
ENTERAL TUBE FEEDING AFTER SURGERY FOR UPPER GASTROINTESTINAL MALIGNANCIES

Hashim S Khayat*, **Jasim D Saud[^]**, **Jawad R. Khersani[@]** & **Tal'at S Shani[#]**

*FRCS, Consultant Surgeon and Chairman, Dept. of Surgery, Basrah General Hospital. [^]FICMS, CABS, Specialist Surgeon Dept. of Surgery, Basrah General Hospital. [@]CABS, FICMS, Lecturer, Dept. of Surgery, Basrah Medical College, Specialist Surgeon, Basrah General Hospital. [#]Senior Resident, Dept. of Surgery. Basrah General Hospital.

Abstract

Patients with major upper gastrointestinal (UGI) resections that were made nil by mouth for 7-10 days postoperatively with pre-existing weight loss and depleted energy reserves in addition to increased metabolic rate needs nutritional support which serves to shorten the postoperative recovery phase and minimizes the number of complications. This may be supplemented by total parenteral nutrition (TPN) which is not available in our hospitals for over a decade. This problem led us to use a feeding jejunostomy tube after major resections for UGI malignancies.

This is a prospective study conducted between May 1999 and December 2004 at First Surgical Unit, Basrah General Hospital. The study aimed to examine the efficacy of Enteral Tube Feeding (ETF) as a method of nutritional support in patients with major resections for UGI malignancies.

A total of 76 patients, 42 males and 34 females. Mean age, 50 years (range, 27-72 years) underwent major UGI resections for gastric(64), oesophageal (10) and pancreatic(2) malignancies. ETF lasted for 12-41 days with diarrhoea and abdominal discomfort were the major complications in 14 and 8 patients respectively. Diarrhoeal tolerance was established in 12 out of 14 patients and controlled in the other two by antidiarrhoeal drugs. There were improved body weight and serum albumin level after ETF and no septic complications or related mortality. ETF is a safe, feasible, cost effective, with few controllable complications rendering it a satisfactory alternative to total parenteral nutrition.

Introduction

Patients with major upper gastrointestinal (UGI) resections who were made nil by mouth for 7-10 days postoperatively with pre-existing weight loss and depleted energy reserves needs nutritional support which serves to shorten the postoperative recovery phase and minimize the number of complications.

Frequently, the patient may become ill or even die from complications of starvation rather than the underlying disorder^{1,2}.

Caloric requirements in surgical patients can be predicted by assuming the basic requirement (25Kcal /Kg /day) and adding an additional amount equal to the percentage increase in metabolic rate caused by surgery around (20-30 %) in major surgical procedures^{3,4}. This is may supplemented by total parenteral nutrition (TPN) which is not available in our hospitals for over a decade. This

Correspondence to: Hashim S Khayat, Dept. of Surgery, Basrah General Hospital

problem led us to use a feeding jejunostomy tube after major resections for UGI malignancies to cope with high caloric requirements.

The aim of this study is to examine the efficacy of enteral tube feeding (ETF) as a method of nutritional support in patients with major resections for UGI malignancies.

Patients and methods

Between May 1999 and December 2004, 76 patients were entered into this prospective study in First Surgical Unit, Basrah General Hospital. Patients undergoing resectional surgery for neoplasms of oesophagus, stomach and pancreas were included. After reconstruction and at the end of the procedure a feeding jejunostomy was constructed by inserting a fine suction catheter (10 Fr.) into the proximal jejunum approximately 25 cm. distal to the ligament of Treitz. The wall of jejunum is inverted over the tube for about 3cm. to create a serosa-lined tunnel as it emerges from the bowel. The tube is brought out through a stab incision in the left upper quadrant of abdomen. The jejunum is sutured to the anterior abdominal wall at the point of tube entry to seal it from the peritoneal cavity. ETF was commenced on the 2nd or 3rd postoperative day according to bowel movement. High caloric diet was mixed and liquified and given in 3 daily rations, one every 8 hours starting in slow infusion rate of about 30-50 ml/hour and advanced to tolerate the goal which is 2800-3000Kcal/day. The tube was flushed clean after each feeding. The patients were assessed for development of any related symptoms like diarrhoea, abdominal cramps, nausea and vomiting. The tube was examined for any infection at exit site, block, leakage or displacement. The patient weight assessed weekly and the serum albumin

every 2 weeks. The diarrhoea was qualitatively defined as more than 3 loose bowel motions per 24 hours.

