

Acute abdomen caused by a small bowel perforation due to a clinically unsuspected fish bone

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ABSTRACT

We report the case of a 78-year-old woman with a three-day history of abdominal pain and vomiting. An abdominal plain film showed a distended small bowel loop and no signs of free intra-abdominal gas. An abdominal ultrasound revealed a mass containing a linear, hyperechoic structure. The mass was connected through a sinus tract to an adjacent aperistaltic small bowel loop. A laparotomy revealed a jejunal perforation and an omental granuloma containing a fish bone. Accidentally ingested foreign bodies should always be suspected in cases of acute abdomen, and ultrasonography remains a first-line examination tool for preoperative diagnoses of unsuspected foreign bodies and their complications.

Key words: • foreign bodies • ultrasonography • acute abdomen

Accidental foreign body ingestion is commonly encountered in clinical practice. However, bowel perforation by a foreign body is less common, as the majority of foreign bodies uneventfully pass to the feces and only 1% of them (the sharper and more elongated objects) will perforate the gastrointestinal tract, usually at the level of the ileum (1). Computed tomography (CT), especially multidetector CT (MDCT), is considered the method of choice for preoperative diagnoses of ingested foreign bodies and their complications due to its high-quality multiplanar capabilities and high resolution (2–6). The increased availability and effectiveness of MDCT has limited the use of ultrasonography (US) in investigations of acute abdominal pain (2). As a result, only a few older reports (using outdated equipment) have investigated the use of US in the diagnosis of ingested foreign bodies (7–10).

Herein, we report a case of small bowel perforation and omental granuloma caused by a clinically unsuspected fish bone in which US led to a precise preoperative diagnosis and successful surgical treatment. In the era of MDCT, we highlight the usefulness of current-generation US as a radiation-free investigative tool in cases of acute abdominal pain caused by ingested foreign bodies.

Case report

A 78-year-old overweight woman presented to the emergency department of our hospital with a three-day history of increasing periumbilical abdominal pain and persistent vomiting. Upon clinical examination, there was tenderness with guarding of the right upper abdomen and an elevated temperature (38.5 °C). Laboratory tests revealed increased inflammatory markers including a white blood cell count of $18.7 \times 10^3/\mu\text{L}$ (85% neutrophils) and a C-reactive protein level of 180 mg/L. The remaining blood test parameters were unremarkable.

An abdominal X-ray in the supine position showed the presence of a distended small bowel loop at the middle abdomen but no signs of free abdominal gas or other remarkable findings (Fig. 1). The patient was referred for an abdominal US, which revealed the presence of a markedly hypoechoic mass with minimal vascularity. The mass measured approximately 4.5 cm in diameter at the right periumbilical area and contained a thin, straight, hyperechoic structure measuring 3.3 cm in length that was associated with slight posterior shadowing depending on the probe position. The fat surrounding the lesion was intensely hyperechoic, and there was an aperistaltic hypoechoic sentinel small bowel loop adjacent to the mass and connected to it by way of a linear hypoechoic sinus tract (Fig. 2). These findings raised suspicion that a foreign body was present, as this could cause both a small bowel perforation and a reactive mass.

Because the patient was rapidly deteriorating, a CT scan was not performed, and the clinical decision was made to perform an urgent surgical

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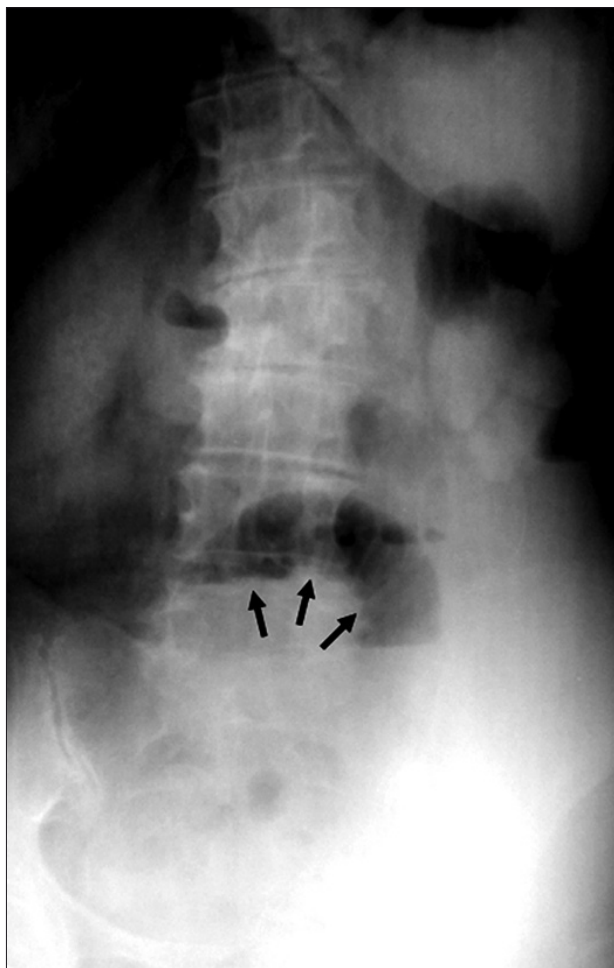


Figure 1. The supine abdominal plain radiograph shows a distended small bowel loop, suggesting a possible small bowel obstruction. No radiopaque foreign body is evident.

