

## PERCUTANEOUS ENDOSCOPIC GASTROSTOMY

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**ABSTRACT:** Since the introduction of percutaneous endoscopic gastrostomy (PEG) into clinical practice in 1980, it has emerged as the preferred method of providing long-term enteral nutrition. PEG insertion is a relatively easy and rapid endoscopic procedure, well tolerated and affords significant palliation to patients. It has been shown to be safe and effective, the rate of complication and mortality being acceptably low. However, PEG is not as widely known or accepted here as it is elsewhere. Patients continue to have nasogastric tubes in place for lengthy periods adding to their discomfort and debility. (*JUMMEC 1996 1(2): 29-32*)

**KEY WORDS:** Percutaneous endoscopic gastrostomy, Gastrostomy tube, Enteral nutrition

### Introduction

The importance of enteral feeding in providing nutritional support in man has long been recognised from centuries ago with the use of nutrient enemas. With time, the delivery system became more sophisticated with the advent of flexible nasogastric feeding tubes. In the mid-nineteenth century, the surgical creation of a fistula between the stomach and abdominal wall was first attempted and over the next hundred years, feeding gastrostomy involving a laparotomy has evolved to become a well established alternative in providing enteral nutrition (1). The most recent innovation in technology was the introduction of percutaneous endoscopic gastrostomy (PEG) into clinical practice in 1980 (2). This has gained wide acceptance and has become the preferred procedure for achieving prolonged enteral nutrition in patients with the inability to swallow who have a functionally intact gut (3,4,5). PEG placement precludes the need for general anaesthesia and an open procedure. It is adequately performed with local and intravenous sedation. The cost benefits of PEG outweighs that of surgical gastrostomy in terms of being significantly cheaper, quicker to perform and involving a shorter hospital stay (6).

Published papers suggest that long term feeding by PEG is safe, effective, with a low complication rate and low mortality. Both short and long term comparisons of PEG and nasogastric tube (NGT) feeding suggest that PEG is at least as effective if not superior to NGT feeding (4,5). In the comparison of the two methods, Park et. al (4) demonstrated better nutritional status with PEG explained by the fact that accidental removal of nasogastric tubes resulted in patients receiving significantly less of their prescribed feeds than with PEG.

PEG seemed better tolerated and cosmetically more acceptable than the NGT. However, there are conflicting results with regards to the rate of reflux and aspiration pneumonia occurring in PEG and NGT feeding (7,8). In order to minimise the risk of gastro-oesophageal reflux, one study suggested that continuous as opposed to bolus gastrostomy feeding may be of help (9). This is demonstrated by the occurrence of scintigraphic reflux and significantly reduced lower oesophageal sphincter pressure on bolus feeding and not on continuous infusion feeding. This suggests that PEG-reflux may be a function of lower oesophageal sphincter alterations caused by gastric distension.

### Indications

Patients suitable for PEG are mostly those who have a permanent neurological disorder causing dysphagia such as cerebrovascular accident, head injury with hypoxic encephalopathy, motor neurone disease and dementia or head and neck cancer (3,10,11). In addition, there have been a number of studies focusing on PEG placement in specialised circumstances. A series on burn patients showed PEG to be effective for nutrition and decompression without increasing the risk of wound infection or major complications (12). In paediatric settings, PEG has been used with effect to provide supplemental nocturnal feedings in patients with malabsorption and inflammatory bowel disease (13). The use of PEG in malignant bowel obstruction for gastric decompression has also been reported with a favourable outcome (14,15,16).

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## Method of Placement

There are two techniques of inserting the PEG tube: the "push" and the "pull" technique. At the Endoscopy unit, University Hospital, we favour the "pull" technique of Ponsky and Gauderer (2,17). Prior to the procedure, mouth toilet is carried out and prophylactic parenteral antibiotics administered. Topical laryngeal anaesthesia with lignocaine spray is given and intravenous sedation achieved with 2.5 to 5 mg of Midazolam. A thorough endoscopic examination is then performed to visualise the oesophagus, stomach and duodenum to exclude significant pathology which would preclude PEG insertion. The patient is turned from the left lateral to the supine position and the abdomen is cleaned and draped. Following this, the stomach is insufflated with air to create gastric distension which mobilises the liver, spleen and colon away from the gastrostomy site and brings the anterior stomach wall in contact with the abdominal wall. The anterior abdominal wall is then transilluminated with the endoscope. The point of transillumination and therefore, the gastrostomy site is confirmed when finger compression at this spot is appreciated as a localised depression on endoscopic view. 1% lignocaine is used to infiltrate the skin and fascia at this point and a 1 cm skin incision is made with a scalpel. A large-bore needle cannula with inner stylet is then introduced with a quick motion to pierce the abdominal and gastric wall without pushing the stomach away. Endoscopic visualisation ensures proper positioning of the cannula before the inner stylet is withdrawn. In the meantime, an endoscopic snare is looped around the cannula. A metal loop wire is threaded through the cannula and is grasped with the snare as it exits from the cannula. With the wire firmly secured in the snare, it is brought out through the mouth together with the endoscope.

