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CASE SERIES

Replacement Gastrostomy Tube Causing Acute Pancreatitis: Case Series with Review of Literature

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ABSTRACT

Context Percutaneous endoscopic gastrostomy (PEG) feedings are generally considered safe with few serious complications. Acute pancreatitis is a rare complication associated with replacement percutaneous endoscopic gastrostomy tubes. **Case report** We report two cases of acute pancreatitis induced by migrated replacement percutaneous endoscopic gastrostomy tubes. **Conclusions** Migration of a balloon into the duodenum can result in external manipulation of the ampulla of Vater thereby disturbing the flow of pancreatic secretions leading to acute pancreatitis. Recognition of this complication is important and should be included as potential etiology of acute pancreatitis in patients receiving percutaneous endoscopic gastrostomy feedings. Periodic examination and documentation of the distance of the balloon from the skin should be performed to document the position of the tubes or any inadvertent migration of the tubes. The use of Foley catheters as permanent replacement tubes should be considered medically inappropriate.

INTRODUCTION

Percutaneous endoscopic gastrostomies (PEG) are the modality of choice for providing long-term enteral nutrition. Gauderer *et al.* first described this method in 1980 [1]. PEG tube placement and feeding is generally considered safe. Most of the complications associated with PEG-tube feedings are minor and the risk of serious complications is very low. PEG tubes require periodic replacement related to degradation of the tubes or inadvertent tube removal. There are a number of dedicated replacement options which include balloon type-PEG tubes. When dedicated replacement tubes are not available Foley catheters have been used as "temporary" replacements. Herein, we report two cases of acute pancreatitis. The first induced by a migrated

Foley catheter balloon and the second a migrated replacement balloon-type gastrostomy tube. The association of PEG tube migration and acute pancreatitis is rare. To the best of our knowledge only six cases have been reported in the literature.

CASE REPORTS

Case #1

A 79-year-old African American male with past medical history of stroke, diabetes mellitus, hypertension, chronic obstructive pulmonary disease, Alzheimer's dementia, atrial fibrillation and bilateral below knee amputation was sent from a nursing home for evaluation of nausea, an episode of non-bloody vomiting, and epigastric pain. The patient had no history of prior alcohol abuse. Medications included enalapril, warfarin, a multivitamin, calcium, albuterol, prednisone and donepezil. On examination he was stable and was not in acute distress. Mild tenderness was noted in the epigastrium. In the nursing home, a Foley catheter had been inserted in place of the PEG-tube which had been accidentally pulled out few days before. The hemoglobin was 18.8 g/dL (reference range: 14.0-17.5 g/dL), white blood cells count 13,800 mm⁻³ (reference range: 4,400-11,000 mm⁻³), platelet count 196,000 mm⁻³ (reference range: 150,000-450,000 mm⁻³), blood urea nitrogen 22 mg/dL (reference range: 6-20 mg/dL), serum creatinine 1.3 mg/dL (reference range: 0.5-1.2 mg/dL), and glucose 188 mg/dL (reference range: 70-110 mg/dL). Liver enzyme tests, serum triglyceride and serum calcium were within

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Precis Acute pancreatitis secondary to replacement gastrostomy tubes is a rare complication. Increased awareness of this complication is important and should be included as a potential etiology of acute pancreatitis in patients with replacement type gastrostomy tubes

Key words Enteral Nutrition; Gastrostomy; Pancreatitis, Acute Necrotizing

Abbreviations PEG percutaneous endoscopic gastrostomy

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Figure 1. CT scan of abdomen showing Foley catheter balloon in the duodenum. Case#1.

normal limits. Serum amylase (1,448 U/L; reference range: 0-100 U/L) and lipase (1,565 U/L; reference range: 7-60 U/L) were elevated. An ultrasound of the abdomen did not reveal gallstones, sludge or biliary dilatation. A CT scan of the abdomen with oral contrast showed findings suggestive of acute pancreatitis. A Foley catheter balloon was identified in the second portion of the duodenum (Figure 1). A diagnosis of acute pancreatitis was made. The patient was started on i.v. fluids and pain medications. The Foley catheter was replaced with a 20 French replacement PEG-tube. A gastrograffin study was done to confirm the placement. The nausea, vomiting and abdominal pain improved and the serum amylase and lipase returned to normal. The patient had no further episodes of pancreatitis. No other cause for acute pancreatitis could be identified.

Case #2

A 38-year-old white female with past medical history of mental retardation, seizure disorder, hypothyroidism and osteoporosis was admitted with complaints of painful abdominal distension, fever and vomiting. There was no history of prior alcohol abuse. Her medications included levothyroxine, phenytoin,



Figure 2. CT scan of abdomen showing replacement gastrostomy tube balloon in the duodenum. Case #2.

docusate sodium and calcium carbonate. The patient was febrile (39.4 °C, 103 °F), hypotensive (87/49 mmHg) and tachycardic (122 min⁻¹). On examination, the patient’s abdomen was distended, slightly firm with decreased bowel sounds but no guarding or rigidity. The hemoglobin was 17.3 g/dL, hematocrit 50.4% (reference range: 41.5-50.4%), white blood cells count 27,500 mm⁻³, and amylase 1,602 U/L and lipase 1,903 U/L, respectively. The liver enzyme tests, serum triglyceride level, serum calcium and IgG subclass 4 were normal. An ultrasound of the abdomen did not reveal any gallstone, sludge or biliary dilatation. A CT scan of the abdomen with oral and intravenous contrast showed peripancreatic fat stranding consistent with acute pancreatitis. A replacement gastrostomy tube balloon was noted to be impacted in the second part of the duodenum (Figure 2). The PEG tube was pulled back and secured to the abdominal wall. Aggressive hydration, ventilator support and antibiotics were administered. The patient’s clinical condition improved and the amylase and lipase returned to normal. The patient had no further episodes of pancreatitis.

