Percutaneous endoscopic gastrostomy (PEG) is commonly used as a long-term enteral nutrition support in patients who suffer from neurological dysphagia or head and neck cancer. Many authors experienced with PEG have documented that the incidence of complications related to the procedure is low. However, numerous significant complications have been reported since its introduction by Ponsky in 1980.1-3

We report herein a patient who developed a complication of PEG in which the internal bumper became buried in the gastric wall. A simple endoscopic method to resolve this problem is described.

**Case Report**

A 79-year-old man was a patient with old cerebral infarction who was bed-ridden for a long time. He stayed at a nursing home for about 1 year. He was admitted to our hospital in Feb. 1999 because of dysphagia, poor intake and cachexia. On physical examination, he was afebrile but cachetic with poor skin turgor. No lymphadenopathy was found in the neck and axilla. The abdomen was soft and scaphoid but no palpable mass was noted on examination. Blood tests revealed WBC 4,000/cumm with 59% polymorphs, Hb 11.5 g%, platelet 105,000/cumm, albumin 3.1 g/dL, cholesterol 133 mg/dL, triglyceride 61 mg/dL, creatinin 0.6 mg/dL and GPT 35 U/L, respectively. Chest film showed pneumonia at right upper lobe. Nasogastric tube (NG) was inserted for feeding because of dysphagia and aspiration pneumonia. However, the patient could not tolerate it and removed the NG tube frequently despite gentle restriction of the upper...
per extremities. So, he had a 22 Fr PEG (Caluso, Norvatis, pull type) placed in April, 1999 by utilizing standard technique. Cefazolin 1 gm was administered 30 minutes before the procedure. In the endoscopy room, upper gastrointestinal (UGI) panendoscopy was performed to evaluate significant disease after topical anesthesia without any sedation. The stomach was insufflated with air until it was fully distended. A gastrostomy site was selected based on light transillumination and finger indentation. The skin was scrubbed with providone-iodine and draped, and the gastrostomy site was punctured with a 22 G needle into the gastric lumen and then the peri toneum and skin were infiltrated with local anesthesia. A 1 cm skin incision was made and a 14 gauge catheter was thrust through the incision into the stomach. The inner needle was removed and the wire inserted through the cannula was snared endoscopically and pulled out through the mouth. A 22-Fr Caluso gastrostomy tube was tied to the guidewire and was pulled out the abdominal wall via mouth. The scope was reintroduced into the stomach. The gastrostomy tube was then withdrawn under direct visualization so that the internal bumper gently opposed the gastric wall. The external binder was advanced to the surface of the skin. The tapered end of the gastrostomy tube was cut and a feeding adapter was inserted to the end of the tube. The procedure was smooth and the patient tolerated it well. Tube feeding started 12 hours later and no complication occurred within 7 days after operation. The gastrostomy worked and the gastrostomy exit site healed well. Then, the patient was discharged to nursing home and we lost follow-up with him till June, 1999 – two months after PEG placement, he was referred to our unit for care of pressure sore. On inspection, the skin surrounding the stoma seemed good and

![Fig.1. Gastroscopy showed that the internal bumper was completely covered by gastric mucosa, just leaving orifice visible (A, B). Manual pushing the tube and a star-shaped elevation of gastric mucosa (by the buried bumper) was seen at endoscopy (C). A mucosal incision 1 cm from orifice by needle-type papillotome was done and the buried internal bumper was explored and reverted in situ (D).](image-url)
tube feeding functioned. But the gastrostomy tube was fixed, not rotating freely, and could not be moved back and forth. Upper GI endoscopy was performed and showed that the internal binder was almost covered by gastric mucosa, just leaving the orifice visible (Fig. 1A, 1B).

