

## Clinical Note

# Percutaneous Transesophageal Gastrostomy (PTEG): A Safe and Well-Tolerated Procedure for Palliation of End-Stage Malignant Bowel Obstruction



Debbie Selby, MD, FRCPC, Amy Nolen, MBBS, CCFP(PC), Cheromi Sittambalam, MD, CCFP, Karen Johansen, RN, MN, CHPCN(C), and Robyn Pugash, MD, FRCPC  
*Sunnybrook Health Sciences Center (D.S., A.N., C.S., K.J., R.P.); Division of Palliative Care (D.S., A.N.), Sunnybrook Health Sciences Center; and Division of Vascular and Interventional Radiology (R.P.), Sunnybrook Health Sciences Center, Toronto, Ontario, Canada*

## Abstract

**Context.** Malignant bowel obstruction (MBO) is a frequent complication in patients with advanced cancer. Symptom management for patients with end-stage MBO can be challenging, especially when venting gastrostomy is contraindicated. Percutaneous transesophageal gastrostomy (PTEG) is an alternative option allowing safe and effective symptom management in palliative care patients.

**Objectives.** We describe our experience with an initial series of 10 patients with MBOs refractory to medical management who received PTEG for gastrointestinal decompression, with a focus on palliative outcomes and safety.

**Methods.** We retrospectively reviewed the charts of 10 patients with advanced malignancy and associated gastrointestinal obstruction who received PTEG for symptom management between March 2018 and November 2018. We report on patient diagnosis, indications for PTEG, outcomes after insertion, and any associated morbidity and mortality.

**Results.** PTEGs were successfully inserted in all 10 patients with contraindications to a venting gastrostomy. There were no acute postprocedural complications. Median time from PTEG insertion to death was 15 days. Symptoms of MBO improved in all 10 patients, and all were able to resume some degree of oral intake. Importantly, unlike with venting gastrostomies, all patients required suction to maintain resolution of MBO symptoms.

**Conclusion.** PTEG should be considered for gastrointestinal decompression in patients with MBO who are not candidates for surgical decompression or standard venting gastrostomy. This safe and effective procedure improves symptom management and quality of life for patients with MBO who are approaching end of life. *J Pain Symptom Manage* 2019;58:306–310. © 2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

## Key Words

*Malignant bowel obstruction, percutaneous transesophageal gastrostomy, gastrointestinal decompression*

## Introduction

Malignant bowel obstruction (MBO), a common complication of malignancy, carries a high rate of morbidity and mortality.<sup>1,2</sup> Although medical and/or surgical interventions can alleviate many MBOs, recurrent or refractory obstructions are not uncommon and result in a high symptom burden.<sup>3</sup> In refractory cases, venting gastrostomies allow ongoing gastric

drainage to relieve nausea/vomiting<sup>4</sup> as an alternative to nasogastric (NG) tubes, which are frequently uncomfortable and have a high rate of displacement with need for reinsertion.

A standard venting gastrostomy is placed through the anterior abdominal wall, across the peritoneal space and into the stomach. A tube of this nature can only function effectively if a healthy tract (fibrous scar) can form around it, which will then prevent

Address correspondence to: Debbie Selby, MD, FRCPC, 2075 Bayview Avenue KGE31, Toronto, ON M4N3M5, Canada.  
E-mail: [Debbie.selby@sunnybrook.ca](mailto:Debbie.selby@sunnybrook.ca)

Accepted for publication: April 26, 2019.

gastric contents or ascites from leaking around the tube. If a healthy tract does not form, the tissues will break down around the tube, leading to pericatheter drainage which can cause significant morbidity. For this reason, peritoneal carcinomatosis, significant ascites, and advanced gastric cancer are considered to be contraindications to the transabdominal placement of venting gastrostomy tubes. Barring an alternate approach to decompression, these patients need to choose between the discomfort of an NG tube or tolerating very limited oral intake with potential ongoing nausea and vomiting despite best medical management.

