

A rare complication of percutaneous endoscopic gastrostomy; Buried Bumper syndrome. Review of literature

Perkütan endoskopik gastrostomi işleminin nadir bir komplikasyonu; Buried bumper sendromu

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ABSTRACT

Percutaneous endoscopic gastrostomy procedure has been described for the first time by Gauderer et al. in 1980 and it is performed commonly in patients having neurological disorders with comorbid chronic conditions for improving patient's nutritional status. Complication rate of this procedure is low and while skin infections are the most commonly observed complication of this procedure; necrotizing fasciitis, colcutaneous fistula and perforation are rarely seen severe complications. In this paper, we presented "Buried bumper syndrome", rarely seen complication after percutaneous endoscopic gastrostomy with the review literature knowledge.

Keywords: Buried bumper syndrome, complication, percutaneous endoscopic gastrostomy

ÖZET

Perkütan endoskopik gastrostomi prosedürü ilk kez 1980 yılında tanımlanmıştır. Komorbid, kronik hastalıkları olan ve nörolojik rahatsızlıkları olan hastalarda beslenme durumunu iyileştirmek için yaygın olarak gerçekleştirilmektedir. Bu işlemin komplikasyon oranı düşüktür, cilt enfeksiyonları en sık gözlenen komplikasyonu iken; nekrotizan fasiit, deride fistül ve perforasyon nadiren gözlenen ciddi komplikasyonlardır. Bu yazıda, literatür bilgileri eşliğinde perkütan endoskopik gastrostomi sonrası nadir görülen komplikasyon olan "Buried bumper sendromunu" sunduk.

Anahtar kelimeler: Buried bumper sendromu, komplikasyon, perkütan endoskopik gastrostomi.

INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) is performed particularly in patients with chronic diseases needing medium- and long-term enteral feeding via a nasogastric tube due to insufficient oral intake or in conditions of parenteral nutrition is compulsory. This minimally invasive technique is cost effective and doesn't need general anesthesia (1). The benefit of PEG insertion is improving the nutritional condition of the patient with an improved quality of life and survival (2). Skin infection, feeding intolerance, peristomal leakage, pain are most observed minor complications. Necrotizing fasciitis, colcutaneous fistula, peritonitis and perforation are most seen major and lethal complications of PEG insertion procedure.

Buried bumper syndrome (BBS) is an extremely rare complication of this procedure. The bumper (the internal fixation device of the PEG tube inside the stomach lumen) migrates through the gastric wall. This complication was described for the first time in 1988 (1), but it was named as BBS in 1990 (2). Definitive diagnosis of this rare complication is made via endoscopic visualization of buried bumper of PEG tube into gastric mucosa. Treatment options of this situation can be classified as; conservative approach, endoscopic therapy, radiological techniques and surgical approach.

In this paper, we presented BBS case, an infrequently seen complication after percutaneous endoscopic gastrostomy, with the literature. The patient's

written consent was obtained before this paper was written.

CASE

Keywords “Buried bumper”, Buried bumper syndrome”, “Percutaneous endoscopic gastrostomy complication” and “PEG complication” were searched in PubMed and Google Scholar database. All related articles published in English between year 1990-2015 were evaluated. The 38 cases were found in 27 articles. Gender, age, symptoms, signs, diagnostic tools, treatment options were analyzed. Also, a new case of our clinic was presented below.

A 76-year-old male patient nursing home due to Alzheimer’s disease for 5 years admitted to clinic with his family with a complaint of malfunction of the PEG tube. In his history, PEG tube was inserted 7 weeks ago. At physical examination, while a minimal cutaneous hyperemia and a malfunctioning PEG tube were observed; an increase in body temperature, crepitation, necrosis and abscess formation were not determined. Minimal edema was observed in the subcutaneous fat plane on superficial ultrasonography. Laboratory tests showed elevation in white blood cell count. An endoscopic examination of the upper gastrointestinal tract revealed that the internal bumper migrated through the gastric mucosa and it was partially covered by the gastric mucosa (Figure 1).



Figure 1: The internal bumper migrated into the stomach mucosa.

