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Is routine postoperative enteral feeding after oesophagectomy worthwhile?

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Abstract

A best evidence topic in surgery was written according to a structured protocol. The question addressed was whether, in patients undergoing an oesophagectomy for cancer, immediate postoperative enteral feeding (via percutaneous jejunostomy or nasojejunostomy) provides better patient outcomes as compared to waiting until oral feeding can be instituted. Four randomized controlled trials represented the best evidence to answer the clinical question. The first study randomized 25 patients into enteral feeding via jejunostomy ($n = 13$) versus a routine diet without jejunostomy ($n = 12$). The authors found no statistical difference in outcomes including length of stay, anastomotic complications and mortality. They did not report any catheter-related complications. A second study included patients undergoing an oesophagectomy or a pancreatodudenectomy, randomized to immediate postoperative jejunostomy feeding ($n = 13$) or remaining unfed for 6 days ($n = 15$). They reported one incident of detachment of the catheter from the abdominal wall. They also noted a statistically significant decrease in vital capacity and FEV1 in enterally fed patients. There was no difference in length of stay or anastomotic complications. They concluded that there was no indication for routine use of immediate postoperative enteral feeding in those patients without significant preoperative malnutrition. A Third report randomized their post-oesophagectomy patients into enteral feeding via jejunostomy ($n = 20$) versus crystalloid only ($n = 20$). The also found no difference in length of stay, anastomotic leak rate or mortality. One catheter was removed due to concerns over respiratory function. They also concluded that there was no measurable benefit in early enteral feeding. The last of these 4 studies randomized patients into naso-duodenal feeding ($n = 71$) and jejunostomy feeding groups ($n = 79$). As in previous trials, they found no statistically significant difference between length of stay or anastomotic leak rates. Mortality was higher in the jejunostomy group, although the team did not attribute the deaths to the catheter. They found both methods equally effective in providing postoperative nutrition. In summary, all the trials concluded that routine postoperative enteral nutrition was feasible, but there was no evidence suggesting that it conferred any clinical benefits.

Keywords: Oesophagectomy • Postoperative • Enteral • Feeding

INTRODUCTION

A best evidence topic was constructed according to a structured protocol as described in a previous publication [1].

CLINICAL SCENARIO

You are in clinic discussing with a patient his planned Ivor-Lewis oesophagectomy for an oesophageal malignancy. He understands that he will not be able to eat for several days after surgery, but would like to know if he will be fed by other means in the interim, while he recovers from his operation. You resolve to check the literature to determine whether or not immediate postoperative enteral feeding confers any clinical benefit.

THREE-PART QUESTION

In patients undergoing an oesophagectomy, is immediate postoperative enteral feeding when compared with withholding feeding until oral intake is reinstated better for postoperative outcomes?

SEARCH STRATEGY

Using the Medline interface ('enteral nutrition'[MeSH Terms] OR ('enteral'[All Fields] AND 'nutrition'[All Fields]) OR 'enteral nutrition'[All Fields]) AND ('oesophagectomy'[All Fields] OR 'oesophagectomy'[MeSH Terms] OR 'oesophagectomy'[All Fields]) AND ('jejunostomy'[MeSH Terms] OR 'jejunostomy'[All Fields]). In addition, the reference lists of relevant papers were searched. The search was current as of May 2011.

