




A case of pneumoperitoneum due to tube dislocation after peg insertion

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ABSTRACT

Percutaneous endoscopic gastrostomy (PEG) serves as a preferred method for providing nutrition and nutritional support to patients who require long-term enteral feeding and have a functioning gastrointestinal tract. PEG offers better access to the gastrointestinal tract than surgical alternatives and has well-documented benefits over parenteral nutrition. Given that PEG tube insertion is among the most common endoscopic procedures globally, a thorough understanding of its indications and contraindications is vital in modern medicine.

While PEG is generally seen as a safe intervention, it carries risks for both minor and major complications, which can arise from endoscopic technical challenges, issues during the PEG procedure, or from prolonged PEG tube usage and wound care.

Our case report details an unusual complication of PEG, where the catheter tube penetrated the omentum majus, leading to pneumoperitoneum due to blockage in the catheter's tract development, followed by the patient's subsequent treatment. Awareness of such potential complications and knowledge of proper catheter maintenance can enhance the standard of care for patients with PEG tubes.

Keywords: Complication, Gastrostomy tube, Enteral nutrition, Percutaneous

Introduction

Enteral nutrition is generally the preferred method over parenteral nutrition in patients with a functional gastrointestinal system (GIS) due to the risks and higher costs of intravenous feeding, as well as the failure of parenteral nutrition to provide enteral stimulation and subsequent compromise of the intestinal defense barrier.^[1,2] Furthermore, enteral nutrition has been shown to reduce the risk of bacterial translocation and corresponding bacteremia.^[3]

Gastric feeding is the most common type of enteral feed-

ing. Gastrostomy tube placement can be performed using endoscopy, radiological imaging, or surgical techniques (open or laparoscopic). Percutaneous endoscopic gastrostomy (PEG) was first introduced in 1980, utilizing endoscopy to insert a feeding tube into the stomach.^[4]

PEG tube placement is generally considered safe, but complications may arise at varying rates depending on the study population. Minor complications include wound infection, leakage from the tube to the abdominal cavity, obstruction of the tube, pneumoperitoneum, and gastric outlet obstruction; major complications comprise



Received: 09.10.2023 Revision: 09.10.2023 Accepted: 09.11.2023

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aspiration pneumonia, bleeding, buried bumper syndrome, intestinal perforation, necrotizing fasciitis, and tumor seeding.^[5]

This report discusses pneumoperitoneum, a rare complication of PEG, often mistaken for GIS perforation when the catheter tube penetrates the omentum majus and obstructs tract formation.

Case Report

An 88-year-old female patient was referred to general surgery for PEG placement during her hospitalization in the palliative service with a history of cerebrovascular disease and diagnoses of Alzheimer's and malnutrition. After anesthesia, the PEG catheter was placed in the endoscopy unit. The patient's pulse, blood pressure, and oxygen saturation were monitored throughout the procedure. The "pull" method was used to perform the procedure endoscopically, utilizing a 20 Fr standard silicone PEG kit. Oral local anesthesia (10% lidocaine spray) was administered to the conscious patient, who was responding to painful stimuli, along with sedoanalgesia using midazolam and propofol. Local anesthesia was also applied prior to the dermal incision. The placement of the tube was guided by the site where the endoscopic light was visible on the abdominal wall. The patient had the PEG inserted using the endoscopic pulling method and commenced feeding via the PEG catheter 24 hours later. After seven days of uncomplicated feeding through PEG, a chest X-ray was taken due to the patient's complaint of food regurgitation through the nose, to rule out aspiration pneumonia. The X-ray revealed free air in the chest (Fig. 1). Consequently, computed tomography (CT) was scheduled, which also showed free air (Fig. 2), leading to surgery under the suspicion of GIS perforation. During the laparotomic procedure with a supraumbilical incision, no free or gastrointestinal fluid was found in the abdomen. Inspection of the PEG tube showed that it was correctly positioned in the stomach; however, the omentum majus was ensnared between the tube's cuff and the peritoneum, preventing tract formation between the stomach and the abdominal wall. The ensnared omentum was dissected, released, and the stomach was secured to the anterior abdominal wall at the tube's insertion point. By the second postoperative day, the patient resumed feeding through the PEG. On day four post-surgery, the patient was stable and was moved back to the palliative service.



