length of stay and lower costs, and have therefore been widely adopted internationally. (1, 2-4)

One core element of the ERAS protocol is early enteral nutrition. Early feeding is typically commenced within 24 hours of surgery and has been associated with lower rates of post-operative ileus (POI) and other morbidity, as well as mortality, when compared to the traditional approach of slow re-introduction of feeding post-operatively. (5-7) Nasogastric tubes (NGT) are associated with significant morbidity and discomfort and hinder early feeding. (8) Therefore, the standard approach under the ERAS protocol is to avoid NGTs where possible, and to remove them before the patient emerges from anaesthesia, when they are required intra-operatively. (5)

The overall benefits of early feeding and avoiding routine NGTs are well established for the majority of patients; (5) however, a subset will still vomit. The early introduction of oral nutrition coupled with the departure from prophylactic NGT insertion has the potential to increase the risk of post-operative abdominal distention and vomiting, which carry a risk of aspiration. (9) As a result, some patients will need to endure the discomfort of NGT placement post-operatively. (10)

Previous studies on early post-operative enteral feeding and NGT insertion have mainly investigated the outcomes of patients managed with early enteral feeding compared with the traditional fasting approach, (2, 6, 11) and compared the benefits of selective vs. routine NGT insertion. (8, 10) However, there is a paucity of data to identify risk factors for failure of early enteral feeding. (12-14)

Aim

The purpose of this study was to identify which patients carry a high risk of vomiting after colorectal surgery, which may assist in identifying those groups of patients who are unlikely to tolerate early enteral feeding and may benefit from routine NGT insertion in theatre.

Methodology

This is a retrospective study of all patients who underwent an elective intra-abdominal colorectal operation from 2014 through to 2018 at University Hospital, Geelong, Victoria, Australia. Our institution's ERAS protocol has been described previously and is routinely applied for elective colorectal operations. (16) This protocol includes routine removal of the NGT (if one has been placed) prior to the patient waking up, as well as the routine use of anti-emetics as required post-operatively.

Patient data were retrieved from the Colorectal Database at University Hospital, Geelong (a prospectively maintained database of all colorectal operations) and directly from the patients' medical records, as required. Data collected from each patient included gender, age, Body Mass Index (BMI), ASA score, indication for operation, operation performed, operation method, day of first vomit, day of NGT insertion and indication for NGT.

We defined a failure of enteral feeding as any patient who had a nasogastric tube inserted for persistent vomiting or abdominal distension.

All non-parametric and parametric data was analysed using a Chi-squared and Mann-Whitney U Test statistic, respectively. Variables with a P value of <0.05 were selected for multivariate analysis using a stepwise logistic regression model. All analyses were performed using MedCalc© (Mariakerke, Belgium).

Results

Between January 2014 and December 2018, a total of 832 patients underwent colorectal operations at University Hospital, Geelong. Following a multi-step exclusion process, 728 patients remained and were included in the analysis.

Anti-emetics were prescribed for all patients and were administered to 653/728 (90%). Opiate analgesics were administered to 718/728 (99%).

Of the 728 patients included in the study, post-operative vomiting occurred in 271 (37%) patients. Most patients who vomited did so within the first four post-operative days (illustrated in Figure 1). Nasogastric tubes were inserted in 156/728 (21%) patients, and these patients were considered to have failed enteral feeding.

