

Percutaneous Endoscopic Gastrostomy in a Military Hospital.

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SUMMARY: Percutaneous endoscopic gastrostomy (PEG) is a simple, relatively safe and cost effective means of establishing enteral access for patients requiring long term nutritional support. PEG has several advantages over surgical gastrostomy and should be considered the procedure of choice for long term enteral therapy in appropriate patients.

At the Queen Elizabeth Military Hospital (QEMH) between June 1992 and October 1993 thirteen percutaneous endoscopic gastrostomies were successfully performed. Eight were performed in soldiers, seven of these were following major neurological trauma. The procedure is described and the literature is reviewed.

Introduction

The past two decades have seen great progress in nutritional support for the ill. In spite of dramatic advances in parenteral nutrition, enteral feeding remains the method of choice for delivering nutritional support when the gastrointestinal tract is functionally intact (1). With limitations on cost, it is important to seek safe and cost effective methods for long term nutritional support. Nasogastric tube feeding, though useful on a short term basis, is associated with numerous complications like oesophagitis, gastroesophageal reflux, aspiration pneumonia and a high interruption rate due to tube blockage, displacement and accidental removal especially if required for prolonged periods (2,3).

Gastrostomy is a time tested and well recognised method of providing long term enteral nutrition and entails the operative creation of a fistulous tract between the stomach and the abdominal surface (4,5).

The most significant advance in the creation of a gastrostomy has been the percutaneous endoscopic gastrostomy (PEG) first described by Gauderer *et al* in 1980 (6). This allows the establishment of permanent enteral access without the need for laparotomy or general anaesthesia (7). PEG is much more cost effective than traditional operative gastrostomy (8) and offers important advantages over nasogastric tube feeding (9).

PEG is now widely used, and is the preferred method of creating a gastrostomy (10-13).

Patients and Indications

Between June 1992 and September 1993, 13 patients underwent PEG at the QEMH. Eight patients (62%) were male and five patients (38%) were female with mean age of 45 years (range 22-81). In our series, eight patients were serving soldiers below the age of 35 years.

The indications for PEG in our series are shown in Table 1

Table 1 Indications for PEG in QEMH patients

Head Injury*	7 (54%)
Cerebrovascular accidents	2 (15%)
Senile dementia and confused state	1 (8%)
Motor neurone disease	1 (8%)
Lymphoma - post radiation	1 (8%)
Carcinoma of tongue with severe iatrogenic radiation glossitis.	1 (8%)

* All seven head injury patients were serving soldiers who have been involved in road traffic accidents.

Material and Method

The Bower-Ring PEG size 12 Fr (Merck) was used in 11 cases and Freka-PEG Universal Gastric-Set (Fresenius) in 2 patients. The 'pull technique' (14) was used in all patients and is described below (Figs 1-4). A diagnostic upper GI endoscopy is performed in the left lateral position under intravenous sedation, with midazolam 2.5-7.5 mgs and pethidine 25-50 mg. The patient is placed in the supine position and under strict aseptic conditions, the selected gastrostomy site (point of maximum finger indentation on endoscopic transillumination of the distended stomach), is infiltrated with 2% lignocaine. A needle catheter is introduced into the stomach, and under direct vision of the endoscopist, a placement wire is fed through the needle and grasped by a polypectomy snare passed through the endoscope. The endoscope and snare is then removed as a unit. The wire is fixed to the PEG tube. Applying controlled traction to the abdominal end of the placement wire, while guiding the PEG tube into

the patient's mouth, the tube is gently pulled back through the abdominal wall until it abuts the gastric mucosa. This phase is performed under endoscopic control. Adjustment of the length of the tube, inflation of the retention balloon is performed according to the type of kit being used and manufacturer's recommended instructions. The final position of the retention balloon is confirmed by endoscopy. The tube is then fixed to the abdominal wall by the fixation device supplied. A single intravenous dose of broad spectrum antibiotic (ciprofloxacin 200mg) is used for prophylaxis. The gastrostomy tube is not used after insertion for 12 hours. In the absence of pain, fever, tachycardia and hypotension 500 mls of sterile water is given via the tube at the rate of 85 ml/hour for the following 6 hours by volumetric pump. PEG feeding is then started, at the rate of 50 ml/hour for a further 12 hours, after which the rate is increased to meet the patient's full nutritional requirements.

