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Gastro-Hepatic Fistula with Liver Abscess: A Rare Complication of a Common Procedure

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Study Design A
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Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
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Patient: Female, 76
Final Diagnosis: Septic shock secondary to liver abscesses and gastro-hepatic fistula from PEG displacement
Symptoms: Acute delirium
Medication: —
Clinical Procedure: None
Specialty: Gastroenterology and Hepatology

Objective: Unusual clinical course





Background: Percutaneous endoscopic gastrostomy (PEG) is a procedure used most commonly for enteral access for nutrition and continuation of treatment in patients when oral nutrition is not possible. It is a safe, cost-effective procedure; however, has its own complications and adverse effects that can be life threatening.

Case Report: Here, we present the case of a 76-year-old woman who was sent to a long-term skilled nursing facility after discharge from a hospital a month before, initially admitted for seizures after a fall and diabetic ketoacidosis. She underwent tracheostomy for prolonged respiratory support on mechanical ventilation and also underwent PEG tube placement. She presented in our Emergency Department (ED) with septic shock and multi-organ failure initially attributed to urinary tract infection and possible *Clostridium difficile* colitis. However, on further evaluation she was found to have a dislodged PEG tube, which led to development of gastro-hepatic fistula and multiple liver abscesses with liver necrosis. Comfort measures were implemented and she died due to her critical condition.

Conclusions: To the best of our knowledge, this is the first case of a PEG tube, with no post-procedure complications, that dislodged and resulted in formation of a gastro-hepatic fistula and multiple liver abscesses. It is the first case that describes liver injury resulting from dislodgement rather than the liver being injured during the procedure of PEG tube placement itself.

MeSH Keywords: Gastric Fistula • Gastrostomy • Liver Abscess

Full-text PDF: <http://www.amjcaserep.com/abstract/index/idArt/895098>

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Background

Percutaneous endoscopic gastrostomy (PEG) is used as an access for nutrition in patients who have neurological disorders, traumatic brain injury, malignancies of head and neck, and advance dementia that prevent normal oral nutrition. Enteral feeding is the preferred route in patients who have a functional gastrointestinal system; it prevents nutritional deficiencies, weight loss, and dehydration, allows continuation of treatment, decreases hospitalization, and improves quality of life [1]. Compared to surgical gastrostomy, it is a quick, much safer, and more cost effective procedure with fewer complications, which have made it a common procedure for enteral access, maintenance of nutrition, and continuation of treatment. However, there are adverse and even lethal complications attributed to PEG placement, most of them being rare. Here, we present an extremely rare complication in which the PEG tube dislodged and resulted in a gastro-hepatic fistula, liver abscesses, and liver necrosis, resulting in septic shock, multi-organ failure, and death.

Case Report

We present the case of a 76-year-old woman who was sent from a long-term skilled care nursing facility when she was found to be in acute delirium in her room. She later became unresponsive and hypotensive with blood pressure of 75/40 mmHg. She was on chronic mechanical ventilation support and usually responsive to simple verbal commands. She had fever and diarrhea in the prior 2 days at the facility. During evaluation at the facility, she had urinary tract infection (UTI) secondary to *Morganella morganii* and was being treated with appropriate antibiotics. There was no associated respiratory distress, vomiting, abdominal pain, jaundice, skin rash, or any other associated complaints. She has a past medical history of chronic systolic heart failure, with ejection fraction of 36%, non-ST elevation myocardial infarction in 2011 (found to have non-obstructive coronary artery disease on evaluation at that time), seizure disorder after fall, primary essential hypertension, diabetes mellitus type II, obstructive sleep apnea, and chronic obstructive pulmonary disease (COPD). She was admitted in a hospital a month ago and was treated for seizure disorder after a fall, and diabetic ketoacidosis. She was on mechanical ventilation and underwent tracheostomy for chronic respiratory failure for long-term respiratory support. She underwent a percutaneous endoscopic gastrostomy (PEG) placement as well. She had a prior history of smoking and cocaine abuse but no history of alcohol or intravenous (IV) drug abuse. There was no significant family history. She had a prior history of hysterectomy. She was on aspirin, pantoprazole, simvastatin, sodium valproate, lisinopril, diltiazem, olanzapine, and insulin glargine at the skilled care nursing facility and was also receiving IV ceftriaxone and IV vancomycin for her UTI.

