On-line Case Report

Small bowel obstruction caused by intraluminal migration of retained percutaneous endoscopic gastrostomy internal bumper

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ABSTRACT

INTRODUCTION Early complications associated with percutaneous endoscopic gastrostomy are well documented. Late complications associated with retained gastrostomy flange are rare. It is unclear why some patients with retained gastrostomy flange (internal bumper) develop mechanical obstruction and others do not. We report a case of mechanical obstruction with perforation occurring 6 months after the tube was cut.

PATIENT AND METHODS A 76-year-old hemiplegic patient with no swallowing reflex and who previously was on long-term percutaneous gastrostomy feeding tube underwent removal of the feeding tube but the internal bumper was left *in situ* due to encrustation.

RESULTS Due to migration of the retained flange, the patient developed small bowel obstruction.

CONCLUSIONS Retained internal bumper is potentially dangerous and we recommend endoscopic retrieval of such flange.

Keywords: Small intestinal obstruction – Percutaneous endoscopic gastrostomy (PEG) – Internal bumper – Gastric flange

Percutaneous endoscopic gastrostomy (PEG) is a well-established form of treatment for providing long-term nutritional support for patients incapable of achieving adequate nutrition by the oral route. Although complications occurring at the time of insertion occur, late mechanical complications due to dislodged gastric flange is a rare event. We report a case of small bowel obstruction and perforation caused by intraluminal migration of internal bumper.

Case report

A 76-year-old man with a right-sided hemiplegia was admitted acutely with a day history of central abdominal

pain, absolute constipation and vomiting. Previously, he was on long-term enteral feeding via a PEG tube due to loss of gag and swallowing reflexes following a major cerebrovascular accident. In total, the patient was on PEG feeding for 18 months. The last PEG tube was in place for 2 months before it was finally discontinued 6 months earlier following improvement in the patient's gag and swallowing reflexes. The tube was discontinued by cutting it at the skin level and allowing the internal bumper (gastric flange) to pass spontaneously with stool (cut-and-push technique) due to the patient's frailty. Initial placement of the PEG tube or the subsequent replacement was unremarkable. He denied any change in

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Figure 1 Plain abdominal X-ray showing small bowel obstruction due to a gastric flange.

bowel habit, mucus discharge or heamatochezia following the initial cut-and-push technique for removal of PEG internal bumper.

Although, at presentation, the patient was clinically dehydrated, he was haemodynamically stable (pulse, 90 bpm; blood pressure, 140/85 mmHg; temperature, 37.2°C). The abdomen was distended with generalised tenderness and hyperactive bowel sounds. Digital rectal examination was unremarkable as was cardiorespiratory examination.

Besides raised urea and C-reactive protein (CRP) levels, routine blood tests were normal (urea, 11 mmol/l [normal

range, 4.0–6.5 mmol/l]; creatinine, 105 mmol/l; CRP, 106.6 mg/l [normal range, < 0.6 mg/dl], haemoglobin, 13 g/l [normal range, 11.5–15.5 mg/dl]; platelet, $164 \times 10^9/l$ [normal range, $150\text{--}450 \times 10^9/l$]; white cell count, $8 \times 10^4/l$ [normal range, $4\text{--}11 \times 10^9/l$]). Plain abdominal X-ray showed dilated loops of small bowel mainly in the right upper quadrant with a radio-opaque foreign body (Fig. 1).

Computerised axial tomogram of the abdomen showed partial extrusion of distal end of the PEG tube resulting in some focal mural oedema and inflammatory change in mesenteric fat causing a degree of mechanical obstruction (Fig. 2).

Figure 2 CT scan of abdomen showing focal mural oedema and inflammatory change in mesenteric fat causing a degree of mechanical obstruction.

Following rehydration, nasogastric decompression of the stomach with a nasogastric tube and insertion of Foley's catheter, the patient underwent exploratory laparotomy.

Operation

With the patient lying supine, a midline laparotomy was performed. Intra-operatively, there was an inflammatory mass, which consisted of ileocaecal pole, omentum, perforated distal ileum and the partially extruded internal bumper. The mass and the perforated small bowel was resected. Gastrointestinal continuity was restored by a functional end-to-end, hand-sewn anastomosis using Polydioxanone (PDS 3/0). The peritoneal cavity was thoroughly lavaged with warm normal saline until the effluent ran clean. The abdominal cavity was closed using loop Polydioxanone (PDS x2) in a typical mass closure technique.

The patient made an uneventful recovery and was discharged after 2 weeks of in-patient stay. The patient remained well at 6 weeks' postoperative follow-up.

