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GUIDELINES FOR CLINICAL PRACTICE

Early postoperative feeding in resectional gastrointestinal surgical cancer patients

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Abstract

Malnutrition is present in the majority of patients presenting for surgical management of gastrointestinal malignancies, due to the effects of the tumour and preoperative anti-neoplastic treatments. The traditional practice of fasting patients until the resumption of bowel function threatens to further contribute to the malnutrition experienced by these patients. Furthermore, the rationale behind this traditional practice has been rendered obsolete through developments in anaesthetic agents and changes to postoperative analgesia practices. Conversely, there is a growing body of literature that consistently demonstrates that providing oral or tube feeding proximal to the anastomosis within 24 h postoperatively, is not only safe, but might be associated with significant benefits to the postoperative course. Early post operative feeding should therefore be adopted as a standard of care in oncology patients undergoing gastrointestinal resections.

Key words: Early feeding; Surgery; Meta-analysis; Randomised controlled trials

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INTRODUCTION

Malnutrition is a common finding in patients presenting for surgical management of gastrointestinal malignancies, with an estimated prevalence in this group of 40% to 80%[1]. A complex mix of factors, such as tumour location, tumour type, stage of disease, and preoperative radiation and/or chemotherapy treatments, might predispose patients to malnutrition. Nausea, vomiting, reduced appetite, early satiety, taste changes, diarrhoea, pain, mucositis, physical obstruction, and malabsorption could result in weight loss, which in turn is a strong prognostic indicator of poor outcome in terms of survival and response to treatment. Similarly, cancer cachexia is frequently observed in patients with solid tumours of the gastrointestinal tract, and it is estimated that the physical

Table 1 Randomised controlled trials investigating early feeding published since 2005

Study	Year	Types of Gastrointestinal Surgery	*n* (Trad/Early)	Early feeding protocol	Outcomes
Lucha *et al*[4]	2005	Open colorectal surgery	25/26	Regular diet from 8 hr following surgery	No difference in post operative complications between groups (1 d *vs* 1 d) or LOS 6.6 d *vs* 6.3 d
Zhou *et al*[5]	2006	Excision and anastomosis for colorectal tumour	155/161	Liquid fibreless diet D1-3 post *op*	Statistically significant benefits of early feeding Flatus 3.0 ± 0.9 d *vs* 3.6 ± 1.2 d, $P = 0.000$ Stool 4.1 ± 1.1 d *vs* 4.8 ± 1.4 d, $P = 0.000$ LOS 8.4 ± 3.4 d *vs* 9.6 ± 5.0 d, $P = 0.016$ Reduced complications with early feeding Reduced febrile illness: 3 *vs* 15, $P = 0.042$ Pulmonary infection: 1 *vs* 7, $P = 0.034$ Pharyngolaryngitis: 5 *vs* 36, $P = 0.000$ No differences in wound complications 4 *vs* 3, $P = 1.0$ No differences in anastomotic leakage 2 *vs* 4, $P = 0.441$
Han-Geurts *et al*[6]	2007	Open colorectal surgery	50/46	Regular diet from D1 post *op*	No statistically significant differences in outcomes between groups in any in-hospital complication, including mortality. No statistically significant differences between return of bowel function and length of hospital stay between groups
Lassen *et al*[7]	2008	Hepatic, pancreatic, oesophageal, gastric resections, bilioenteric and gastroenteric bypass procedures, unspecified procedures in which traditional NBM management would be indicated	227/220	Early oral feeding provided with ordinary hospital diet from D1 post *op* NB control group received enteral nutrition *via* a jejunostomy tube from D1 post *op*	No differences between number of patients major complications between groups (33% in jejunum fed *vs* 28% early oral, $P = 0.26$); less overall complications in early oral feeding group (100 *vs* 165, $P = 0.012$) No differences in mortality between groups within the trial period (8.4% early jejunum feeding *vs* 5.9% early oral, $P = 0.36$) Increased likelihood of intra-abdominal abscesses in gastrectomy patients with early jejunum feeding *vs* early oral intake (6 *vs* 0, $P = 0.012$) Shorter duration to passage of flatus early oral feeding group (2.6 *vs* 3.0 d, $P = 0.01$); no difference for duration to first bowel motion (4.3 *vs* 4.0 d, $P = 0.112$) Longer length of stay with jejunum fed patients (16.7 *vs* 13.5 d, $P = 0.046$)

wasting of both fat and lean body tissue associated with this syndrome is implicated in approximately 30% to 50% of all cancer deaths[1].

EDITORIAL

Traditional perioperative care following resectional surgery for gastrointestinal cancer involves, among other things, withholding of nutritional provision postoperatively until resumption of bowel function, as evidenced by passage of flatus or first postoperative bowel motion, which in some cases might not occur for close to a week after surgery. Reasons purported for this practice include reducing the risk of postoperative abdominal distension, nausea/vomiting and subsequent concerns regarding anastomotic breakdown, wound dehiscence, and pulmonary aspiration. Moreover, when dietary intervention is recommenced, fluids of limited nutritional value such as water, tea, lemonade, consommé soups and jelly are traditionally provided for the first several days until tolerance is thought to be established[2]. This could result in a patient receiving little or no nutrition within the first week post surgery, further contributing to the nutritional deficit incurred during the perioperative period and exacerbating the weight loss and malnutrition experienced by this already nutritionally vulnerable patient group[2].