Such an alternate approach, percutaneous transesophageal gastrostomy (PTEG), was first described by Oishi in 1994 with a subsequent case series published in 2003.<sup>5</sup> PTEG, now more commonly referred to as percutaneous transesophageal gastrostomy, was developed as a novel, minimally invasive technique for gastric drainage or provision of supplemental nutrition for patients with contraindications to venting gastrostomies. Although use of PTEG has been slowly increasing in North America, there remain very few reports in the literature, with these largely limited to surgical, endoscopic, and interventional radiology journals.<sup>6–10</sup>

The Vascular and Interventional Radiology Division at Sunnybrook Health Sciences Centre, an acute care center in Toronto, Canada, has placed PTEGs in 10 patients since March 2018. This paper reports on our experience with PTEGs with the view to bringing awareness of this option to the palliative care community.

## Methods

### Patients

Records of all patients who underwent PTEG insertion at our hospital from March 2018 to November 2018 were retrospectively reviewed. Data collected included demographics, clinical history, indications, outcomes after insertion, place of discharge, and mortality for each patient. The study was approved by the Research Ethics Board at Sunnybrook Health Sciences Centre.

Data extraction was completed independently by three researchers (A. N., D. S., C. S.) who subsequently met to discuss any areas of disparity in data recording.

### Technique

PTEG insertion is possible because the esophagus lies slightly left of the midline as opposed to directly behind the trachea. An angiographic catheter is first placed as an NG tube. It is then exchanged over a guidewire for a catheter with a large diameter (22 or

24 mm) balloon on it. The balloon is inflated in the esophagus at the level of the sternal notch or just below it. The left side of the base of the neck is then scanned with ultrasound. The inflated balloon will be visible posteriorly, between the trachea and left common carotid artery. The balloon is then punctured using this safe window. Once the balloon has been punctured, a wire is advanced into the esophagus. This wire is then advanced through the esophagus into the stomach, at which point standard techniques are used to dilate the tract and place a tube (usually 14 French) that has a locking loop on the end. The locking loop is positioned in the stomach, and the catheter is then sutured to the neck exit site to prevent dislodgement (see Figs. 1 and 2).

## Results

PTEGs were inserted in 10 patients who had contraindications to a venting gastrostomy from March to November 2018. Demographics are shown in Table 1. Most patients had very limited disease beyond carcinomatosis/adenopathy with only two having solid tumor metastatic disease (both to liver). All, however, had very extensive carcinomatosis, often with invasion of the pelvic sidewall, liver, or bowel. Bowel obstructions included mechanical as well as functional obstructions, with mechanical obstructions frequently being multifocal and almost all in the proximal small bowel. All obstructions were clinically noted to be either “complete” or “near-complete” obstructions. Seven of 10 patients had an NG tube inserted for at least several days before transition to PTEG, with all citing a desire to have the NG removed.

There were no procedural complications with PTEG insertions nor mortality related to insertion, and all PTEGs functioned after insertion. In three instances, the PTEG was inserted through the left lobe of the thyroid as there was no other window; no bleeding was noted peri-insertion in any of these cases. Two patients had minor complications including one needing an extra suture at the site of the insertion (Day 17) and one requiring the PTEG to be advanced on Day 14 as it had pulled back to the upper esophagus. This patient also required antibiotics four days later for an exit site infection.

Nine of the patients died within 35 days of PTEG insertion (median 15 days), with one patient surviving over 10 months. Of note, the one long-term survivor had a distal obstruction only (sigmoid colon, with failed attempt at stenting) and developed an enterocutaneous fistula which resulted in resolution of their bowel obstruction. The remainder of the patients had small bowel dominant obstructions. Five patients were discharged home, though only transiently, with



Fig. 1. Percutaneous transesophageal gastrostomy insertion site immediately post placement.

subsequent readmission for four of these patients to either the palliative care unit (PCU) or another hospital for end-of-life care.

