RESEARCH

Observed high incidence of buried bumper syndrome associated with Freka PEG tubes

Joanna K Dowman,¹ Linda Ditchburn,¹ Warren Chapman,¹ Par Lidder,² Nicola Wootton,¹ Nicola Ryan,² Rachel M Cooney¹

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/flgastro-2014-100503>).

¹Sandwell and West Birmingham NHS Trust, City Hospital, Birmingham, UK

²Sandwell and West Birmingham NHS Trust, Sandwell General Hospital, West Bromwich, UK

Correspondence to

Dr Rachel M Cooney, City Hospital, Dudley Road, Birmingham B18 7QH, UK; rachel.cooney@nhs.net

Received 20 July 2014

Revised 26 October 2014

Accepted 1 November 2014

Published Online First

25 November 2014

ABSTRACT

Background Buried bumper syndrome (BBS) is an uncommon but significant complication of percutaneous endoscopic gastrostomy (PEG), which occurs due to overgrowth of gastric mucosa over the inner bumper of the gastrostomy tube. A high incidence of BBS was observed in patients with Freka PEG tubes.

Objective To review case numbers of BBS and confirm the observed association with Freka tubes to determine whether change of practice should be considered.

Design Data was collected on the number of cases of BBS reported to the community nutrition team Birmingham, UK. Data on type of PEG kit and total number of PEGs inserted between 2009 and 2013 were collected. The electronic endoscopy reporting database was used to compare case numbers of BBS in our Trust in years when Corflo and Freka PEG tubes were used, respectively. Data from our Trust were also compared with that from a Trust using Corflo only.

Results Fifty-eight cases of BBS were reported in the area covered by the Birmingham community nutrition team between 2009 and 2013, all of which were associated with Freka PEG tubes. An estimated 1000–1200 PEGs were inserted during this period, representing an incidence of BBS of 4.8–5.8%. No cases of BBS occurred over the same period in the comparison Trust (451 Corflo PEGs inserted).

Conclusions Our review confirmed our observation of an increased risk of BBS with Freka PEG tubes. Clinicians should be aware of our findings when deciding which brand of PEG tube to insert, particularly in patients with a previous history of BBS.

INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) is a simple and safe method for provision of long-term enteral feeding to

patients who have a functioning gastrointestinal tract but are unable to swallow.¹ Such individuals include those with neurological disorders such as stroke, cerebral palsy or brain injury, or those with cancer or recent surgery of the oropharynx or upper gastrointestinal tract. PEG placement is most commonly performed using the pull-through technique, which requires an endoscopist and a second individual to perform the abdominal part of the procedure. PEGs are usually placed using conscious sedation with antibiotic prophylaxis.

Buried bumper syndrome (BBS) is an uncommon but significant long-term complication of PEG, which occurs due to overgrowth of gastric mucosa over the inner bumper of the gastrostomy tube (figure 1). BBS may present as increased leakage around the PEG tube, resistance to infusion or abdominal pain with infusion of feed, and can be confirmed clinically by inability to advance and rotate the tube, endoscopically or radiologically with CT imaging. Most reported case series are small but report a typical incidence of BBS of 0.9–3%.^{1–5} Factors which may contribute to development of BBS include the characteristics of the internal bumper, malnutrition, weight gain causing increase in abdominal wall thickness,¹ and excessive external traction on the tube causing friction and ischaemic necrosis of the gastric submucosa.⁶ Adequate aftercare following PEG placement is also essential.^{5 7} Although BBS may occur within the first few months, it is generally regarded as a long-term complication, with case series reporting a median time from PEG insertion to development of BBS of 22–35 months.^{1 2 5}

CrossMark

To cite: Dowman JK, Ditchburn L, Chapman W, et al. *Frontline Gastroenterology* 2015;**6**:194–198.

Figure 1 Endoscopic view of a case of buried bumper syndrome in an 82-year old woman. The internal bumper was completely covered by gastric mucosa, preventing endoscopic replacement and necessitating surgical intervention (photo with permission).

A variety of management options for BBS have been described, including endoscopic,^{2 5 6 8} surgical^{3 9} or laparoscopic,^{10 11} replacement, or insertion of a jejunal extension tube.¹ However, such methods carry a risk of complications, and therefore opportunities to reduce incidence of BBS should be sought where possible.

