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THE ROLE OF T-TUBE FEEDING JEJUNOSTOMY IN PATIENTS WITH PANCREATIC SURGERY

By
N. S. El-Masry, M.D.
Departments of Surgery, Charing Cross Hospital, Fulham Palace Road, London W12, UK

Background: Perioperative nutritional support is desirable in surgical patients with pancreatic disease who are often malnourished because of biliary and gastric outlet obstruction or the catabolic response to sepsis or cancer. This study reviewed the experience in providing enteral nutrition through a T-tube jejunostomy in these patients.

Methods: The records of a consecutive series of 36 patients (mean age 56 yr.) who had undergone pancreatic operations during the last four years were reviewed, and data were collected about their preoperative nutritional status and their postoperative feeding.

Results: Thirty-six patients had partially hydrolysed feeds administered through a feeding T-tube jejunostomy placed during pylorus-preserving proximal pancreatoduodenectomy (21), Whipple's procedure (4), debridement of infected pancreatic necrosis (3), palliative biliary and gastric bypass (2), distal pancreatectomy (2), cyst-jejunostomy (3) and accessory sphincteroplasty (1). Operations had been performed for benign (17) or malignant (19) disease of the pancreas. Tube feeding was employed for a mean of 18 days (range 1 - 60). There were no related deaths, but 8 patients had complications directly attributable to the tube including blockage (4), dislodgment (2), pericatheter leakage (2) and peritonitis in a patient with downstream adhesion obstruction. Twenty patients suffered complications that included transient diarrhoea (13), abdominal distension (8), nausea or vomiting (6) and pain (6). Consequently, nitrogen and energy needs were completely fulfilled in only 19 patients.

Conclusion: Providing nutrition by the enteral route can be a challenging exercise in pancreatic patients who typically have two or more vulnerable upper intestinal anastomoses, bilio-pancreatic insufficiency and gastric stasis. Despite many minor shortcomings, jejunostomy tube feeding appears to be a safe adjunct to pancreatic surgery.

Key Words: Feeding jejunostomy and Pancreatic surgery

INTRODUCTION

There is little doubt about the value of perioperative nutritional support in malnourished patients[1], and the superiority of enteral over the parenteral route is firmly established[2]. The preferred route for postoperative enteral feeding is less certain, however, and probably depends on the type of operation involved and on local expertise or preferences.

Malnutrition is a common problem in pancreatic surgery[3] and one that may be ameliorated by attention to perioperative feeding. Biliary and gastric outlet obstruction and the catabolic response to biliary and pancreatic sepsis are chiefly responsible for this malnutrition.Short-term delayed gastric emptying[4,5], which complicate 8% to 33% of pylorus-preserving pancreatoduodenectomies, may also impede the early return to oral nutrition and worsen pre-existing malnutrition.

Several techniques have been described for postoperative enteral feeding, including the nasojejunal route and tube jejunostomy. The main attractions of tube feeding jejunostomy after pancreatic operations are that

they are inserted under direct vision downstream to the most distal anastomosis and can be firmly secured in position. They are not susceptible to being displaced by postoperative vomiting or retching. The use of a soft latex T-tube abolishes the risk of intestinal perforation[14] caused by the jejunostomy tube. Latex T-tubes are not only inexpensive, but they encourage the early formation of a fistulous tract permitting safe replacement in the event of dislodgement. Also, the large calibre of the tube minimizes the risk of tube obstruction by feeds or tube-administered medications.

Nevertheless, jejunostomy tube feeding is not without complications. Feed-related gastrointestinal symptoms have been reported in 33-91%[6-8] of patients and minor tube-related complications in 15-32%[6,7]. The occasional pericatheter leak may necessitate laparotomy for peritonitis and procedure-related mortality of 0-5% has also been reported[6]. However, many reports concern patients with multiple trauma and may not be representative of those undergoing elective operations.

I have reviewed the experience with T-tube feeding jejunostomies in 36 patients undergoing elective pancreatic operations.

PATIENTS AND METHODS

Patients

The case notes and dietetic records of 36 consecutive patients who had undergone elective pancreatic operations over a four year period were reviewed with reference to the following data:

1. Clinical assessment of preoperative nutritional status
2. Clinical indication for jejunostomy tube feeding
3. Operative procedure
4. Complications related to the tube and to feeding
5. Type of feed used
6. Amount of energy and nitrogen delivered by this route.

Nutritional Assessment

Preoperative nutritional assessment was made on clinical grounds, with a detailed dietetic history and clinical examination[9]. Nutritional status was assessed as poor if there was a history of inability to tolerate oral diet or weight loss in excess of 10% on admission. The dietician estimated the energy and nitrogen requirements for the patient using the Schofield equations[10] and Elia normogram[11]. Patients were also considered to be at risk of malnutrition if there was intra-abdominal sepsis, poor preoperative nutrition or an anticipated delay in gastric emptying. In these situations, a feeding jejunostomy was inserted at operation.

