

This is an Open Access article licensed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License (www.karger.com/OA-license), applicable to the online version of the article only. Distribution for non-commercial purposes only.

Inadvertent Ingestion of a Press-Through Package Causing Perforation of the Small Intestine within an Incisional Hernia and Panperitonitis

Hiromitsu Domen Masanori Ohara Misa Noguchi
Yoshitsugu Nakanishi Kazuteru Komuro Nozomu Iwashiro
Masanori Ishizaka

Department of Surgery, National Hospital Organization Hakodate Hospital,
Hakodate, Japan

Key Words

Press-through package · Ileus · Incisional hernia · Perforative peritonitis

Abstract

A 90-year-old woman was admitted to the emergency department of our hospital with abdominal pain and a fever of up to 39°C. She had a history of hysterectomy about 30 years previously, and redness and swelling were seen at the abdominal median scar. Serum biochemistry showed minor elevation of C-reactive protein and creatine phosphokinase. Abdominal computed tomography (CT) showed an edematous intestinal tract image over the median abdominal wall. Incarcerated incisional hernia and intestinal necrosis were suspected. Therefore, emergency surgery was performed. On laparotomy, abundant purulent ascitic fluid was found. The small intestine was incarcerated about 100 cm orally from the terminal ileum, and a 2-mm perforation was present in the incarcerated small intestine. In addition, some white areas measuring 1 mm were found in the small intestinal wall. A press-through package (PTP) of a tablet was confirmed in the intestinal tract near the perforated area. We removed the PTP through the perforation and performed direct suture. Postoperatively, we retrospectively reviewed the CT image and found a high-density shadow which seemed to represent the PTP.

Introduction

Press-through packages (PTPs) are commonly used to enclose drugs and are also increasingly seen in cases of foreign body in the digestive tract. We present a case of inadvertent PTP ingestion. Although commonly considered too small and soft to cause bowel damage, PTPs tend to become caught and to pose a potential risk for perforation of the bowel because of their sharp edges. Removal should be attempted for a PTP in the esophagus or stomach, while computed tomography (CT) and early laparotomy should be considered if it passes through the pyloric ring and the patient develops symptoms. Efforts to prevent the swallowing of PTPs should be an essential part of our everyday practice, particularly for elderly patients.

Intestinal perforation resulting from accidental ingestion of a PTP has occasionally been reported. However, a search of the literature revealed no other cases of combined abdominal incisional hernia and perforative peritonitis due to accidental PTP ingestion.

Case Report

A 90-year-old woman, who had been aware of repeated abdominal herniation over several months, was admitted to the emergency department of National Hakodate Hospital with severe abdominal pain. She had a history of hysterectomy about 30 years previously and had developed swelling and redness in the resultant lower median abdominal scar. She also had a fever of up to 39°C. Muscular guarding could be detected on palpation. Serum biochemistry revealed the following: white cell count 3,700/mm³ (normal <9,500) (segmented: 90%), C-reactive protein 14.79 mg/dl (normal <0.5 mg/dl), and creatine phosphokinase 230 IU/l (normal <119 IU/l). Abdominal CT showed an edematous intestinal tract image over the median abdominal wall ([fig. 1](#)). Incarceration of abdominal incisional hernia was suspected and emergency surgery was performed. On laparotomy, abundant purulent ascites was seen. The small intestine was herniated and incarcerated about 100 cm orally from the terminal ileum, and a 2-mm perforation was present in the incarcerated small intestine. In addition, some white areas measuring 1 mm, which were considered to be the stimulation to intestinal wall by sharp corners of a PTP, were found in the intestinal wall. A PTP ([fig. 2](#)) was confirmed in the intestinal tract near the perforation. After dilation of the perforation to pass through, a PTP was removed through the perforation. Direct suture of the perforation was performed. After surgery, when we retrospectively reviewed the preoperative abdominal CT, we detected a high-density shadow that appeared to represent the PTP ([fig. 3](#)). The patient had an uneventful postoperative course. After physical rehabilitation she was discharged in stable condition on the 40th day of hospitalization.