Two frequently used PEG tubes in UK centres are the Corflo (Corpak Medical Systems) and Freka (Fresenius Kabi) kits (**figure 2**). Our Trust changed from the use of Corflo to Freka tubes in 2008 due to a combination of financial considerations and a perceived increased tendency of Corflo PEGs to fall out.

Figure 2 Corflo (purple) and Freka (blue) percutaneous endoscopic gastrostomy (PEG) tubes. The inner bumper on the Corflo PEG tube (A) is thicker and spongier compared with the thin and flat Freka inner bumper (B).

In recent years we have observed an abnormally high incidence of BBS in patients with Freka PEG tubes. The number of BBS cases was therefore reviewed to determine whether change of practice should be considered.

METHODS

The Birmingham Community Nutrition Team sees patients discharged from several different NHS Trusts in the Birmingham area, although the catchment area of these hospitals is larger than that covered by the nutrition team.

Data were gathered from community nutrition nurses that serve our Trust on the number of reported cases of BBS, the type of PEG tubes used, and the total number of PEGs inserted between 2009 and 2013. For comparative purposes, data were also collected from a large Trust in a neighbouring region where only Corflo PEGs are used.

The endoscopy reporting database (ADAM) in our Trust was also interrogated to compare case numbers of buried bumper in the years 2004 and 2010, before and after the change from use of Corflo to Freka PEGs in the Trust.

RESULTS

Between 2009 and 2013, 58 confirmed cases of BBS were reported, all of which involved Freka PEG tubes. Eight (14%) were size 9F tubes and the remaining 50 (86%) were size 15F. This is likely to represent a significant underestimate as not all cases will have been known to the team. Some patients will be managed by GPs or directly in secondary care, and as the catchment area of these hospitals is significantly larger than that covered by the community nutrition team, there may well be several other unidentified cases.

Based on annual numbers of PEG placements at each of the respective Trusts, the total number of PEG tubes inserted during this period is estimated to lie between 1000 and 1200, representing an incidence of BBS of 4.8–5.8%. In contrast a neighbouring Trust who use only Corflo PEG tubes did not identify any cases of BBS over the same period, during which 451 PEG tubes were inserted. Data on time to development of BBS was not available for all patients, but while a small number occurred earlier between 6 months and 12 months, most developed at least 2 years after initial PEG placement.

Details on management of BBS were available for 53/58 patients. Thirty of these 53 cases had a replacement PEG which was placed either endoscopically (n=19), surgically (n=9) or radiologically (n=1). In 13 of these 30 cases who had replacement PEG, the buried bumper could not be removed and was left in situ. Therefore in 17 of these 30 cases the PEG was replaced, with simultaneous removal of the old buried bumper. Three of these 17 patients had a balloon gastrostomy tube replacement, one of whom later

required siting of a new PEG. One patient had surgical jejunostomy with jejunal feeding tube insertion, following removal of the PEG. In 14 patients a jejunal extension tube was placed through the buried PEG; in 2 patients this was later followed by a replacement PEG, and in one case took place after recurrent BBS in a replacement PEG. In 8 patients no further action was taken, either because the PEG was no longer required ($n=4$), or because the patient was too unwell ($n=4$). Although longer-term follow-up data were not available for all patients, at least six patients had recurrent problems with PEG site infection or leakage, and/or wound dehiscence following surgical intervention. Multiple buried bumpers prevented endoscopic replacement and necessitated surgical replacement in at least two patients. Several patients required recurrent admissions and interventions for BBS incurring significant patient distress as well as financial cost.

In our Trust, 67 Freka PEGs were inserted in 2010, of which 3 were replacements and 2 were for BBS. In 2004, when Corflo PEGs were used in the Trust, 96 PEGs were inserted, of which 11 were replacements and none were for BBS.

Although data on age and indication for PEG was not available for all patients, a representative sample of 22 patients included in this study showed a median age of 74.5 years (range 32–94 years), with indications for PEG being stroke ($n=10$), brain injury ($n=4$), multiple sclerosis ($n=4$), cerebral palsy ($n=1$), learning disability ($n=1$), Parkinson's disease ($n=1$) and progressive supranuclear palsy ($n=1$). This wide range of age and indication for PEG suggests neither of these factors is significantly related to development of this complication.