However, in the last 30 years, many studies have challenged this traditional approach to postoperative nutritional care by investigating the safety, feasibility, and benefits of providing nutrition within 24 h following gastrointestinal surgery. Since the first randomised controlled trial investigating this topic in 1979[3], there have been no less than 30 randomised controlled trials investigating this topic in some form, the majority of which have been conducted in patients receiving surgical oncology management. The results of these studies have collectively failed to support the traditional postoperative management principles, and many demonstrate clear benefits associated with early feeding in terms of nutritional, biochemical, anthropometric, financial, and clinical outcomes. In particular, despite long held concerns that early feeding would increase the likelihood of anastomotic dehiscence, this finding was not significantly associated with the early provision of nutrition in any individual study that reported on this outcome (Table 1)[4-7]

Table 2 Comparison of outcomes and characteristics of published meta-analyses on early feeding

	Lewis, Egger, Sylvester & Thomas *BMJ* 2001[8]	Andersen, Lewis & Thomas *Cochrane Database Syst Rev* 2006[9]	Lewis, Andersen & Thomas *J Gastrointest Surg* 2009[10]
Inclusion criteria	Elective gastrointestinal surgery RCTs Enteral feeding within 24 h post *op vs* NBM/traditional management Included unpublished data	RCTs (un/published) Colorectal surgery Early feeding (within 24 h) *vs* NBM Malignant/benign disease incl. IBD Studies solely in paediatric population RCTs with no blinding If reported on outcomes including adverse outcomes, mortality	RCTs (unpublished/published) Colorectal surgery Early feeding (within 24 h) *vs* NBM Malignant/benign disease including inflammatory bowel diseases Studies solely in paediatric population RCTs with no blinding If reported on outcomes including adverse outcomes, mortality
Exclusion criteria	Not stated	PN Non-RCTs Unpublished abstracts with no correspondence data	PN Non-RCTs Unpublished abstracts with no correspondence data
Number of patients	929	1173	1173
Number of included studies	11	13	13
Publication dates	1979-1998	1979-2004	1979-2004
Gastrointestinal surgery types included	Colonic, ileal or colonic resection; oesophago-gastrectomy, gastrectomy, ileoanal J pouch, reanastomosis; esophagectomy, pancreatoduoden-ectomy; unspecified laparotomy	Colonic, ileal or colonic resection; oesophago-gastrectomy, gastrectomy, ileoanal J pouch, reanastomosis; esophagectomy, pancreatoduodenec-tomy; unspecified laparotomy	Colonic, ileal or colonic resection; oesophago-gastrectomy, gastrectomy, ileoanal J pouch, reanastomosis; esophagectomy, pancreatoduodenectomy; unspecified laparotomy
Outcomes			
Wound infections	RR 0.71 (0.44-1.17) χ^2 value not reported, $P = 0.074$	RR 0.77 (0.48-1.22) $P = 0.3$ (FEM) $\chi^2 = 10.30$ $P = 0.26$	RR 0.78 (0.38, 1.68) (REM) RR 0.77 (0.48-1.22) $P = 0.3$ (FEM) $\chi^2 = 10.30$ $P = 0.26$
Intra-abdominal abscesses	RR 0.87 (0.31-2.42) χ^2 value not reported, $P = 0.84$	RR 0.87 (0.31–2.42) $P = 0.8$ $\chi^2 = 1.45$ $P = 0.84$	RR 0.94 (0.32, 2.77) (REM) RR 0.87 (0.31–2.42) $P = 0.8$ (FEM) $\chi^2 = 1.45$ $P = 0.84$
Pneumonia	RR 0.73 (0.33–1.59) χ^2 value not reported, $P = 0.85$	RR 0.76 (0.36-1.58) $P = 0.5$ $\chi^2 = 3.73$ $P = 0.81$	RR 0.71 (0.32, 1.59) (REM) RR 0.76 (0.36-1.58) $P = 0.5$ (FEM) $\chi^2 = 3.73$ $P = 0.81$
Any infection	RR 0.72 (0.54-0.98) $P = 0.036$ $\chi^2 = 10.7$, $P = 0.22$	Not assessed	Not assessed
Mortality	RR 0.48 (0.18-1.29) $P = 0.15$ χ^2 value not reported, $P = 0.99$	RR 0.41 (0.18-0.93) $P = 0.03$ $\chi^2 = 0.6$ $P = 0.99$	RR 0.42 (0.18, 0.96) (REM) RR 0.41 (0.18-0.93) $P = 0.03$ (FEM) $\chi^2 = 0.6$ $P = 0.99$
Anastomotic dehiscence	RR 0.53 (0.26-1.08) $P = 0.08$ $\chi^2 = 2.1$, $P = 0.96$ NB-little evidence that data from proximal *vs* distal feeding results differed $P = 0.42$	RR 0.69 (0.39-1.32) $P = 0.3$ $\chi^2 = 4.89$ $P = 0.77$	RR 0.62 (0.30, 1.28) (REM) RR 0.69 (0.39-1.32) $P = 0.3$ (FEM) $\chi^2 = 4.89$, $P = 0.77$ for FEM. No χ^2 reported for REM
Length of hospital stay	-0.84 d (-0.36-1.33) $P = 0.001$ $\chi^2 = 16.2$, $P = 0.094$	-0.60 d (-0.66, -0.54) $\chi^2 = 18.86$ $P = 0.06$	-0.89 d (-1.58, -0.20) (REM) -0.60 d (-0.66, -0.54) (FEM) $\chi^2 = 18.86$ $P = 0.06$
Vomiting	RR 1.27 (1.01-1.61) $P = 0.045$ χ^2 value not reported, $P = 0.52$ NB-non-significant increase in N&V with early feeding where NGs were not placed at time of surgery RR 1.21 (0.73-1.99) $P = 0.46$	RR 1.27, (1.01-1.61) $P = 0.04$ $\chi^2 = 4.21$ $P = 0.52$	RR 1.23 (0.97, 1.55) (REM) RR 1.27 (1.01-1.61) (FEM) $\chi^2 = 4.21$ $P = 0.52$