The PEG tube was pushed back into the stomach by loosening the external bumper of the tube and placed in normal localization (Figure 2). The internal bumper position was controlled endoscopically and the feeding tube was fixed at 4 cm. The patient was discharged at the postoperative 8th hour with full recovery. Antibiotic therapy was maintained for ten days. At follow-up of the patient, it was observed that the PEG tube was working properly without any problem.

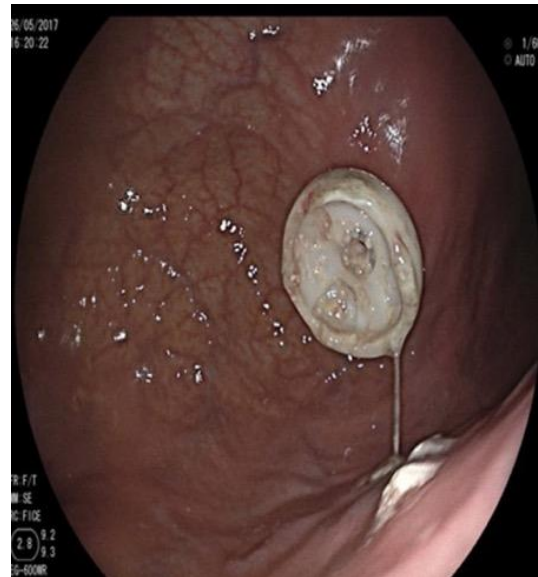


Figure 2: The internal bumper pushed back into the stomach lumen.

DISCUSSION

Gastrostomy is a widely used enteral nutrition method which could be performed via endoscopic, radiological or surgical techniques (3). Percutaneous endoscopic gastrostomy procedure first described by Gauderer et al. in 1980 (4) and it is performed commonly in patients with comorbid chronic conditions needing medium- and long-term enteral feeding. Oral-esophageal carcinoma, patients having neurological disorders, short bowel syndrome patients, trauma patients such as burn are examples for patients may need feeding via a PEG tube. Our patient had severe Alzheimer’s disease which is a chronic neurodegenerative disease and causes dementia.

Primary indication for PEG is enteral feeding and stomach decompression. Coagulopathy and abnormal coagulation test results, small bowel obstruction and hemodynamically instable patient are contraindications of PEG insertion. This minimally invasive technique is cost effective and doesn’t need general anesthesia. The benefit of PEG insertion is improving the nutritional condition of the patient with an improved quality of life and survival. The PEG complication rate is between 0.4- 22.5% (5). Complications are categorized as major and minor complications. While skin infections are the most commonly observed minor complication of this procedure; necrotizing fasciitis, colo-cutaneous fistula, peritonitis and perforation are rarely seen major complications. Feeding intolerance, peristomal leakage, pain, hyperemia, edema at the place of tube insertion and tube occlusion are other minor complications (6,7).

BBS is an infrequent complication of PEG with a prevalence of 0,3% (8). Leaving a small distance between the internal bumper and external bolster during insertion of the tube and fitting the tube tightly cause ischemia-necrosis of the skin, abdominal wall, and stomach (9). By the time, the internal bumper

migrates from the ischemic and necrotic area towards the stomach wall or subcutaneous region. Leakage of stomach content near the PEG tube is an early symptom of BBS (10). BBS also can be presented with minor complications such as feeding intolerance, pain, swelling at the site of tube insertion, stoma infection and tube obstruction. Patients may rarely present with acute abdomen, abdominal wall abscess, necrosis, fasciitis or sepsis (6). In case of presence of abdominal pain, tube malfunction, the presence of inflammation around the stoma site or purulent discharge around the tube should raise suspicion of possible BBS (11), and it generally develops 3-6 months after insertion of a PEG tube (3), but early cases can be found in the literature such as Geer and Jeanmonod et al. presented a BBS case 3 weeks after PEG tube insertion (12). Our patient presented to the clinic with signs of skin infection and complains about PEG tube obstruction 7th week of PEG tube insertion.

Ultrasonography and computed tomography are also useful for diagnosis and prediction of depth of bumper migration (13). Endoscopic ultrasonography also can be used to estimate migration depth of the bumper (14-16). But the definitive diagnosis is made with endoscopic visualization of the bumper migrated into the gastric mucosa.