Figure 1. Subdiaphragmatic free fluid in the chest X-ray after PEG catheter placement (7th day).



Figure 2. Tomography image after PEG catheter placement (diffuse free air in the abdomen and failure of the PEG catheter to form a tract).

Discussion

With an enhanced appreciation for the clinical importance of nutrition, gastrostomy procedures have become integral to treatment strategies. Enteral nutrition, offering substantial benefits over parenteral nutrition, is more frequently recommended for patients with an operational gastrointestinal system.^[5] ESPEN (European Society of Clinical Nutrition and Metabolism) guidelines advise PEG for patients requiring nutrition beyond 2 to 3 weeks.^[6] Enteral nutrition can be administered to individuals

in palliative care and intensive care using nasogastric or nasojejunal tubes for up to four weeks. PEG is commonly employed for longer-term enteral feeding due to its practicality, cost-effectiveness, and feasibility of bedside implementation under local anesthesia and sedation.^[7]

Complications associated with PEG can arise during or after the procedure, with a range of complication rates cited in the literature. Fröhlich et al. reported PEG-related complication rates, including morbidity and mortality, at 4.9-50%, 3-12, and 0.5-1.2%, respectively.^[8] Intra-abdominal organs, particularly the colon and small intestine, and less commonly the liver and spleen, are susceptible to injury during PEG placement. Notably, cases of complete gastric laceration post-placement have been documented.^[9] The incidence of iatrogenic intestinal perforation during PEG insertion is higher in the elderly due to mesenteric laxity of the colon.^[10] Contrast-enhanced CT scanning or fluoroscopy, especially in hemodynamically unstable cases, is a valuable diagnostic tool to confirm gastrointestinal integrity. The presence of peritonitis symptoms and any sign of contrast leakage into the peritoneal cavity necessitates urgent surgical intervention.

Pneumoperitoneum is frequently observed post-PEG tube insertion, with reports of occurrence rates up to 50% in some studies.^[11] Typically, pneumoperitoneum post-PEG is not classified as a complication, as it often has no detrimental consequences. It is generally attributed to air introduction into the abdominal cavity during endoscopic maneuvers and abdominal wall needle insertion. In the absence of peritonitis indicators, pneumoperitoneum should not hinder the initiation or continuation of PEG feeding. However, persistence of any amount of free air beyond 72 hours post-PEG suggests the possibility of intestinal compromise.^[10] Although instances of complicated pneumoperitoneum, such as those resulting from intestinal injury, are infrequent following PEG, they have been noted.^[12]

The etiology of pneumoperitoneum after PEG placement is likely related to the high intragastric air pressure from the endoscope compared to the needle puncture of the stomach and gastric wall. Air may escape from the stomach during the needle puncture and while placing the PEG tube through the abdominal wall.^[13] The most common complications identified in pneumoperitoneum after PEG tube placement are colcutaneous fistula or colon injury. A colcutaneous fistula often results from entrapment of the intestine between the anterior abdominal wall



Figure 5. Operational images post-complication (PEG catheter tube intersecting the omentum majus, narrowly contacting the transverse colon).

and the stomach wall.^[11] Inadequate or excessive gastric insufflation, improper transillumination, or unnoticed focal invagination of the anterior gastric wall during palpation are linked to colon damage.^[11]

These observations suggest that technical issues during PEG placement could be linked to complex pneumoperitoneum cases. In our specific instance, the pneumoperitoneum arose from the PEG tube piercing the omentum majus near the transverse colon during the endoscopic pulling process (Fig. 3). This obstructed the creation of a passageway between the stomach and the peritoneum, leading to pneumoperitoneum.

Conclusion

PEG is a commonly employed, effective method for enteral nutrition, but it may lead to the complications we have discussed. Careful use of endoscopy light and palpation of the anterior abdominal wall to identify the tube's entry point can prevent such complications. Additionally, our case report illustrates that pneumoperitoneum following PEG does not always follow a benign and self-limiting course.

Disclosures

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship Contributions: Concept – A.İ.S.; Design – A.İ.S., M.Y.; Supervision – B.K.; Materials – A.İ.S., M.Y.; Data collection and/or processing – A.İ.S., B.K.; Analysis and/ or interpretation – A.İ.S., M.Y.; Literature search – A.İ.S., B.K.; Writing – A.İ.S.; Critical review – M.Y.

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