



Case report

An unusual cause of pericardial effusion: A case report of a hepatic abscess following foreign body migration and duodenal perforation

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ARTICLE INFO

Keywords:

Case report

Foreign body, hepatic abscess, duodenal

perforation

Pen

Unusual pericardial effusion

ABSTRACT

Introduction and importance: Although foreign bodies are a rare cause of gastrointestinal tract perforation, they may serve as a nidus for hepatic abscess. Abdominal pain is the most common presenting symptom. We present a case of an ingested pen causing duodenal perforation and hepatic abscess several months after initially presenting with a pericardial effusion.

Case presentation: A 59-year-old female living in an intensive tertiary mental health facility was noted to have an incidental pericardial effusion during work-up for hyponatremia. Seven months later, she developed a new fever and was noted to have interval increase in the pericardial effusion size. This prompted further investigation which finally revealed that an ingested pen had perforated through the first part of the duodenum and caused an abscess in the left lobe of the liver. The pericardial effusion was presumed secondary to local inflammation. Upon discovery of the abscess, the patient underwent successful operative management including abscess drainage, foreign body extraction, and duodenal repair.

Clinical discussion: Reports of hepatic abscess from foreign body causing duodenal perforation are rare, with bone fragments and toothpicks the most common foreign bodies implicated. There is one other previously reported case of an ingested pen. Abdominal pain is present in up to 85% of cases, but fever may be the only presenting symptom.

Conclusion: Foreign body migration causing a hepatic abscess may present non-specifically with unexplained fever or even pericardial effusion. Psychiatric comorbidities may contribute to delays in diagnosis due to difficulties recalling the episode of ingestion.

1. Introduction

First described by Lambert in 1898, an ingested foreign body and subsequent migration through a perforated gastrointestinal tract may be an uncommon cause of hepatic abscess formation [1,2]. Most foreign body ingestions occur in children, but individuals with psychiatric disorders, developmental delays, and other impairments are also at higher risk [3]. Symptoms of a hepatic abscess from foreign body migration are often non-specific and usually include abdominal pain, fever, vomiting, and weight loss [4]. Further complicating matters, patients rarely recall the episode of ingestion [5]. We report a case of a patient managed in an academic tertiary care center who initially presented with unexplained pericardial effusion and was months later found to have a hepatic

abscess secondary to duodenal perforation from an ingested pen. This case is reported in-line with the updated consensus-based surgical case report (SCARE) 2020 guidelines [6].

2. Presentation of case

A 59-year-old female with schizoaffective disorder, hepatitis C, previous substance use disorder, hypertension, and type 2 diabetes mellitus living in a tertiary mental health facility underwent a computed tomography (CT) scan of the chest and head for unexplained hyponatremia found on routine bloodwork. A small pericardial effusion was identified. Subsequent investigations at this time were not noted in the patient's documentation. Seven months later, the patient developed a

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<https://doi.org/10.1016/j.ijscr.2022.106931>

Received 21 January 2022; Received in revised form 16 February 2022; Accepted 5 March 2022

Available online 9 March 2022

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fever and a chest X-ray demonstrated new enlargement of the pericardial silhouette. An echocardiogram demonstrated a small-to-moderate sized pericardial effusion without obvious etiology. The patient did not report any chest or abdominal pain, dyspnea, nausea, vomiting, weight loss, appetite change, recent illness, or infectious contacts. Current medications included several anti-hypertensive, antihyperglycemic, and anti-psychotic agents. She was a current cigarette smoker with a history of previous use of cocaine, amphetamines, marijuana, and opioids. Furthermore, the patient was not jaundiced and had a soft and nontender abdomen without any peritoneal signs. Bloodwork demonstrated an elevated C reactive protein at 71.1 mg/L (normal <7.5), slightly elevated white blood cell count at $12.6 \times 10^9/L$ (normal 4.0–11.0), and decreased hemoglobin at 92 g/L (normal 115–160). Besides a mild hyponatremia with a sodium level of 133 mmol/L (normal 135–145), the rest of the patient's bloodwork including electrolytes, kidney function, and liver function tests were unremarkable. The patient denied any history of foreign body ingestion, but prior documentation showed that she underwent an esophagogastroduodenoscopy two years prior for removal of an ingested felt pen. At that time, the patient had intentionally ingested a 10 cm long felt pen and presented to the Emergency Department (ED) after subsequently developing epigastric pain. The foreign body extended from the stomach fundus to the proximal antrum and was endoscopically removed with no complications.

