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CASE REPORT

Misdiagnosis of food-borne foreign bodies outside of the digestive tract on magnetic resonance imaging: Two case reports

Dan Ji, Jian-Dong Lu, Zhi-Guo Zhang, Xu-Ping Mao

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Dan Ji, Jian-Dong Lu, Zhi-Guo Zhang, Xu-Ping Mao, Department of Radiology, Zhangjiagang Traditional Chinese Medicine Hospital Affiliated to Nanjing University of Chinese Medicine, Zhangjiagang 215600, Jiangsu Province, China

Corresponding author: Xu-Ping Mao, MD, Chief Doctor, Department of Radiology, Zhangjiagang TCM Hospital Affiliated to Nanjing University of Chinese Medicine, No. 77 Changan Road, Zhangjiagang 215600, Jiangsu Province, China. maoxuping256@163.com

Abstract

BACKGROUND

Patients with foreign bodies in the digestive tract are often encountered, but complete penetration of a foreign body through the gastrointestinal tract is rare, and the choice of imaging method is very important. Improper selection may lead to missed diagnosis or misdiagnosis.

CASE SUMMARY

An 81-year-old man was diagnosed as having a liver malignancy after he took magnetic resonance imaging and positron emission tomography/computed tomography (CT) examinations. The pain improved after the patient accepted gamma knife treatment. However, he was admitted to our hospital 2 mo later due to fever and abdominal pain. This time, he received a contrast-enhanced CT scan, which showed fish-boon-like foreign bodies in the liver with peripheral abscess formation, then he went to the superior hospital for surgery. It lasted for more than 2 mo from the onset of the disease to the surgical treatment. A 43-year-old woman with a 1 mo history of a perianal mass with no obvious pain or discomfort was diagnosed as having an anal fistula with the formation of a local small abscess cavity. Clinical perianal abscess surgery was performed, and fish bone foreign body was found in perianal soft tissue during the operation.

CONCLUSION

For patients with pain symptoms, the possibility of foreign body perforation should be considered. Magnetic resonance imaging is not comprehensive and that a plain computed tomography scan of the pain area is necessary.

Key Words: Acute abdomen; Bowel perforation; Liver foreign body; Buttocks foreign body; Fish bone; Case report

Core Tip: We report two cases of digestive tract foreign body perforation, with one foreign body located in the liver and the other foreign body located around the anus, both of which were misdiagnosed by magnetic resonance examination. We hope that through our report, there will be more diagnostic ideas for similar problems in clinics in the future.

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INTRODUCTION

Patients with foreign bodies in the digestive tract are often encountered in the emergency room. The most common foreign bodies include fish bones, date stones, chicken bones, and toothpicks[1]. To achieve a precise diagnosis, imaging is often performed first; however, the choice of imaging modality is extremely important. A study has shown that the detection rate for fishbone foreign bodies is only 32% [2]. Ultrasound can detect most foreign bodies; however, ultrasound is susceptible to gastrointestinal gas interference, limited by low image resolution and operator's skills, and have a high probability of misdiagnosis[3,4]. Computed tomography (CT) has a good density resolution. A foreign body has a strong contrast, in color and texture, with the surrounding soft tissue and, as such, can be easily detected on a regular CT examination. As reported in the medical literature, CT has a 100% sensitivity for the recognition of calcified foreign bodies[5]. Magnetic resonance imaging (MRI) is not a good option for detecting foreign bodies in or out of the digestive tract. It is likely to lead to missed diagnosis or misdiagnosis. This report describes two patients in whom a foreign body completely perforated the digestive tract. Neither patient had typical clinical manifestations of digestive tract perforation. MRI without CT was performed before surgery, which is a likely cause of the misdiagnoses.

CASE PRESENTATION

Chief complaints

Case 1: On May 26, 2014, an 81-year-old man developed a fever (39.2 ℃) of unknown cause accompanied by general weakness presented in our clinic.

Case 2: A 43-year-old woman presented with a 1 mo history of a perianal mass with no obvious pain or discomfort.

History of present illness

Case 1: The fever had been lasted for several hours.

Case 2: The perianal mass had lasted for over a month.

History of past illness

Case 1: At the end of March 2014, the patient developed upper abdominal pain and discomfort without chills or fever and was admitted to the First People's Hospital of our city. Electronic gastroscopy was performed during hospitalization, but no abnormality was found. Abdominal MRI showed that there was a mass in the IV segment of his liver, and the possibility of a malignant tumor was considered (Figure 1A). Laboratory examination showed that the alpha fetoprotein concentration was normal, and hepatitis B virus test was negative. On April 11, 2014, the patient underwent positron emission tomography/CT examination at Huaxi Hospital in Jiangyin City. This imaging examination showed a hypermetabolic mass in the IV segment of the liver, and the possibility of liver cancer with a tumor thrombus in the inferior vena cava was considered. Significant fluorodeoxyglucose uptake was present. The patient was then admitted to the 81st Hospital of the Chinese People's Liberation Army and diagnosed with primary liver cancer. He underwent gamma knife treatment for the liver mass in mid-April 2014. The abdominal pain improved after surgery.