Table 1: Best evidence papers

Author, date country Study type (level of evidence)	Patient group	Outcomes	Key results	Comments
Swails *et al.*, 1985, [4], USA Prospective, randomized trial (level II)	Twenty-five patients undergoing elective oesophagogastrectomy were randomized into enteral feeding via feeding jejunostomy (jej, *n* = 13) and control of routine diet advancement and no jejunostomy (*n* = 12)	Length of stay	Jej group 12 days Control group 15 days (*P* = 0.3)	This study examined the role of feeding jejunostomies and found no statistical significant advantages of EN over no feeding and required an extra operative time of 10 min They did, however, conclude that jejunal feeding was safe and effective at supplying postoperative nutritional support
		Anastomotic complications	Jej group 0/13 (0%) Control 3/12 (25%) (*P* = 0.06)	
		Infectious complications	Jej group 3/13 (23%) Control 3/12 (25%)	
		Catheter-related complications	None reported	
		Mortality	None reported	
		Other outcomes: Proportion of caloric needs received (%)	Enteral feeding 60% versus control 28% (*P* = 0.0001)	
Watters *et al.*, 1997 [5], Canada Randomized, controlled non-blinded clinical trial (level II)	Twenty-eight patients undergoing oesophagectomy or pancreatodudenectomy randomized to either immediate postoperative jejunostomy feeding (jej, *n* = 13) or unfed for 6-days postoperative (unfed, *n* = 15)	Length of stay	No difference between groups	This study showed that feeding jejunostomy was associated with significant impairment of vital capacity and FEV1 and was associated with significant catheter-related complications Their overall conclusions were that immediate postoperative feeding should not be routine in well-nourished patients
		Anastomotic complications	None reported	
		Infectious complications	Jejunostomy group; Multi-organ failure 1 (7%) Control group: 0	
		Catheter-related complications	One case of jejunal detachment from abdominal wall requiring relaparotomy	
		Mortality	None reported	
		Other outcomes: Postoperative vital capacity	Lower in jej group (*P* < 0.05)	
		FEV1	Lower in jej group (*P* = 0.07)	
		Postoperative mobility	Lower in jej group (*P* < 0.05)	
Page *et al.*, 2002, [6], UK Prospective, randomized trial (level II)	Forty patients undergoing transthoracic oesophagectomy for cancer were randomized to enteral feeding via NJ tube (*n* = 20) versus control [(IV crystalloid (*n* = 20)]	Length of stay	Jej group: 13.6 ± 5.2 days Control group: 13.4 ± 5.0 days	This study examined the role of NJ feeding and suggested that postoperative morbidity was unaffected by the use of enteral feeding, however no statistical analysis done due to small study size No specific problems attributable to enteral feeding were identified although one patient did have his NJ tube removed due to concerns over respiratory function Overall the authors concluded that NJ feeding is safe and effective but shows no detectable objective benefits
		Anastomotic leak	None in either group	
		Infectious complications	NJ group: 3 (15%): Pneumonia (2), wound infection (1) Control group: 1 (5%): Pneumonia (1)	
		NJ tube-related complications	None—however one was removed over concerns respiratory function	
		Mortality	None in either group	
		Other outcomes: Nutritional status	No difference between groups	
Hans-Geurts *et al.*, 2006 [7], Netherlands	One hundred and fifty patients underwent oesophageal resection and were randomized to naso-duodenal (ND; *n* = 71) versus	Length of stay	ND group: 14 days median Jej group: 14 days median	This large-scale randomized controlled trial compared ND and jejunal feeding There were eight deaths in
		Anastomotic leak	ND group: 8 (11%) Jej group: 5 (6%)	

Continued

Table 1: Continued

Author, date country Study type (level of evidence)	Patient group	Outcomes	Key results	Comments
Prospective, randomized trial (level II)	jejunostomy feeding (jej, *n* = 79)	Infectious complications	ND group: 34 (48%): Wound infections 4 (6%), UTI 1 (1%), pneumonia 29 (41%) Jej group 36 (45%): Wound infection 5 (6%), UTI 4 (5%), pneumonia 27 (34%)	the series though none was felt to be attributable to catheter-related problems Catheter-related complications were frequent and similar in both groups. Although it should be noted that one patient in the jejunostomy group needed relaparotomy Overall they concluded that both jejunostomy and ND feeding were equally effective means of enteral feeding postoesophagectomy
		Catheter-related complications	ND group 20 (29%): Obstruction 2 (3%), patient removed 2 (3%), dislocation 16 (23%) Jej group 31 (38%): Obstruction 5 (6%), patient removed 4 (5%), dislocation 5 (6%), infection at insertion site 13 (16%), leakage 3 (4%), relaparotomy 1 (1%)	
		Mortality	ND group 2 (3%) Jej group 6 (8%)	

SEARCH OUTCOME

Forty-four papers were found using the reported search. From these, four were identified as representing the best evidence to answer this clinical question and are summarized in Table 1.

DISCUSSION

Oesophageal cancers have long been known to be associated with the impairment of the nutritional and immunological status of patients. This is due to a number of factors, including the oesophageal stenosis and increased catabolism secondary to malignancy [2, 3]. These factors, coupled with the long period of convalescence required following an oesophageal resection and the need to restrict oral intake until the oesophagogastric anastomosis has sufficiently healed have led many to question whether immediate postoperative enteral feeding either by a naso-enteral route (i.e. via the naso-duodenal or naso-jejunal (NJ) route with a tube passing through the newly formed anastomosis) or by a percutaneous jejunostomy (inserted at the time of surgery distal to the anastomosis) would be beneficial.

