*Digestive Endoscopy* (2007) **19**, 22–25 doi:10.1111/j.1443-1661.2007.00681.x

## ORIGINAL ARTICLE

# BURIED BUMPER SYNDROME AS A COMPLICATION OF PERCUTANEOUS ENDOSCOPIC GASTROSTOMY IN CANCER PATIENTS: THE BRAZILIAN EXPERIENCE

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**Background:** Buried bumper syndrome (BBS) is a major complication of percutaneous endoscopic gastrostomy (PEG) in which the internal bumper migrates from the gastric lumen into the gastrostomy tract. The aim of the present study was to describe the frequency and characteristics of BBS in cancer patients.
**Methods:** Retrospective chart review of cancer patients submitted to PEG placement.
**Results:** Thirteen cases of BBS were diagnosed among 213 PEG procedures, with an incidence of 6.1%. The interval between PEG and BBS varied from 7 to 630 days (mean 217.5 days). All patients were treated on an outpatient basis. There were six partial, four subtotal and three total BBS. Three partial and four subtotal BBS were treated by external traction and replacement with a balloon-tipped tube. In three cases of partial BBS the PEG tube was not removed, just repositioned. In three cases of total BBS it was necessary to redo the PEG procedure.
**Conclusion:** BBS is an uncommon and usually late complication of PEG. Most of our cases were detected early, due to instructions provided to patients and caregivers and regular follow up. Early diagnosis permits simple treatment consisting of replacement of the original PEG tube by a balloon-tube or repositioning the original system.

**Key words: buried bumper syndrome (BBS), cancer patients, gastrostomy, percutaneous endoscopic gastrostomy (PEG).**

## INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) is a relatively simple and safe method of providing long-term enteral nutrition to patients unable to swallow but with a functioning gastrointestinal tract.[1]

According to the literature, the main therapeutic indications are benign neurological disorders (almost 50% of cases) and pharyngo-laryngeal disorders, usually of malignant origin (approximately 30% of cases).[2]

Complications related to this procedure usually occur in patients who are malnourished or have late-stage malignancies. The major complications are peritonitis, premature dislodgement or removal, aspiration, necrotizing fasciitis, hemorrhage, gastro-colic fistula, buried bumper syndrome (BBS) and tumor implantation in the stoma.[3]

BBS is the external migration of the internal bumper from the gastric lumen becoming lodged in the gastric wall or anywhere along the gastrostomy tract.[4] Overzealous tightening of the external flange producing excessive pressure on the internal bumper of the PEG catheter leads to ischemic necrosis of the gastric mucosa with subsequent ulceration, allowing the internal bumper to migrate through the layers of the abdominal wall and eventually becoming overgrown by the gastric mucosa. The reported incidence ranges from 1.6 to 21.8%.[3]

Several factors contribute to the development of BBS: characteristics of the internal bumper, malnutrition, increase of the abdominal wall thickness due to weight gain, and inadequate manipulation, with excessive traction of the retention system.[5]

The clinical manifestations of BBS include leakage around the PEG tube, inability to infuse the feeding solution, a fixed and steady tube,[6] pain, swelling and local infection.

The objective of the present study was to describe the frequency and characteristics of BBS patients in an oncological population.

## PATIENTS AND METHODS

In this retrospective study, we reviewed medical records of patients submitted to PEG at the Cancer Hospital I, National Cancer Institute, Rio de Janeiro, Brazil, from October 2000 to March 2006. During this period, 208 cancer patients were submitted to 213 PEG insertion procedures, and the cases of BBS were evaluated.

The Gauderer-Ponsky technique was used for all patients, using commercially available kits (MIC PEG-24; Ballard Medical Products, Draper, UT, USA, and PEG 24-Pull; Wilson-Cook Medical, Winston-Salem, NC, USA) or 'home-made' kits (modified Foley catheter).

In patients with BBS, the degree of migration of the internal bumper was classified into three grades (partial, subtotal

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Received 29 May 2006; accepted 7 August 2006.

