

Foreign body ingestion-related peritonitis in an elderly peritoneal dialysis patient

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Abstract

Among peritoneal dialysis patients, peritoneal dialysis-related peritonitis is a well-known complication, but it can also be non-peritoneal dialysis-related (e.g. ruptured appendix). Ileal perforation by foreign bodies such as blister pill packs can be seen in the emergency room. Differentiating this from peritoneal dialysis-related peritonitis can be difficult, since they can have both identical presentations. Computed tomography can be of value in detecting abscess, thickening of the digestive wall or adhesions, and exclude other causes of intra-abdominal sepsis. Because of the aging population, ingestion of foreign body can be expected to rise. We therefore recommend that blister pill packs should not be divided into single-dose pieces, and we invite elderly patient's entourage to check medication administration. Furthermore, manufacturing efforts are highly recommended to improve blister pill pack's design, to avoid accidental ingestion. We report the case of an elderly peritoneal dialysis patient who presented with peritonitis due to ileal perforation because of blister pill pack ingestion.

Keywords

Peritonitis, peritoneal dialysis, elderly patients, blister packs, intestinal perforation

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Introduction

Ileal perforation by foreign bodies (FBs) such as dental prosthetics, orthodontic pieces, or other sharp objects such as blister pill packs (BPPs) can be seen in the emergency room (ER).

About 80%–90% of FB ingestion are spontaneously eliminated through the digestive tract without consequences. Less than 1% can lead to associated complications such as perforation, peritonitis, or gastrointestinal bleeding.¹

Peritonitis not related to the peritoneal dialysis (PD) technique (e.g. ruptured appendix, ischemic bowel, cholecystitis, or diverticulitis) is a well-known complication, but yet uncommon. Differentiating this from PD-related peritonitis can be difficult, since they can have both identical presentations.² Computed tomography (CT) can be useful for the detection of fluid collections, abscess, thickening of the small-bowel wall or adhesions, and ruling out other etiologies of abdominal sepsis.³ We report a case of an elderly PD patient who presented peritonitis due to ileal perforation because of BPP ingestion.

Clinical case

A patient in her eighties came to the ER with abdominal pain, fever, and nausea without vomiting neither diarrhea. She had been on assisted automated peritoneal dialysis (APD) treatment for end-stage kidney disease due to autosomal dominant polycystic kidney disease (APKD) for a year. Her caregivers included nurses and relatives. She had a medical history of

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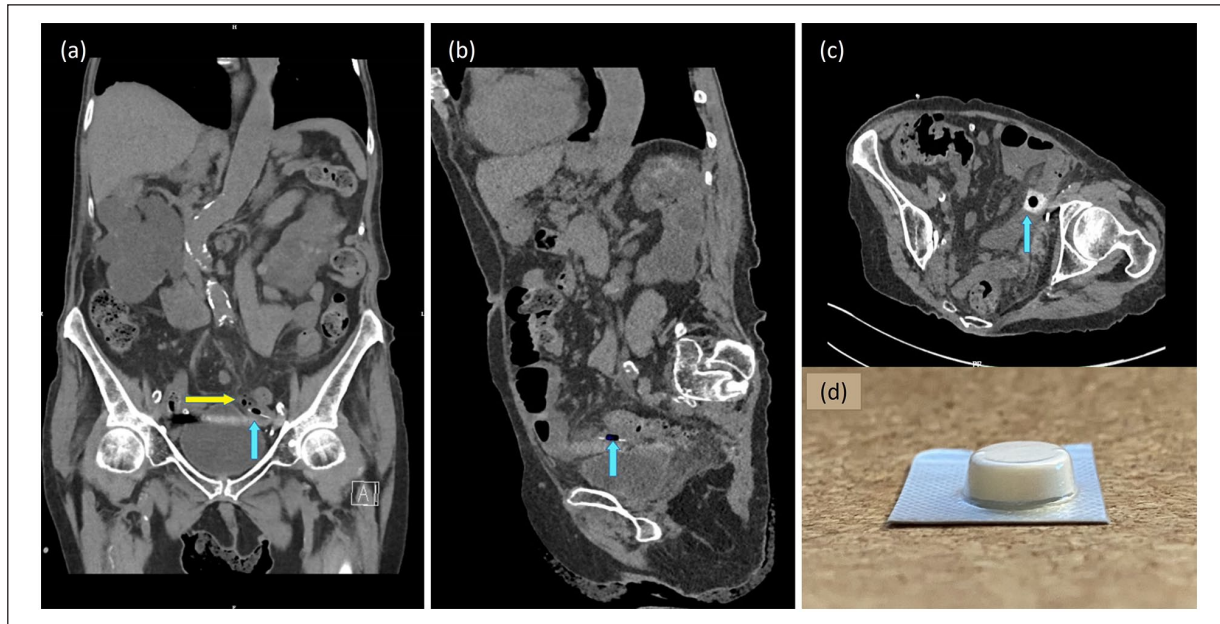