Case 2: Past medical history was not remarkable for this patient.

Personal and family history

The personal and family history was not remarkable for these two patients.

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Figure 1 An 81-year-old man was admitted to our hospital with abdominal pain. A: Magnetic resonance imaging showed mixed-signal shadows in the liver, and an enhanced scan showed uneven enhancement (arrow); B: Two months later, computed tomography images showed a strip-like shadow of bone density in the liver, and the edge of the shadow was sharp (arrow).

Physical examination

Case 1: The patient had not receive special medical examination.

Case 2: A specialist examination revealed a 4 cm × 4 cm mass 3 cm away from the anal verge at 8-11-o'clock of lithotomy position. The skin temperature over the mass was elevated, the mass was painful when touched, and it exhibited no obvious fluctuation on palpation. Digital examination and anoscopy were not performed because of pain.

Laboratory examinations

Case 1: The patient had a white blood cell count of 7.4 × 10^9/L and C-reactive protein level of 108 mg/L.

Case 2: The patient had a white blood cell count of 8.08 × 10^9 g/L, neutrophil ratio of 0.775, lymphocyte ratio of 0.158, and C-reactive protein level of 77.9 mg/L.

Imaging examinations

Case 1: In march 2014, Abdominal MRI showed that there was a mass in the IV segment of his liver and the possibility of a malignant tumor was considered. On April 11, 2014, the patient underwent positron emission tomography/CT examination. This imaging examination showed a hypermetabolic mass in the IV segment of the liver, and the possibility of liver cancer with a tumor thrombus in the inferior vena cava was considered. Significant fluorodeoxyglucose uptake was present. CT examination on June 9, 2014 showed multiple annular low-density shadows in the left hepatic lobe after the previous gamma knife treatment. The possibility of infection, the presence of linear dense shadows, and the possibility of foreign bodies were considered (Figure 1B).

Case 2: MRI in August 12 showed an abnormal signal in the back of the anal canal; this abnormal signal started at the 9-o'clock position of the anal canal, extended to the posterolateral side of the external anal sphincter, and ended at the skin of the right posterior buttock. There was a low signal on T1WI sequence and high signal on T2 fat-suppression sequence. An enhanced scan showed obvious local enhancement. Tube-like unenhanced areas can be seen in some layers. Additionally, exudation changes were present in the surrounding subcutaneous fat (Figure 2).

FINAL DIAGNOSIS

Case 1: The final diagnosis of the patient was liver abscess caused by fish bone.

Case 2: The final diagnosis of the patient was para-anal abscess caused by fish bone.

TREATMENT

Case 1: The patient went to Shanghai Changhai Hospital for special liver segmentectomy + cholecystectomy + intestinal adhesion release.

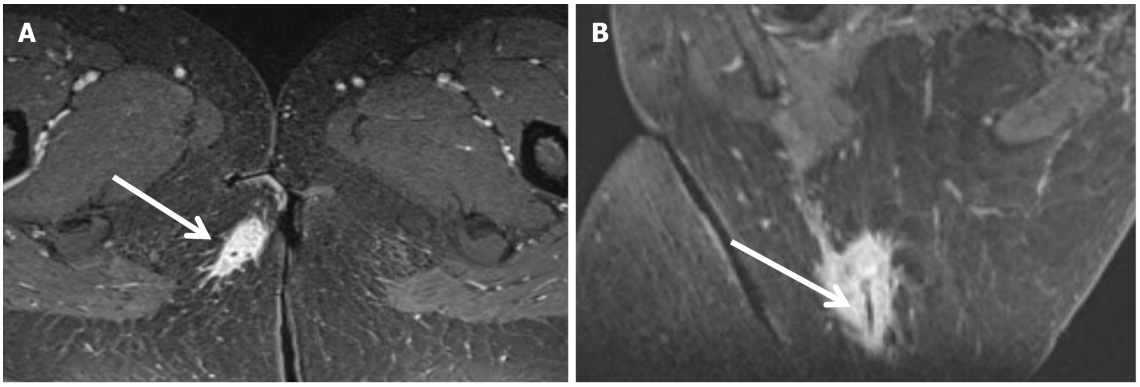

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Figure 2 A 43-year-old woman was admitted to our hospital with hip pain. A: Magnetic resonance imaging showed abnormal tubular signals behind the anal canal, obvious local enhancement on an enhanced scan, but no enhancement in some layers. Additionally, exudation was observed in the surrounding subcutaneous fat (arrow); B: A low signal bar with very clear and smooth edges was present, but sharp edges were evident on oblique coronal images (arrow).