To date, four randomized-controlled trials have looked at the role of early enteral feeding after an oesophagectomy and its associated morbidity. Swails *et al.* [4] randomized a group of 25 patients undergoing oesophagogastrectomy into enteral feeding via jejunostomy (*n* = 13) and no jejunostomy with a routine advancement of diet (*n* = 12). They found that the enterally fed group received a much higher proportion of their calorific needs. With respect to the incidence of anastomotic leaks, the control group experienced three leaks, as opposed the enterally fed group who experienced none, although this difference was not statistically significant. In addition, the length of stay and the incidence of infectious complications were similar between the two groups. They concluded that although there was no statistically significant benefit to enteral feeding with a jejunostomy, it was a safe and effective procedure that added only 10 min to the operative time.

In their paper on 28 patients undergoing oesophagectomy or pancreatodudenectomy, Watters *et al.* [5] randomized their cohort into immediate postoperative feeding via jejunostomy (*n* = 13) or unfed (*n* = 15). They found that the group receiving enteral nutrition had a statistically significantly lower postoperative vital capacity and a consistently lower, though not statistically significant, FEV1. They also noted that the postoperative mobility was decreased in the enterally fed group, and the feeding catheter itself was associated with one case of significant morbidity requiring laparotomy. This study attributed the impairment in respiratory function in the enterally fed group to an abdominal distention leading to an impaired diaphragm function. However, it should be noted that the rate of complications and length of stay in the intensive care were not different between the two groups.

Page *et al.* [6] presented their findings of a cohort of 40 patients undergoing transthoracic oesophagectomy for cancer who were randomized to enteral feeding via NJ tube (*n* = 20) and a control group supported with intravenous crystalloid fluid (*n* = 20). With respect to the feasibility of NJ feeding, the tube was removed in one patient due to concerns regarding the adverse effects on expectoration. Overall, this study did not find differences in any other parameters between the two groups, and concluded that enteral feeding via the NJ tube is safe and well-tolerated, but provided no measurable benefit over intravenous hydration only for patients undergoing routine oesophagectomy.

The issue of whether the nasal or percutaneous route should be used for enteral feeding was addressed in a study by Hans-

Guerts *et al.* [7] in a large-scale study of 150 postoesophagectomy patients who were randomized to naso-duodenal feeding ($n = 71$) or jejunostomy feeding ($n = 79$). This study demonstrated that catheter-related complications were frequent and statistically comparable in both groups, although the incidence in the jejunostomy group was higher, and in one case led to a re-laparotomy for leakage. Overall, this study found no statistically significant difference in the rates of postoperative complications or catheter efficacy in the two groups, and they concluded that naso-duodenal tube feeding was as effective as jejunostomy as a means of providing enteral nutrition after oesophageal resection.

On reviewing all of the evidence, it should be noted that there is significant heterogeneity in the management of the control groups in these studies and, with the exception of Hans-Guerts *et al.* [7], these studies were significantly underpowered, with small numbers. Nonetheless, what is clear is that none of them show any clinical benefit in early enteral feeding. Indeed, some of these studies demonstrate a significant morbidity associated with enteral catheters themselves, and in the case of Watters *et al.* [5], a significant clinical detriment in respiratory function associated with early feeding. It should be noted that similar conclusions were reached by Markides *et al.* [8] in their systematic review examining all nutritional access routes following oesophagectomy. Overall, they found that the evidence in support of any particular type of routine nutritional support was weak, although they suggested that enteral, as opposed to parenteral, nutrition may be superior—a conclusion also reported by another recent systematic review [9].

CLINICAL BOTTOM LINE

Although in enteral feeding immediately following an oesophagectomy, either the nasal route or via percutaneous jejunostomy is feasible, this procedure is not associated with any clinical benefits when compared with a no-feeding strategy. The use of routine postoperative enteral feeding following oesophagectomy cannot be justified.

Conflict of interest: none declared.

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eComment. Enteral nutrition following oesophagectomy for oesophageal carcinoma

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The systemic effects of malignancy and obstruction caused by oesophageal strictures means patients with oesophageal carcinoma are frequently malnourished. Wheble and colleagues [1] point out there is a paucity of data to identify whether a routine early postoperative enteral feeding after oesophageal resection is beneficial. They correctly conclude none of the randomized studies show any mortality benefits. However none of trials quoted examined whether any preoperative predictors of nutrition status would affect the outcome (mortality). This information could be used to see if stratification of patients based on nutritional status resulted in any benefit of early enteral feeding. Larger sample sizes would be needed for such an analysis.

A study not quoted by the authors compared the outcomes of 44 patients who underwent early enteral feeding in patients who underwent oesophageal resection to a historical cohort of patients who underwent parenteral feeding [2]. Although no difference in 30-day perioperative mortality was found, early enteral feeding compared to parenteral feeding reduced both the stay in the ICU and overall hospital stay. Therefore, until more robust data is available, routine early postoperative enteral feeding should not be abandoned.

Conflict of interest: none declared

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