After PTEG insertion, all patients were able to start clear fluids with some advancing diet ultimately to purees. Symptoms were markedly improved in most with a clear finding that those not on suction had persistent nausea and vomiting which resolved with resumption of suction. No patient had resolution of symptoms without suction (aside from the long-term survivor). All were able to reduce medications specifically for nausea, though given ongoing multilevel obstructions most remained on medications such as dexamethasone and octreotide.

Patients tolerated the PTEG well with no pain reported after the first 24–48 hours after insertion. Dressings were noted to be readily concealed by

clothing, and no patient reported discomfort with the visual impact of the PTEG. From a quality of life perspective, most patients commented predominately on having the NG tube out and being able to drink fluids without nausea or vomiting.

### **Discussion**

Our series of 10 patients demonstrated PTEG as an effective modality for gastric drainage in patients with MBO refractory to medical therapy, who were ineligible for venting gastrostomy.

Our patients had advanced illness and poor functional status (median Eastern Cooperative Oncology Group 3), and most died within weeks of insertion of the PTEG. This is consistent with previous studies indicating that inoperable bowel obstruction confers



Fig. 2. Chest xray showing percutaneous transesophageal gastrostomy placement.

a very poor prognosis, usually in the order of weeks to short months. Insertion of a PTEG was not an intervention that aimed to extend lifespan in our patients but rather to improve quality of life.

Unlike venting gastrostomy tubes, symptom relief from PTEG was only obtained when patients were adequately connected to suction (120 mmHg or less). Furthermore, when off suction, we noted leakage around the PTEG insertion site in two patients, felt due to increased intragastric pressure, which resolved with restarting suction. This leakage appears to increase the risk of infection at the insertion site as both went on to require antibiotics, one

topically and the other systemically. Of note, some patients complained of increased discomfort when suction was set to higher pressures, with a small number of patients tolerating only low wall suction (between 40 and 80 mmHg).

PTEG is a new intervention for palliative care patients, and staff may initially feel intimidated by the appearance of the PTEG, given the insertion site in the neck. Locally, in our PCU, some were concerned care would be complex, but in fact they found it to be very similar to care of a standard venting gastrostomy tube except that the PTEG required suction. The site dressing involved simply cleaning the site and assessing for any signs of infection, followed by the application of drain gauze dressing. Once oral intake resumed, regular surveillance by nursing staff to monitor for blockage of the PTEG was needed. In the rare instances the PTEG did block, and it was easily cleared with a water flush.

All 10 individuals were capable of resuming some oral intake after PTEG insertion. For most, this was limited to clear or full fluids although two patients advanced to a puréed diet. Although nutrition was not the goal of the PTEG, the mouthfeel and taste

Table 1  
Demographics

	Median (Range)
Age	61.5 (39–76)
Gender	Female = 9/10
Malignancy	Gastric/small bowel = 5, ovarian = 3, vulvar = 1, pancreas = 1
ECOG	3 (2–4)
Albumin (g/L)	27.5 (16–33)
Time to death (days)	15 (2–35)

ECOG =Eastern Cooperative Oncology Group.

of food and the social aspect of sharing a meal with loved ones allowed for meaningful interactions with family and further enhanced quality of life in patients' last days or weeks. Anecdotally, one patient ultimately requested (and was found eligible for) medical assistance in dying and was able to enjoy a final dim sum with her family immediately before provision of medical assistance in dying, which would not have been possible had she not been managed with PTEG decompression.

The requirement for continuous suction may present a challenge for community management of PTEGs, although this challenge is not insurmountable. Five of our 10 patients were discharged home within one week of PTEG insertion with a suction apparatus in the home and palliative home care nursing support. Two of the five patients were ultimately admitted to the PCU but were still able to have a short period at home with symptoms controlled. This opportunity to die at home or to spend even a short period of time at home is a significant goal for many patients at the end of life, and intervention with PTEG allowed half of our cohort to obtain this goal.