Operative technique: T-tube jejunostomy

The technique involved creating an enterotomy on the antimesenteric border of the jejunum approximately 20cm downstream to the most distal anatomosis. A 14 Fr latex T-tube was inserted and secured with a purse-string suture. The tube was brought out through the anterior abdominal wall via a stab incision. The jejunostomy site was sutured to the peritoneal lining of the anterior abdominal wall so that the enterotomy site was excluded from the peritoneal cavity. The T-tube was finally secured to the skin with a silk suture. Feeding was initiated in the postoperative period.

Type of feed used

Feeds generally contained a combination of partially hydrolysed protein and carbohydrate and fat in the form of medium chain trigylcerides (MCT) (Survimed OPD, Fresenius-Kabi Limited, UK; Perative, Abbott Laboratories, UK; Nutrison Pepti, Nutrica, UK). When bilio-pancreatic insufficiency did not pose a problem, a preparation containing long chain trigylcerides (LCT), malto-dextrins and whole protein was used (Osmolite, Abbott Laboratories, UK). Occasionally, a high-energy preparation was required (Ensure Plus, Abbott Laboratories, UK) containing 1.5 calories/ml and consisting of casein and soya proteins, fats (corn, canola and safflower oils) and corn syrup solids as carbohydrates.

RESULTS

There were 24 men and 12 women with a mean age of 56 years (range 25-80 years). Eleven patients had lost more than 10% of body weight on admission and another 9 had lost between 3-9% of weight. Fourteen patients had not lost any weight, and there was no documentation for two patients. Even though 9 patients were overweight, with a body mass index in excess of 25, two of them had lost 10% or more of body weight and another three had lost lesser degrees.

The indications for operation and the operative procedures performed are summarised in (Table 1). Infected necrosis or abscess formation were the indications for operation in acute pancreatitis, while pain, pseudocysts or biliary obstruction necessitated operative intervention in chronic pancreatitis. Most of the periampullary carcinomas were adenocarcinomas of the head of pancreas.

The decision to place a feeding jejunostomy was made entirely on clinical grounds, notably anticipated delay in

gastric emptying (n=22); weight loss in excess of 10% (n=11) and inability to tolerate oral feeding (n=8); five patients had more than one indication.

All patients had feeding initiated between 12-24 hours after operation. The feeding tube was used for a mean of 18 +/-14.5 days, with a median of 19 days (range 1-60). Twelve patients required prolonged jejunostomy feeding for between 21 to 60 days.

A partially hydrolysed feed containing oligopeptides, malto-dextrin and MCT and LCT was used in 31 patients. Most of these patients had a major pancreatic resection or required debridement of infected pancreatic necrosis. Four patients used an iso-osmolar feed containing long chain triglycerides, malto-dextrin and whole casein and soya protein. One patient with a body mass index of 19 and a 16% weight loss was given a high-energy preparation containing whole casein and soya protein, corn syrup and fat as corn and canola oils.

Twenty-five patients suffered a complication attributable either to the tube or to feeding, 3 of who had complications from both (Table 2). Of these, twenty had feed-related complications including 8 who had more than one complication. Eight had complications related to the tube, one patient having both a pericatheter leak and peritonitis that required laparotomy. There were no procedure-related deaths. The patient who developed peritonitis had leaked through the jejunostomy site as a consequence of distal adhesion obstruction. She had earlier undergone a cystjejunostomy for drainage of an infected pancreatic pseudocyst secondary to acute gallstone pancreatitis. The patient was managed by reoperation with closure of the leaking enterotomy and postoperative parenteral nutrition.

Nineteen patients (52.8%) were able to meet their entire energy and nitrogen requirements through the jejunostomy but in the rest complications prevented administration of more than 0-50% (n=12) or 60-75% (n=4) of total calculated requirements. In one patient, excessive peri-catheter leaks prevented an accurate estimate of volumes administered into the gut. Overall, a mean energy and nitrogen intake of 74.3% +/- 31.8% of the calculated requirement was achieved.