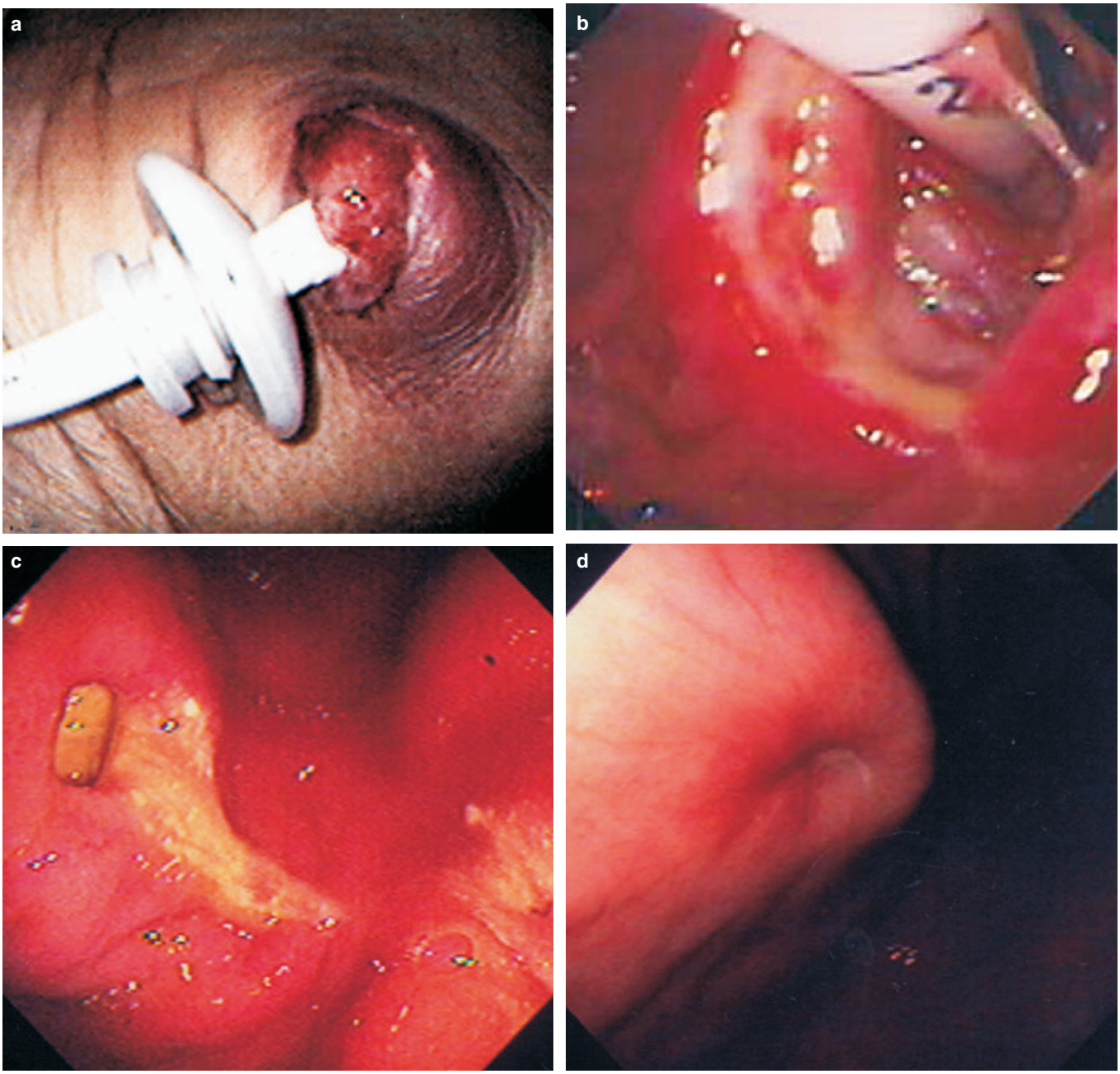


**Fig. 1.** Buried bumper syndrome (BBS). (a) External aspect; (b) partial BBS (1st Grade); (c) sub-total BBS (2nd Grade); (d) total BBS (3rd Grade).

and total BBS), according to the classification proposed by Orsi *et al.*[7](Fig. 1).

This study was approved by the National Cancer Institute Ethics Committee.

## RESULTS

In the present study, 13 cases of BBS were diagnosed among 213 PEG procedures, with an incidence of 6.1%. The interval between the PEG procedure and the BBS varied from 7 to 630 days, with a mean of 217.5 days.

The demographics and characteristics of patients submitted to PEG (Table 1) and those complicated by BBS (Tables 2,3) are described in the respective tables.

All patients were successfully treated on an outpatient basis, as described below (Table 3):

1. In cases of partial BBS, three patients were treated by removal of the PEG tube through external traction and immediate replacement with a balloon-tipped Foley catheter through the same PEG site. Three other patients were treated by repositioning the original PEG tube, allowing a small distance of the internal bumper from the gastric wall and the healing of the ulcer.

2. In four cases of subtotal BBS, removal of the PEG tube through external traction and immediate replacement with a balloon-tipped Foley catheter through the same PEG site was performed.
3. In three cases of total BBS, there was removal of the PEG tube through external traction. In one patient, there was immediate placement of a new PEG at the same site and in two patients with moderate peri-stomal infection, use of a nasal-enteric tube and placement of a new PEG, 2 weeks later was performed.

At the time of the completion of this study, eight patients were alive (from 1 to 24 months after BBS diagnosis and treatment), three patients died from progression of disease (from 5 to 23 months after the BBS) and two patients were lost to follow up.