Case 2: The patient accepted perianal abscess resection + catheter drainage + removal of foreign body in the anus.

OUTCOME AND FOLLOW-UP

The two patients were cured.

DISCUSSION

The clinical manifestations of foreign body perforation of the digestive tract vary according to the perforation site[6]. The most common presentation is pain at the perforation site, followed by fever and peritonitis; however, pneumoperitoneum is rare[7]. Unlike acute gastrointestinal perforation caused by ulcers or trauma, gastrointestinal perforation caused by foreign bodies often presents as a chronic process, and clinical peritonitis can progress to subacute or abscessation with milder clinical symptoms [1,8-10]. Because most patients are unable to recall a history of foreign body ingestion, emergency physicians often do not consider the diagnosis of a gastrointestinal tract foreign body[9]. Choosing the most appropriate imaging method is very important and is correlated with the accuracy of diagnosis.

The two cases of foreign bodies described in the present report were misdiagnosed. One foreign body was found more than 2 mo after the onset of symptoms, and the other was found during surgery. The first patient was diagnosed with a malignant tumor and underwent gamma knife treatment. Neither patient recalled a history of foreign body ingestion when they were admitted to the hospital. The time from symptom onset to admission was long. The clinical manifestations were dull pain at the lesion site, and there were no typical symptoms of gastrointestinal perforation, and no obvious free gas on imaging. Ultrasound and MRI examinations were performed in case 2, which suggested anal fistula. Case 1 was considered to have a liver malignancy. The misdiagnosis of case 1 led to incorrect clinical management and brought great physical and mental pain to the patient. We believe that the main reasons for misdiagnosis in the two cases described in the present report are as follows: (1) The patients did not provide a history of foreign bodies; (2) The disease course was long, the clinical symptoms were mild, and there were no typical symptoms of gastrointestinal perforation; and (3) It is rarely to see foreign bodies that penetrate the gastrointestinal tract completely. Moreover, many physicians are inexperienced in the selection of imaging protocols for such cases, and clinicians and radiologists do not consider the possibility of foreign body puncture.

In patients with perforation of the digestive tract by foreign bodies who undergo MRI, an inflammatory mass develops near the perforation site, the MRI resolution is high, and the lesions are easy to find[11]. However, because of the dense tissue of the foreign body, the MRI signal is extremely low, and the lesion is easily mistaken for gas; thus, misdiagnosis may occur[12]. When the foreign body is located in a solid organ, it is easy to confuse the foreign body for an abscess or tumor on MRI[13,14]. In particular, when the inflammatory mass is blurred and the boundary with the surrounding tissue is unclear, it is easily misdiagnosed as an advanced tumor[15]. In these cases, doctors and patients often forgo surgery; this occurred in case 1 of the present report, in whom a fish bone penetrated the liver. When the foreign body is located in a hollow organ, a large number of artifacts will be generated because of the influence of gas, making the diagnosis more difficult. Missed diagnosis or misdiagnosis is

especially common when the patient does not provide a history of foreign body ingestion.

According to the literature, the sensitivity of CT for the identification of calcified foreign bodies is 100%. In one retrospective study, all fish bone foreign bodies were found by CT. The CT density resolution is good, and such foreign bodies have strong contrast with the surrounding soft tissue and are thus easy to find[16,17]. Especially if the patient provides a history of foreign body ingestion, the doctor can specifically look for the lesion in the area of discomfort, which can greatly improve the detection rate. Three-dimensional CT reconstruction can be used to reconstruct the overall shape and direction of foreign bodies, providing assistance for surgery[18]. Contrast-enhanced scans are not recommended for initial diagnosis. Ingested contrast agent will cover the foreign body, greatly increasing the risk of missed diagnosis[19]. Research has shown that blood vessels are easily confused with foreign bodies after enhanced scanning; however, we believe that if clinicians are careful enough and use anatomical knowledge to observe suspicious high densities at the scan level, blood vessels can be distinguished from foreign bodies[9]. This combined with the high diagnostic accuracy of 3D reconstruction can greatly improve the chance of a correct diagnosis.

CONCLUSION

In conclusion, we believe that for patients with local pain as the main symptom, clinicians should consider the possibility of perforation of the digestive tract by a foreign body. Obtaining the history of the patient's living and eating habits in combination with CT examination of the pain site is helpful for diagnosis.

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FOOTNOTES

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ORCID number: Dan Ji 0000-0002-0929-3511; Xu-Ping Mao 0000-0002-6160-847X.

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