

Case Report

Pneumo-Peritoneum Following PEG Insertion: A Clinical Dilemma

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Key Learning Points

- Benign pneumoperitoneum (BPP) following PEG insertion is common and requires no specific treatment.
- Iatrogenic perforation of bowel and peritonitis following PEG insertion is a rare complication; in cases of diagnostic uncertainty abdominal CT scan should be considered prior to undertaking laparotomy.

Abstract

We present the case of a 48 year old male with multiple sclerosis who later became unwell with fever and vague abdominal pain 2 days after inserting a percutaneous endoscopic gastrostomy (PEG) tube. His chest x-ray showed gas under the diaphragm. As a result of this, a laparotomy was performed which found no evidence of intra-abdominal sepsis. We discuss the importance of recognising 'benign' pneumoperitoneum following PEG insertion. Further imaging, such as abdominal CT scan is desirable prior to consideration of laparotomy when diagnostic uncertainty exists.

Case

A 48 year old male with multiple sclerosis underwent an uncomplicated PEG insertion because of dysphagia and weight loss. Two days following the procedure, he became unwell with cough, brown sputum, breathlessness and slight abdominal pain. He vomited once and passed a single semi-formed stool (Bristol type 5). On examination his temperature was 37.7°C, with pulse 120 per minute and blood pressure 98/74 mmHg. Respiratory rate was 18 per minute and there were reduced breath sounds at the left base on chest examination. His abdomen was tender but there was no guarding or rebound and bowel sounds were present. The PEG site was clean and dry and not inflamed; rectal examination showed a moderate amount of type 5 stool.

Initial investigations revealed a white cell count of $31 \times 10.9/L$, with a C-reactive protein (CRP) of 168 mg/L. Urea and electrolytes, liver function tests and serum amylase were all normal as was his ECG. However, his chest x-ray showed gas under the diaphragm (Figure 1).

The differential diagnosis was felt to be benign pneumoperitoneum with sepsis elsewhere or iatrogenic peritonitis related to the recent PEG insertion. He was started on intravenous fluids together with intravenous cefuroxime and

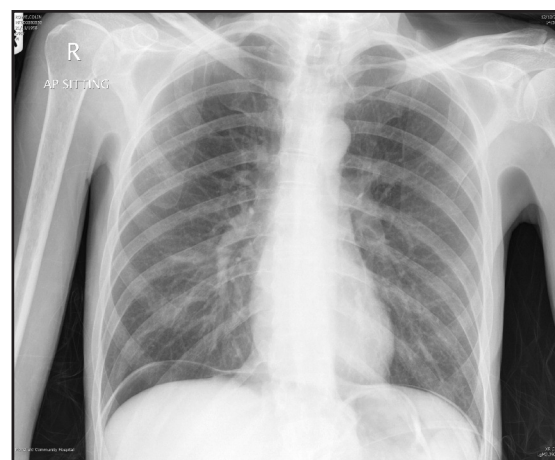


Figure 1. Chest x-ray

metronidazole, and a surgical opinion was sought. A laparotomy was decided upon by the consultant surgeon who felt that peritonitis was likely. During the operation a small pneumoperitoneum was discovered with no evidence of intra-abdominal sepsis; the PEG site looked healthy. The abdomen was closed and antibiotics were continued. He was managed on the intensive care unit for 3 days and then returned to the ward. The PEG feed was restarted the day after surgery, and his blood tests improved. His stay in hospital was further complicated by *Clostridium difficile* toxin positive diarrhoea which responded to oral vancomycin. Although the precise cause of his sepsis was not discovered, it was felt likely to have been caused by a lower respiratory tract infection. He was discharged after 3 weeks in hospital without further complications.

Discussion

Use of Percutaneous endoscopic gastrostomy (PEG) was first described in 1980.¹ It is the method of choice for long term enteral feeding; insertion is quick, usually associated with little discomfort and

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requires minimal anaesthesia. There is a procedure related complication rate of about 15%,² mostly relating to minor PEG site infection. Abdominal wall or intra peritoneal bleeding is rare, as is peritonitis due to damage of an intra-peritoneal viscus. Procedure related mortality has been quoted as 0.6% but this is mainly attributed to the risks of endoscopy in a vulnerable patient group.^{3,4}

Pneumoperitoneum occurs when there is free gas in the peritoneal cavity, and can occur without development of peritonitis, when it is termed 'benign' pneumoperitoneum (BPP). Iatrogenic causes of BPP include PEG insertion, post laparotomy and following laparoscopic surgery where it is an inevitable consequence of the procedure.

In BPP following PEG insertion, it has been suggested that air insufflated at gastroscopy escapes the stomach lumen entering the peritoneal cavity via the puncture site on the gastric wall. Peritonitis following PEG insertion usually results from accidental perforation of the bowel (most commonly the large bowel) during insertion of the tube. BPP following PEG was first described in 1984;⁵ reported rates in the literature vary between 8.6 and 55.6%.^{6,7,8,9} Peritonitis may prove difficult to diagnose clinically, the classic signs of guarding, rebound/tenderness, rigidity and absent bowel sounds may not be present. A retrospective review found evidence of free peritoneal gas in 39 of 281 patients who had undergone x-ray following PEGs/PEJ (percutaneous endoscopic jejunostomy) insertion.¹⁰ Of these 33 were felt to be benign and 6 had evidence of peritonitis; 4 of these underwent abdominal CT scanning, which showed free fluid within the peritoneum, all of whom had iatrogenic

peritonitis evident at laparotomy. Dulabon *et al* found that, of 119 patients who had undergone PEG insertion while in a critical care unit, 6 were found to have free air on abdominal CT scans; of these 2 patients underwent exploratory laparotomy as a result of additional signs of peritonitis but both explorations were negative.⁶ Milanchi *et al* investigated 85 patients with PEGs over a 5 year period, of whom 4 had pneumoperitoneum on chest x-ray.¹¹ In one case there was no change after 72 hours. Because of the persistence of the pneumoperitoneum the patient went on to have a CT scan of the abdomen, which showed that the PEG had been inserted through the transverse colon necessitating a laparotomy. Persistence does not always imply that the pneumoperitoneum is not benign: in one study 3 of 13 patients who developed pneumoperitoneum had persistence after 72 hours, with no adverse clinical outcome.¹²

We have presented a case of a man with multiple sclerosis who became unwell with clinical and laboratory evidence of infection following PEG insertion. The combination of these findings and x-ray appearance indicative of intraperitoneal gas led the surgical team to undertake laparotomy on the presumption of peritonitis. However the laparotomy subsequently proved to be unnecessary. Clinicians need to be aware of the high incidence of BPP following PEG; alternative causes of infection should be sought in the absence of clear clinical evidence of peritonitis. CT scanning of the abdomen prior to laparotomy may help to diagnose peritonitis. In this case the patient experienced a prolonged and potentially avoidable hospital stay.

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