Twenty-seven published case reports since 1990 were evaluated (Table 1), it was noticed conservative approach, endoscopic therapy, and surgical approach are main treatment methods chosen by physicians. But primary aim of all treatment methods is replacement of the malformed tube if the insertion site of the PEG is salvageable (7). Conservative approach is recommended only for patients having high operative risks and expectation of poor prognosis. But there is a risk of skin infection, abscess, peritonitis in the wait and see approach. Also buried bumper rarely continue to migrate spontaneously and can protrude from skin incision (19). Extraction of the bumper from skin, push&pull technique, using needle knife, argon plasma coagulation and papillotome are techniques and devices of endoscopic therapy (16,20-23). Extraction of the bumper from skin needs an additional incision and surgical preparation were needed (24). Pushing buried bumper back into stomach, cutting tube and catching the bumper by an endoscopic snare is named as push&pull technique (25). Ma et al. used a needle knife for dissection of overgrowing tissue for the first time (26). Orsi et al. combined needle knife technique and push and pull technique (25). Curcio et al. pointed "Hybrid knife" for endoscopic mucosal resection also can be used for extraction of buried bumper (27). Ulla et al. used argon plasma coagulation system for solution of buried bumper (16). Crowley et al. took out buried bumper by using an angiography 28catheter in pediatric patients (28). Richter-Schrag and Fischer evaluated 38 patients having BBS and classified 17 BBS cases, tried to estimate the risks of therapy; IA: Inner bumper partially extracorporeal or subcutaneous with and without fistula; IB: Inner

bumper completely extracorporeal, full thickness focal defect; II: Partially visible inner bumper inside the stomach, good degree of mobility; IV: Deep type, inner bumper not visible, mucosa without mobility. Richter-Schrag and Fischer pointed BBS patients having good mucosa mobilization with or without partial identification of the inner PEG bumper could be previously induced (29).

If there are signs of acute abdomen the patient should be treated surgically (1,30). Surgical approach or percutaneous drainage (via ultrasonography or computed tomography) should be performed in the case of abdominal abscess formation (18). Rarely, partial gastrectomy should be done for proper drainage of abdominal abscess (31). It should be kept in mind that the patients who will be followed up conservatively should not have symptoms of skin and subcutaneous tissue infection. Since our case did not have symptoms of skin infection, the internal bumper was partially covered by the gastric mucosa and the PEG tube was functioning normally after pushing the tube into the stomach lumen, we did not consider to change the PEG tube.

CONCLUSION

BBS is a very rare complication of percutaneous endoscopic gastrostomy procedure, but it may lead to fatal outcomes such as peritonitis, intra-abdominal abscesses, and sepsis. In case of tube malfunction and presence of symptoms of skin infection around the tube, the tube position should be confirmed with an endoscopic examination of the upper gastrointestinal tract. Although endoscopic and surgical treatment methods come to the forefront, we think that conservative method including pushing the tube into the stomach lumen and following up the patient can be safely performed in patients with the internal bumper partially covered by the gastric mucosa and without symptoms of skin infection.