A week after the echocardiogram, a CT chest/abdomen/pelvis was performed in the community which demonstrated interval enlargement of the pericardial effusion from seven months prior (Fig. 1). Additionally, there was an incidental finding of a 12 cm foreign body with a metallic tip suspicious for a pen perforating through the first part of the duodenum and extending into the left lobe of the liver (Fig. 2). There were lobulated complex fluid collections with peripheral enhancement suggestive of hepatic abscess (Fig. 3). Upon note of these findings, the

patient's family physician sent her to the local ED to be admitted. Two days later, the patient was transferred to a tertiary care hospital for hepatobiliary surgical consultation. A CT scan with oral contrast was performed, which demonstrated stable positioning of the foreign body and size of the hepatic collection without any contrast extravasation or other site of perforation. The patient subsequently underwent urgent laparotomy for removal of the foreign body (Fig. 4), drainage of the liver abscess, and duodenal repair with a Graham patch by the hepatobiliary surgery team. A tract was noticed where the pen had perforated the duodenum and the liver had sealed the perforation (Fig. 4). There was no peritoneal contamination. The liver abscess extended through and through the liver, abutting the left diaphragm. Three drains were left in-situ, one of which was placed within the abscess cavity and the two others around the repair.

The patient recovered well with a stable post-operative course. Intra-operative cultures from the abscess were positive for polymicrobial flora including *Candida albicans*, *Candida glabrata*, and *Streptococcus anginosus*. The patient was started on intravenous (IV) piperacillin/tazobactam and oral fluconazole. The antibiotics were later changed to IV ceftriaxone and oral metronidazole following susceptibility testing. The patient was pleased with the surgical outcome, however, there were issues with occasional refusal of post-operative radiologic scans and removal of her own IV lines. Nevertheless, repeat CT scans were performed on post-operative days 4, 7, and 14 and demonstrated interval improvement in intra-abdominal fluid collections with no evidence of peripheral enhancement or residual abscess. The abscess drain was removed on post-operative day 17 and the patient was discharged back to the tertiary mental health facility after continuing antimicrobial therapy for 4 more days following drain removal. She had recovered well 6 weeks following the surgical management of her liver abscess.