Results

There were 76 patients, 42 males and 34 females. Mean age was 50 years (range 27-72 years). The types of the resection surgery shown in Table I.

Mean insertion time of ETF was 2.5 minutes (range 1.5-4 minutes). Diarrhoea and abdominal discomfort were the major complications of ETF developed in 14 and 8 patients respectively. Other complications shown in Table II. Diarrhoea occurred shortly after starting ETF and tolerance was established in 12 out of 14 patients. In the remaining 2 patients, diarrhoea controlled by drugs diphenoxylate hydrochloride 2.5 mg and atropine sulfate 0.025 mg (lomotil) which was used after exclusion of infectious diarrhoea by general stool analysis and assay of stool for *Clostridium difficile* enterotoxins. ETF lasted for 12-41 days according to the patient's condition. In 74 patients the feeding tube was removed 3 days after removal of nasogastric tube which was done after a water soluble contrast study in 10th postoperative day show no signs of leakage at anastomosis line. In the remaining 2 patients, ETF lasted for 35 and 41 days respectively. Those two patients underwent radical total gastrectomy with ileo-caecal interposition, one developed radiological subdiaphragmatic leakage at oesophago-ileostomy and was easily controlled conservatively. The other one developed controlled fistula at duodeno-caecal anastomotic line. Both of them discharged from hospital while still receiving ETF at home. Mean body weight and serum albumin concentration were improved at the end of ETF as shown in table III. There were no related septic complications and no

mortality in patients receiving ETF in our series.

Discussion

ETF is the provision of liquid formula diet by tube into some area of gastrointestinal tract to maintain or improve nutritional status based on the premise that (if the gut works—use it)⁵. Although in patients with malignant disease the outcome is determined by the type and stage of tumour, progress of underlying disease is often paralleled by malnutrition which in turn facilitates complications and reduces survival and quality of life⁶. Nutritional support via enteral route is today more and more the preferred method of nutrition can be applied to shorten the postoperative recovery phase, maintain body weight and improve immune function in patients with UGI malignancies, because investigations have demonstrated that the gastrointestinal tract is not an organ system that involved only with digestion and absorption, however this system also actively regulates and processes circulating substrates⁷⁻⁹ and is a major component of host defenses¹⁰. ETF in form of jejunostomy tube is technically easy to perform, with short time of insertion, more economical and well tolerated. ETF has much fewer procedure related morbidity as well as preventable complications. Most complications related to ETF are gastrointestinal rather than mechanical and infectious. The most frequent gastrointestinal complication is diarrhoea which occur in 14 patients (19%). It was related to hyperosmolarity and was easily controlled. The desired therapeutic approach is to adjust the enteral nutrition regimen accordingly rather than to discontinue it completely. Only one variable of feeding regimen (i.e osmolarity,