Discussion

PTPs have been used in Japan since 1963 and are popular. They consist of a lid coated with heat-sealed material on an aluminum leaf and a dome of vinylchloride. The dome is pushed externally to expel a tablet or capsule; therefore, it is called a press-through package. The mean size of a square PTP for a tablet is about 18 × 16 mm, and the mean size of a rectangular PTP for a capsule is about 30 × 16 mm [1]. Since small square pieces of PTPs with sharp edges may break off, they tend to be caught and to pose a potential risk of bowel perforation when inadvertently swallowed. In addition to lodging in the esophagus, mistakenly swallowed PTPs have caused distal intestinal and colonic perforation or obstruction [2, 3]. Although previous reports have noted that 80–90% of swallowed foreign bodies are spontaneously passed and that less than 1% cause perforation [4], PTPs might be associated with a greater risk of perforation.

As in the present case, some patients may initially ignore accidental swallowing of a PTP and be subsequently admitted to hospital after deteriorating symptoms and signs [1, 5]. Radiological tests play a very important role in revealing the presence, location and nature of an ingested foreign body, thus enabling the best therapeutic approach. When the foreign body is radiopaque, diagnosis is relatively straightforward. However, PTP material is difficult to detect because it is radiolucent [2]. Hence, in most of the reported cases, the correct diagnosis was not made until operation or endoscopic examination [1, 3, 6–8]. However, Hou et al. emphasized that air trapped in the PTP can make it visible on X-ray [9]. Their cases were diagnosed after early correct interpretation of these specific radiographic findings. In a study by Traub et al. [10], KUB films had a sensitivity of 85–90% for drug packaging. Fulford and Tooley reported that a previously unnoticed PTP was visible when the preoperative abdominal radiograph was reviewed [7]. In the present case, however, the PTP was not visible on the preoperative abdominal radiograph, even when it was reviewed postoperatively. On the other hand, postoperative review of the abdominal CT revealed the PTP. Early CT examination should therefore be considered in symptomatic patients to evaluate possible complications, as CT is more sensitive than plain radiography in detecting foreign body ingestion [5, 10].

It has been reported that patients with a history of abdominal surgery are at risk of obstruction from a foreign body that may lodge at a pre-existing stenosis and perforate the intestine [1, 3]. However, no other cases of perforative peritonitis from an incarcerated incisional hernia associated with an inadvertently swallowed PTP have been reported. The following sequence of events appears to have occurred. The intestine repeatedly prolapsed and reduced through the hernial orifice. The patient swallowed the PTP by mistake. The PTP reached the incarcerated intestine while it was prolapsed, and then irritated and perforated the wall. Intestinal fluid flowed into the abdominal cavity, causing panperitonitis. Physical pressure of the incisional hernia by the clothes may also have contributed to bowel perforation by the PTP.

Accidental ingestion of foreign bodies is not uncommon, particularly in older patients and among those who are blind or mentally impaired. Having seniors cut up sheets of PTP by themselves when preparing their medications is a real hazard because of the possibility that they will not take the medication out of the package, and this practice should be avoided. We therefore suggest that elderly people should be given their tablets after they have been unwrapped by a nurse or family member. Further, changes in packaging design might help prevent accidental ingestion or minimize adverse effects if ingestion does occur. Sasahara et al. [11] reported that PTPs were sometimes detected on CT. Therefore abdominal CT should be performed routinely when a patient with acute abdominal pain is admitted. In addition, it is essential to adequately explain to patients how to take their medications. Improved design to avoid accidental ingestion and better training of patients in the use of PTPs should decrease the incidence of this problem.

In conclusion, although relatively rare, PTPs are being seen increasingly in cases of foreign body in the digestive tract. It is essential to give patients adequate instruction on how to take their medications. Improved design to avoid accidental ingestion and better training of patients in the use of PTPs could avoid complications of this condition, which is most likely to occur in elderly patients.

Disclosure Statement

The authors declare no competing interests.

