

Carol Rees Parrish, R.D., M.S., Series Editor

## Buried Bumper Syndrome: Can We Prevent It?



George H. Pop

**Percutaneous endoscopic gastrostomy (PEG) is considered a safe procedure which has been used worldwide since the 1980s. Although percutaneous enterostomy catheters are most commonly placed for nutritional support, other indications have evolved for specific clinical scenarios. Most procedures are done in outpatient settings and carry low complication rates. One of the most severe complications known to occur as early as 8 days post procedure is the buried bumper syndrome (BBS). The following review focuses on prevention of BBS. Once recognized, a buried bumper should be removed even if the patient is asymptomatic, because of the risks of tube impaction in the abdominal wall and/or gastric perforation, as illustrated in the following case report from our institution, included in this review.**

### CASE REPORT

**M**.W., a pleasant 47-year-old morbidly obese Caucasian female, arrived at our institution's Emergency Department complaining of abdominal pain. Her pain was localized to the left upper quadrant, non-radiating, 8/10 in severity and relatively recent (onset 12 hours prior to admission)

Of note, M.W. has a significant history of gastro paresis and she recently underwent an elective percu-

taneous endoscopic gastrostomy with jejunal extension (PEG/J) placement 9 days prior to presentation. She noted a progressively enlarging erythematous rash surrounding the feeding tube which became extremely tender to palpation. She also reported inability to administer her formula via the tube 24 prior to presentation. She is 5 feet 6 inches, 339 pounds. On physical exam, she was noted to have a 6 × 10 cm erythematous area surrounding the feeding tube, extremely tender to palpation. The PEG appeared fused to the abdominal wall. Twisting or advancing the tube was not possible. Laboratory data was significant for leukocytosis (WBC 15.8, 14.5% bands, 82.9% neutrophils). An

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George H. Pop, M.D., Internal Medicine Resident, University of Virginia Health System, Charlottesville, VA.

abdominal CT scan revealed a malpositioned percutaneous gastric tube with extravasation of contrast material and air along the tube tract and into the subcutaneous fat along the ventral abdominal wall. The general surgery team was consulted and the patient was taken to the OR. In the operating room, Ms. W received an incision and drainage of an abdominal wall abscess and removal of the dislodged PEG tube. An incision of about 40 cm was made across her abdominal wall and the area in question appeared to have enteral feeding present which was washed out. She tolerated the surgery well, recovered nicely and was discharged home nine days later (after a short stay in the surgical intensive care unit post-operatively) with a temporary nasogastric tube.

## INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) tubes were introduced three decades ago [1]. Currently in the United States more than 250,000 PEG tubes are placed annually [2]. The procedure is performed by gastroenterologists or surgeons, usually requiring moderate sedation. It serves as a safe alternative route for nutrients, hydration, and medication delivery in patients who lack oral intake capabilities and need long term feeding support. Another primary and growing indication is for gut decompression (see Table 1 for indications and relative contraindications).

As with any invasive procedure, placing a PEG tube carries some risks. Appropriate counseling should be offered to patients prior to referring them for a PEG tube placement. A detailed description of the PEG tube insertion technique, as well as the immediate risks and potential delayed complications is typically performed in the gastroenterologist's clinic or in the hospital room. Long-term follow up (monitoring for potential complications and success of overall plans and goals) is ideally scheduled in a multidisciplinary clinic (involving gastroenterologists, nurses or physician assistants and nutritionists who specialize in nutrition support). Primary care physicians are also involved in post-PEG placement care and may encounter acute or late post-PEG complications. One known complication, described since the early 1980's, is the buried bumper syndrome (BBS) [3].

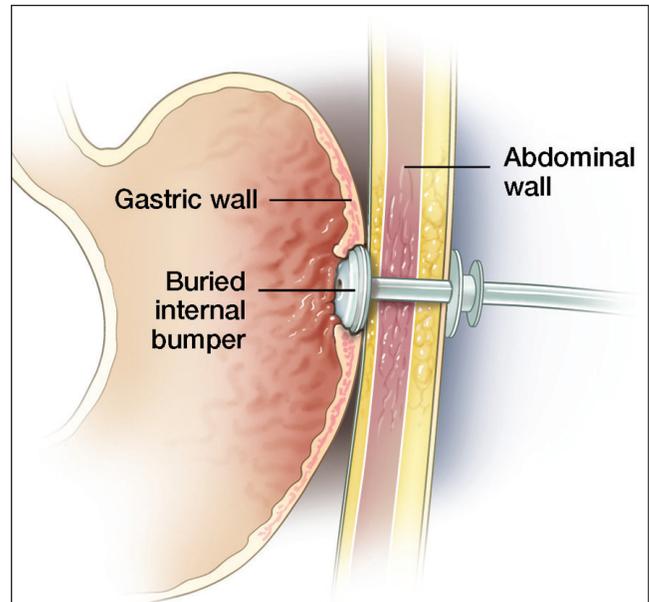


Figure 1.

**Table 1.**  
Indications and Contraindications for PEG placement

### Indications

- *Neurologic event:* CVA, PD, ALS [8] MS, HIV encephalopathy, trauma, dementia, brain tumor
- *Anatomic:* tracheoesophageal fistula
- *Malignant obstruction:* oropharyngeal or esophageal masses [10]
- *Other:* gastric decompression, burn patients, severe bowel motility disorder

### Relative Contraindications

- Peritoneal metastases
- Peritoneal dialysis
- Ascites
- Coagulopathy
- Poor life expectancy
- Acute illness (respiratory distress)
- Severe obesity
- Open abdominal wound
- Ventral hernia
- Portal hypertension with gastric varices
- Sepsis

CVA – cerebrovascular accident; PD – Parkinson's disease;  
ALS – Amyotrophic Lateral Sclerosis; MS – Multiple Sclerosis

#### INCIDENCE

Although the incidence of BBS has decreased over the years, given improved design of internal bumpers, including softer edges and better materials, the syndrome persists, possibly due to the increasing incidence of obesity in our population [11,12]. The current incidence ranges from 0.3–2.4% [3].