DISCUSSION

This is by far the largest reported series of BBS, and suggests a higher incidence of BBS than other reported smaller case series.^{1–5} Importantly, in all cases BBS complicated the placement of a Freka PEG tube, with no cases documented in patients with Corflo PEG tubes.

Corflo PEGs have a collapsible internal bumper and can be removed transcutaneously by external traction, unlike Freka PEGs which are non-collapsible and require endoscopic removal. Therefore endoscopy is not necessary when changing a Corflo PEG unlike Freka PEGs. As Corflo PEGs are removable by traction, their use is sometimes avoided in patients who are likely to attempt to pull out their tube. The hubs of the two types of tubes are considerably different, with the Freka inner plates being much thinner and flatter than the Corflo hubs (figure 2), which may predispose to encroachment of the gastric mucosa over the edges, causing BBS. All PEGs were inserted by a Consultant Gastroenterologist with the assistance of a Gastroenterology Specialist Registrar or Nutrition nurse specialist, therefore the incidence of BBS is

unlikely to be related to the seniority of the operator inserting the tube.

There are clear guidelines for the correct management of PEG tubes, which state that tubes should be advanced and rotated regularly to avoid the complication of BBS. Specifically, Freka and Corflo recommend that tubes should be advanced and rotated daily-weekly and weekly respectively, and the National Institute of Health and Care Excellence Clinical Guideline 32 on Nutrition Support in Adults recommends once a week for PEG tubes in general.¹²

In response to our reporting of the high incidence of BBS with Freka PEGs to the Medicines and Healthcare products Regulatory Agency, the manufacturer's response was that this complication can be avoided by strict adherence to these guidelines. However, we noticed a clear increase in numbers of buried bumper cases following the change from use of Corflo to Freka PEGs, and it would seem unlikely that carers and community nutrition nurses are adhering to these guidelines more strictly with Corflo than Freka PEGs.

Although precise costs may vary, in our Trust Corflo and Freka PEG tubes are priced similarly at approximately £95 per kit if bought through standard NHS supplies. However, if purchased directly from the manufacturer, Corflo PEGs are more expensive at approximately £80 compared with £50 for Freka kits. The cost of replacement accessories is also greater for Corflo PEGs. However, this should be balanced against the considerable financial cost of managing many of these cases of BBS, with recurrent complications necessitating multiple admissions and interventions.

One of the factors contributing to a change to the use of Freka PEGs in our Trust several years ago was a possible increased tendency of Corflo PEGs to fall out. This is consistent with our data showing more replacement PEGs performed in the year when Corflo PEGs were used. Although replacement may require repeat endoscopy, if the tube has been in place for more than 1 month and the tract is formed, simple percutaneous insertion of a replacement tube in the community may be performed. Therefore this complication is considerably easier to manage than the more complex and serious BBS.

A variety of techniques have been described to manage BBS, including endoscopic, surgical or radiological removal/replacement. A proposed care pathway for the management of patients with BBS is illustrated in figure 3.

Patients with PEG tubes are often in poor general health due to comorbidities, and/or have brain injury or learning difficulties, which makes any intervention to ameliorate the problem even more complex and distressing. Many patients may not tolerate repeat endoscopy, and endoscopic removal/replacement of the PEG is often unsuccessful. Endoscopy also requires sedation and carries the associated risks of bleeding, perforation and infection. Surgical

*needle knife, balloon dilatation using push and pull technique, snare technique

Figure 3 Proposed care pathway for the identification and management of buried bumper syndrome. GI, gastrointestinal; PEG, percutaneous endoscopic gastrostomy.

intervention carries the risk of general anaesthetic and is associated with a high rate of wound and infective complications. Placement of a jejunal extension tube into stomach allows management in community, but generally represents only a short-term solution. Leaving a buried bumper in place carries risk of infective complications, as observed in several of our cases. Therefore every effort should be made to minimise the incidence of BBS.