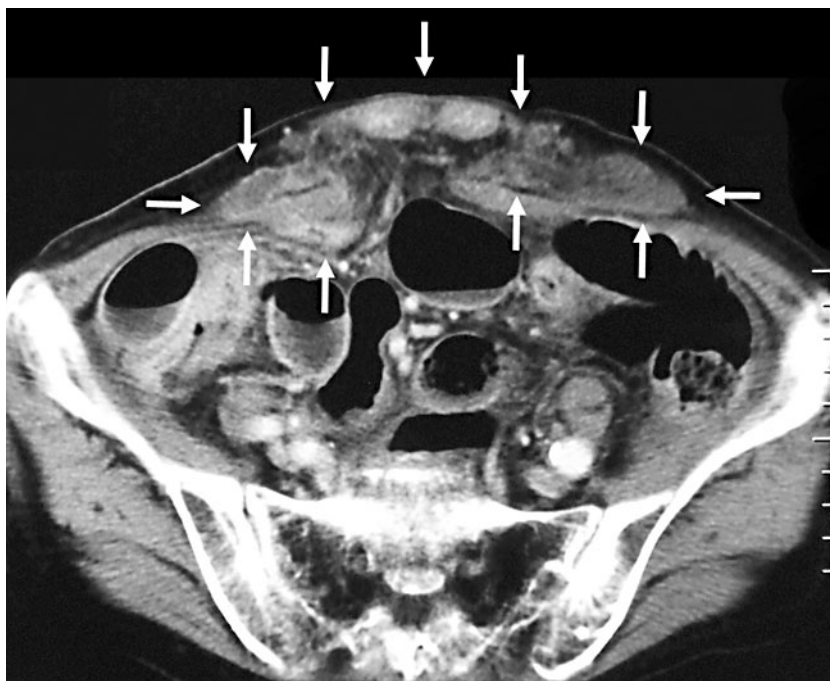


Fig. 1. Abdominal CT. An edematous intestinal tract image (arrows) over the median abdominal wall was observed.



Fig. 2. The PTP of the tablet which measured about 15 × 12 mm. The edge was sharply demarcated.



Fig. 3. Abdominal CT. A staple-like foreign body (arrows) lodged in a small bowel loop with wall thickening and adjacent mesenteric fat stranding were observed. The foreign body was thought to be a PTP.

References

- 1 Imaizumi H, Yamauchi M, Namiki A, Takahashi H, Hatakeyama K: Obstructive ileus caused by a swallowed foreign body (a 'press-through' package) and preexisting adhesions. *Am J Emerg Med* 1997;15:52–53.
- 2 Sakakura A, Yamamoto Y, Terada M, Takenaka H, Ueda N, Furuya T: Clinical study of esophageal foreign bodies attributable to PTP material. *Auris Nasus Larynx* 1997;24:411–416.
- 3 Gupta V, Manikyam SR, Gupta R, Gupta NM: Pelvic abscess after ingestion of blister-wrapped tablet. *Am J Gastroenterol* 2002;97:2142–2143.
- 4 Eisen GM, Baron TH, Dominitz JA, et al: Guideline for the management of ingested foreign bodies. *Gastrointest Endosc* 2002;55:802–806.
- 5 Takada M, Kashiwagi R, Sakane M, Tabata F, Kuroda Y: 3D-CT diagnosis for ingested foreign bodies. *Am J Emerg Med* 2000;18:192–193.
- 6 Norstein J, Krajci P, Bergan A, Geiran O: Intestinal perforation after ingestion of a blister-wrapped tablet. *Lancet* 1995;346:1308.
- 7 Fulford S, Tooley AH: Intestinal perforation after ingestion of a blister-wrapped tablet. *Lancet* 1996;347:128–129.
- 8 Sudo T, Sueyoshi S, Fujita H, Yamana H, Shirouzu K: Esophageal perforation caused by a press through pack. *Dis Esophagus* 2003;16:169–172.
- 9 Hou SK, Chern CH, How CK, Wang LM, Huang CI, Lee CH: Press through package mis-swallowing. *Int J Clin Pract* 2006;60:234–237.
- 10 Traub SJ, Hoffman RS, Nelson LS: Body packing – the internal concealment of illicit drugs. *N Engl J Med* 2003;349:2519–2526.
- 11 Sasahara K, Katoh H, Tsukada K: A case of perforation by press-through-package (PTP) diagnosed by CT findings. *Jpn J Clin Surg* 1998;59:2826–2829.