

# Buried bumper syndrome: an uncommon complication of percutaneous endoscopic gastrostomy

## Report of three cases

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**Abstract.** *Percutaneous endoscopic gastrostomy (PEG) is widely used as a safe way for long-term enteral nutrition support. Buried bumper syndrome is a rare complication of PEG. We report our experience in managing 3 cases that were encountered with this complication. Upper endoscopy showed completely covered internal bumpers with central dimples. The position of the buried bumper was estimated by abdominal ultrasonography. Successful endoscopic extraction of the tube, using needle knife papillotome and argon plasma coagulation, was our end result. We had no complications in the procedure apart from minor bleeding that was secured by argon plasma coagulation and/or epinephrine injection.*

**Key words:** *percutaneous endoscopic gastrostomy, buried bumper syndrome, needle knife papillotome, argon plasma coagulation*

Percutaneous endoscopic gastrostomy (PEG) has gained wide acceptance as a relatively safe and effective mean of long-term enteral nutrition (5,11) and has widely replaced laparotomy to create the gastrostomy (20). Its overall success rate of placement is 95 – 98 % regardless to the used technique (18). PEG is commonly indicated for patients suffering from neurologic disorders with swallowing disorders, oropharyngeal or oesophageal tumours, and various hypercatabolic states as short gut syndrome and major traumas or burns (19,23). Prospective clinical studies demonstrated that enteral nutrition via PEG significantly improved quality of life of those patients (2,14).

However, numerous significant complications have been reported. They may be minor, ranging between 5 – 20 %, and include cellulitis, peristomal leakage,

pneumoperitoneum, haematoma and tube leakage. Major complications are less than 3 % and include peritonitis, gastric haemorrhage, aspiration, severe wound infection up to necrotizing fasciitis, visceral perforation, PEG site tumour seeding and buried bumper syndrome. Procedure related mortality is 0 – 2 % (12,15).

Buried bumper syndrome is a late major complication of PEG in which there is migration of internal bumper of PEG tube into gastric or abdominal wall with mucosal overgrowth of the opening (18).

Between April 2003 and April 2006 a total of 362 PEGs (Freka® PEG Set Gastric Fr 15, PEG sonde off polyurethane, diameter of the internal bumper 25 mm) were performed in the gastrointestinal endoscopy unit at the Charles University Teaching

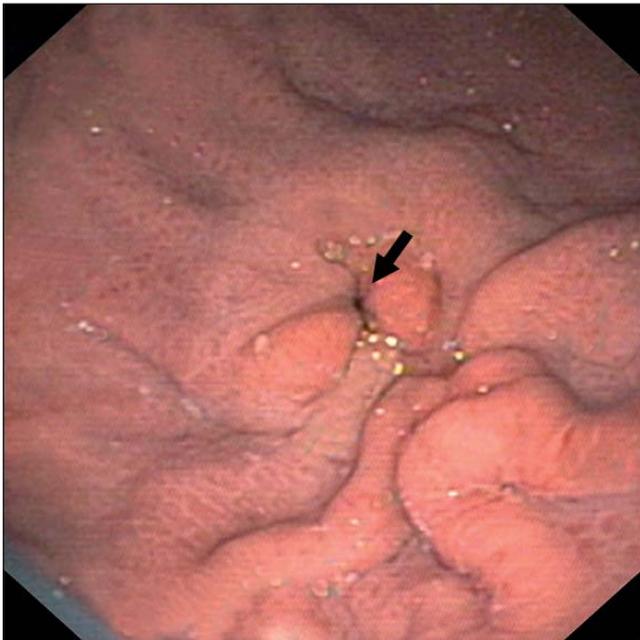


Figure 1  
Completely buried internal bumper by the gastric mucosa with a small central dimple (arrow) corresponding to the orifice.