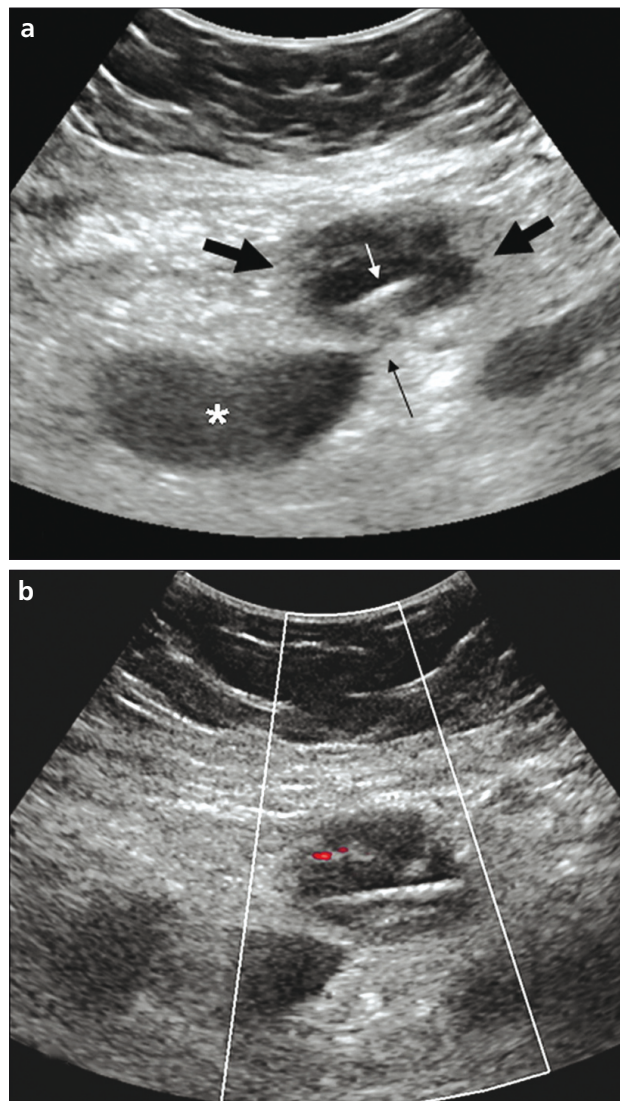
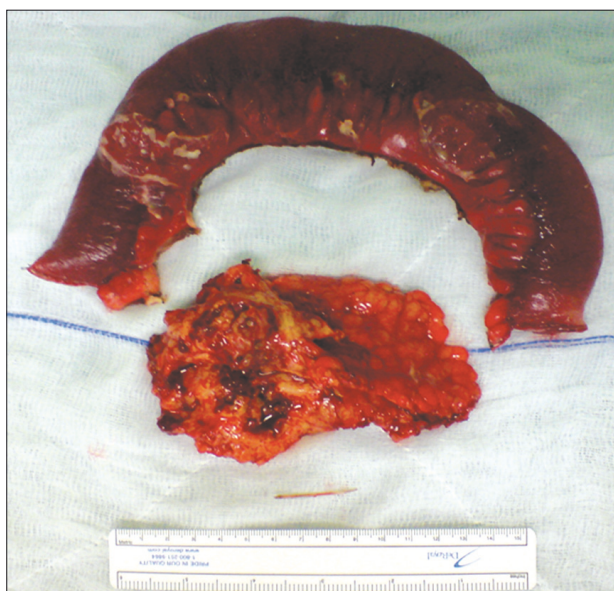


Figure 2. a, b. B-mode (a) and Doppler (b) US transverse images of the right periumbilical area showing a hypoechoic mass (thick black arrows) measuring 4.5 cm in maximal diameter and containing a thin, 3.7-cm long, straight, linear, hyperechoic structure (white arrow), representing a fish bone. There is also a hypoechoic sentinel small bowel loop (asterisk) with absent peristalsis immediately adjacent to the mass and connected to it by a 2-mm wide, linear, hypoechoic sinus tract (thin black arrow). Note the intensely hyperechoic omental fat surrounding the lesion.