Our data suggest that the primary indication for a PTEG would be for those patients with a complete or near-complete proximal bowel obstruction, in the setting of carcinomatosis or ascites that precludes placement of a venting G tube. Our one patient with distal large bowel obstruction received a PTEG after a failed attempt at sigmoid stenting but went on to develop a colocolic fistula which acted to defunction the bowel and the PTEG was no longer needed. Of note though, similar to the rest of our cohort, the PTEG provided early symptomatic relief, allowed removal of the NG tube, and discharge home for this patient.

The technical success rate of PTEG insertion in our patients was 100% with no acute postinsertion complications, in keeping with other series described to date.<sup>5–10</sup> We noted only minor complications thereafter, including one incidence of tube migration that was safely repositioned by interventional radiology without removal of the tube, one need for an additional suture, and two insertion site infections both related to the PTEG being off suction. Based on our small cohort of 10 patients, we conclude that PTEG is a safe and minimally invasive intervention that carries little risk of adverse events or complications.

## Conclusion

Our experience with our first 10 consecutive patients receiving PTEG for decompression of complete or near-complete MBOs, who were unable to be

decompressed via venting gastrostomy, demonstrates that PTEG is a safe, well-tolerated, and effective means of achieving symptom relief. These are patients very near end of life, and the purpose of the PTEG should not be construed as extending life, but rather improving quality of life by reducing nausea and vomiting, removing the discomfort of needing an NG tube, and by allowing patients to continue drinking and eating (purée) through to end of life.

## Disclosures and Acknowledgments

This research received no specific funding/grant from any funding agency in the public, commercial, or not-for-profit sectors. The authors declare no conflicts of interest.

## References

1. Franke A, Iqbal A, Starr J, Nair R, George T Jr. Management of malignant bowel obstruction associated with GI cancers. *J Onc Pract* 2017;13:426–434.
2. Wright FC, Chakraborty A, Helyer L, Moravan V, Selby D. Predictors of survival in patients with non-curative stage IV cancer and malignant bowel obstruction. *J Surg Oncol* 2010;101:425–429.
3. Chakraborty A, Selby D, Gardiner K, et al. Malignant bowel obstruction: natural history of a heterogeneous patient population followed prospectively over two years. *J Pain Symptom Manag* 2011;41:412–420.
4. Brooksbank MA, Game PA, Ashby MA. Palliative venting gastrostomy in malignant intestinal obstruction. *Pall Med* 2002;16:520–526.
5. Oishi H, Shindo H, Shirotani N, Kameoka S. A nonsurgical technique to create an esophagostomy for difficult cases of percutaneous endoscopic gastrostomy. *Surg Endosc* 2003;17:1224–1227.
6. Mackey R, Chand B, Oishi H, Kameoka S, Ponsky JL. Percutaneous transesophageal gastrostomy tube for decompression of malignant obstruction: report of the first case and our series in the US. *J Am Coll Surg* 2005;201:695–700.
7. Udomsawaengsup S, Brethauer S, Kroh M, Chand B. Percutaneous transesophageal gastrostomy (PTEG): a safe and effective technique for gastrointestinal decompression in malignant obstruction and massive ascites. *Surg Endosc* 2008;22:2314–2318.
8. Singal AK, Dekovich AA, Tam AI, Wallace MJ. Percutaneous transesophageal gastrostomy tube placement: an alternative to percutaneous endoscopic gastrostomy in patients with intra-abdominal metastasis. *Gastro Endosc* 2010;71:402–406.
9. Murakami M, Nishino K, Takaoka Y, et al. Endoscopically assisted percutaneous transesophageal gastrotubing: a retrospective pilot study. *Eur J Gastro Hep* 2013;25:989–995.
10. Aramaki T, Arai Y, Inaba Y, et al. Phase II study of percutaneous transesophageal gastrotubing for patients with malignant gastrointestinal obstruction; JIVROSG-0205. *J Vasc Interv Radiol* 2013;24.