volume, rate and type of diet) should be decreased at a time. In two patients who still had diarrhoea when receiving feeding at a rate of 30 ml/hour and concentration of approximately 1.5 Kcal/ml, then anti-diarrhoeal treatment was indicated, in many instances, antidiarrhoeal medication was given without a definite diagnosis. Therefore, it is essential to select medication with both a wide therapeutic range and a low incidence of side effects, for these reasons, we prefer kaolin-pectin over opiates. However, diarrhoea which could not be controlled by using antidiarrhoeal drugs is often multifactorial and needs several diagnostic methods to identify the cause. Diarrhoea is estimated to occur in 15–20% of enteral feeding population and in 34–41% of critically ill patients^{11,12}. Cole et al reported that failure to stimulate the cephalic response is important in contributing the ETF related diarrhoea, which can not initially be controlled by reducing the volume and concentration, or by use of fiber containing feeds or use of bulk agent e.g. Metamucil¹³. Homann and colleagues tried to reduce incidence of diarrhoea by soluble fiber in patients receiving enteral nutrition found that diarrhoea may be related to factors other than the tube feeding itself not controlled by: slowing the rate of feeding, reducing the volume and concentration, using soluble fibers in their feeding, changing to continuous or changing the formula and lastly use of medication if not contraindicated¹⁴. Kohn and Keithery in their technique for evaluating and managing diarrhea in the tube fed patients reported that most patients developed diarrhoea when giving concentrated tube feeding formula more than 1.5 Kcal/ml or more than 150 mOsm¹⁵. So careful monitoring of conditions

surrounding the onset of diarrhoea is important when evaluating the cause . Abdominal discomfort is often the result of formula being delivered quickly ,and it could be controlled by slowing the rate, feeding in a sitting position, lying on the right side or ambulating after feeding, all are effective in eliminating distension which caused abdominal discomfort. Silk et al reported that visceral hypersensitivity after initiation of enteral feeding is the main cause of abdominal discomfort and cramping. Wound infection at site of exit of tube feeding is a rare complication seen only in one patient ,and related to over tenting and mobilization of the tube ,exit site was larger than the tube and associated with leakage of small amount of enteric contents around the tube . Such leakage around a tube is prevented by creating a nearly snug fit exit site. Over tenting on tube was managed by transfixing the tube to the skin of abdominal wall 5 cm from exit site. ETF provides long term nutritional support and after educational session to the patient's next of kin can discharge the patient home on ETF¹⁶. ETF associated with improved survival, tend to have less septic complications than those receiving TPN, this can be explained by maintenance of intestinal mucosal function as well as gut integrity by preventing disruption of intestinal

barrier function as well as overgrowth of intestinal microorganisms which may move across the intestinal barrier into the portal circulation or lymphatics ie. Bacterial translocation, which is one proposed mechanism aggravate or cause multiorgan failure (MOF)¹⁷ Jejunostomy tube feeding has advantage over the nasogastric or nasoenteric tube feeding including reduced risk of tube displacement and blockage, higher patients acceptance and can continue at home. Tube displacement seen only in one patient and it is rare complication demanding reinsertion which was done successfully. ETF improved body weight in our patients, the weekly and monthly weight trends are more helpful in monitoring nutritional gains, because weight gains greater than 0.25 Kg/day usually reflects fluid accumulation as Rowland et al reported¹⁸. Visceral protein also improved at the end of ETF, although it is best assessed by measurement of serum transferrin which is rapid turn over protein (half-life is 3 days) ,but this analysis is not available in our hospital, so serum albumin level is measured 2-3 weeks after initiation of ETF and showed significant improvement .In conclusion we think that ETF is a safe, feasible ,cost effective, with few complications rendering it a satisfactory alternative to total parenteral nutrition.

Table I: Type of malignancy and type of resections.

Type of malignancy	Patient No.	Type of resection
Gastric carcinoma	64	Total radical gastrectomy (40 abdominal incision &24 thoracoabdominal incision)
Oesophageal carcinoma	10	Oesophagectomy (7 Ivor-lewis&3 Mckeon)
Pancreatic carcinoma	2	Pancreaticoduodenectomy
Total	76	

Table II: Complications of ETF .

Complication	Patient No.
Diarrhoea	14
Abdominal discomfort	8
Infection at site of tube	1
Tube displacement	1
Nausea & vomiting	0
Tube blockage	0
Intraperitoneal leakage	0
Total	24

Table III: Improved body weight and serum albumin level after ETF .

Mean	Preoperative	After ETF
Body weight	52.9Kg	53.6Kg
Serum albumin	2.9g/dl	3.8g/dl

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