The gastrostomy tube has a metal loop attached at the tapered end. This is interlooped with the metal loop wire and by pulling at the abdominal end of the wire, the gastrostomy tube is drawn into the mouth down the oesophagus and stomach until the gastrostomy bumper is in apposition with the gastric wall. A repeat endoscopy confirms the proper positioning of the bumper. The tubing is cut to the desired length and an outer bolster is placed to anchor the tube to the abdomen. Finally, a feeding adaptor is screwed onto the gastrostomy tube. The 'push' method is very similar to the 'pull' method but uses a long, firm, tapered gastrostomy tube which is pushed over the mouth end of the guide-wire (18,19).

The success rate for either methods of PEG insertion is close to 100%. There are more publications on the experience with the 'pull' than the 'push' method. However, there is little to choose between the two methods. Both have the potential of introducing oral flora

into the stomal site and both require two passes of the endoscope to ensure proper positioning of the gastrostomy tube bumper.

A third method described by Russell uses a Foley catheter that is inserted percutaneously directly into the stomach by way of a peel-away sheath introduced over a previously placed J-wire guide (20,21). The potential risk of contamination with oral flora is therefore minimised. This method of introduction is advantageous in patients with a fixed obstruction of the oesophagus or hypopharynx that prevents safe passage of a standard gastrostomy tube bumper.

A skin-level 'button' can replace the relatively more cumbersome gastrostomy tube once the gastrocutaneous fistula has matured (22). It is easy to insert and offers the advantage of greater comfort and cosmetic acceptability. Primary button gastrostomy placement has been described in recent publications with mixed results (23,24,25) and is in general not advisable.

## Contraindications

To achieve success in PEG placement whilst avoiding serious complications, several safety precautions are important. Maximal gastric distension is the rule to bring the stomach in apposition with the abdominal wall so that indirect finger compression on the stomach is appreciated on endoscopic view. Endoscopic transillumination is necessary to ensure good placement of the cannula and to avoid the inadvertent creation of a gastrocolocutaneous tract. The anterior stomach wall should be free of any infection, inflammation or neoplastic disease. The first PEGs were placed at the junction between the middle two-thirds and outer one-third of a line drawn from the umbilicus to the left inferior costal margin.

The procedure is not recommended in the presence of a large diaphragmatic hernia, ascites or previous laparotomy. The presence of sepsis or multi-system organ failure would also preclude PEG placement.

## Complications

PEG placement is virtually always possible. It is well accepted to be a safe and relatively easy procedure. Cumulative results from larger series show that the procedure-related mortality is low at less than 1%. Major complications occur in about 3% (1 - 7%) of patients. In order of frequency, these include peritonitis, bronchopulmonary aspiration, gastric perforation and gastric haemorrhage. The occurrence of major complications, namely aspiration and peritonitis lead to death in 25% of cases. Measures to prevent aspiration include the avoidance of over-sedation and airway maintenance



throughout the procedure. As there could be a transient ileus following the procedure, bowel sounds should be auscultated prior to the commencement of feeding. The patient should be propped up during feeding and this position should be maintained for 1 hour after the feeding has stopped. Early recognition and prompt treatment with broad-spectrum antibiotics will minimise untoward outcomes in the majority of patients (11,26,27).

The commonest cause of peritonitis is premature dislodgement of the gastrostomy tube which occurs in 0.8 to 3.4% of PEG patients (3,11,26) with the risk of gastric perforation. There should be no tension when the gastrostomy tube bumper is placed in contact with the gastric mucosa and the outer bolster is only loosely in contact with the skin. This avoids tissue necrosis and therefore tube extrusion and reduces the risk of leakage of gastric contents into the peritoneal cavity. Again, emphasis should be placed on early detection and appropriate treatment which includes exploratory laparotomy if warranted.

Minor complications occur in about 8% of cases. The most common minor complication is peristomal wound infection. Other complications include stomal leak, dislodged tube, tube migration and ileus.

## Epilogue

PEG is in general, a relatively simple endoscopic procedure which offers significant palliation to patients. However it is still a procedure that is not widely known or accepted by doctors in various specialities who continue to keep nasogastric tubes in patients for long periods of time at great discomfort and inconvenience to patients.

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