Case report

PEG reimplantation after Buried Bumper Syndrome: a case report

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Abstract. Percutaneous endoscopic gastrostomy (PEG) is the method of choice to provide long-term enteral nutrition for patients with impossibility to be fed orally. Although it is considered a routine and safe procedure, potential complications exist, which are generally classified into three major categories: endoscopic technical difficulties, PEG procedure-related complications and late complications associated with PEG tube use, such as buried bumper syndrome (BBS). BBS is a potentially life-threatening complication, occurring in 0.3% to 2.5% of cases. Additional complications related to BBS may present, such as wound infection, peritonitis, and necrotizing fasciitis. Once resolved the acute complication, an adequate feeding method should be prompted for the patient, among whom PEG remains of choice. After tissue inflammation, fibrosis may prevent a standard endoscopic procedure for the new implantation, therefore endoscopists should modulate procedures to obtain successful and safe results. A combined surgical- and endoscopic strategy could resolve implantation difficulties ensuring a safe and simple procedure. We present here a case of BBS complicated with abdominal wall cellulitis in a paraplegic 35-year-old-man who was admitted to our hospital. (www.actabiomedica.it)

Keywords: Percutaneous Endoscopic Gastrostomy; Buried Bumper Syndrome; Complication; Cellulitis; Enteral nutrition.

Case presentation

A thirty-five-year-old male patient, bed-bound followed in a neurorehabilitation clinic was admitted to our hospital because of reported fever and the development of a collection in left hypochondrium next to his Percutaneous Endoscopic Gastrostomy (PEG) device. The PEG tube was inserted after a car accident provoking neurologic lesions inducing feeding and breathing difficulties.

On presentation at the emergency department the patient was afebrile, tachycardic (92 beats per minute), with blood pressure 138/85 mmHg. The neurological assessment was not altered compared to his usual clinical condition; physical examination revealed no cutaneous marbling or other signs of sepsis of arms, legs and thorax, while the abdominal wall showed extensive skin redness around the gastrostomy tube and crepitus was felt during abdominal palpation. The tracheostomy was well-located without signs of inflammation.

Pharmacological history revealed an ongoing broad-spectrum antibiotic therapy (meropenem plus vancomycin) for a month because of aspiration pneumonia.

Investigations

Laboratory tests revealed hemoglobin 13 g/dl (normal limits (NL) 13 – 17.5 g/dl), white blood cells 8.5 x 10^3/μL (NL 4 – 8 x 10^3/μL) with a formula showing 82% neutrophils (NL 40 – 74%), 11% lymphocytes (NL 19 - 48%), C reactive protein 12.7 mg/L (NL 0 - 5 mg/L).

To evaluate the position of the PEG tube, a thoracic and abdominal CT was performed which showed a right lobar pneumonia and a dislocated PEG tube in the adipose tissue, paraumbilical subcutaneous imbibition and emphysema of the soft tissues, in absence of a delimited collection (figure 1).

Imaging results indicated that the PEG tube showed signs of infection and inflammation of the surrounding soft tissues consequent to its dislocation. The diagnosis of buried bumper syndrome (BBS) associated with cellulitis was confirmed.

According to the current guidelines, the dislocated tube needed to be removed and repositioned in order to ensure a correct nutritional status in addition to the infection treatment (1, 2).

Treatment

First, the broad-spectrum intravenous antibiotic therapy previously set for his aspiration pneumonia was continued to treat the abdominal wall cellulitis. The PEG tube was removed by using simple external traction to allow the healing of the infected surrounding tissues, which was dressed about every 8 hours. Parenteral nutrition and hydration were maintained for 72 hours, but due to his frail health conditions, enteral nutrition via a PEG tube was the best solution to guarantee a long term adequate caloric intake, hydration and drugs administration in an outpatient setting. Therefore, after the infection was controlled with antibiotic therapy showing an improvement of laboratory exams and of the signs of infection in the abdominal wall, PEG replacement was once again programmed to be performed endoscopically. Endoscopy showed a complete closure of the previous gastrostomy site with a surrounding scar, hindering a correct transillumination maneuver during the procedure. Therefore, a multidisciplinary collaboration between gastroenterologists and general surgeons was set, for the best placement of the new PEG tube. The procedure was carried out in an operating room, under general anesthesia. The surgeon guided laparoscopically the endoscopic maneuver. The gastric wall was approached to the abdominal wall, allowing an endoscopic precise, fast and minimally invasive, placement of the new PEG tube.

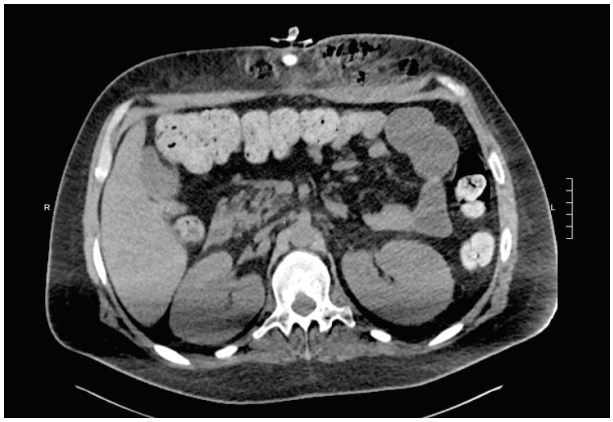

Figure 1. CT scan confirming Buried Bumper Syndrome with associated cellulitis.

Follow-up and outcome

After the procedure, the antibiotic therapy was continued for further 7 days with a complete resolution of the cellulitis and the restoration of normal laboratory exams. The PEG tube use for nutrition and hydration was started 48 hours after the repositioning without complications. The patient was discharged 72 hours after the combined endoscopic-laparoscopic procedure.