To our knowledge this high rate of BBS with Freka tubes has not previously been described, but has important implications for management of this frail and vulnerable group of patients. Although we were unable to collect definitive case numbers due to the involvement of different specialties across multiple

Trusts, we believe this data is sufficiently robust to prompt review of current practice. As a result of this study, our Trust has now changed back to using Corflo in preference to Freka PEG tubes. We have also produced an alert form which is given to all recipients of Freka PEGs (see online supplementary file 1).

These data were presented at biannual meetings of the Midlands Gastroenterological Society and the Midlands Gastroenterological Nurses Society at the University of Warwick on 15 November 2013. In these fora, many clinicians from other NHS Trusts confirmed having also managed BBS in patients with Freka PEGs. Notably, no individual was able to recall a case of BBS with a Corflo PEG tube. Although the investigation by the Medicines and Healthcare

products Regulatory Agency concluded that no further action was necessary, we advise clinicians to be alert to this potentially serious complication associated with Freka PEG tubes.

Significance of this study

What is already known about this subject?

Buried bumper syndrome is an uncommon, but significant complication of percutaneous endoscopic gastrostomy (PEG) tubes.

What are the new findings?

This report finds an increased risk of buried bumper syndrome with Freka PEG tubes when compared to Corflo PEG tubes.

How might it impact on clinical practice in the foreseeable future?

Clinicians should consider this potentially significant complication associated with Freka PEG tubes, particularly when dealing with patients with a history of buried bumper syndrome.

Acknowledgements The authors thank Joe Colby, Nutrition Nurse Specialist, University Hospital Coventry, for his help with data collection.

Contributors JKD compiled the data and wrote the first draft of the manuscript. LD, WC, PL, NW and NR helped with data collection. RMC critically revised the manuscript. All authors read and approved the final manuscript.

Funding All authors are employed by the NHS but there are no other relevant funding sources to declare.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; internally peer reviewed.

REFERENCES

- 1 Kejariwal D, Aravinthan A, Bromley D, *et al.* Buried bumper syndrome: cut and leave it alone! *Nutr Clin Pract* 2008;23:322–4.
- 2 El AZ, Arvanitakis M, Ballarin A, *et al.* Buried bumper syndrome: low incidence and safe endoscopic management. *Acta Gastroenterol Belg* 2011;74:312–16.
- 3 Finocchiaro C, Galletti R, Rovera G, *et al.* Percutaneous endoscopic gastrostomy: a long-term follow-up. *Nutrition* 1997;13:520–3.
- 4 de Souza e Mello GF, Lukashok HP, Meine GC, *et al.* Outpatient percutaneous endoscopic gastrostomy in selected head and neck cancer patients. *Surg Endosc* 2009;23:1487–93.
- 5 Horbach T, Teske V, Hohenberger W, *et al.* Endoscopic therapy of the buried bumper syndrome: a clinical algorithm. *Surg Endosc* 2007;21:1359–62.
- 6 Turner P, Deakin M. Percutaneous endoscopic gastrostomy tube removal and replacement after “buried bumper syndrome”: the simple way. *Surg Endosc* 2009;23:1914–17.
- 7 Loser C, Aschl G, Hebuterne X, *et al.* ESPEN guidelines on artificial enteral nutrition—percutaneous endoscopic gastrostomy (PEG). *Clin Nutr* 2005;24:848–61.
- 8 Leung E, Chung L, Hamouda A, *et al.* A new endoscopic technique for the buried bumper syndrome. *Surg Endosc* 2007;21:1671–3.
- 9 Schwartz HI, Goldberg RI, Barkin JS, *et al.* PEG feeding tube migration impaction in the abdominal wall. *Gastrointest Endosc* 1989;35:134.
- 10 Boreham B, Ammori BJ. Laparoscopic percutaneous endoscopic gastrostomy removal in a patient with buried-bumper syndrome: a new approach. *Surg Laparosc Endosc Percutan Tech* 2002;12:356–8.
- 11 Ehsan S, Dyall L, Ubhi S. A novel laparoscopic approach for the surgical management of buried bumper syndrome. *Ann R Coll Surg Engl* 2012;94:61–2.
- 12 National Institute for Health and Care Excellence Clinical Guideline 32: Nutrition support in adults: Oral nutrition support, enteral tube feeding and parenteral nutrition (2006).