

Acute Buried Bumper Syndrome with Gastric Perforation and Peritonitis: A Rare Complication of Percutaneous Endoscopic Gastrostomy: Case Report

Mide Perforasyonu ve Peritonitle Birlikte Akut Gömülmüş Tampon Sendromu: Perkütan Endoskopik Gastrostominin Nadir Bir Komplikasyonu

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ABSTRACT Percutaneous endoscopic gastrostomy (PEG) is a broadly accepted procedure of enteral feeding for patients with inadequate oral intake. The side effects and complications of PEG are becoming more evident with its increasing use. Here, we report a case of buried bumper syndrome, gastric perforation and peritonitis after PEG. In our case, perforated area was closed endoscopically by using hemoclips. The patient was treated with intravenous broad spectrum antibiotics for 10 days and fed by parenteral nutrition. The patient responded well to medical treatment therefore there was not any need for a surgical exploration. Follow up endoscopy was performed 15 days later which showed closure of the perforation area. A new PEG tube was inserted 1 month later.

Key Words: Peritonitis; endoscopy, gastrointestinal

ÖZET Perkütan endoskopik gastrostomi (PEG) ağızdan gıda alımı yetersiz olan hastalarda geniş kabul görmüş bir işlemdir. Artan kullanımla birlikte PEG'in yan etkileri ve komplikasyonları da daha belirgin hale gelmektedir. Burada PEG'den sonra gelişen gömülmüş tampon sendromu, mide perforasyonu ve peritonit olgusunu sunuyoruz. Olgumuzda perfore alan hemoklipler kullanarak endoskopik olarak kapatıldı. Hasta 10 gün boyunca intravenöz geniş spektrumlu antibiyotiklerle tedavi edildi ve parenteral beslendi. Hasta medikal tedaviye iyi yanıt verdi, böylece cerrahi eksplozasyona gerek kalmadı. Onbeş gün sonra takip endoskopisi yapıldı ve perforasyon alanının kapandığı görüldü. Bir ay sonra yeni bir PEG tüpü yerleştirildi.

Anahtar Kelimeler: Peritonit; endoskopi, gastrointestinal

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Percutaneous endoscopic gastrostomy (PEG) is a broadly accepted procedure of enteral feeding for patients with inadequate oral intake. The side effects and complications of PEG are becoming more evident with its increasing use. Buried bumper syndrome (BBS) is one of the rare complications of PEG and occurs when internal bumper of the PEG tube becomes lodged anywhere between the gastric wall and the skin along the PEG tract. It is considered to be a late complication and becomes apparent months to years after PEG placement.¹ Here, we report an unusual case of BBS with a gastric perforation at the internal gastrostomy site and peritonitis that occurred on the third day of placement. The contributing factors, preventive measures and treatment recommendations are also reviewed briefly.

CASE REPORT

A 74-year-old female patient was admitted to our gastroenterology department because of non-functional PEG tube with peritubular leak and white-colored discharge from the tube. The PEG had been inserted 3 days ago. The patient's past medical history revealed the diagnosis of Alzheimer's disease for 10 years, and 6 months before she was treated in intensive care unit because of aspiration pneumonia.

On admission, the body temperature was 39.6°C with a white blood cell count of 8.5/ul, C-reactive protein of 88.8 mg/L with a peritubular leak suggesting peritonitis. The patient's blood pressure was 120/80 mmHg and her heart rate was 70/min. Laboratory studies revealed a hemoglobin concentration of 10.7 g/L, hematocrit 32% and platelet count of 342/ul. Her serum urea nitrogen concentration was 5 mg/dL, creatinine 0.37 mg/dL, aspartate aminotransferase was 15U/L, alanine aminotransferase was 10U/L, sodium was 138 mmol/L, potassium was 3.8 mmol/L and chloride was 0.8 mmol/L.

Upper gastrointestinal system endoscopy revealed a gastric perforation of 12 mm in diameter at the anterior wall of the distal gastric corpus. The edges of the perforation were ulcerated circumferentially and the internal bumper was visible from the perforated area (Figure 1). A water-soluble contrast solution was given to this perforated area and the spread of the contrast material was seen in abdominal cavity under the scope. Abdominal computerized tomography showed that the internal PEG bumper was at the subcutaneous region, without any connection of the tube to the colonic segments (Figure 2).