Figure 3. Gross pathology specimens of the excised jejunal loop (top), the omental tissue containing the granuloma (middle), and the fish bone that caused the perforation (bottom).

bone) measuring 3.5 cm in length (Fig. 3). Upon systematic examination of the associated jejunal loop, a punctate perforation was depicted with an omental sinus tract leading to the foreign body. There was also diffuse inflammation of the surrounding omentum and a small quantity of free fluid. The surgeons performed an excision of the inflamed jejunal loop and omental mass. A pathological analysis confirmed the presence of an omental granuloma surrounding the foreign body (Fig. 3).

The patient was given antibiotic therapy, had an uneventful postoperative course and was discharged seven days

exploration of the abdomen. A laparotomy revealed an omental mass that was closely attached to a section of jeju-

num. The mass was examined with the surgeon's finger and was found to contain a sharp, linear foreign body (a fish

later. Upon inquiring about her eating habits, she admitted that she had been mainly consuming fish during the previous month because she was refraining from meat for religious reasons.

Discussion

Accidentally ingested fish bones are the most common foreign bodies to cause gastrointestinal (GI) tract perforation due to their sharp ends and elongated shape (4). The perforation can occur anywhere within the GI tract but usually occurs at areas of angulation or narrow lumen such as the distal ileum (2, 4). Perforation of the jejunum, as occurred in our case, is relatively uncommon and has a reported incidence of approximately 14.3% (4). The complications of a fish bone perforation include the formation of localized abdominal abscesses, colorectal, colovesical and enterovascular fistulas, inflammatory masses or omental pseudotumors, pyemia, and endocarditis (2, 4). Fish bone ingestion is especially common in cultures where the consumption of an entire fish is considered a delicacy (11) or when a great deal of fish is consumed in a particular period for religious reasons, which was true in our case. Other risk factors leading to incidental fish bone ingestion include increased age, reduced time or capability to form a food bolus, increased bowel fragility due to inflammatory disease and the wearing of dentures, which eliminates tactile sensations (2, 12).

Preoperative diagnosis of foreign body ingestion is a clinical challenge because ingestion is usually incidental and thus forgotten and unreported during a patient's history assessment. Furthermore, the clinical presentation is usually non-specific (2, 4). GI perforation by a foreign body usually presents as an acute abdomen, as in our case; however, a variety of symptoms have been reported, including chronic or acute bowel obstruction, hemorrhage, and ureteric colic (4).

In our case, the supine plain abdominal radiograph demonstrated signs of small bowel obstruction but no evidence of a radiopaque foreign body or pneumoperitoneum. This finding is not surprising because fish bones have variable radiopacity depending on the fish species; in general, they are minimally radiopaque and can rarely be detected on plain films, especially if they are masked by coexistent inflammatory tissue, fluid or abscesses (13). Moreover, signs of

pneumoperitoneum are not usually observed in plain films because impaction of the foreign body into the intestinal wall is gradual, allowing the perforation site to seal with omentum or adjacent loops and limiting the amount of gas or fluid in the peritoneal cavity (13).

The use of US makes it possible to identify foreign bodies, even non-radiopaque bodies such as fish bones and toothpicks, based on their high reflectivity and variable posterior shadowing (7–10). There are several older reports on the value of US for the depiction of foreign bodies (7–10). In recent years, however, the wide availability of MDCT has resulted in its greater use in emergency departments and has limited the use of US in the evaluation of acute abdomen cases. MDCT is currently considered the method of choice for the evaluation of patients with acute abdominal pain and the depiction of foreign bodies due to MDCT's ability to generate high-resolution, thin-collimation, multi-planar reconstructions, which allow the GI tract to be examined in all projections (2).

However, US has several advantages over CT: high flexibility, repeatability, low price, lack of radiation burden, and the possibility of a more clinical approach that combines real-time imaging with palpation and allows the clinician to focus their attention on the symptomatic area of the abdomen (14). Using US, it is often relatively easy to evaluate perforations, changes in the surrounding tissue and the luminal contents at superficial loops or colon segments, but it may be challenging to evaluate deeper areas. While a dependency on the patient's morphological characteristics, the location of the perforation, and the performance of the operator are acknowledged limitations, the substantial increases in the diagnostic ability of new US systems have led to improved image quality when examining the intestine, even in larger patients and in deeper areas of the abdomen (14). US can also be uniquely valuable in pediatric cases as a means to identify the exact location of an ingested foreign body that has not passed to the feces, facilitating its surgical removal (15). Improved US image quality combined with a high index of suspicion for foreign bodies when performing US of acute abdomen cases may allow a larger number of correct diagnoses to be made.

In conclusion, this case report highlights the fact that intestinal perfora-

tion caused by an ingested foreign body is a challenging diagnosis that should always be suspected in cases of acute abdomen. Even in the era of MDCT, US remains a useful first-line imaging tool for early preoperative diagnoses of unsuspected foreign bodies, limiting the use of MDCT to inconclusive cases and thus preventing unnecessary radiation exposure.

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