

# Retrospective Evaluation of Percutaneous Endoscopic Gastrostomy in Jamaica

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## Abstract

The technique of percutaneous endoscopic gastrostomy (PEG) tube placement has now replaced surgical gastrostomy as the method of choice for long-term enteral feeding. The outcomes of PEG placement have not been evaluated since its introduction to Jamaica in 1999. We performed a retrospective audit of PEG procedures performed at a major referral centre in Jamaica between January 1999 and January 2007.

There were 240 PEG tubes placed in 215 patients during the study period. There was PEG-related morbidity in 5.4% of patients. The commoner complications included aspiration (2.1%), bleeding (1.3%), tube dislodgement (1.3%) and surgical site infection (0.8%). There were no reports of stomach perforation, gastro-enteric fistulae or intra-abdominal sepsis in this series. There was 1.7% mortality within one week of PEG tube placement and 9.6% mortality at 30 days.

PEG placement is being performed at this institution with acceptable overall morbidity and mortality. Aspiration rates are higher than accepted, but may be reduced by the avoidance of over-sedation, minimal gastric insufflation and complete aspiration of gastric contents before the procedure.

## INTRODUCTION

The PEG technique was described by Gauderer and Ponsky in 1980 as a means to access the gastro-intestinal tract without a laparotomy. (1) Since its introduction, the utility of PEG has dramatically increased. It has been estimated that over 200,000 PEG tubes are placed annually in the USA, and its utility continues to increase. (2,3,4)

The technique was first performed in Jamaica in 1999. The University Hospital of the West Indies (UHWI) acts as the major referral centre for this service from other institutions across Jamaica. We report our experience with PEG tube insertion at this institution.

## MATERIALS AND METHODS

One of two endoscopists placed PEG tubes either in an endoscopy suite or the ICU after informed consent was obtained. One of several commercially available PEG placement systems was utilized: Freka® PEG Set (Fresenius Ltd, Warrington, UK); Ponsky® PEG Kit (Bard Endoscopic Technologies, Massachusetts, USA); Cook® PEG Kit (Wilson-Cook Medical Inc, North Carolina, USA). The procedures were performed under intravenous sedation using

midazolam and pethidine when appropriate.

Both endoscopists used similar operative techniques for PEG. A complete upper gastrointestinal endoscopy was routinely performed. With the stomach fully insufflated, endoscopic vision was used to identify the entry point during abdominal wall palpation. After administration of local anaesthetic, a needle and cannula were inserted into the stomach. A guide wire was passed across the cannula after the needle was withdrawn. It was grasped with an endoscopic snare and pulled retrograde into the mouth. The tapered end of a 20Fr or 24 Fr gastrostomy tube was attached and pulled into place by traction on the guidewire across the abdominal wall. The internal bumper remained within the gastric lumen and the external bumper was used to secure the tube in place. A repeat endoscopy was routinely performed after the procedure to confirm the tube position and detect any complications. Feeding through the PEG tubes was routinely delayed for at least three hours after the procedure.

A surgical site infection was considered present when there was a purulent discharge or positive wound culture that was associated with tenderness, localized swelling and/or

erythema and was identified within 30 days of operation. Hemorrhage was considered significant when there was clinical evidence of bleeding, such as melena or hematemesis, with an associated fall in the hemoglobin concentration by at least 2gm/dl. Perforation included retroperitoneal or bowel wall leaks documented by any radiographic technique or at operation. Gastric fistulae were defined as an abnormal communication between the gastric lumen and internal viscera and/or skin demonstrated radiographically or at operation. Aspiration was considered present when there was clinical or radiographic evidence that oral or gastric contents entered the broncho-pulmonary tree. We included patients who did not have obvious evidence of vomiting, but developed signs of respiratory compromise or pneumonia (dyspnoea, cyanosis, tachycardia, hypotension and radiographic changes) in the post-operative period.

All the patients who had PEG tubes placed over an eight year period from January 1999 to January 2007 were identified from the operative log. Their hospital records were retrieved and the relevant data extracted for analysis. We excluded patients who were transferred from other facilities for this service since their hospital records would not be available for analysis. The data collected included patient demographics, indications, complications and mortality.

## RESULTS

There were 313 PEG tubes placed in 289 patients during the study period. Sixty-four patients were transferred from other hospitals for PEG and they were excluded from the final analysis. Hospital records were unavailable for analysis in 9 cases. Of the remaining 240 cases, there were 95 males and 145 females, with ages ranging from 17 to 97 years (Mean  $\pm$  SD: 73 $\pm$ 17). The indications for PEG are outlined in Table 1.

**Figure 1**

Table 1: Indications for PEG tube placement

Indication	Number (%)
<b>Cerebro-vascular Accidents</b>	120 (50%)
<b>Head and Neck Neoplasms</b>	27 (11.3%)
• Brain	21
• Oesophagus	2
• Pharynx	1
• Thyroid	3
<b>Traumatic Brain Injury</b>	18 (7.5%)
• Blunt trauma	17
• Penetrating injuries	1
<b>Neurologic Disorders</b>	50 (20.8%)
• Parkinson's disease	9
• Alzheimer's disease	18
• Multi-infarct dementia	8
• Amyotrophic Lateral Sclerosis	13
• Hypoglycaemic brain injury	2
<b>Change of PEG</b>	25 (10.4%)
<b>Total</b>	240

Attempts at PEG placement were unsuccessful in two patients. One patient had an oesophageal tumor beyond which the endoscope could not pass and the other had an acute cerebro-vascular accident, but the reason for PEG failure was not recorded.