DISCUSSION

PEG-tube feedings are the preferred feeding method in patients requiring long-term enteral nutrition. In general, PEG tubes are safe, inexpensive and easy to place. Ten percent of nursing home residents and 1.7% of Medicare patients over the age of 85 years undergo gastrostomy tube placement [2]. The overall complication rate ranges from 4% to 23.8% [3, 4]. Serious complications are infrequent. Minor complications occur in 7.4-20% and procedure related mortality is less than 1% [5, 6]. Long-term complications include the formation of granulation tissue, leakage at PEG site, unintentional removal and buried bumper syndrome [7, 8, 9, 10, 11]. Table 1 lists the major and minor complications of PEG-tube feedings [3, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32].

Acute pancreatitis secondary to migrated replacement gastrostomy tubes has also been reported [33, 34, 35,

Table 1. Complications of percutaneous endoscopic gastrostomy-tube feeding. Adapted with permission from Practical Gastroenterology: Nutrition Issues in Gastroenterology; Series #22 [39].

Complications	Frequency	References
Major:		
Peritonitis	0.5-1.3%	[3, 13]
Aspiration	0.3-1%	[3, 14]
Hemorrhage	0-2.5%	[13, 15, 16]
Necrotizing fasciitis	Rare	[17, 18]
Death	0-2.1%	[12, 19, 20]
Tumor implantation	Rare	[21, 22]
Minor:		
Peristomal infection	5.4-30%	[23, 24, 25]
Inadvertent removal	1.6-4.4%	[3, 26, 27]
Ileus	1-2%	[3, 14]
Stomal leakage	1-2%	[28]
Gastric ulcer	0.3-1.2%	[3, 15, 26, 29]
Buried bumper syndrome	0.3-2.4%	[3, 30, 31]
Fistulous tracts	0.3-6.7%	[32]

36, 37, 38]. Duerksen *et al.* and Imamura *et al.* each described a case of acute pancreatitis caused by balloon gastrostomy tube [36, 38]. The acute pancreatitis was hypothesized to be caused by the migration of the balloon which caused direct mechanical irritating the major and or minor papilla resulting in a disturbance of the flow of pancreatic juice, an accepted cause of in acute pancreatitis. Duerksen *et al.* described spontaneous loosening of the external bumper as the cause of the tube migration [36]. Imamura *et al.* described a case in which the replacement gastrostomy tube was inserted too deeply in the duodenum and inflated there causing pancreatitis and cholangitis. Although the numbers are small these complications appears to be more common when a Foley catheter is used as a replacement. (Table 2) [38].

Our two cases illustrate the potential dangers associated with use of balloon-type replacement gastrostomy tubes and highlight the inherent problems associated with the use of Foley catheter as permanent replacement tube. The presence of a water filled balloon the end of the PEG tube allows the gastric peristalsis to propel the balloon making it more likely to migrate. Foley catheters are even more likely to migrate because they do not have any external bumper to secure the tube to the external abdominal wall. In addition, Foley catheters do not have markings on the surface of the catheter that allow one to measure the depth of balloon placement. As a result there is no way to judge balloon placement before inflation which could lead to inadvertent inflation in the second duodenum. In the interests of preventing such complications, we believe that Foley catheters should only be used as temporary replacements when dedicated catheters are not available. They should only be used to maintain the integrity of the fistula and replaced with a dedicated tube as soon as one is available. When Foley catheters are used they should be secured to the abdominal wall to prevent migration. In addition, the catheters should be marked in some way to determine the depth of insertion prior to inflation. If there is any doubt as to the location of any replacement tube, the position of the tube should be confirmed radiographically before inflation and the resumption of tube feedings. Moreover, all indwelling replacement tubes should be checked periodically to document the distance of the balloon or internal bumper from the skin to document inadvertent

migration and to correct it before complications occur. In summary, the number of patients with PEG tubes has increased significantly and will continue to increase. An increased awareness of this rare but potentially life threatening complication is important. PEG tube migration should be included as a potential etiology of acute pancreatitis in patients with any PEG tube. The use of Foley catheters as permanent replacement options should be considered medically inappropriate.

Conflict of interest The authors have no potential conflict of interest

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Table 2. Cases of replacement gastrostomy tube induced acute pancreatitis.

Case No.	Study	Year	Replacement tube	Cause
1	Bui, <i>et al.</i> [33]	1986	Foley catheter	Not secured, propelled by gastric peristalsis
2	Panicek, <i>et al.</i> [34]	1988	Foley catheter	Placement in duodenum
3	Barthel, <i>et al.</i> [35]	1991	Foley catheter	Pancreatic divisum and tube migration
4	Duerksen [36]	2001	Balloon PEG tube	Spontaneous loosening of external bolster
5	Miele, <i>et al.</i> [37]	2005	Foley catheter	Spontaneous migration by gastric peristalsis
6	Imamura, <i>et al.</i> [38]	2007	Balloon PEG tube	Replacement tube passed too deep and inflated
7	Current study: Case #1	2011	Foley catheter	Propelled by gastric peristalsis/placement in duodenum
8	Current study: Case #2	2011	Balloon PEG tube	Spontaneous loosening of external bolster causing migration

PEG: percutaneous endoscopic gastrostomy

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