The internal bumper was removed by external traction. The perforated area was closed endoscopically by using hemoclips in two consecutive sessions. Patient was treated with intravenous broad spectrum antibiotics for 10 days and fed by parenteral nutrition. She responded well to medical treatment without any need for a surgical exploration. Follow up endoscopy was performed 15

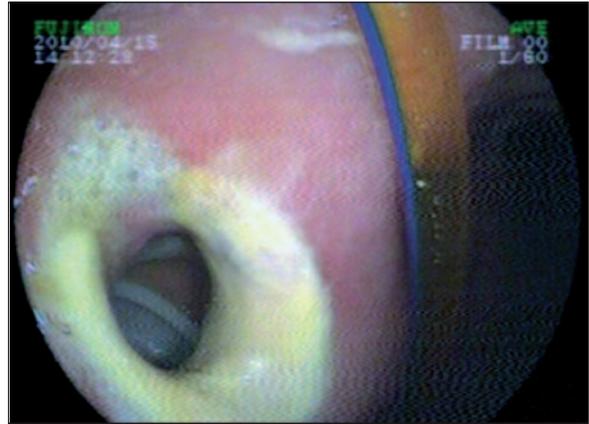


FIGURE 1: Endoscopic view of gastric perforation. PEG is seen in the intra-abdominal cavity.

(See for colored form <http://tipbilimleri.turkiyeklinikleri.com/>)



FIGURE 2: The internal bumper of PEG tube in the subcutaneous region without any connection to the colonic segments.

days later which showed closure of the perforated area. A new PEG tube was inserted 1 month later.

DISCUSSION

Percutaneous endoscopic gastrostomy was first described in 1980 by Gauderer as an effective method of feeding via the stomach in patients with inadequate oral food intake.² It is now a broadly accepted procedure for patients who have a high risk for malnutrition, with inadequate oral intake for long periods, and when enteral nutrition is required for more than 4-6 weeks.³ Percutaneous endoscopic

gastrostomy insertion seems to be simple, but it is an invasive procedure and associated with a number of complications.⁴ Wound infection, peristomal leak, tube occlusion and tube displacement are some of the most frequently seen complications. Other rare complications are peritonitis, gastrocolocutaneous fistula, aspiration pneumonia and buried bumper syndrome.³⁻⁷

Buried bumper syndrome is an uncommon but serious complication of PEG with an incidence of 1.97%.⁸ It occurs when the internal bumper of the PEG tube migrates and becomes lodged between the gastric wall and the skin along the PEG tube tract. The syndrome becomes apparent after 4 months of use, but time intervals as short as 6 days or as long as 7 years have been reported in the literature.^{9,10} In some patients, epithelialization with coverage of the internal gastrostomy stoma with gastric mucosa can result in complete closure of the orifice. The burial level of the internal bumper and the stage of mucosal covering over the tube determine symptoms such as immobilization of PEG tube, inability to infuse feeding solutions through the tube, leak around the tube and abdominal pain.¹¹ To the best of our knowledge, our case is the first BBS occurred 3 days after PEG placement with a gastric perforation in the literature.

Diagnosis of BBS is confirmed by endoscopy, which shows internal bumper buried within gastric mucosa. Ultrasonography, computerized tomography or magnetic resonance imaging facilitate the localization of the bumper and would be helpful for deciding whether a surgical or endoscopic approach should be used to remove the PEG. The management of BBS is basically dislodging the buried tube either out of the abdominal wall or back into the stomach. The type of the PEG tube also determines the treatment route. If the internal bumper is collapsible, it can be removed simply by external traction, as in our case.¹¹⁻¹³ The buried tube can be removed from abdominal wall through a small cutaneous incision down to the bumper.^{10,14,15} The tube can be pulled out and replaced with a new pull-type feeding tube simultaneously after insertion of a guidewire through the old tube into the stomach.¹⁶ In the literature there are also some new

techniques such as inserting a stainless steel probe or a ureteric catheter from external PEG opening and pushing the bumper buried into the wall of stomach and grasping the PEG tube by using a snare endoscopically.^{17,18} However, if the buried tube cannot be removed by manual or endoscopic methods or if the patient's condition is complicated by peritonitis and abscess, surgical intervention with laparotomy or a laparoscopic approach is required.¹⁹

Several factors have been proposed that contribute to the development of BBS. Excessive tension between the internal and external bumpers that causes ischemic necrosis and subsequent ulceration of the gastric mucosa have been thought to be the initiating factors in BBS. Tubes with small inner bumper, sharp tapered flange, and hard plastic composition may increase the risk of this complication.⁹

Some methods have been described to prevent BBS. It is advised to allow an additional 1.5 cm between the external bumper of the PEG and the skin to minimize the risk of pressure necrosis.¹¹ In addition, the gastrostomy tube itself should be pushed forward into the stomach slightly and rotated during the daily nursing care. This would ensure that the internal bumper does not become buried into the gastric mucosa. After rotation, the PEG tube should be placed back into its original place.

