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Original Article

Successful treatment of fish bone perforation of the duodenum with hepatic abscess formation and literature review

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Abstract: Symptomatic gastrointestinal foreign bodies are a common clinical event. Some patients can develop complications, such as gastrointestinal obstruction, perforation etc., and rarely the secondary hepatic abscess can also occur. A 45-year-old male was admitted to hospital with abdominal pain for 1 month and high fever for 6 days. He was diagnosed with hepatic abscess formation due to perforation of the digestive tract by a foreign body. This diagnosis was confirmed when the patient underwent surgery and the foreign body was identified as a fish bone. The fish bone was removed by laparotomy and the patient recovered uneventfully. Based on this case and the currently available literature, we recommend that endoscopic or surgical treatment should be initiated as soon as possible after detection of symptomatic gastrointestinal foreign bodies. Such intervention is important in reducing the risk of perforation of the digestive tract, as well as hepatic abscess formation.

Keywords: Foreign body, hepatic abscess, duodenum, endoscopy, surgery

Introduction

Symptomatic gastrointestinal foreign bodies are a common clinical event. Most (80%-90%) pass through the gut uneventfully within one week [1], with less than 1% of such patients developing complications [2], such as gastrointestinal obstruction, and perforation of the esophagus or gastrointestinal tract mucosa resulting in internal bleeding and infection. Hepatic abscess formation due to perforation of the duodenum by a foreign body is a rare. Gastrointestinal foreign bodies can be removed by endoscopy [3], laparoscopy or laparotomy if necessary [4]. Here, we present a rare case of hepatic abscess caused by perforation of the duodenum by a fish bone, which was treated effectively by surgical intervention.

Case presentation

A 45-year-old male clothing salesman reported discomfort and abdominal pain after a session of heavy drinking 1 month previously. He delayed attending hospital for treatment but 6 days prior to his visit he experienced a high fever (Tmax 39.1°C) and abdominal pain. Physical examination indicated abdominal pain in the epigastrium and right hypochondrium. Laboratory data revealed leukocytosis (white blood cell (WBC) count: 9.43×10^9/L; neutrophils (N): 84.4%), and C-reactive protein (CRP) >200 mg/L, while hemoglobin and platelet counts were normal. Hepatic laboratory tests revealed moderately elevated levels of alanine aminotransferase (ALT 158 U/L), aspartate aminotransferase (AST 89 U/L), while serum amylase, lipase and renal function tests were normal. Gastroscopy performed at the local hospital revealed superficial gastritis with erosion. A contrast enhanced abdominal computed tomography (CT) scan showed a hepatic abscess, and a hyperdense, linear foreign body in the lateral wall of the duodenum (**Figure 1A-F**). The patient received conservative treatment including the use of antibiotics (Piperacillin

Figure 1. A-F: Abdominal CT scan revealing a circular low density area with circular enhancement in the right anterior lobe of the liver; an abscess was diagnosed. A high density shadow was observed outside the space between the duodenum and the liver.

Sodium and Sulbactam Sodium for Injection and Tinidazole) and his symptoms improved. After one month he was readmitted to hospital due to recurrent abdominal pain. Physical examination revealed obvious abdominal tenderness and liver percussion pain. The leukocytosis was significantly increased (WBC count, 14.1×10^9/L; N: 83.6%); Liver function tests revealed moderately elevated levels of ALT (182 U/L) and AST (72 U/L). The contrast enhanced abdominal CT scan and abdominal ultrasound also showed a hepatic abscess, a foreign body outside the duodenal wall and cholecystitis. The patient eventually underwent surgery. The laparoscopic exploration was unsuccessful due to severe adhesions and difficulty in locating the foreign body. Laparotomy confirmed that the duodenum was perforated by a fish bone causing a hepatic abscess (**Figure 2**). The fish bone was then removed and

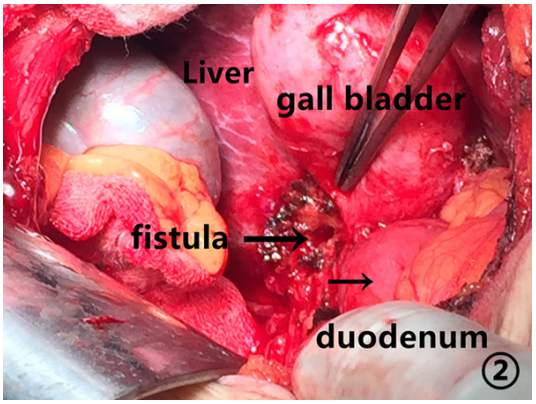

Figure 2. Surgical findings indicated a hepatic abscess adjacent to the fistula formed by the perforation of the duodenum.

Figure 3. A sharp fish bone (approximately 45 mm long) was removed.

the perforation of the duodenum was repaired (**Figure 3**). The recovery of the patient was uneventful after 3 months of follow-up.

Discussion

Early detection, diagnosis, and treatment of foreign bodies in the gastrointestinal tract is important, especially in cases where clinical symptoms are observed. Without timely intervention, intestinal obstruction, bleeding, abdominal abscess formation, and even more serious complications, such as liver failure, septic shock, death can result. Reports of hepatic abscesses caused by foreign body perforation the duodenum wall are rare [5, 6]. Bacterial hepatic abscesses are a secondary infection due to bacterial migration to the liver parenchyma causing inflammatory reactions and necrosis through a variety of mechanisms. In recent years, with improvements in diagnosis and treatment, the mortality rate associated with hepatic abscess has declined markedly to less than 10% [7].