Competing interests

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Table 1: Cases presented as BBS since 1990 in English literature				
Authors	Year	Number of patients	Method	
Klein et al[2]	1990	1	Endoscopy	Savary dilators+ endoluminal push extraction
Mang et al[32]	1994	9	Endoscopy	Alligator grasper
			Endoscopy	Savary dilator
			Endoscopy	Needle knife
			Endoscopy	Snare
			Not removed	Not removed
			Endoscopy	Needle knife
			Endoscopy	Needle knife
			Endoscopy	Needle knife
Shhers and Chapman[33]	1998	2	Peg tubes were not removed,second PEG tubes were placed parallel to first ones.	
Lin LF et al[22]	2001	1	Endoscopy	Needle type papillotome
Rino Y et al[34]	2002	1	Surgery	Surgeons choice
Boreham and Ammori[30]	2002	1	Surgery (laparoscopic)	
Vu CK[35]	2002	2	PEG tube removed by external traction in both patients	
Gencosmanoglu et al[46]	2003	1	Buried bumper of PEG tube removed by external traction, the same site was used for PEG insertion	
Sasaki et al[37]	2003	1	Buried bumpers of PEG tube removed by external traction, new PEG tube was inserted	
Anagnostopoulos et al[17]	2003	1	Endoscopy	Snare forceps
Bhala N et al[38]	2004	1	Endoscopy	Snare forceps
Strock and, Weber[39]	2005	1	Endoscopy	Balloon catheter
Walters et al[40]	2005	1	Surgery	
Kim YS et al[41]	2006	1	Buried bumper removed by external traction	
Obed A et al[42]	2006	1	Surgery	Intraperitoneal abscess
Ulla JL et al[16]	2007	1	Endoscopy	Savary dilator +argon beam local gastric destruction
Lee and Craig[43]	2007	1	Endoscopy	Needle-knife papillotome
McClave and Jafri[9]	2007	2	Two patients; one, conservative therapy. One, removed by external traction	
Erdil A et al[44]	2008	1	Removed external traction	
Furlano RI et al[45]	2009	1	Endoscopy	Push- Pull t technique+ snare
Johnson T et al[46]	2010	1	Surgery	Abdominal wall abscess
Bhat G et al[7]	2010	1	Endoscopy	Repositioning of inner bolster with rat tooth forceps
Erkan G et al[47]	2012	1	External traction, new PEG inseriton from another side	
Tanaka Y et al[15]	2012	1	Surgery	Abdominal abscess
Christiaens P et al[48]	2014	1	Endoscopy	Ballooncathater
Bertolini R et al[49]	2014	1	Endoscopy	Over-the-scope-clip system usage for gastrocolocutaneous fistula closure
Tenembaum D et al[50]	2015	1	Surgery	Necrotizing fasciitis

REFERENCES

1. Gerbes DM, Hartmann B, Lima J, et al.Comparasion of removal techniques in the management of buried bumper syndrome: a retrospective cohort study of 82 patients. Endoscopy International Open 2017;5:603-7.
2. Klein S, Heare BR, Soloway RD. The”buried bumper syndrome”: a complication of percutaneous endoscopic gastrostomy. Am J Gastroenterol. 1990;85:448-51.
3. Afifi I, Zarour A, Al-Hassani A, Peralta R, El-Menyar A, Al-Thani H. The Challenging Buried bumper syndrome after percutaneous endoscopic gastrostomy. Case Rep Gastroenterol. 2016;10: 224-32.