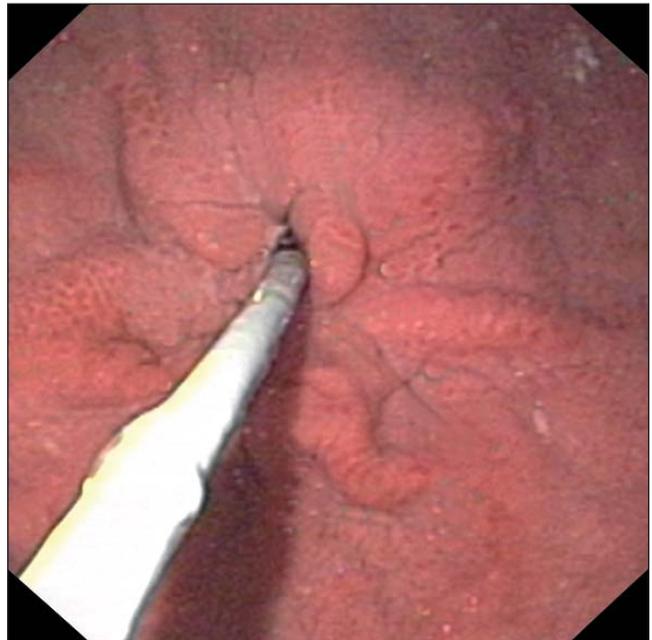


Figure 3  
The bougie dilator was introduced through the PEG into the stomach.

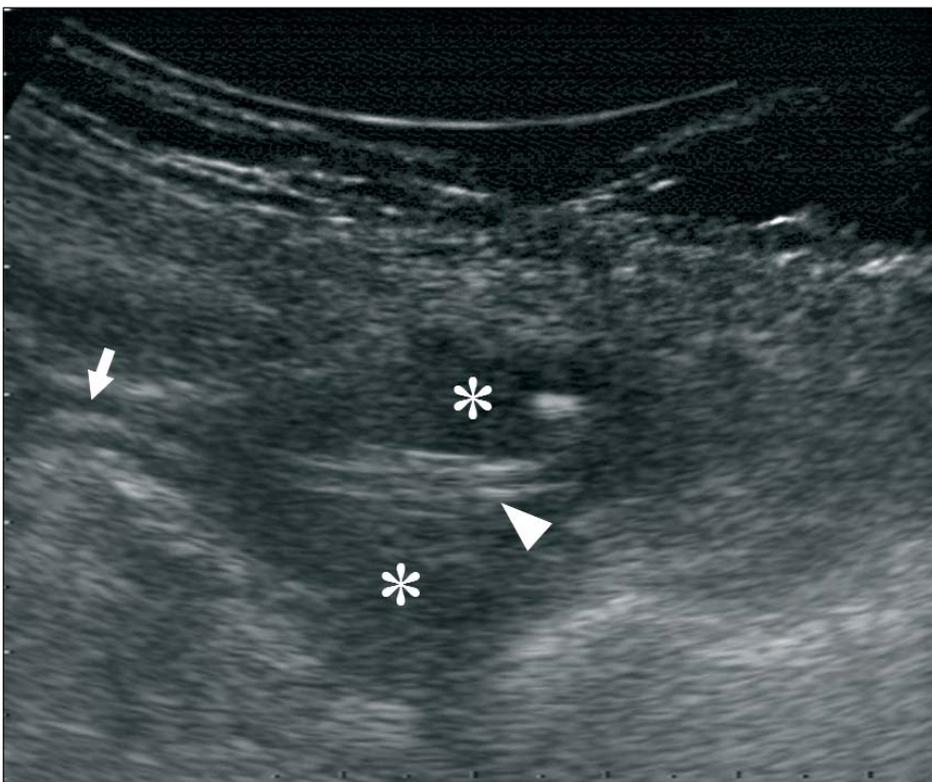


Figure 2  
Hypoechoic infiltrate (asterisks) with a diameter of 3 cm around the internal bumper (arrowhead) in the gastric wall. The muscularis propria of the gastric wall is marked with arrow.

Hospital at Hradec Králové. Buried bumper syndrome was encountered in 3 cases (0.8 %). We hereby report our experience in managing them.

### Case reports

#### Case 1

A 40-year-old man was admitted to an internal medicine department elsewhere due to short bowel

syndrome resulting from the resection of a large segment of his small intestine that was affected by acute mesenteric ischaemia. He complained of persistent nausea, vomiting, abdominal colicky pain and passing 3 – 5 daily watery stools and he lost 6 kg due to malabsorption. On examination, stigmata of dehydration were evident. Since admission he was on par-enteral nutrition and for the following one month



Figure 4  
Internal bumper after releasing from the gastric wall grasped by the polypectomy snare.