Most manufacturers of commercial PEG kits supply useful information booklets for patients and carers. These should be freely available to all caring for patients with PEG. It is important that nurses and carers, are aware of the practical problem of tube blockage and instructed not to use the tube for anything other than recommended feeds, water and liquid medications. Practical demonstration of how to flush the tube with 25-50 ml of water, goes a long way in preserving the tube patency. Nurses should be instructed to avoid immersion of the gastrostomy site under water during the first two to three weeks (shower rather than bath).

Results and Complications

All 13 patients (100%) underwent successful percutaneous endoscopic gastrostomy, and tolerated the procedure well.

There were no deaths directly related to the procedure. In two patients (15%) PEG had to be deferred for 2 weeks due to severe gastric erosions in the anterior wall. Two patients (15%) developed post procedural wound infection. Perioperative mortality (within 30 days of the procedure) was 15% (two patients aged 81 years and 67 respectively died on the 13th and 8th post procedure day; death in these patients was not directly attributable to the procedure. The cause of death was bronchopneumonia in the first patient and central respiratory failure unrelated to procedure sedation in the second patient). Two more patients aged 73 yrs and 81 yrs died after PEG on day 35 and day 90; both these deaths were due to cardiorespiratory failures unrelated to the PEG. Delayed complications occurred in four patients (31%), tube obstruction in two patients (15%) accidental tube damage in one patient (8%), and delayed (PEG) cellulitis in one patient (8%). All complications were easily managed conservatively.

Three patients (23%) recovered normal swallowing and had their PEG tubes removed after four, six and eight months respectively.

Discussion

More than a decade after its initial description, PEG continues to occupy a prominent position in current endoscopic practice and research (15). Despite many new indications, neurological disease resulting in inability to swallow remains the commonest indication for feeding gastrostomy. The other important category where PEG has been successfully used are patients requiring percutaneous

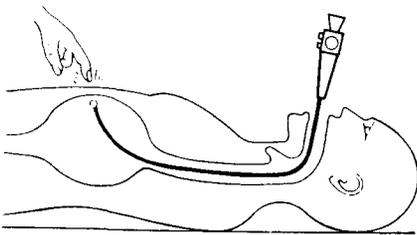


Fig 1. Transillumination and Finger indentation of distended stomach.

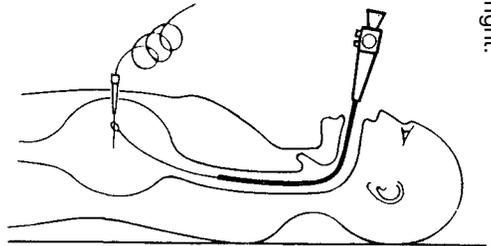


Fig 2. After introduction of needle catheter into stomach placement wire is fed through, grasped by endoscopic snare and finally wire, snare and endoscope removed as a unit.

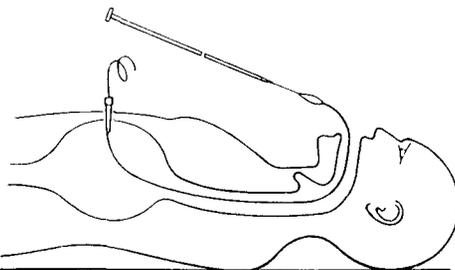


Fig 3. PEG tube and placement wire interlocked.