4. Gauderer MW, Ponsky JL, Izant RJ. Gastrostomy without laparotomy: a percutaneous endoscopic technique. *J Pediatr Surg.* 1980;15:872-5.
5. Itkin M, DeLegge MH, Fang JC, et al. Multidisciplinary practical guidelines for gastrointestinal access for enteral nutrition and decompression from the Society of Interventional Radiology and American Gastroenterological Association (AGA) Institute, with endorsement by Canadian Interventional Radiological Association (CIRA) and Cardiovascular and Interventional Radiological Society of Europe (CIRSE). *Gastroenterology* 2011;141:742-65.
6. Cyrany J, Rejchrt S, Kopacova M, Bures J. Buried bumper syndrome: A complication of percutaneous endoscopic gastrostomy. *World J Gastroenterol.* 2016;22:618-27.
7. Bhat G, Suvarna D, Pai CG. Acute buried bumper syndrome: an endoscopic peg tube salvage approach. *Indian J Med Sci.* 2010;64:234-6.
8. Lee TH, Lin JT. Clinical manifestations and management of buried bumper syndrome in patients with percutaneous endoscopic gastrostomy. *Gastrointest Endosc.* 2008;68:580-4.
9. Mc Clave SA, Jafri NS. Spectrum of morbidity related to bolster placement at time of percutaneous endoscopic gastrostomy: buried bumper syndrome to leakage and peritonitis. *Gastrointest Endosc Clin N Am.* 2007;17:731-46.
10. Köhler H, Lang T, Behrens R. Buried bumper syndrome after percutaneous endoscopic gastrostomy in children and adolescents. *Endoscopy* 2008;40:85-6.
11. Biswas S, Dontukurthy S, Rosenzweig MG, Kothuru R, Abrol S. Buried bumper syndrome revisited: a rare but potentially fatal complication of PEG tube placement. *Case Rep Crit Care* 2014;2014:634953.
12. Geer W, Jeanmonod R. Early presentation of buried bumper syndrome. *West J Emerg Med.* 2013;14:421-3.
13. Hwang JH, Kim HW, Kang DH, et al. A case of endoscopic treatment for gastrocolocutaneous fistula as a complication of percutaneous endoscopic gastrostomy. *Clin Endosc.* 2012;45:95-8.
14. Braden B, Brandstaetter M, Caspary WF, Seifert H. Buried bumper syndrome: treatment guided by catheter probe US. *Gastrointest Endosc.* 2003;57:747-51.
15. Tanaka Y, Akahoshi K, Motomura Y, et al. Pretherapeutic evaluation of buried bumper syndrome by endoscopic ultrasonography. *Endoscopy* 2012;44:162.
16. Ulla JL, Alvarez V, Fernandez-Salgado E, Vazquez-Astray E. Radial endoscopic ultrasonography and buried bumper endoscopic solution. *Surg Laparosc Endosc Percutan Tech.* 2007;17:201-2.
17. Anagnostopoulos GK, Kostopoulos P, Arvanitidis DM. Buried bumper syndrome with a fatal outcome, presenting early as gastro-intestinal bleeding after percutaneous endoscopic gastrostomy placement. *J Postgrad Med.* 2003;49:325-7.
18. Finocchiaro C, Galletti R, Rovera G, et al. Percutaneous endoscopic gastrostomy: a long-term follow-up. *Nutrition* 1997;13:520-3.
19. Behrle KM, Dekovich AA, Ammon HV. Spontaneous tube extrusion following percutaneous endoscopic gastrostomy. *Gastrointest Endosc.* 1989;35:56-8.
20. Fay DE, Luther R, Gruber M. A single procedure endoscopic technique for replacing partially extruded percutaneous endoscopic gastrostomy tubes. *Gastrointest Endosc.* 1990;36:298-300.
21. Boyd JW, DeLegge MH, Shamburek RD, Kirby DF. The buried bumper syndrome: a new technique for safe, endoscopic PEG removal. *Gastrointest Endosc.* 1995;41:508-11.
22. Lin LF, Ko KC, Tsai YM, Huang JS. Buried bumper syndrome-complication of percutaneous endoscopic gastrostomy. *Zhonghua Yixue Zazhi* 2001;64:315-319.
23. Müller-Gerbes D, Aymaz S, Dormann AJ. Management of the buried bumper syndrome: a new minimally invasive technique- the push method. *Z Gastroenterol.* 2009;47:1145-8.
24. Oner OZ, Gunduz UR, KocU, Karakas BR, Harmandar FA, Bulbuler N. Management of a complicated buried bumper syndrome with a technique involving dye test, cannulation, and extraction. *Endoscopy* 2014;46:238-9.
25. Orsi P, Pinazzi O, Di Mario F. Is the buried bumper syndrome a buried problem? Personal experience about a different therapeutic approach and prevention possibilities. *Rivista Italiana di Nutrizione Parenterale ed Enterale* 2002;20:124-31.
26. Ma MM, Semlacher EA, Fedorak RN, et al. The buried gastrostomy bumper syndrome: prevention and endoscopic approaches to removal. *Gastrointest Endosc.* 1995;41:505-8.
27. Curcio G, Granata A, Ligresti D, Tarantino I, Barresi L, Traina M. Buried bumper syndrome treated with Hybrid Knife endoscopic submucosal dissection. *Gastrointest Endosc.* 2014;80:916-7.
28. Crowley JJ, Vora D, Becker CJ, Harris LS. Radiologic removal of buried gastrostomy bumpers in pediatric patients. *AJR Am J Roentgenol.* 2001;176:766-8.
29. Richter-Schrag HJ, Fischer A. Buried bumper syndrome: A new classification and therapy algorithm. *Chirurg* 2015;86:963-9.
30. Boreham B, Ammori BJ. Laparoscopic percutaneous endoscopic gastrostomy removal in patient with buried bumper syndrome: a new approach. *Surg Laparosc Endosc Percutan Tech.* 2002;12:356-8.
31. Piskac P, Wasiková S, Hnízdil L, Kalac J, Urbánek L. Buried bumper syndrome (BBS) as a