After PEG tube placement, 6.3% of patients experienced major morbidity as outlined in Table II. Two patients experienced pulmonary embolism that was related to their underlying condition, rather than the PEG placement. Therefore PEG specific morbidity occurred in 5.4% of patients. After PEG tube placement, 1.7% of patients succumbed to their illnesses within one week and 9.6% of patients died within 30 days of PEG placement.

**Figure 2**

Table 2: Complications of PEG Tube Placement

Parameter analyzed	Total n (%)
<b>Total Number of Cases</b>	240
<b>Overall Morbidity</b>	15 (6.3%)
<b>PEG-specific Morbidity</b>	13 (5.4%)
• Aspiration	• 5 (2.1%)
• PEG Dislodgement	• 3 (1.3%)
• Wound Infection	• 2 (0.8%)
• Bleeding	• 3 (1.3%)
• Perforation / Peritonitis	• 0
• Gastro-Enteric Fistula	• 0
• Pulmonary Embolism	• 2 (0.8%)
<b>Mortality at 1 Week</b>	4 (1.7%)
<b>Mortality at 30 Days</b>	23 (9.6%)

## DISCUSSION

PEG tubes have become widely popular because the procedure is technically easy, safe and well tolerated by patients. (2) There are fewer complications associated with PEG placement than with surgical gastrostomy. (3,6,7) There are also savings in cost, operating room utility and anaesthetic time. (3,7)

PEG tubes have been gaining popularity in Caribbean countries. In a recent report from Trinidad, ten PEG tubes were placed over a period of four years. (5) This was similar to the case volume at our institution, where we placed an average of 18 PEG tubes per year during the first three years after its introduction. Our case volume has now tripled to an average of 60 PEG tubes per year between 2004 and 2006.

The efficacy of using PEG to optimize nutritional status has been proven in patients with acute dysphagic stroke (8), chronic neurological disorders (9), AIDS (10), bowel obstruction (11) and in cancer patients undergoing adjuvant chemo-radiotherapy. (12,13,14) Compared to nasogastric tubes, PEG tubes provide superior nutritional efficacy with less

complications and lower aspiration rates. (8,9,14) Prospective clinical studies have also demonstrated that enteral nutrition via PEG significantly improves the quality of life of the patients. (15)

We believe that the relatively low 30-day mortality reflected appropriate patient selection for PEG. There were no reports of procedures performed in patients with accepted contraindications: coagulation disorders; peritoneal carcinomatosis; severe ascites; peritonitis; limited life expectancy. (2,16,17) The mortality at 7 days (1.7%) probably more closely reflects the PEG-related mortality, and this is similar to PEG-related mortality from larger reports that range from 0-2%. (2,3,21)

Our overall success with PEG placement (99.2%) compares well to the outcomes reported from large volume centres. (2,3,18,19,20,21) There was failure to advance the endoscope past an oesophageal tumor in one case and this is a recognized predisposition to unsuccessful PEG placement. (2,18)

Our PEG-specific morbidity (5.4%) was comparable to that reported from large volume centres that range from 4% to 30%. (2,3,18,19,20,21) However, the incidence of aspiration during the procedure was higher than expected (2.1%). Aspiration related to PEG is reported to occur in 0.3-1.0% of cases (3,18) and leads to mortality in up to 57% of patients. (3,18,19) There are measures that may be adopted to reduce the incidence of aspiration: avoidance of over-sedation, minimal gastric insufflation and complete aspiration of gastric contents before PEG placement. (3)

There was a low incidence of surgical site infections in this series (0.8%). Large volume centres report peri-stomal wound infections in 5% to 30% of the patients who have undergone PEG (3,18,22), with only 1.6% of cases requiring aggressive medical and/or surgical treatment. (22) We routinely used a single prophylactic dose of third generation cephalosporin prior to PEG placement. There are several prospective trials (22,23,24,25,26,27) and one recent meta-analysis (28) in support of antibiotic prophylaxis. Routine prophylaxis with a single dose of antibiotic prior to the procedure is the most recent recommendation by the European Society of Gastrointestinal Endoscopy (29) and the American Society of Gastrointestinal Endoscopy. (30)

PEG tract maturation usually occurs within 7 to 10 days, although it may be delayed up to 4 weeks in the presence of malnutrition, ascites, or corticosteroid treatment. (3) The PEG tubes were inadvertently dislodged before maturation

of the tract in 1.3% of our patients. This is similar to the 1.6% to 4.4% incidence of accidental tube removal from larger reports. (3,18) We have noticed that several of the inadvertently dislodged tubes were “pulled” by incoherent patients or by their caregivers while addressing their hygienic needs. These patients may have benefited from the use of low profile devices (PEG buttons) that lay flush with the skin. (3,31,32)

## CONCLUSIONS

PEG placement is being performed at this institution with acceptable rates of success, overall morbidity and mortality. The aspiration rates are higher than accepted, but may be reduced by adopting the following precautions: avoidance of over-sedation, minimal gastric insufflation and complete aspiration of gastric contents before PEG.

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