



## LETTER / *Gastrointestinal imaging*

### CT diagnosis of small bowel perforation by ingestion of a blister pack: Two case reports

**Keywords:** Perforation ; Intestinal ; Foreign body ; Blister pack ; Computed tomography

The accidental ingestion of a foreign body (FB) is common in the child. In the adult, it often occurs in visually challenged patients, patients presenting an intellectual disability or among the psychiatric population and is not found during questioning.

In 1% of the cases, the ingestion of a FB may be complicated by intestinal perforation [1], resulting in a painful acute abdominal syndrome.

Computed tomography (CT) is the choice examination in this context. It helps confirm the perforation of the gastrointestinal tract, identify the site of the perforation as well as the type of FB [1,2]. This paper presents two cases of intestinal perforation due to unusual FB: blister wrapped drugs.

#### Case 1

A 57-year-old woman with antecedents of dermatomyositis was hospitalized for an acute coronary syndrome. Three days after admission, she presented a picture of acute abdominal pain with left epigastric and paraumbilical discomfort. The patient did not have fever and the laboratory tests were normal.

The abdominal CT-scan detected localised pneumoperitonitis, left periumbilical topography associated with a local infiltration of mesenteric fat and slight thickening of a loop (Fig. 1a). Analysis of the contents of this intestinal loop revealed a FB with a double component: dense and gaseous. The thick maximal intensity projection (MIP) reformations and the volume rendering (VR) (Figs. 1b, 1c) helped identify a triangular blister containing a tablet. The patient underwent an emergency laparotomy to remove this FB impacted in the wall.

#### Case 2

A 90-year-old woman, living in a retirement home, was admitted to the emergency department for abdominal pain, vomiting and fever (39°C) that had been evolving for 24 h.

The abdominal CT-scan revealed signs of intestinal perforation at the left iliac fossa: localized pneumoperitonitis, infiltration of the mesenteric fat, moderate intraperitoneal effusion and slight thickening of a loop (Figs. 2a, 2b). Careful examination of the pathological loop, the assumed site of the perforation, detected a FB. The thick MIP reconstructions (Fig. 2c) identified the type of FB as a square blister containing a tablet.

The emergency intervention confirmed the diagnosis of perforation and the type of FB.

#### Discussion

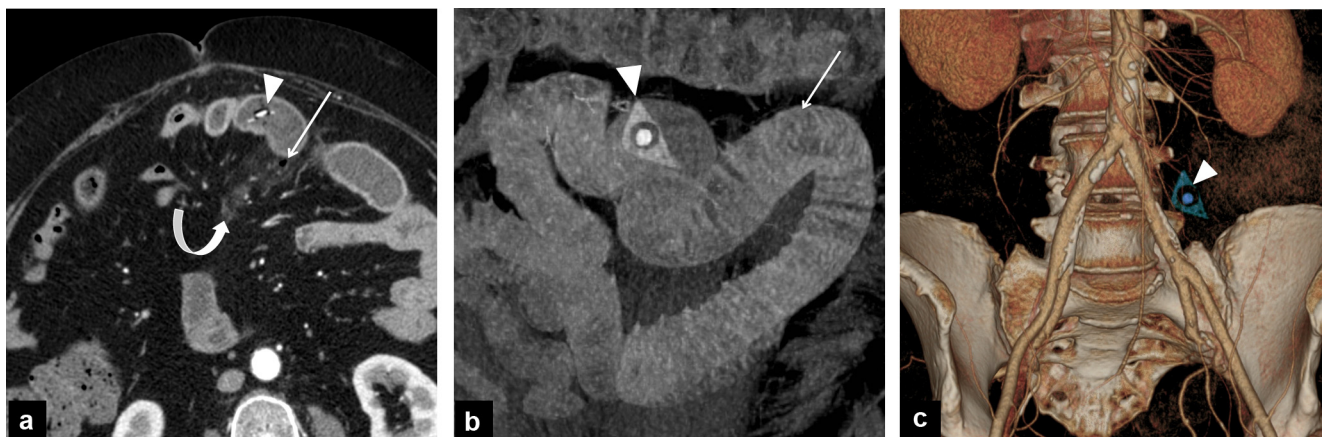
In the adult, the main causes of intestinal perforation are ulcers, sigmoiditis, wounds (mainly by knives), diastatic perforations, Crohn's disease and gastric ischemia [3]. Perforations due to an ingested FB are more rare. They are usually secondary to fish bones, chicken bones or toothpicks [2,4] due to the sharp ends that impact the wall of the gastrointestinal tract and perforate it.

CT is used to confirm the perforation of the gastrointestinal tract, the perforated organ and the cause. Thin axial sections completed by multi-plane reconstructions are required to analyze the gastrointestinal tract and identify the site of the perforation [5].