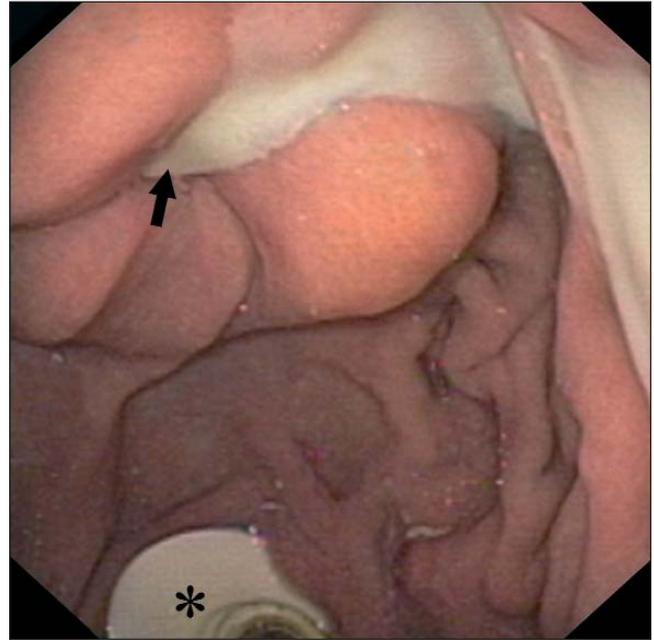


Figure 5  
Pus oozing from the place of the buried internal bumper (arrow) in the upper part of the picture. Newly inserted PEG in the lower part of the image (asterisk)



Figure 6  
Fluoroscopy with injected contrast into the PEG, patient lying in the left lateral position. Cavity in the gastric wall (asterisk) above the internal bumper (arrow).

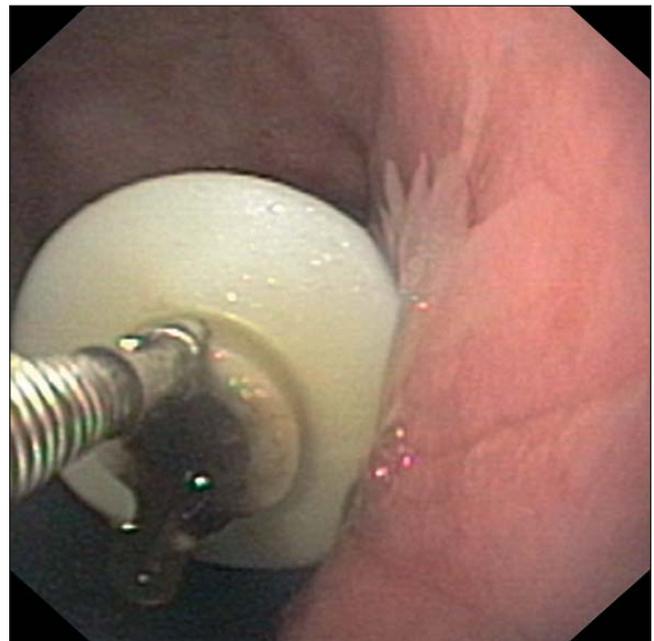


Figure 7  
Internal bolster extraction using rat-tooth forceps.

needed to stabilize his condition, we were requested to perform PEG insertion. An upper GI endoscopy was performed and revealed an endoscopic picture suggestive of mild gastritis and healed duodenal ulcers. PEG was inserted using the pull technique without complications. This was preceded by prophylactic antibiotic intake and we recommended starting enteral nutrition by the next day.

Twenty-six months later, the patient recurred again to the endoscopy unit due to peritubular leakage. External examination showed the presence of seropurulent discharge. Trials to manipulate the tube pushing it towards the gastric lumen were not successful. Endoscopic examination showed a completely buried internal bumper by the gastric mucosa with appearance of a small central dimple corresponding to the orifice

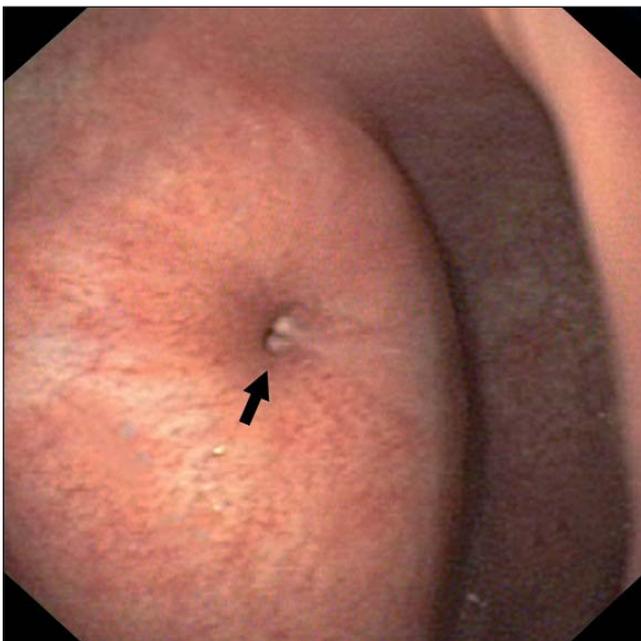


Figure 8  
Buried bumper in the anterior gastric wall, the orifice marked with an arrow.