Figure 1. (a) Non-enhanced CT scan (coronal plane) showing pneumoperitoneum (extradigestive gas) with locoregional fat stranding (yellow arrow) foreign body responsible for the digestive perforation (blue arrow). (b) Non-enhanced CT scan (sagittal plane) showing the foreign body responsible for perforation. We recognize the drug blister with its lidding seal of aluminum foil (blue arrow). (c) Non-enhanced CT scan (axial plane) showing the empty blister with its lidding seal of aluminum foil and figure. (d) Drug blister.

hypertension, supraventricular arrhythmia, vesicoureteral reflux, recurrent urinary infections, renal cyst infection, and urinary incontinence. Her surgical history included appendectomy when she was young, and in 1986, total hysterectomy for carcinoma. Geriatric assessment few days before admission revealed a Katz Index of Independence in Activities of Daily Living⁴ of 3/6. She had no impaired vision or cognition.

On admission, her blood pressure was 180/88 mmHg, pulse rate 69/min, and temperature 37.5°C. Her physical examination revealed mild diffuse abdominal tenderness which was predominant in the lower left quadrant (LLQ) without rebound. Peritoneal fluid was cloudy and PD-related peritonitis was suspected.

Because of her abdominal history, CT scan of the abdomen was immediately performed and showed a thickened small intestine loop in the LLQ with a flat shape intraluminal lamellar FB of about 2 cm in the longitudinal axis. This FB seemed to have eroded the digestive wall because of the presence of extra digestive gaseous clarities (perforation) seen next to it. Peridigestive fat stranding was also observed (Figure 1(a)–(c)).

Laboratory data on the admission day revealed the following: white blood cell count of 7.500/ μ L with 85% neutrophils, C-reactive protein (CRP) level of 115 mg/L, hemoglobin at 10.8 g/dL, platelet count of 280.000/ μ L, estimated glomerular filtration rate (eGFR) 9.6/mL/min/1.73 m², serum electrolytes, lactate levels, and liver enzymes were normal. She received 1.5 g of IV metronidazole and 1.5 g of IV cefuroxime and was transferred to the operation room for an urgent exploratory laparotomy. In our hospital, analysis of the PD fluid is done

only by a PD nurse. Unluckily, when the PD nurse arrived, the patient was already in the operation room. The surgical team took a sample of the PD effluent for bacteriological analysis but unluckily they did not send a peritoneal fluid sample to be tested for leukocyte count.

The abdominal exploration revealed, about 30 cm from the ileocecal valve, a small perforation in the antimesenteric border by an envelope of drugs which pierced the wall. Resection of 10 cm of the small intestine was performed as well as meso ligation. Histology examination of the surgical specimen confirmed the perforation with ulcerated ileum wall and showed necrosis and transmural ileal perivisceritis located next to the FB (Figure 2(a)–(c)).

Peritoneal fluid culture results showed *Klebsiella pneumoniae*. The two blood cultures done at the admission came negative. PD was stopped and a tunneled central catheter was placed and the patient was transferred to hemodialysis (HD). Twelve days after the admission, the patient presented an acute pulmonary edema, with fatal cardiogenic shock.

Discussion

FB inadvertent ingestion is commonly seen in the ER in pediatric patients. When occurring in adults, it is usually related to vision impairment, intellectual disability, or cognitive disorders. Intentional ingestion is more frequently seen in patients with psychiatric disorders. It can also be seen in incarcerated patient or in suicide attempts.⁵ Despite her advanced age, our patient had no visual nor cognitive

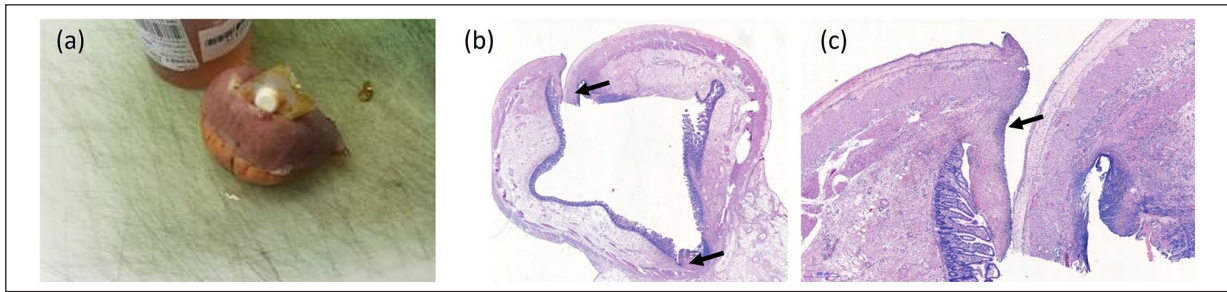


Figure 2. (a) Macroscopic view. We received a partial ileal resection. Macroscopically, we identified a perforation of ileum wall due to a foreign body, a blister. (b) Microscopic view ($\times 0.6$). Microscopically, ileum wall was one side ulcerated and the other perforated (arrows). It shows where the blister touched ileum wall. (c) Microscopic view ($\times 2.6$). Ileum wall shows necrosis and perforation (arrow).

impairments. Relatives and nurses contributed to her home care and assisted her during her APD treatment because she found difficult to lift up the 2 L PD bags and place them on the stand. They also prepared her medications on a daily basis, one Motilium[®] tablet remained on the BPP (Figure 1(d)) and the patient ingested it inadvertently.