Manual pushing on the tube could not dislodge the bumper, and a star-shaped elevation of gastric mucosa was seen under endoscopy (Fig. 1C). After water irrigation, there was no more bleeding, and the gastrostomy tube was kept in situ. Barium study revealed no leakage and the patient began gastrostomy tube feeding twelve hours later. No complication occurred after the procedure and the gastrostomy functioned well. Repeated gastroscopy one month later showed good internal stoma, and patient has been stable till present.

**Discussion**

PEG has gained wide acceptance as a relatively safe and efficient means of enteral access. The complications encountered in several large series showed that procedure-related mortality occurred in less than 1%, major complication in 3%, and minor complication in less than 14% of patients. One complication of PEG is migration of the internal bumper into or through the abdominal wall. This was first described in 1988 by multiple authors and was coined “the buried bumper syndrome.” To date, this complication of PEG has been reported in around 30 cases, with the majority of reported cases involving the use of the Sacks-Vinge (Ross Laboratories, Columbus, Ohio) PEG system. Recent literature has described a variety of techniques to salvage implanted and occluded PEG tubes, including surgical exploration of the PEG wound and instrument manipulation to ultimately find, secure, and remove the PEG tube. An endoscopic approach was described by Klein in 1990 and another non-surgical technique to salvage implanted and occluded PEG tubes was also described by Harvey and Sloyer in 1993. Until 1995, Boyd et al. presented the same buried bumper complications. All the patients had newly-designed commercial PEG kits, Caluso 22 F or 28 F (Sandoz Nutrition, MN, USA). The design of these PEGs consists of a soft silicone PEG lumen and a more rigid cloverleaf internal bumper which creates a fixed internal bumper design that requires the PEG to be removed endoscopically and in creases the surface area of the internal bumper to reduce the risk of leakage and ensure the gastric mucosa is covered by the internal bumper. Caluso PEG has a wide internal bumper so that it acts as a barrier to prevent gastric wall perforation. In our patient, the Caluso PEG kit, 22 F (Norvatis Nutrition, MN, USA) consists of the same materials and structure as the Sandoz Nutrition Caluso PEG. Caluso PEG has a wide internal bumper so that it acts as a barrier to prevent gastric wall perforation when cut is performed in case of buried bumper. So, we use an endoscopic cut to explore the buried bump, re-vert the gastrostomy tube and keep it functioning continuously.

It is likely that a tight-fitting external bumper over the abdominal skin surface creates a situation where the fixed external bumper causes pressure necrosis of the gastric mucosa and slow migration into the abdomen.
nal wall. Potential reasons for this tight-fitting external binder include patient’s weight gain, patient manipulation and pulling of the PEG, the placement of multiple gauze pads beneath the external binder, rotation of the external binder by inexperienced personnel after moving it to care for the external PEG site, or tight external binder placement during PEG placement. To reduce buried bumper complications, the use of PEG tubes requires proper PEG positioning on initial endoscopy and good communication between the physician, patient, and caregivers with regard to PEG.

The problem of buried bumper may occur at any time after PEG placement. Most patients develop buried bumper 6 months after original PEG placement but occurrence of buried bumper has been reported 5 days, 2 weeks and 1 month after PEG. Experienced authors recommend that the external binder should be kept at least 1 cm away from abdominal skin after gastrostomy fistula has formed and matured, and periodic rotation of tube to verify that the internal bumper is free and not buried within the gas tric wall. Care givers should be given specific instructions regarding rotation of the external binder, observation of the external binder for too “tight” a fit, and avoidance of placement of gauze pads beneath the external bumper. In any patient who presents with increased abdominal pain, peritubular leakage, resistance to formula flow, or inability to push in and rotate the PEG, the buried bumper syndrome must be considered.

Although the buried bumper syndrome may be an uncommon complication of the present commercial fixed internal bumper PEG system, physicians need to be aware of avoidance and management of this potential complication. In cases of buried bumper, there are many approaches, reviewed above, including surgical removal, non-surgical salving technique, endoscopic retrieval, and push-pull T technique. Our endoscopic cutting also provides a simple and safe method for resolving this complication in the Caluso PEG.

References