- complication of percutaneous endoscopic gastrostomy). *Rozhl Chir.* 2010;89:298-9.
32. Mang MM, Semlacher RN, Fedroak RN, et al. The buried gastrostomy bumper syndrome: prevention end endoscopic approaches to removal. *Gastrointest Endosc.* 1995;41:505-8.
 33. Sheers R, Chapman S. The buried bumper syndrome: a complication of percutaneous endoscopic gastrostomy. *Gut* 1998;43:586.
 34. Rino Y, Tokunaga M, Morinaga S, et al. The buried bumper syndrome: an early complication of percutaneous endoscopic gastrostomy. *Hepato-gastroenterology* 2002;49:1183-4.
 35. Vu CK. Buried bumper syndrome: old problem, new tricks. *J Gastroenterol Hepatol.* 2002;17:1125-8.
 36. Gencosmanoglu R, KocD, Tozun N. The buried bumper syndrome: migration of internal bumper of percutaneous endoscopic gastrostomy tube into abdominal wall. *J Gastroenterol.* 2003;38:1077-80.
 37. Sasaki T, Fukumori D, Sato M, Sakai K, Ohmori H, Yamamoto F. Percutaneous endoscopic gastrostomy complicated by buried bumper syndrome. *Int Surg.* 2003;88:64-7.
 38. Bhala N, Sanders DS, McAlindon ME. Methylene blue dye injection: an adjuvant technique in the management of buried bumper syndrome? *Endoscopy* 2004;36:670.
 39. Strock P, Weber J. Buried bumper syndrome: endoscopic management using a balloon dilator. *Endoscopy* 2005;37:279.
 40. Walters G, Ramesh P, Memon MI. Buried bumper syndrome complicated by intra-abdominal sepsis. *Age Ageing* 2005;34:650-1.
 41. Kim YS, Oh YL, Shon YW, et al. A case of buried bumper syndrome in a patient with a balloon-tipped percutaneous endoscopic gastrostomy tube. *Endoscopy* 2006;38:41-2.
 42. Obed A, Hornung M, Schlottmann K, Schlitt HJ, Bolder U. Unnecessary delay of diagnosis of buried bumper syndrome resulting in surgery. *Eur J Gastroenterol Hepatol.* 2006;18:789-92.
 43. Lee GC, Craig P. Education and Imaging. Gastrointestinal: buried bumper syndrome. *J GastroenterolHepatol.* 2007;22:1344.
 44. Erdil A, Genc H, Uygun A, Ilica AT, Dagalp K. The buried bumper syndrome: the usefulness of retrieval PEG tubes in its management. *Turk J Gastroenterol.* 2008;19:45-8.
 45. Furlano RI, Sidler M, Haack H. The push-pull T technique: an easy and safe procedure in children with the buried bumper syndrome. *Nutr Clin Pract.* 2009; 23:655-7.
 46. Johnson T, Velez KA, Zhan E. Buried bumper syndrome causing rectus abdominis necrosis in a man with tetraplegia. *Spinal Cord* 2010;48:85-6.
 47. Erkan G, Coban M, Atac KG, Caliskan A, Dergertekin B. The advantage of retrieval PEG tubes in patients with buried bumper syndrome-a case report. *Turk J Gastroenterol.* 2012; 23:773-5.
 48. Christiaens P, Bossuyt P, Cuyle PJ, Moons V, Van Olmen A. Buried bumper syndrome: single-step endoscopic management and replacement. *Gastrointest Endosc.* 2014;80:336.
 49. Bertolini R, Meyenberger C, Sulz MC. First report of colonoscopic closure of a gastrocolocutaneous PEG migration with over-the-scope-clip-system. *World J Gastroenterol.* 2014;20:11439-42.
 50. Tenembaum D, Inayat F, Rubin M. Necrotizing fasciitis secondary to acute buried bumper syndrome. *Clin Gastroenterol Hepatol.* 2015; 13:17-8.