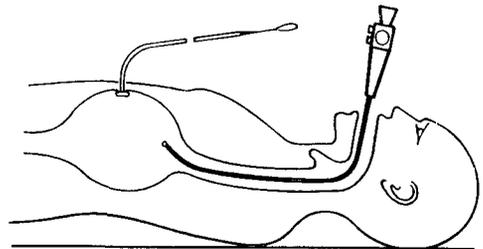


Fig 4. PEG tube gently pulled out after re-inserting the endoscope and complete re-inflation of balloon visualised.

longed gastrointestinal decompression (16). Careful patient selection is the most important factor for a successful outcome of PEG. It is essential that patients selected for the procedure should demonstrate potential for extended survival and must have normal gastrointestinal function(1).

Contraindications to PEG are marked ascites, peritoneal dialysis, and nonvisualisation of gastric transillumination or inability to elicit a good finger indentation of the distended stomach. Finger indentation is essential prior to PEG especially when using the video endoscope as over half of the cases will not transilluminate with the video endoscope(17). Other relative contraindications include sepsis, severe disease of anterior gastric wall, coagulopathy, and portal hypertensive gastropathy.

PEG enjoys widespread application and is now performed safely in most patients. Combined results from 27 separate reports involving a total of 1338 patients(8) showed a total complication rate of 13.6%. Major complications (bleeding, perforation, peritonitis etc) occurred in 2% and minor complications (wound infections, aspiration, stomal leak, tube migration, ileus, etc) occurred in 11% of patients. Mortality reported in the first 30 days after the procedure ranges from 9-15%(18) and is often associated with other underlying diseases. Pneumoperitoneum has been shown to be common after PEG, and is of no significance(19). In a series of 24 patients evaluated for pneumoperitoneum, 21% had clinical evidence of pneumoperitoneum and 38% had evidence of radiographic pneumoperitoneum(8). Other reported complications include the "Buried Bumper Syndrome" in which the internal bumper of the gastrostomy tube erodes into the stomach wall and gets covered with gastric epithelium(20), gastrocolic fistula(5,8,20), fatal necrotising fasciitis(21), gastric outlet obstruction in tubes with Foley catheter type balloon(22) and "PEG ileus"(23). The use of prophylactic antibiotics has been shown significantly to reduce the risk of wound infection and is now recommended(24).

The pull technique is by far the most commonly used, although recent comparisons between this technique and the "push technique" as described by Sachs-Vine(8), show little difference between them with regards to results, difficulty or complications(18).

Direct comparison of percutaneous and surgical gastrostomy technique shows that insertion time and time to initiation of feeding were significantly less in the percutaneous group. Procedure related mortality was 2% in the percutaneous group as compared to 7% in the surgical group. Major and minor complication rates were 2 and 12% respectively after PEG compared to 10 and 23% respectively after surgical gastrostomy(25,26). Among the many benefits of PEG, cost effectiveness is significant. Cost comparison of PEG versus surgical gastrostomy reveal significant advantages of PEG which costs two to three times less than surgical gastrostomy(8). An additional advantage of PEG is that it is easily removed when

the patient regains the ability to eat, and the fistula heals rapidly(27). In this regard the Bower-Ring PEG has the great advantage that it does not require endoscopy at the time of gastrostomy tube removal.

A striking feature in this first report of PEG in the British Army is that 55% of patients were young serving soldiers with severe neurological trauma. The average number of soldiers discharged from the British Army each year due to neurological sequelae of head injury is 27, and from all the three Services is 58. Based on these figures the estimated requirement for gastrostomies due to head injury in all three Services is 12 to 18 per year (Personal Communication, Garnett & Etherington).

An estimate of total numbers of PEGs required annually in Service hospitals will be between 30 to 40 and that in Army hospitals will be 15 to 20.

As a part of integrated approach PEG is a safe and efficient method of enteral feeding and is recommended for wider consideration in the United Kingdom (UK)(28). Although the documentation of nutritional support services in (UK) hospitals remains poor, there was a dramatic increase in the number of centres carrying out percutaneous gastrostomy feeding between 1988 (6%) in 1991 (74%)(29). PEG is an important component in the rehabilitation of patients with severe head injury, yet it is probably still underused in British service hospitals.

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