Discussion

Percutaneous endoscopic gastrostomy is the most common method for providing long-term enteral nutrition (2). It is indicated in patients unable to achieve a sufficient oral food intake (e.g., neurological dysfunction, swallowing disorders or tumors of the upper aerodigestive surgery, hypercatabolic states, etc.) or in case of need of decompression of the gastrointestinal tract due to complicated chronic diseases (e.g., advanced abdominal malignancies).

Although safe and effective, this procedure can be associated with significant complications, varying from minor events like wound infections to major life-threatening complications such as BBS (1, 3, 4). Other possible complications include aspiration, hepatic or colonic perforation, esophageal laceration, gastrocolic

fistula, pneumoperitoneum, portal/mesenteric venous gas and- abdominal wall bleeding, cellulitis necrotizing fasciitis, peritonitis, gastroduodenal obstruction, volvulus, gastrointestinal bleeding, dumping syndrome and gastroparesis (3, 4).

Buried bumper syndrome, first described in 1988, is reported to occur in 0.3–2,5% of patients, typically between two months and seven years after PEG insertion (5, 6). It occurs when the internal bumper of the PEG causes an excessive traction on the gastric wall and leads to ischemia and ulceration of the mucosa between the internal and external bumper.

The predisposing factors include: physiological factors, like an excessive gastric secretion;

PEG tube-related factors, including excessive traction of the PEG internal fixator on the stomach wall leading to mucosal ischemia and possibly secondary necrosis, inadequate dressing (e.g., gauze placement beneath the external bumper instead of over it); patient's general health conditions, including obesity, rapid weight gain, chronic cough, poor hygiene (5).

Typically, BBS presents with a leakage around the PEG tube associated to signs of infection which can spread and hesitate in cellulitis (7). Diagnosis of BBS diagnosis is clinical and can be confirmed by endoscopy, with the direct vision of the internal bumper buried within the gastric wall or by Computed tomography.

BBS can lead to serious complications especially in case of delayed diagnosis (7, 8).

Cellulitis is usually the result of bacterial infection, whose most common etiologic agents are beta hemolytic Streptococcus, in particular Streptococcus pyogenes and Staphylococcus aureus, and methicillin resistant organisms (MRSA) (9). Penicillin or third generation cephalosporins are recommended as empirical treatment, while waiting for microbial culture and antibiogram, in order to prevent the worsening of the infection.

In the presented case, the patient had poor general health conditions, which also predispose to bacterial overgrowth.

Management of BBS can be conservative, endoscopically-assisted or surgical depending on the clinical presentation. Anyway, the prompt removal of the PEG tube is indicated, even if the patient is asymptomatic, to prevent further complications, such as peritonitis (6). In case the tube removal by traction is impeded, other techniques are described such as skin incision performed under local anesthesia and the application of balloon dilators or Savary dilators on the tube track, with the aim to avoid surgery. These approaches are particularly indicated for high-risk patients.

Endoscopic methods generally consider a mucosal dissection through a needle knife then a push-pull T-technique is performed, however there are high risks of bleeding and perforation. Surgical management includes mainly laparoscopic procedures under general anesthesia. The laparotomic approach is less and less used and reserved for emergency cases (10).

Once removed the PEG tube to resolve the acute condition and the associated infection, the patient's management required an adequate nutritional program. Despite the acute complication, enteral nutrition via PEG should always be preferred to parenteral nutrition, due to its better achievement of a correct nutritional status, lower risks of bacteremia associated to intravenous administration of nutrition, and easier management in outpatient setting (2). Neurological dysphagia, along with cancer-related reasons, is one of the most common indications for PEG tube insertion, therefore our patient was programmed to undergo PEG reimplantation.

Anatomical conditions and the presence of fibrotic tissue, consequent to the resolution of the previous infection, complicated the standard endoscopic procedure of insertion, hindering transillumination of the abdominal wall. The transillumination procedure is a crucial step of PEG endoscopic insertion, as it demonstrates the area where the stomach and abdominal surface are in closest contact, without interposition of organs (11, 12). In case transillumination is absent, other gastrostomy insertion techniques are usually considered, mainly radiologic- and surgical implantation. Nevertheless, these last two procedures are often more complex, expensive and require a different setting, e.g., orotracheal intubation of surgical implantation. In the present case, the impossibility to complete PEG procedure under sedation led to the organization of a combined surgical- and endoscopic procedure, with the aim to simplify the implantation applying endoscopy and to bypass the transillumination problem. Thanks to this combined procedure, PEG insertion was successful, and the post-procedural follow-up was uneventful.

Conclusion

Buried bumper syndrome is an infrequent but potentially life-threating complication of PEG insertion, especially if associated to cellulitis, as in the presented case. The prompt evaluation by a multidisciplinary team, involving gastroenterologist, general and plastic surgeons, radiologists, microbiologists and nutritionists allowed a correct diagnosis and initial management. Once the acute complication is resolved, PEG insertion often results the best method to guarantee an adequate nutrition in neurologically impaired patients. After tissue inflammation, fibrosis can hamper the endoscopic procedure preventing transillumination. To avoid more complex procedures such as surgical or radiologic gastrostomy implantation, the organization of a combined surgical- and endoscopic procedure can help simplifying the process, guaranteeing a successful outcome and an uneventful follow-up.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013).

Conflict of Interest: Each author declares that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

Authors' contributions: FF, FG and FV conceived, designed, and coordinated the research; NG drafted the manuscript; FF, GdA and FV carried out the esophagogastroduodenoscopy (EGD) exam and managed the follow up; FF, LL, FG and GdA contributed to the acquisition and interpretation of the data. All Authors revised the manuscript and gave their contribution to improve the paper. All authors read and approved the final manuscript.

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