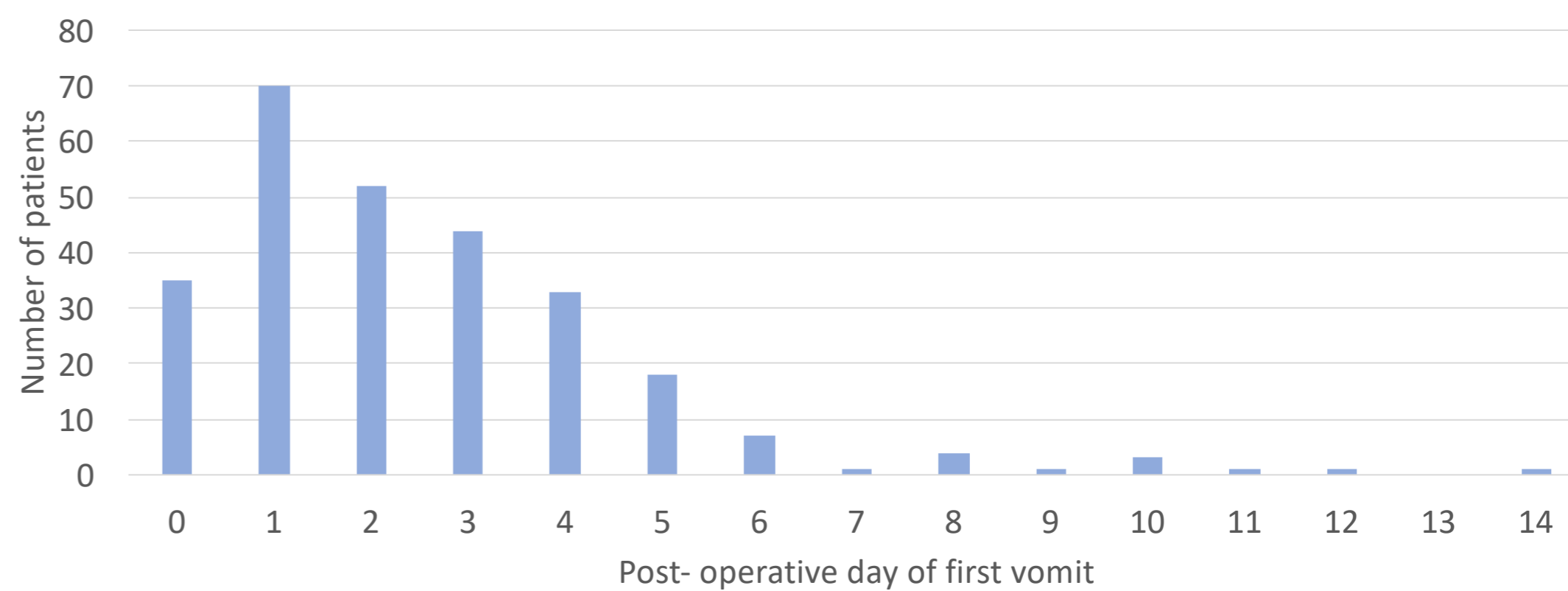


Figure 1: Day of first vomit post-operatively

Variable	NGT	No NGT	p-value
Gender	Male	77%	p=.235
	Female	81%	
Age			p=.147
BMI			p=.010
Indication	Benign	80%	p=.174
	Malignant	77%	
Anastomosis	Yes	77%	p=.235
	No	84%	
Operation method	Laparoscopic	85%	p=.002
	Open	75%	
Operation group	Subtotal/total colectomy	48%	p<.001
	Other	80%	

Table 1: Gross findings

The strongest predictor of failure of enteral feeding was the type of operation. Specifically, patients who underwent a subtotal or total colectomy failed enteral feeding in 15/28 (54%) cases, compared with 141/557 (25%) for all other types of operation (P=0.0007; Relative risk 2.2) (illustrated in Figure 2). Open surgery was also associated with a higher risk of failure than laparoscopic surgery (112/ 449 (25%) vs. 43/278 (15%); P=0.0025; Relative risk 1.7), and patients with a high BMI were more likely to fail enteral feeding (P=0.037). These were confirmed on multi-variant analysis to be independent predictors of risk.

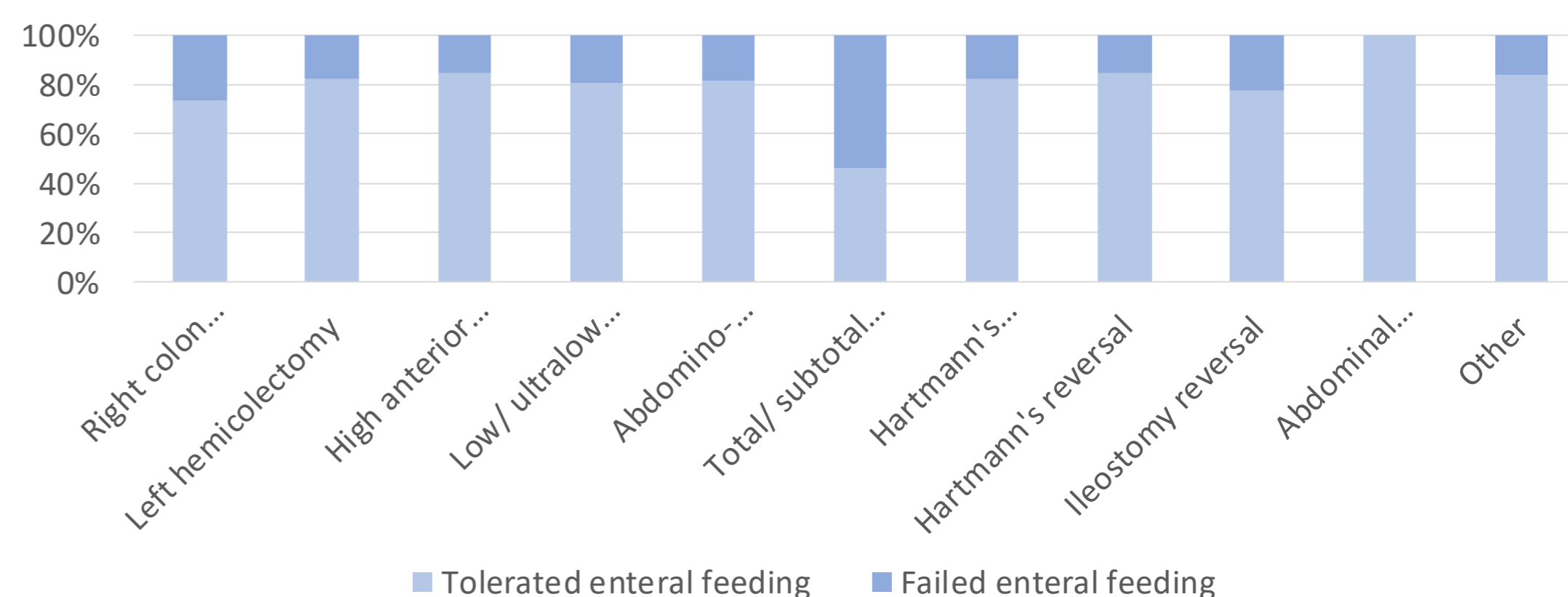


Figure 2: Failure of enteral feeding by operation type

Independent predictor	Effect on risk of failing ERAS
BMI	0.7% increased risk (for every 1-point increase in BMI)
'Open' procedure	9.3% increased risk
Subtotal/total colectomy	36% increased risk

Table 2: Independent predictors

Conclusion

A lower BMI and laparoscopic procedures were found to lower the risk of failure of early enteral feeding. Patients undergoing a total or subtotal colectomy have a high rate of failure. These findings may allow for pre-operative identification of those patients who are unlikely to benefit from early enteral feeding.

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