(Fig. 1). The patient was referred for abdominal ultrasonography to determine the position of the internal bumper and it revealed its intragastric position (Fig. 2).

Attempting to remove the PEG tube, an external guide wire with an overlying dilator (acts also as a stiffener) were pushed till they were seen endoscopically coming from the central dimple (Fig. 3). Using argon plasma coagulation alternating with needle knife papillotome, radial incisions from the centre to the periphery were accomplished to expose the internal bumper. For incisions using the needle knife, the generator ERBE ICC 200 was set at 60 watt at endocut mode, and for argon plasma coagulation we used APC 300 ERBE at 60 watt, argon flow 1.2 L/min (ERBE Elektromedizin GmbH, Tübingen, Germany). This needed 2 sessions within 2 days. Minimal bleeding was related to cutting and was dealt with using argon plasma coagulation. After the appearance of the internal bumper, the tube was pushed towards the gastric lumen, grasped with a snare and extracted endoscopically (Fig. 4). This was followed by insertion of a new PEG tube and instructions to the patient to prevent recurrence of buried bumper syndrome with the new tube.

## Case 2

An 81-year-old female patient was referred from the department of neurology for PEG tube insertion. She

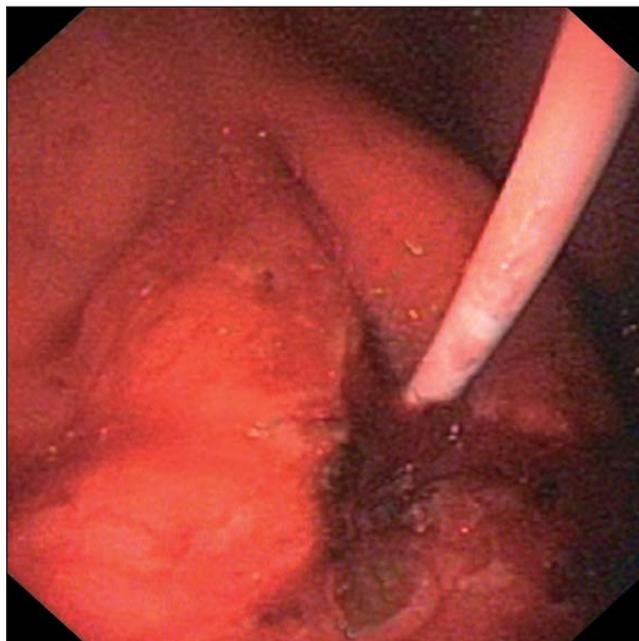


Figure 9  
Bleeding after radial incisions with a needle knife papillotome.

suffered from cerebral infarction with a swallowing disorder. A complete upper GI endoscopy assessment revealed a picture suggestive of atrophic gastritis. The PEG tube was inserted using the pull technique and run eventually without complications. Antibiotic prophylaxis and same instructions of previous case were prescribed.

Nine months later, the patient was again presented to the endoscopy unit as her caregivers had found a new onset of resistance to the inserted food formula through the PEG tube. Externally, trials to flush the tube with saline solution were met with resistance. Gastroscopy showed a dome-like appearance on the ventral surface of the stomach corresponding to the site of the buried internal bumper and pus was seen trickling from its centre. A second PEG tube was inserted in the vicinity of the old one (Fig. 5). Abdominal ultrasonography excluded extragastric position of the internal bumper. A course of antibiotic was taken and patient was represented again after 2 weeks to remove the buried bumper.

Three sessions, with the interval 1 and 4 days, were needed to remove the original PEG tube. An external guide wire was inserted and a contrast medium was injected to delineate the tube (Fig. 6). Using the needle knife papillotome, radial incisions were performed. Minor bleeding due to cutting was secured with an epinephrine injection (diluted 1:10,000). Repeated incisions alternatively using argon plasma

coagulation succeeded to expose the internal bumper. The tube was grasped with a snare and endoscopically removed but missed the internal bolster in the stomach. This was secondarily extracted using rat tooth forceps (Fig. 7).