In our case, BBS was not the only problem but there was a perforated area of approximately 1.2 cm in diameter in the distal corpus of the stomach accompanied with signs of peritonitis. Gastric perforation due to PEG is a very rare complication and has been defined in only one case in the literature. It was a gastric perforation of 2 cm in diameter which was treated surgically.²⁰ Endoscopic clipping can also be used successfully to repair perforations in gastrointestinal system although immediate surgical intervention is the traditional treatment of choice.^{1,7,21-23} Gastric perforation is mostly seen in cases where displacement of PEG tube occurs before fistula tract formation. We think that pressure necrosis due to excessive tension between the bumpers before formation of fistula tract is the main contributing factor in our case. If displace-

ment of PEG tube had occurred after fistula tract formation, gastric perforation would probably have not been expected. In our case, BBS occurred on third day of insertion and the perforation area was about 1.2 cm in diameter. The unconscious pulling of the PEG tube by the patient might have caused this early BBS. We closed the perforated area by using hemoclips. Since the patient responded well to medical treatment, surgery was not needed.

BBS is a very serious complication of PEG and may result in gastrointestinal bleeding, perforation of the stomach, peritonitis and even death.²⁴ Management of BBS should be individualized according to presence of these manifestations. When a new PEG tube replacement is not possible because of a gastric perforation, there will be a need to feed the patient parenterally. The patient should be given nothing from the mouth, a nasogastric tube should be placed and broad spectrum an-

tibiotics must be started. Surgical exploration might be indicated if signs of peritonitis or sepsis are present in cases unresponsive to treatment.^{25,26} After healing of perforated area, a new PEG tube can be placed.

In conclusion, PEG provides a safe way of enteral feeding but can lead to some life-threatening complications such as BBS and gastric perforation. BBS is considered as a late complication of PEG, but it may also occur early after PEG placement. When peritubular leak, inability to infuse feeding solutions and fixation of the tube are noticed, BBS should be considered and the patient should be referred to emergency endoscopy. Treatment of BBS should be planned with taking the other manifestations of PEG into account. Nevertheless, it would be advisable to prevent this serious complication by giving education to caregivers about proper patient and PEG care.