Patients having ingested BPP may consult at the ER with diffuse abdominal pain, gastrointestinal bleeding, intestinal obstruction, intra-abdominal inflammatory mass or sepsis, and acute peritonitis.⁶ BPP perforation can lead to peritonitis and septicemia which is associated with increased morbidity and mortality. Multiple intestinal perforations can occur⁶ as well as rectal perforation.⁷ Our patient had fever, nausea without vomiting, and a diffuse abdominal pain more pronounced in the LLQ.

In PD patients, CT scan is suggested when multiple enteric organisms are found, especially in the setting of bacteremia and/or treatment failure. Also, hemodynamically unstable patients or patients with non-specific gastrointestinal symptoms, localized abdominal pain, or abnormal blood test results (e.g. elevated lipase) should benefit from a CT scan, because these findings may suggest another etiology.¹ Our patient's PD effluent was cloudy, and she was hemodynamically stable. Because of the localized abdominal pain, we performed a CT scan that revealed the ileal perforation.

Abdominal imaging in PD patients may reveal air under the diaphragm which can be of variable significance. Pneumoperitoneum is mostly due to free air entering the peritoneum cavity through the PD catheter. Pneumoperitoneum can be seen in PD patients, in the absence of abdominal pathology; however, clinicians should assess the clinical context (i.e. polymicrobial enteric peritonitis), the detailed history and physical examination, and imaging findings that are suggestive of a concerning cause.^{8,9} Other CT scan findings such as ascites and intestinal wall edema may help for the diagnosis. However, the presence of ascites is not relevant in PD patients as they are filled with PD fluid.

BPP imaging is suggestively radiopaque due to the aluminum foil, a thin air rim surrounding the tablet or pill that it contains. It can be seen through simple X-rays, but CT scan is more effective at identifying metallic, gas, or calcic content.¹⁰

Nevertheless, BPP can be difficult to identify because of its flat shape, depending on the orientation. Therefore, clinical information and diagnosis hypothesis should be discussed with the radiologist. In our patient, CT scan showed pneumoperitoneum with locoregional fat stranding and the FB responsible for perforation. We recognized the drug BPP with its lidding seal of aluminum foil (Figure 1(a)–(c)).

PD-related bowel perforation can be iatrogenic, due to PD catheter¹¹ or the use of high-dose calcium polystyrene sulfonate following PD-related peritonitis.¹² According to our knowledge, bowel perforation in PD patients due to BPP ingestion has not been yet reported. BPP is mainly made of plastic and aluminum and is commonly used by pharmaceutical companies. When divided, individual portions have sharp edges that may be a causative agent of digestive perforations, especially in the esophagus, duodenojejunal junction, ileocaecal valve, and Meckel's diverticulum but also in areas with acquired stenosis.⁵

In our patient, the sharp edges of the BPP contributed to the ileal perforation by causing mucosal injury, bowel wall edema, and necrosis. Resection of 10 cm of the small intestine was performed as well as meso ligation.

In comparison to bottled medications, BPP is associated with better compliance,¹³ better protection of the drug, and fewer tablet ingestion in suicides attempts, most certainly due to the difficulty of punching several tablet, one after the other.¹⁴ Thus, patients treated with multiple medications can benefit from the use of BPP because of improved compliance.¹³ The latter can lead to accidental ingestion of intact BPP.¹⁵ Advanced age, defective vision, impaired cognition, and edentulous status with or without dental prosthesis are other risk factors for unintended ingestion of BPP. Elderly patients may have difficulties to remove a pill from BPP.¹⁶ In some cases of BPP ingestion with complications, patients did not report, or withheld the information about FB ingestion. In the absence of clinical information, radiologist's awareness of this problem is important to make early diagnosis. Our elderly patient was on multiple medications, she was edentulous but she did not have impaired vision, or cognition and she had no history of FB swallowing. Most probably, she swallowed the BPP by inadvertence.

Conclusion

All peritonitis occurring in PD patients are not necessarily related to the latter technique. Because of the aging population and the increasing number of fragile elderly patients, the incidence of unintended FB ingestion is expected to rise.

Medical history, clinical examination of the patients, and high index of suspicion will enable clinicians to make an early diagnosis and avoid a fatal issue. CT imaging may guide proper and early treatment, that will improve patient's outcomes.

We recommend that BPPs should not be cut into single-dose pieces. It is also important to encourage relatives and care givers, to actively contribute in the medication administration of elderly patients. Furthermore, manufacturing efforts are highly recommended to reduce the risk of unintended BPP ingestions and its complications.

Declaration of conflicting interests

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Ethical approval

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Informed consent

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