Discussion

Since Gauderer and colleagues,¹ in 1980, described a simpler and more effective way of placing a percutaneous endoscopic gastrostomy tube, the technique has become established as the standard in most centres in world-wide. Overall complications for all comers has remained static for the past decades and ranges from 4–23.8% and a mortality rate of less than 1% is reported in most series.^{2–6} The technique is safe with the incidence of a major technical complication rate of 3–13.6%.^{7,8} The commonly reported complications are aspiration (0.3–1%), haemorrhage (0–2.5%), peritonitis (0.5–1.3%), gastric ulcer (0.3–1.2%), fistulous tract (0.3–1.2%), ileus, stomal leak, infection, buried bumper, visceral perforation and accidental removal, necrotising fasciitis and tumour implantation. Generally, complications following removal of PEG are uncommon. Gastric separation may occur resulting in generalised peritonitis.

The effect of retained internal bumper or its intraluminal migration is not commonly discussed in the surgical literature, although a series by Pearce *et al.*⁹

described their experience with the cut-and-push method of percutaneous endoscopic tube removal. In this study, Pearce *et al.*⁹ analysed the results obtained with 384 patients in whom they inserted PEG tube over a 4-year period. In 73 patients, the tube was removed by the cut-and-push method with two complications (2.7%). The group concluded that it is a safe approach especially in the elderly.

Nind and colleagues¹⁰ reported a case of enterovaginal fistula/intestinal obstruction occurring nearly 2 years after a cut-and-push technique was performed in a patient in whom endoscopic removal of gastric flange was impossible due to oesophageal stricture and supraglottic tumour.

Although Nind and colleagues failed to state how many patients were in their series, they reported an incidence of 1–2% of failure to pass gastric flange spontaneously after a cut-and-push technique. In this cohort, the flange may obstruct or even perforate the bowel. This led the group to conclude that a pro-active approach should be employed for internal bumper retrieval. Coventry *et al.*¹¹ also reported two cases of small bowel obstruction and perforation following a cut-and-push technique. Based on this finding, the group recommended a serial plain abdominal radiograph in these patients to assess passage of the internal bumper. The group recommended early operative intervention if the bumper fails to pass within 3 weeks. In a similar report by Lambertz *et al.*,¹² a case of small bowel obstruction was reported due to retained gastric flange.

In a separate, prospective study of 64 patients, Korula *et al.*¹³ reported a case of gastric outlet obstruction due to lodging of the internal bumper in the pylorus.

Beside intestinal obstruction, there have been reports of oesophageal obstruction due to retained flange especially in the paediatric population.^{14,15} This cephalic migration of the flange attributable to the presence of pre-existing gastro-oesophageal reflux had resulted in oesophago-aortic fistula with fatality.¹⁶

Whilst, in most cases, the internal bumper may pass through the gastrointestinal tract without any untoward effect following a cut-and-push technique, in a small group of patients it may predispose to obstruction or even acts as an apex for intussusception. Although the reason why some patients with retained gastric flange obstruct and others do not is unclear, we suspect that hyperactive small bowel in the presence of a competent ileocaecal valve may have played an important role in the development of obstruction or perforation.

Several factors such as encrustation or failure to deflate the gastric cuff may militate against flange retrieval. Although, the patient declined endoscopic retrieval of the internal bumper due to frailty, it is possible that, as the

flange was retained in the stomach for 6 months, there was extensive encrustation thereby making it difficult to retrieve even if attempted earlier. The reason why the flange decided to dislodge 6 months after the initial cut-and-push technique was unclear. As far as we know, there was no attempt endoscopically to retrieve the flange prior to presentation nor was there a change in gastrointestinal function prior to the day before the patient presented. Importantly, the patient denied eating any high fibre or roughage in his diet to have precipitated the obstruction.

Although Nind and colleagues¹⁰ described a perforation occurring nearly 2 years after a cut-and-push method of internal bumper removal, we believe this and the present case present a unique problem. This, therefore, calls for a closer monitoring of patients with a cut-and-push method of PEG removal. We agree with Coventry *et al.* and others in their recommendation for a more aggressive approach to the management of retained internal bumper.^{11,12,17} As most PEG tubes are radio-opaque, diagnosis can be made easily with plain abdominal X-ray. Computerised axial tomography may be helpful in difficult cases. As it is unclear which group of patients are likely to develop complications due to retained gastric flange, it may be appropriate to follow all patients with retained flange with serial abdominal X-ray.

We are aware that, in certain groups of patients especially those with poor mobility and possibly in care, this approach may not be wholly appropriate or logistically feasible, but we recommend a close monitoring of these patients for signs of complications.

Whilst Pearce *et al.*⁹ advocate a cut-and-push approach to the management of gastric flange, we believe that it is incumbent on the medical team to understand and to apply that which is known regarding elements of patient care and delivery of endoscopic procedures that reduce the risk of subsequent complication as much as possible. For this reason, we believe that, until a collapsible internal bumper is developed, the internal bumper in its current form should be retrieved.

Conclusions

We believe that, until a collapsible internal bumper is developed, the current flange should be retrieved endoscopically in order to prevent the few cases of intestinal obstruction associated with retained flange. This view is supported by the manufacturer of PEG tube.

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