#### ETIOLOGY AND CLINICAL PRESENTATION

The etiology of BBS is related to excessive tightening of the external bolster during or soon after PEG placement, presumably in an attempt to manage excessive leakage of tube feedings or gastric contents. Such vigorous tightening can lead to ischemic necrosis of the gastric wall and subsequent migration of the internal bolster either into the gastric wall, abdominal wall, or even into subcutaneous tissue and skin, eventually leading to loss of feeding access and loss of the device [2]. Epithelialization with coverage of the internal gastrostomy stoma with gastric mucosa can result in complete closure of the orifice (see Figure 1).

The buried bumper syndrome is considered a late complication of PEG insertion. The earliest reported case was at 8 days post insertion [3]. All types of PEG feeding tubes (initial placement, replacement tubes, and low profile devices) are associated with this complication [3].

BBS can, if unrecognized in a timely fashion, lead to more significant complications, including bleeding, wound infection, and fistula tract formation. Several

case reports described pressure necrosis beneath the internal PEG bumper leading to gastric perforation and peritonitis [4]. One case report described a fatal outcome [14].

The presenting symptomatology ranges anywhere from pain (excessive) at the PEG site, inability to twist or advance the tube (appears “fused” to the abdominal wall), to inability to administer formula or medications [13]. The diagnosis is usually clinical, confirmed by delivering contrast via the PEG (may not flow into the gastric lumen). Subsequent endoscopy or computed tomography (CT) usually demonstrates absence of the internal bumper in the gastric lumen [4].

#### RISK FACTORS

It is important, therefore, to identify possible prevention methods, as well as risk factors for the development of BBS. Recent studies have identified obesity as the single most important risk factor for developing the syndrome [15]. Interestingly, rapid weight gain (regardless of the pre-procedure weight) has been associated with an increased risk as well, especially if concurrent loosening of the external bumper is not performed. Patient manipulation and pulling of the PEG, placement of multiple gauze pads or other coverings beneath the external bumper, repositioning of the external bumper by inexperienced personnel (often after moving it aside to care for the external PEG site), have been associated with its occurrence [7]. Chronic cough may also contribute to the development of the BBS [5]. Stiff (polyurethane) tubes, malnutrition, poor tissue healing (due to diabetes or irradiation) have also been shown to increase the risk of developing BBS [15]. See Table 2 for the most common risk factors associated with the development of BBS. Nutrition Editors note: Two patients with significant obesity at our institution experienced BBS; it was felt due to the fact that when the patient was lying on the endoscopy table and the PEG was placed, upon standing, and with gravitational pull on the panniculus, not allowing for a little extra tubing to account for this, might have prevented it from occurring.

**Table 2.**  
**Risk Factors Associated with Buried Bumper Syndrome**

- Obesity
- Rapid weight gain, in particular if loosening of the external bumper is not also attended to
- Patient manipulation and pulling of the PEG
- Placement of multiple gauze pads or other coverings beneath the external bumper
- Repositioning of the external bumper by inexperienced personnel
- Chronic/severe cough
- Frequent or inadvertent tube traction by caregivers

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## PREVENTING BURIED BUMPER SYNDROME

Several prevention techniques have been proposed, but current literature lacks strong prospectively established evidence to support them. One particular widespread practice is to allow an additional 1.5 cm between the external bolster and the skin. In an older study, Foutch et al. [6] recommended leaving a 2 mm space between the external bumper and the abdominal skin surface upon PEG placement to prevent pulling the internal bumper up too tight against the gastric mucosal surface. They also recommended pushing the PEG in 5 mm further after 10 days post-PEG placement, allowing a total of 7 mm between the external bolster and the abdominal skin surface.

In addition, a PEG tube should be periodically gently pushed in and out of the stomach (1–2 cm) while rotating it. In hospitalized patients, simple diagrams of the PEG system should be displayed at the bedside. Length of the protruding external portion of the PEG should be measured periodically to recognize early migration (see Table 3).

## CONCLUSION

As always, it is of uttermost importance to have good communication between the patient, the patient's family and the multidisciplinary healthcare providing team (gastroenterologists, nutritionists, nurses, primary care

physicians, etc.) with regard to PEG care. BBS is a preventable complication and, in light of its significant morbidity and healthcare associated costs, deserves thorough prevention efforts. We therefore encourage all healthcare professionals involved in PEG care to be more proactive in monitoring (at bedside or in clinic) for the development of BBS, by identifying the high risk patient population and recognizing early presenting symptomatology. ■

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**Table 3.**

### Possible Considerations in Preventing Buried Bumper Syndrome

- Allow an additional 1.5–2 cm between the external bumper and the skin.
- Visualize the internal bumper (immediately following the PEG placement) to confirm its location prior to applying the external bumper
- Once a day gently rotate and push the PEG in and out ~1–2 cm
- Display simple diagrams of the PEG system at the bedside in the hospital or clinic.
- Length of the protruding external portion of the PEG should be measured periodically to recognize early migration