REFERENCES

1. Minami S, Gotoda T, Ono H, Oda I, Hamanaka H. Complete endoscopic closure of gastric perforation induced by endoscopic resection of early gastric cancer using endoclips can prevent surgery (with video). *Gastrointest Endosc* 2006;63(4):596-601.
2. Gauderer MW, Ponsky JL, Izant RJ Jr. Gastrostomy without laparotomy: a percutaneous endoscopic technique. *J Pediatr Surg* 1980; 15(6):872-5.
3. Varnier A, Iona L, Dominutti MC, Deotto E, Bianchi L, Iengo A, et al. Percutaneous endoscopic gastrostomy: complications in the short and long-term follow-up and efficacy on nutritional status. *Eura Medicophys* 2006;42(1):23-6.
4. Nicholson FB, Korman MG, Richardson MA. Percutaneous endoscopic gastrostomy: a review of indications, complications and outcome. *J Gastroenterol Hepatol* 2000;15(1):21-5.
5. Erdil A, Saka M, Ates Y, Tuzun A, Bagci S, Uygun A, et al. Enteral nutrition via percutaneous endoscopic gastrostomy and nutritional status of patients: five-year prospective study. *J Gastroenterol Hepatol* 2005;20(7):1002-7.
6. Kirchgatterer A, Bunte C, Aschl G, Fritz E, Hubner D, Kranewitter W, et al. Long-term outcome following placement of percutaneous endoscopic gastrostomy in younger and older patients. *Scand J Gastroenterol* 2007;42(2): 271-6.
7. Friedmann R, Feldman H, Sonnenblick M. Misplacement of percutaneously inserted gastrostomy tube into the colon: report of 6 cases and review of the literature. *JPEN J Parenter Enteral Nutr* 2007;31(6):469-76.
8. Kejarawal D, Aravinthan A, Bromley D, Miao Y. Buried bumper syndrome: cut and leave it alone! *Nutr Clin Pract* 2008;23(3):322-4.
9. Khalil Q, Kibria R, Akram S. Acute buried bumper syndrome. *South Med J* 2010; 103(12): 1256-8.
10. Frascio F, Giacosa A, Piero P, Sukkar SG, Pugliese V, Munizzi F. Another approach to the buried bumper syndrome. *Gastrointest Endosc* 1996;43(3):263.
11. Gençosmanoğlu R, Koç D, Tözün N. The buried bumper syndrome: migration of internal bumper of percutaneous endoscopic gastrostomy tube into the abdominal wall. *J Gastroenterol* 2003;38(11):1077-80.
12. Vu CK. Buried bumper syndrome: old problem, new tricks. *J Gastroenterol Hepatol* 2002; 17(10):1125-8.
13. Hodges EG, Morano JU, Nowicki MJ. The buried bumper syndrome complicating percutaneous endoscopic gastrostomy in children. *J Pediatr Gastroenterol Nutr* 2001; 33(3):326-8.
14. Shallman RW, NorFleet RG, Hardache JM. Percutaneous endoscopic gastrostomy feeding tube migration and impaction in the abdominal wall. *Gastrointest Endosc* 1988;34(4): 367-8.
15. Rino Y, Tokunaga M, Morinaga S, Onodera S, Tomiyama I, Imada T, et al. The buried bumper syndrome: an early complication of percutaneous endoscopic gastrostomy. *Hepatogastroenterology* 2002;49(46):1183-4.
16. Venu RP, Brown RD, Pastika BJ, Erikson LW Jr. The buried bumper syndrome: a simple management approach in two patients. *Gastrointest Endosc* 2002;56(4):582-4.
17. Binnebösel M, Klink CD, Otto J, Schumpelick V, Truong S. A safe and simple method for removal and replacement of a percutaneous endoscopic gastrostomy tube after "buried bumper syndrome". *Endoscopy* 2010; 42(Suppl 2):E17-8.
18. Leung E, Chung L, Hamouda A, Nassar AH. A new endoscopic technique for the buried bumper syndrome. *Surg Endosc* 2007;21(9): 1671-3.
19. Lee TH, Lin JT. Clinical manifestations and management of buried bumper syndrome in patients with percutaneous endoscopic gastrostomy. *Gastrointest Endosc* 2008;68(3): 580-4.

20. Angiò LG, Versaci A, Rivoli G, Fracassi MG, Rosato A, Pacilè V, et al. [Hemorrhage and gastric perforation in patients with percutaneous endoscopic gastrostomy (PEG)]. *Ann Ital Chir* 2003;74(2):195-201.
21. Kim JS, Kim HK, Cho YS, Chae HS, Kim CW, Kim BW, et al. Extraction and clipping repair of a chicken bone penetrating the gastric wall. *World J Gastroenterol* 2008;14(12):1955-7.
22. Gleichmann D, Stienecker K, Glaser J. [Endoscopic clipping of a gastric perforation after GIST resection]. *Med Klin (Munich)* 2004;99(9):537-9.
23. Fujishiro M, Yahagi N, Kakushima N, Kodashima S, Muraki Y, Ono S, et al. Successful nonsurgical management of perforation complicating endoscopic submucosal dissection of gastrointestinal epithelial neoplasms. *Endoscopy* 2006;38(10):1001-6.
24. Anagnostopoulos GK, Kostopoulos P, Arvanitidis DM. Buried bumper syndrome with a fatal outcome, presenting early as gastrointestinal bleeding after percutaneous endoscopic gastrostomy placement. *J Postgrad Med* 2003;49(4):325-7.
25. Schrag SP, Sharma R, Jaik NP, Seamon MJ, Lukaszczuk JJ, Martin ND, et al. Complications related to percutaneous endoscopic gastrostomy (PEG) tubes. A comprehensive clinical review. *J Gastrointest Liver Dis* 2007;16(4):407-18.
26. Raju GS. Endoscopic management of gastrointestinal leaks. *Gastrointest Endosc Clin N Am* 2007;17(3):487-503, vi.