The patient was nonresponsive in the Emergency Department (ED), with blood pressure of 82/48 mmHg, pulse of 94/min, with oxygen saturation of 100% on fraction of inspired oxygen (FiO₂) of 40% on volume assist-control mode of mechanical ventilation, and she was febrile with a temperature of 103°F. On examination, she was unresponsive, with Glasgow coma scale of 3/15 and mid-dilated pupils sluggishly reactive to light bilaterally. There was no spontaneous movement of any extremity on painful stimulus, with mute Babinski reflex. Chest and cardiovascular examinations were unremarkable. Her abdomen was soft and non-tender, and the PEG tube in place had normal surrounding skin. There were no decubitus ulcers. Foley catheter had turbid urine. She was admitted to the ICU for severe sepsis, likely secondary to UTI, and was placed on contact isolation for possible *Clostridium difficile* colitis. She was empirically started on IV meropenem, IV vancomycin, IV metronidazole, and vancomycin via the PEG tube. Hemodynamically, she did not respond to IV normal saline, for which norepinephrine infusion was started because she met the criteria for septic shock [2].

On evaluation, she was found to have a hemoglobin of 7.4 g/dl, hematocrit of 23.9%, white blood cells (WBC) of 33.2 k/μl, with neutrophil percentage of 86.8% and platelets of 91 k/μl. She had an INR of 1.6, elevated d-dimer of >400 ng/ml and decreased fibrinogen of 106mg/dl (normal range 185–450 mg/dl). She had anion gap metabolic acidosis secondary to lactic acidosis (elevated serum lactate of 7.2 mmol/L) and acute kidney injury with creatinine of 2.4mg/dL and blood urea nitrogen of 38mg/dL. Transaminases were elevated, with alanine transaminase of 812 U/L and aspartate transaminase of 1826 U/L. Total bilirubin was 1.7 mg/dl with direct bilirubin of 1.6 mg/dl and alkaline phosphatase of 244 U/L. Serum albumin was 2.3 g/dl with total protein of 5.3 g/dl and lactate dehydrogenase of 2428 U/L. These results were all suggestive of multi-organ failure. Urinalysis was negative for nitrites and leucocyte esterase, with moderate bacteria and few WBCs. Blood culture revealed *Lactobacillus acidophilus*, but urine cultures had no growth.

Chest X-ray was unremarkable. Ultrasound of abdomen was compatible with emphysematous cholecystitis. Gall bladder was seen to be under-distended, edematous, and appeared thickened. Echogenic foci within the left hepatic lobe were also seen, suggestive of air in the biliary tree (Figure 1). She was then taken emergently for computed tomography (CT)-guided cholecystostomy and drainage. The CT image did not show any cholecystitis but did reveal PEG tube dislodgement, lying outside the gastric cavity along the left lobe of the liver. Areas of vague left hepatic hypo-attenuation were seen with air bubbles (Figures 2, 3). On injecting contrast via the PEG, contrast leakage/filling was seen in a branching pattern representing multiple left liver abscesses around the dislodged

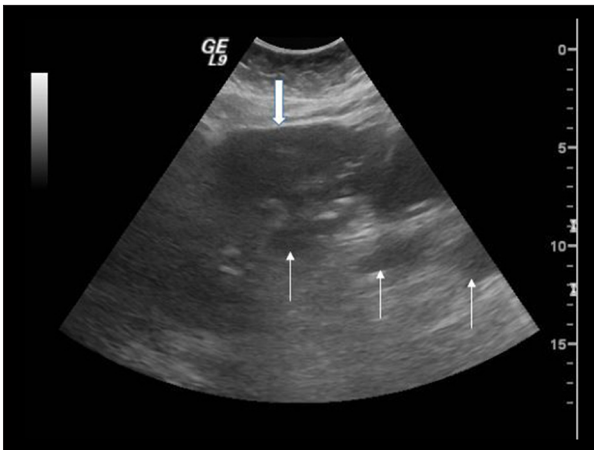


Figure 1. Ultrasound of the right upper quadrant showing an edematous, emphysematous gallbladder (thick white arrow) along with multiple echogenic foci in the left liver lobe suggestive of air in biliary tract (thin arrows).



Figure 4. Hepatic collections/abscesses after injection of contrast via PEG tube (thin arrows). Nasogastric tube seen in the gastric cavity (thin black arrow).

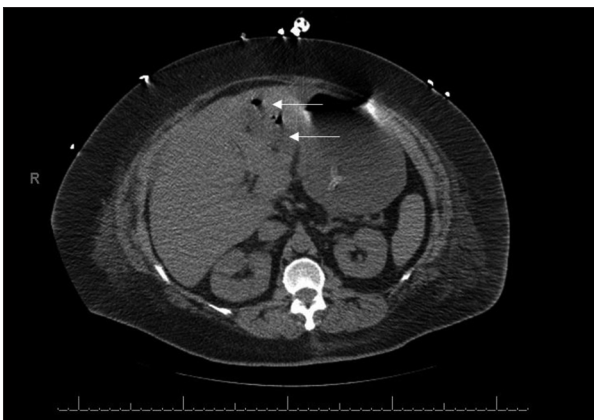


Figure 2. PEG tube seen to traverse the abdominal wall (thin arrow).