## DISCUSSION

Buried bumper syndrome is usually a late complication of PEG,[8] with some unusual early cases.[9]

The incidence in the literature varies from 1.6 to 21.8% of all PEG patients.[3] This large span is probably due to various reasons:

1. The absence of regular follow up of the patients submitted to PEG, resulting in under-diagnosis of BBS;
2. Different life expectancy among patients with diverse groups of pathologies;
3. The known greater risk of BBS among patients with malignancies, poor nutritional condition with low weight at the time of PEG placement, and rapid weight gain after PEG.[7]

Taking into account that in our institution we treat almost exclusively cancer patients, usually in poor nutritional conditions, we take special care in regular follow up and in the education of patients and caregivers for the home care of PEG, instructing them to regularly mobilize the PEG system in and out of the abdomen and to evaluate and adjust the external bumper tension. Any restricted movement, leakage or peri-stomal pain should be reported promptly. Due to this approach, we probably prevented and detected the BBS cases early, with 76.9% being partial or subtotal.

In the last years, following improvements in the materials and design of PEG kits, plastic or soft silicone tubes have been used. These tubes can be removed by external traction, without the need for endoscopy or surgery.[7,8] This technical evolution allowed non-surgical management of our BBS patients.

Thus, in cases of a partial or subtotal BBS, a balloon-tipped tube could easily replace the buried PEG tube, through the

**Table 1.** Characteristics of patients submitted to percutaneous endoscopic gastrostomy (PEG)

| | *n* (%) |
|---|---|
| No. procedures | 213 (100%) |
| Mean age (years) | 55.4 |
| Male | 153 (73.5%) |
| Head and neck cancer | 157 (75.5%) |
| Central nervous system cancer | 39 (18.7%) |
| Commercially available kit | 193 (90.6%) |

**Table 2.** Characteristics of buried bumper syndrome (BBS) patients

| | *n* (%) |
|---|---|
| BBS | 13 (100%) |
| Mean age (years) | 56.8 |
| Male | 7 (53.8%) |
| Head and neck cancer | 12 (92.3%) |
| Commercially available kit | 12 (92.3%) |
| BBS classification | |
| Total BBS | 3 (23.1%) |
| Sub-total BBS | 4 (30.8%) |
| Partial BBS | 6 (46.1%) |
| Medium interval between PEG procedure and BBS (days) | 217.5 |

**Table 3.** Description and treatment used for the buried bumper syndrome (BBS) patients

| Case | Gender | Age | Tumor location | Kit | BBS | Interval PEG-BBS (days) | Treatment |
|---|---|---|---|---|---|---|---|
| 1 | M | 55 | Larynx | PEG 24-Pull | Partial | 630 | Replacement |
| 2 | F | 45 | Larynx | Home-made | Partial | 60 | Replacement |
| 3 | M | 46 | Oral cavity | PEG 24-Pull | Sub-total | 90 | Replacement |
| 4 | F | 77 | Larynx | MIC PEG 24 | Total | 150 | Removal and delayed new PEG |
| 5 | F | 78 | Larynx | PEG 24-Pull | Total | 180 | Removal and delayed new PEG |
| 6 | M | 69 | Larynx | MIC PEG 24 | Total | 30 | Removal and immediate new PEG |
| 7 | M | 65 | Larynx | MIC PEG 24 | Partial | 600 | Replacement |
| 8 | M | 45 | Mandible | PEG 24-Pull | Partial | 420 | Repositioning |
| 9 | M | 52 | Oral cavity | PEG 24-Pull | Partial | 7 | Repositioning |
| 10 | M | 58 | Larynx | MIC PEG 24 | Sub-total | 528 | Replacement |
| 11 | F | 59 | CNS | PEG 24-Pull | Sub-total | 21 | Replacement |
| 12 | F | 47 | Maxillary sinus | PEG 24-Pull | Sub-total | 102 | Replacement |
| 13 | F | 43 | Maxillary sinus | PEG 24-Pull | Partial | 9 | Repositioning |

PEG, percutaneous endoscopic gastrostomy.

same site. We also had three cases of partial BBS, in which the PEG tube was not removed, just repositioned, under endoscopic control. In the cases of total BBS, we removed the PEG tube through external traction, followed by placement of a new PEG at the same site.

All our patients were successfully managed on an outpatient basis, without further complications.

In conclusion, BBS is an uncommon and usually late complication of PEG. Patients' and caregivers' education and regular follow up may play a critical role in minimizing its incidence and allowing early diagnosis, with better prognosis and fewer related complications.

## ACKNOWLEDGMENT

The authors would like to express their deepest gratitude to Dr Michael W. L. Gauderer for his expert comments and review of this article.

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