95% Confidence intervals in closed brackets. RCT: Randomised controlled trial; PN: Parenteral nutrition; NBM: Nil by mouth; RR: Relative risk ratio; FEM: Fixed effects model (of meta-analysis); REM: Random effects model (of meta-analysis); N&V: Nausea and vomiting.

or by any of the meta-analyses examining this topic (Table 2)[8-10]. Furthermore, a recent study has also demonstrated the safety of early oral feeding within 24 h of receiving major upper gastrointestinal surgery such as gastrectomy and Whipple's procedures[7].

Withholding nutrition from patients until the resolution of the transient postoperative ileus has been employed as the standard postoperative management for well over

100 years[11], and is thought to have developed in response to the high rates of postoperative emesis experienced by patients anaesthetised with traditional agents, such as ether and chloroform[12]. From this origin, a cautious reintroduction of diet following operative procedures has been adopted, irrespective of the site of surgery, and particularly so if it has involved the gastrointestinal tract[12]. A textbook on surgical after-treatment from 1915 recommends "feed(ing) the patient as soon as possible, but at the same time to avoid distension" for patients undergoing abdominal surgery, for which a clear fluid diet (consisting of water, tea and sparkling wine) is promoted in the first few days post surgery, followed by boiled fish or eggs after "a day or two"[13]. The addition of other elements such as dairy and "farinaceous" (starchy) foods are recommended to be "cautiously added" after a few days on the light protein diet allowing the "gradual return made to a full mixed diet"[13]. Similar concepts were promoted into the 1930's with dietary intake being limited to milk diluted with limewater on the third or fourth postoperative day, once flatus had been passed[12]. By the 1940's a more rapid progression through the dietary stages were appearing in surgical texts; however, little in terms of dietary composition or reasoning behind the provision of this had changed. A textbook from 1940 advises to avoid oral nutrition within the first 24 h post surgery so as not to "interfere with" the anticipated paralytic ileus resulting from physical manipulation of the bowel, and to commence milk and water orally after 1 d, then solids 48 h thereafter[14]. Another source makes the recommendation of "giving water in the first 12 h, then liquids for the next 24 h, and thereafter a light diet until the bowels have moved" following abdominal and thoracic surgery[15]. Even within the last 20 years these recommendations have been largely adhered to and promoted[16].

Despite a growing number of studies that challenge the benefit of this long held surgical tradition, clinicians in many cases have been slow to adopt these practices. Perhaps this is best illustrated through the example of "Fast-Track" perioperative programs, which incorporate early feeding, among other strategies, in a structured program in an attempt to hasten postoperative recovery[17]. These programs have demonstrated compelling results in support of a structured, multi-modal approach-particularly in colorectal surgery[18]; However, the widespread implementation of these practices has been disappointingly low[19,20].

Based on this information, several points should be made clear. Firstly, patients undergoing resectional surgery for gastrointestinal malignancies frequently present with malnutrition symptoms, weight loss, and/or cachexia, and do not have the reserves to withstand extended periods of fasting without risking further nutritional compromise that will adversely affect their postoperative course and overall prognosis. Secondly, the evidence supporting the ongoing practice of withholding nutrition postoperatively is lacking: oral nutrition has been shown to be safe even after major upper gastrointestinal surgery. Furthermore, it appears to confer significant benefits to the postoperative course, especially when incorporated into a multi-modal perioperative program. Thirdly, the rationale for which traditional postoperative nutritional management was introduced has essentially been rendered obsolete with the availability of modern anaesthetic agents and changes to post-operative analgesic management. In this day and age of evidence-based practice, there can be little justification for the continuation of the outdated and detrimental practice of withholding much needed nutrition to oncology patients during their postoperative course. Early feeding appears to have much to offer both to the patients and the institutions in which they are being treated, and given the overwhelming evidence supporting its safety, early feeding can, and should, be adopted with confidence as part of standard postoperative care.

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