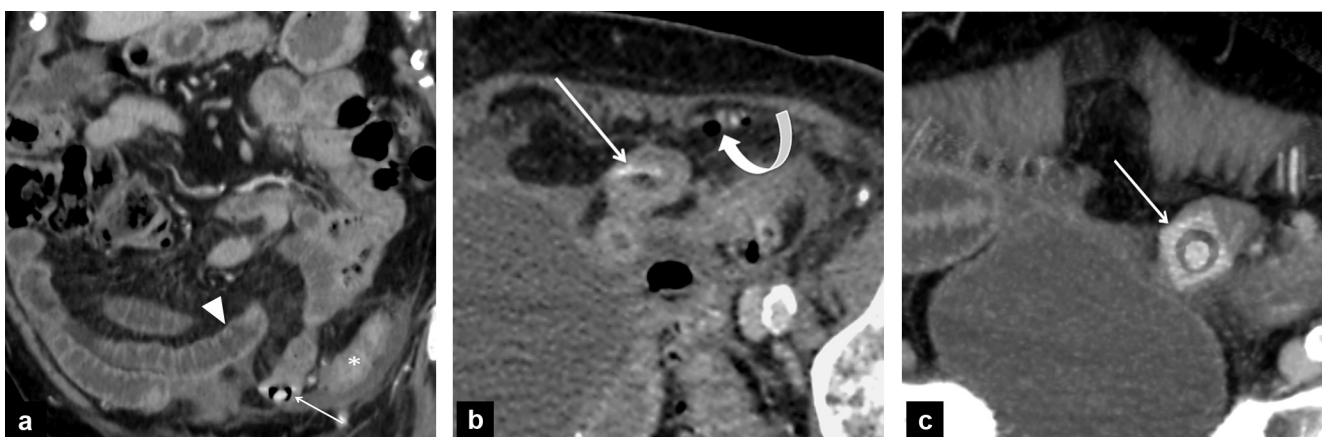
In the two cases reported, although the diagnosis of intestinal perforation by a FB was clear in the CT-scan, the parietal defect was not directly detected although we were able to identify the gastric loop involved by the indirect signs: local infiltration of the mesenteric fat, extra-gastric gas nearby [6].

In cases of perforation of the small intestine, the pneumoperitoneum may be minimum and the presence of extra-luminal gas may not be seen in the CT-scan (50% of the cases) [3]. These two cases support these findings, since only several extra-gastric gas bubbles in the periphery of the pathological loops were isolated.

To confirm that the FB is the cause of the perforation and characterize it, a multi-plane reconstruction in thick sections is necessary. Although a certain number of intestinal perforations due to ingested blisters have been reported in the literature [7–11], the diagnosis was only reached with surgical exploration. In fact, thin sections may visualize the FB in the form of a spontaneously hyperdense edge surrounding a gas halo centred by a dense round or oval body that corresponds to the tablet. The reconstructions in thick



**Figure 1.** a: axial enhanced 0.625 mm thick image, showing the foreign body (arrowhead) in the small bowel loop with the gas halo. Little extra-intestinal air is seen (white arrow) with a fatty infiltration of the mesentery nearby (curved arrow); b: coronal 50 mm thick maximal intensity projection reformation identifying the triangular shaped blister pack (arrowhead), in a small stretched bowel loop (white arrow); c: volume rendering reformation also identifying the blister pack (arrowhead).



**Figure 2.** a: coronal volume reconstruction 3 mm thick of the enhanced acquisition showing the gas halo of the blister pack (white arrow). The upstream intestinal loops are stretched due to ileus (arrowhead). Slight thickening of the sigmoid wall (star) due to local inflammation was observed; b: enhanced axial 2 mm thick image showing extra-intestinal air (curved arrow) nearby the foreign body (white arrow); c: 7 mm thick oblique maximal intensity projection reformation identifying the foreign body as a blister pack (arrow).

sections and in MIP (Figs. 1b, 2c) enable identification of the blister.

The perforation of the gastrointestinal tract secondary to a blister is due to the fact that the ends of the pre-cut blister are pointed since these drug protections are made of hard plastic coated with a metal film. They impact in the mucosa of the gastrointestinal tract and perforate it. The administration of tablets in their blister to patients may be very dangerous, in particular in the elderly, the visually challenged or the mentally handicapped.

### Conclusion

The diagnosis of intestinal perforation following the unknown ingestion of a FB is a clinical challenge. The CT-scan carried out during a picture of acute abdominal may detect the presence of a FB. The characterization requires multi-plane reconstructions in thick sections for a 3D analysis of the FB and its nature.

The cutting of drug blisters is a risky practice, especially in the elderly or handicapped patients and should be banned.

### Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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