### Case 3

An 84-year-old male was referred from the department of neurology for PEG insertion. Similarly, he suffered from cerebral stroke due to infarction with swallowing disorders. Upper endoscopy revealed normal findings and the PEG was inserted using the pull technique with no problems.

Eighteen months later, the patient's caregivers found resistance to insertion of enteral nutrition through the tube. Endoscopy confirmed the diagnosis of buried bumper syndrome (Fig. 8) and ultrasonography ensured the intragastric position of the internal bumper. The second PEG tube was inserted before removal of the previous one.

Two sessions within 2 days were required to remove the original PEG tube. Similar to the previous case, an external guide wire with an overlying dilator was inserted and contrast medium was injected. Both needle knife papillotome and argon plasma coagulation were used alternatively to make the radial incisions. Bleeding (Fig. 9) was controlled using argon plasma coagulation and diluted epinephrine. Overlying tissue covering the buried bumper was removed by polypectomy snare. Endoscopic extraction occurred successfully without complications apart from minor controlled bleeding.

### Discussion

Since it was first described in 1988 (22), buried bumper syndrome has been increasingly recognized and is reported to occur in 0.3 – 2.4 % of patients (25). A certain interval, usually reported around 4 months, is required for complete mucosal healing of the opening after migration of the internal bumper into the gastric or abdominal wall as a result of excess pressure applied to the tube. This interval may be as short as 2 months and as long as 7 years, depending on the level of traction force applied to the tube and the quality of patient care (10). Other estimated risk factors for its development include malnutrition, poor wound healing and significant weight gain secondary to successful enteral nutrition (18). Additionally, buried bumper syndrome was noticed to

be more frequent with tougher internal bolsters (polyurethane is stiffer than silicone) (18).

In this paper, we describe 3 cases (0.8 %) that developed buried bumper syndrome. Their time interval to develop this syndrome ranged between 9 months and 26 months. We initially suspected this complication from their complaints concerning the inability to infuse feeding solution through the PEG tube and peritubular leakage. This is similar to what is reported in different series that additionally mentioned the possibility of an accompanying abdominal pain (1). Endoscopically, collapse of the gastrostomy tract, after migration of internal bumper into the gastric or abdominal wall and overlying epithelialization, leads to the appearance of a small crevice or mucosal bulge. This can be difficult to recognize in certain cases and may require insertion of a dye, such as methylene blue, to recognize the internal opening of the tube (3). Using abdominal ultrasonography, we determined the position of the internal bumper within the gastric wall in our three cases. This can alternatively be accomplished using endoscopic ultrasonography with high-resolution probes (7).

Attempting to solve this complication of buried bumpers, we attempted to remove them using an external guide wire with an overlying stiffener that was inserted into the PEG under endoscopic control. Radial incisions starting from the centre (marked by the stiffener) were performed using needle knife papillotome and/or argon plasma coagulation. Tissue covering of the internal bumper was removed by polypectomy snare in one case. The buried bumper was successfully removed in all 3 cases within 2 – 3 sessions. No complications occurred apart from minor bleeding initiated by cutting the mucosa with needle knife papillotome, which was controlled by argon plasma coagulation and/or epinephrine injection.

Various internal and external techniques have been described for removal of the buried bumper. These include a number of endoscopic techniques such as using needle knife papillotome to expose the internal bumper (7,8,17) then its retrieval with an endoscopic snare after external cutting of the PEG tube. Other methods include push and pull "T" technique with a tube fragment grasped by a snare (6), extraction using the tapered tip of a new PEG tube (25), extraction using Savary dilator over a guide wire to push the PEG tube towards the lumen of the stomach (21), and

extraction using an oesophageal balloon dilator that is maximally inflated while it is in the tube then their extraction through the stomach (24). Additionally, simple external traction removal was reported with certain externally removable PEG tubes having a soft collapsible internal bumper (8,10,16). A radiological technique removing the buried bumper was recently described using angioplasty balloon dilator and radiological guidance (9). Also, surgical treatment plays a role in some cases via minilaparotomy (8) or laparoscopically (4).

To prevent buried bumper syndrome, it is recom-

mended after PEG insertion to fasten the external bumper tight enough to ensure good apposition between the abdominal and gastric walls, while at the same time not exerting excessive pressure or indenting the abdominal skin. Loosening the external flange by a few millimetres usually eases the tension and helps to prevent this complication (8). Additionally, it is recommended regularly one to two times monthly to push the tube carefully into the stomach approximately 2 – 3 cm, rotate it to ascertain easy movement and then carefully pull it back to the resistance of internal fixation flange (13).

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