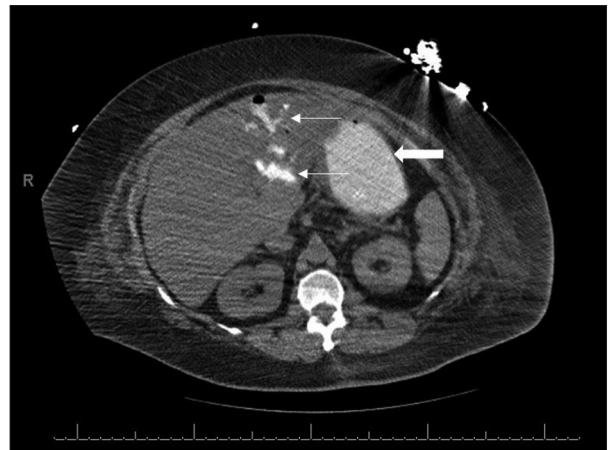


Figure 5. Hepatic collections seen with contrast injection (thin arrow), but no contrast enhancement of the adjacent gastric cavity (thick arrow).

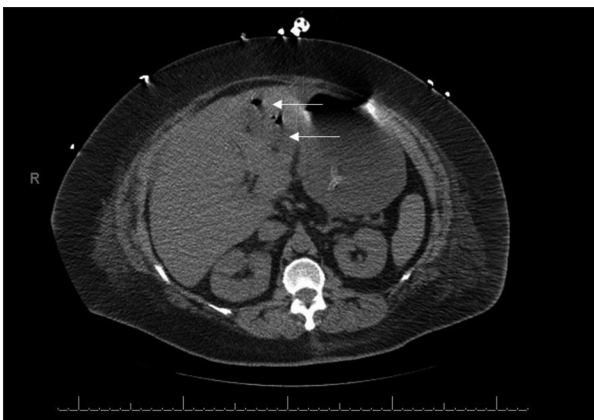


Figure 3. Areas of hypo-attenuation and air collection in liver seen prior to injection of contrast (thin arrows).

PEG with left liver lobe necrosis (Figures 4, 5). A fistulous tract was seen to be formed between the gastric fundus and left

hepatic branching system (Figure 6). Because there were multiple small liver abscesses, percutaneous drainage was not attempted. Attempting to remove the PEG tube could have led to more complications because it appeared to be somewhat deep and possibly adherent to the liver. Her condition was too critical for her to be taken for any emergent surgical procedure. She continued to be on vasopressors, with no response to treatment. Her condition was explained to the family in detail and they opted for comfort measures. The patient died on the same day.

Discussion

PEG has become the most widespread procedure with which to establish an enteral access. It was first introduced by Gauderer et al. in 1980 when PEG was performed in 12 children and 19



Figure 6. PEG tube balloon (thin black arrow) within the left liver silhouette with contrast filling fistulous tract (thin white arrow) between gastric fundus (black star) and left hepatic branching and contrast-pulling regions (thick white arrow).

adults [3]. It is a relatively safe procedure but has its own set of complications that can either present early or late. Complications related to the endoscopic procedure itself are recognized early, which include injuries to the esophagus and even perforation, bleeding, respiratory distress, cardiac events, tissue injury while inserting the PEG or its needle, peritonitis, colonic injury (rarely), and even gastro-colonic fistula formation. It is also known to cause aspiration pneumonia, hyper-granulation around the gastrostomy site, peristomal leakage, infection, and gastric outlet obstruction [1,4–9]. Rare complications include PEG stoma tumor seeding, gastric volvulus, intrahepatic PEG placement, aortogastric fistula, and pneumoperitoneum [7,10–13]. Procedure-related morbidity is reported to be 9–17% [14], whereas procedure-related mortality is estimated at 0.53% [7].

The most frequent complication encountered with PEG is the development of peristomal wound infection; it occurs in around 30% of cases when prophylactic antibiotics are not given prior to the procedure. However, after PEG it is very rare to have severe wound infections requiring medical or endoscopic intervention [15,16]. Tube leakage is seen in 5–78% of cases with long-term placement. They also get blocked, which is seen in 16–31% of cases after 18-month follow-up [1,14]. Buried bumper syndrome is a long-term complication related to gastrostomy tube traction, in which the internal bumper of the PEG erodes the gastric wall and lodges between the gastric wall and the overlying skin. This erosion occurs when there is excessive pressure between the internal and external bumpers of the PEG [6,17]. Formation of colo-cutaneous fistula has also been rarely reported; it develops after erosion and migration of the internal retention disc/bumper of the PEG tube through the gastric wall into the colon, even though they are correctly placed [4,18].