Here, we present the case illustrating the potential complications that can arise from the lack of timely detection of ingestion of a fish bone. The bone was moved by gastrointestinal peristalsis but was obstructed in the duodenum and perforated the liver, causing a fistula. The bacteria then migrated directly into the liver causing a hepatic abscess. Our experience of this case and a review of the relevant literature [8, 9] highlight the importance of timely diagnosis of foreign bodies in the gastrointestinal tract. Rather than abdominal X-ray and ultrasonography we recommend the application of enhanced CT imaging, which provides more detailed information of the location of foreign bodies and allows clarification of the relationship with the adjacent organs, and blood vessels, etc. This is very important for establishment of the therapeutic strategy (**Figure 4**). Digestive tract endoscopy is also an essential diagnostic and therapeutic method. For treatment, we recommend individualized treatment according to the progression of clinical symptoms. At an early stage, prior to complete perforation of the bowel wall, the foreign body can be removed by endoscopy, and the patient treated by combined gastrointestinal decompression and antibiotic application to prevent local infection [8, 10]. Endoscopic intervention may be the first-line approach for patients because of the advantages of relatively minor trauma and pain, as well as rapid recovery. However, in our case, the patient delayed seeking medical help for one month after symptoms appeared due to the personal reasons. Gastroscopy performed at the patient's local hospital revealed superficial gastritis with erosion and no foreign body was detected. The CT examination was not performed and as a result, the optimal timing of treatment was not met. The patient was then transferred to our hospital, and through comprehensive analysis of medical history and related imaging data, the diagnosis of hepatic abscess due to perforation of the duodenum by a foreign body was clearly established. We recommended laparoscopic surgery because of the advantages of its relatively low risk of complications, minimal trauma, rapid recovery, short period of hospitalization, and better cosmetic result [5, 11, 12]. However, the patient

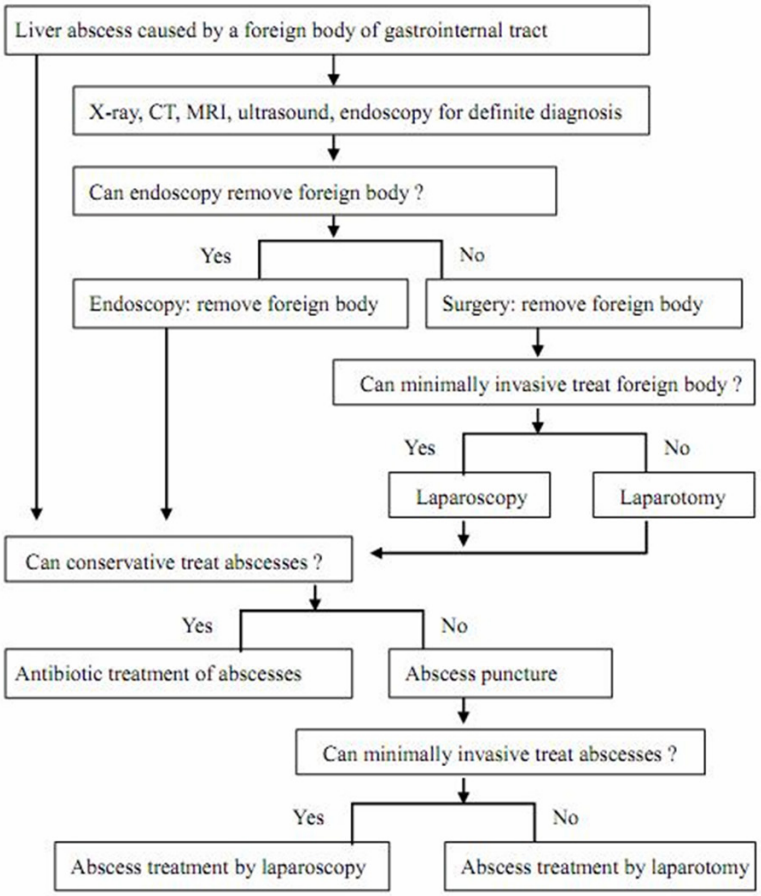

Figure 4. Treatment process for liver abscess due to gastrointestinal tract perforation by a foreign body.

refused surgery for personal reasons. After one month he was readmitted to hospital because recurrent abdominal pain. Laparoscopic surgery was unsuccessful due to liver and duodenum adhesions, although the fish bone was detected and removed by laparotomy [13, 14]. Compared to laparoscopic surgery, laparotomy allows accurate positioning, facilitates dissection of the adhesions and can decrease the risk of damage to the gallbladder, duodenum and adjacent organs. Generally, after removal of the foreign bodies, hepatic abscesses can be treated effectively by the administration of appropriate antibiotics. In serious cases, patients may require percutaneous puncture drainage, and even liver resection [15].

Conclusions

In summary, the diagnosis of symptomatic gastrointestinal foreign bodies should base on a comprehensive analysis of the patient's history, imaging data, disease evolution and systemic condition. Based on this case and the currently available literature, we recommend that endoscopic or surgical treatment should be initiated as soon as possible after detection of symptomatic gastrointestinal foreign bodies. Such intervention is important in reducing the risk of perforation of the digestive tract, as well as hepatic abscess formation.

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Disclosure of conflict of interest

None.

Authors' contribution

Wu YS, Chen BC, Li JH, Zhang M, Zheng SS carried out the surgical procedure, designed the report, analyzed all of the reports, and drafted the manuscript. Chen BC and Li JH performed the histological analysis of the surgical specimens. Jia JJ participated in designing the report and revised the manuscript for submission. All authors have read and approved the final manuscript.

Abbreviations

CT, Computed tomography; MRI, Magnetic resonance imaging; WBC, White blood cell; N, Neutrophils; CRP, C-reactive protein; ALT,

Alanine aminotransferase; AST, Aspartate aminotransferase; Tmax, Maximum temperature.

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