Table (1): ***Indications for operation and type of procedure performed***

Diagnosis	*Number of patients*
Periampullary carcinoma	19
Chronic pancreatitis	12
Acute pancreatitis with complications	5
Operation	
PPPP*	21
Whipple's operation	4
Pancreatic cyst-jejunostomy	3
Debridement of infected necrosis/abscess	3
Palliative biliary and gastric bypass	2
Distal pancreatectomy	2
Accessory duct sphincteroplasty	1

*PPPP = Pylorus-preserving proximal pancreatoduodenectomy

Table (2): *Complications of T-tube jejunostomy feeding*

Complications	*Number of patients*
Feed-related (20 patients+)	
Diarrhoea	13
Abdominal distension	8
Nausea/Vomiting	6
Abdominal pain	6
Tube-related (8 patients+)	
Peritonitis	1
Tube blockage	4
Tube dislodgement	2
Pericatheter leaks	2

+Some had more than one complication

DISCUSSION

Patients undergoing pancreatic operations pose two particular challenges: they are frequently malnourished, and in those undergoing a pylorus-preserving operation a delay in gastric emptying may preclude early oral feeding. Insertion of a feeding jejunostomy tube both anticipates and treats these problems.

The use of a soft latex T-tube abolishes the risk of intestinal perforation[14] caused by the jejunostomy tube. They encourage the early formation of a fistulous tract permitting safe replacement in the event of dislodgement. In two patients in whom the T-tube became dislodged, the tube was readily replaced with a 12 Fr Foley's catheter.

Using nasojejunal access should avoid any risk of peritonitis, as the placement of this tube does not require an enterotomy, yet nasojejunal tubes are readily displaced proximally or even completely displaced by vomiting or retching. While replacement may be achieved with radiological confirmation of position, some 20% of patients would require more than one visit to the radiology suite for insertion under fluoroscopic guidance[13], with the attendant risk of breaching a recent anastomosis. Such transfers are labour-intensive and risky for the critically ill ventilated patient. Furthermore, there can be much loss of feed time from the inevitable delays involved in re-introducing the tube.

By contrast, T-tube feeding jejunostomy is inserted under direct vision downstream to the most distal anastomosis and is not susceptible to postoperative displacement by vomiting. From the clinician's perspective, the ideal method would deliver the most calorie and nitrogen with the least procedure-related morbidity and mortality.

The choice of feed was based on a number of factors. A high energy feed may be preferable in patients with unusually high-energy requirements or where rate of feeding is a limiting factor. The initial choice of feeding solution may have to be changed to deal with feed intolerance, and an iso-osmolar preparation or one with lower calorie and nitrogen may then have to be used. The expected reduction in bile salts, pancreatic proteases, lipases and amylase brought about by the temporary diversion of biliary and pancreatic juices by stents was the rationale for using partially hydrolysed feeds containing medium chain triglycerides. Severe, complicated acute pancreatitis can similarly impair pancreatic exocrine function. Intestinal brush border enzymes adequately deal with both oligopeptides and malto-dextrins, while the absorption of MCTs does not require micelle formation by bile salts. However, there is no published evidence that feeds of normal composition have any adverse effect in these patients.

While complications of feeding jejunostomy were frequent (69.4%), they were not life threatening except in the one patient with peritonitis. Nevertheless, the symptoms can be distressing for the patient, and in nearly half (47%) they interrupted the delivery of energy and nitrogen. The development of peritonitis demonstrates the potential hazard of any tube jejunostomy if the patient develops a distal intestinal obstruction.

It is uncertain whether replacing the shortfall in enteral nutrient delivery with parenteral nutrition has demonstrable benefits to set against the increased risk of sepsis associated with a central venous line1. Whether the provision of suboptimal levels of enteral nutrition has an adverse effect on clinical outcome is also questionable, particularly bearing in mind the short periods involved. On the contrary, there is increasing evidence that the provision of even small amounts of enteral feeding has a trophic effect on the gut that confers protection against bacterial translocation[12].

Most of the tube jejunostomy feeding problems were related to blocked tubes or gastrointestinal symptoms. Blocked tubes are readily overcome by relatively simple interventions. There is however no clear solutions to the several gastrointestinal symptoms suffered by these patients. They all resolve when the feeding is either slowed down or stopped, but full cessation defeats the purpose of

creating such a feeding access. The aetiology of these symptoms is not clearly understood.

While the incidence of minor complications is comparable to that in several other major series[8,13] the incidence of major complications appears to be much less. However, these series had a high proportion of patients undergoing multiple trauma, among whom peritonitis (2%), intestinal infarction (4%), necrotising fascitis (1%) and a 4% mortality rate appear directly related to the use of jejunostomy tube feeding[6]. The discrepancy may reflect a more favourable population of patients who underwent operation without the deleterious systemic effects of multiple trauma.

With careful patient selection, all feeding tubes inserted were put to use in providing enteral nutrition either as the principal source or as a supplement to oral feeding. The high usage rate would seem to justify the small incidence of major complications.

In conclusion, despite many shortcomings, T-tube jejunostomy feeding appears to be a safe adjunct to pancreatic operations.

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