Our case is a very rare case of PEG tube dislodgement to the liver leading to a gastro-hepatic fistula, liver abscesses, and liver necrosis. In our literature review we only found 1 such case of development of liver abscess from migration of the PEG. The PEG tube in that case penetrated the liver parenchyma during the procedure, followed by its migration weeks later into the peritoneum, leading to peritonitis and perihepatic abscess formation [19]. However, our case is the first to be reported to have an uncomplicated PEG tube placement with no direct hepatic injury during procedure, followed by migration out of the gastric cavity a month later into the liver, leading to the above-mentioned complications. The PEG tube was placed in our patient with introduction of the angiocath with needle into the gastric cavity under direct endoscopic vision. The procedure was completed as per protocol and placement was confirmed by reexamining the gastric cavity via an endoscope.

Dislodged PEGs are known to cause a variety of complications. Artul et al. reported a case of necrotizing fasciitis due to a dislodged PEG in the subcuticular tissue. Abdominal wall necrotizing fasciitis is seen in around 1% of patient who undergo gastrostomy placement [5]. There should be a high degree of suspicion of complications related to PEG, even if the wound surface appears clean. Liver injury from PEG placement may be an underdiagnosed condition. It is also important to take measures to prevent traction on the PEG, especially in patients with loss of cognition and awareness, as it puts them at high risk of pulling their own PEG tube, leading to complications.

Gubler et al. reported 2 cases of liver injury as early complication of PEG placement in which PEG penetrated through the liver, likely during placement. The first case involved an 81-year-old woman in whom abdominal pain developed 1 week after placement and was later found to have a PEG tube that penetrated the liver. The second case was a similar penetration of the PEG tube through the edge of the left lobe of the liver in a 59-year-old man with nasopharyngeal carcinoma. It was actually unclear in these cases if the liver parenchyma was penetrated and it is believed that it was the migration of the PEG tube that led to this complication, as such migration can occur if there is traction on the PEG tube [4]. Our patient was being managed at a skilled care facility for 1 month and was being fed via the PEG with no complications until this event. What led to the migration of the PEG to the liver is unknown and it must have happened within the last few days considering she was getting nutrition and medication via the PEG with no documented symptoms, adverse events, or complications.

Unfortunately, our patient developed multiple liver abscesses and presented with septic shock leading to multi-organ failure, which has a very poor prognosis. It has been shown that patients who present with sepsis having a lactate of >4 mmol/L with hypotension have a mortality rate of around 46.1% [2].

Symptoms can be very vague in elderly patients, making its diagnosis challenging at times and management even more difficult. Common bacteria seen to be isolated in multiple liver abscesses are gram-negative rods like *Klebsiella pneumoniae* and *Escherichia coli*. There are no guidelines for management when complications of PEG tube placement occur; such complications are treated with broad-spectrum antibiotics, which are later tailored as per culture and sensitivity of the causative organism. Drainage of the abscess is also a vital part of its management and is easily done via percutaneous needle aspiration or catheter placement. Open surgical drainage is rarely required for management [20].

Many of the above-mentioned complications can easily be prevented by good post-procedure care. This involves measures such as pain relief, regular examination of the stoma site for any evidence of infection, regular movement of the tube up and down by about 1-2 cm after complete healing (to ensure the internal bumper is free), and flushing the tube with water before and after feeding. During placement of PEG, it has been recommended to keep the external bumper at a distance of around 1 cm away from the abdominal wall after maturation of the gastrostomy fistula, to prevent the above-mentioned erosive complications [6,21].

Conclusions

PEG is an efficient and cost-effective procedure compared to open surgical gastrostomy for enteral access and is one of

the most common referrals for gastroenterologists. All surgical procedure can have complications and each procedure has its own set of possible adverse events and risks. Utmost vigilance and expertise should be exercised in determining its necessity, followed by good post-procedure care and long-term maintenance care. Care providers should continue to monitor all patients with PEGs for any clinical derangement with high suspicion always towards development of complications from PEG itself. Strong emphasis is needed on a multidisciplinary team approach to continue efforts towards making PEG placement a safer procedure free from complications.

Conflict of interest

The authors of the manuscript have no conflicts of interest to declare.

Disclosures

All Authors have confirmed that the article is not under consideration for review at any other journal.

All Authors have made contributions to the article and have reviewed it before submission.

None of the authors has a financial relationship with a commercial entity that has an interest in the subject of the manuscript.

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