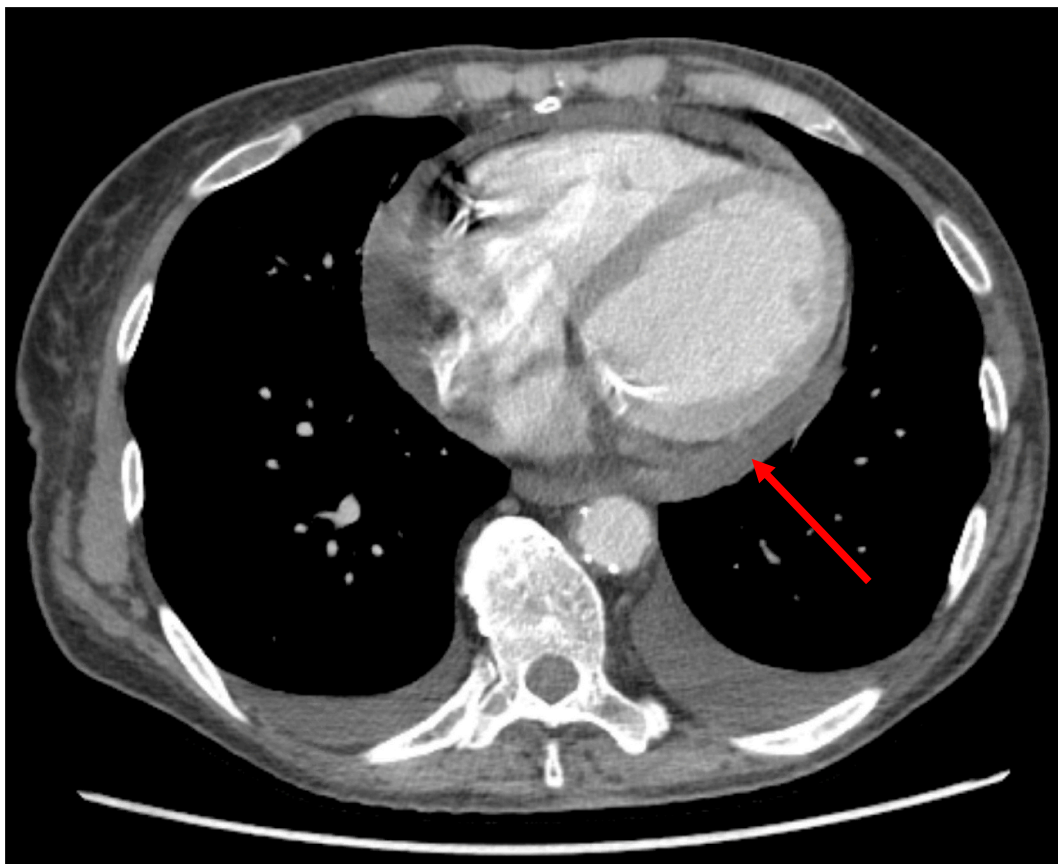


Fig. 1. A moderate pericardial effusion demonstrated on computed tomography imaging with interval enlargement since seven months prior.

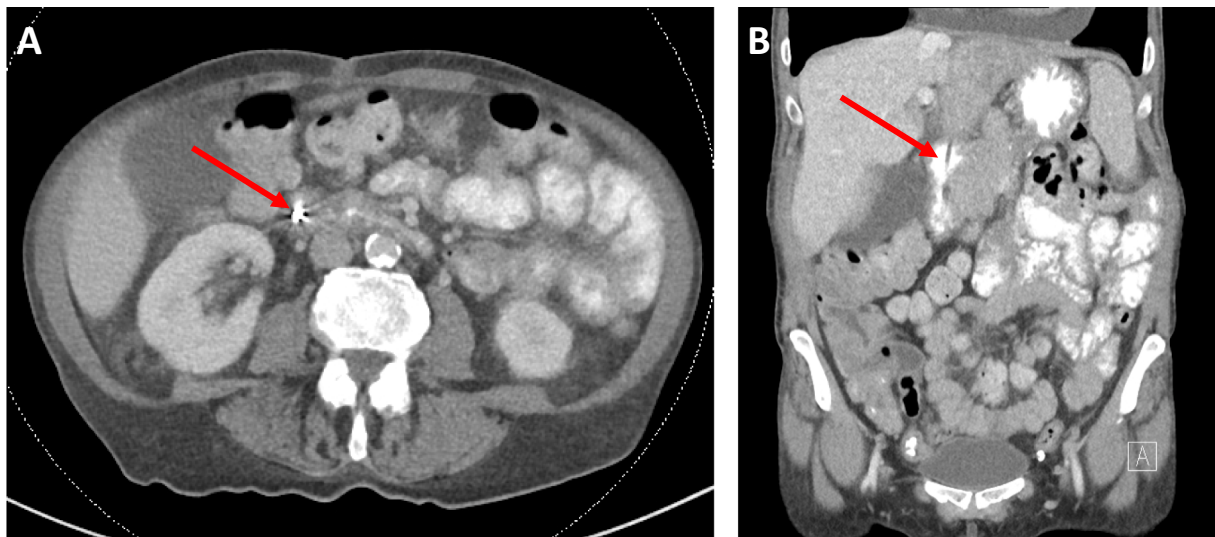


Fig. 2. Axial computed tomography (CT) view (A) showing the radio-opaque tip of the ingested pen. Coronal CT section (B) demonstrating where the pen perforates through the first part of the duodenum.



Fig. 3. Axial computed tomography image of the liver abscess measuring $6.7 \times 6.1 \times 6.5$ cm with loculated complex fluid collections containing air-fluid levels and peripheral enhancement involving segments II and III.

3. Discussion

Most ingested foreign bodies will pass through the gastrointestinal

tract without any intraluminal injury [7]. However, a small proportion (<1%) may cause perforation, and while rare, migration of a foreign body into the liver parenchyma causing pyogenic infection has been

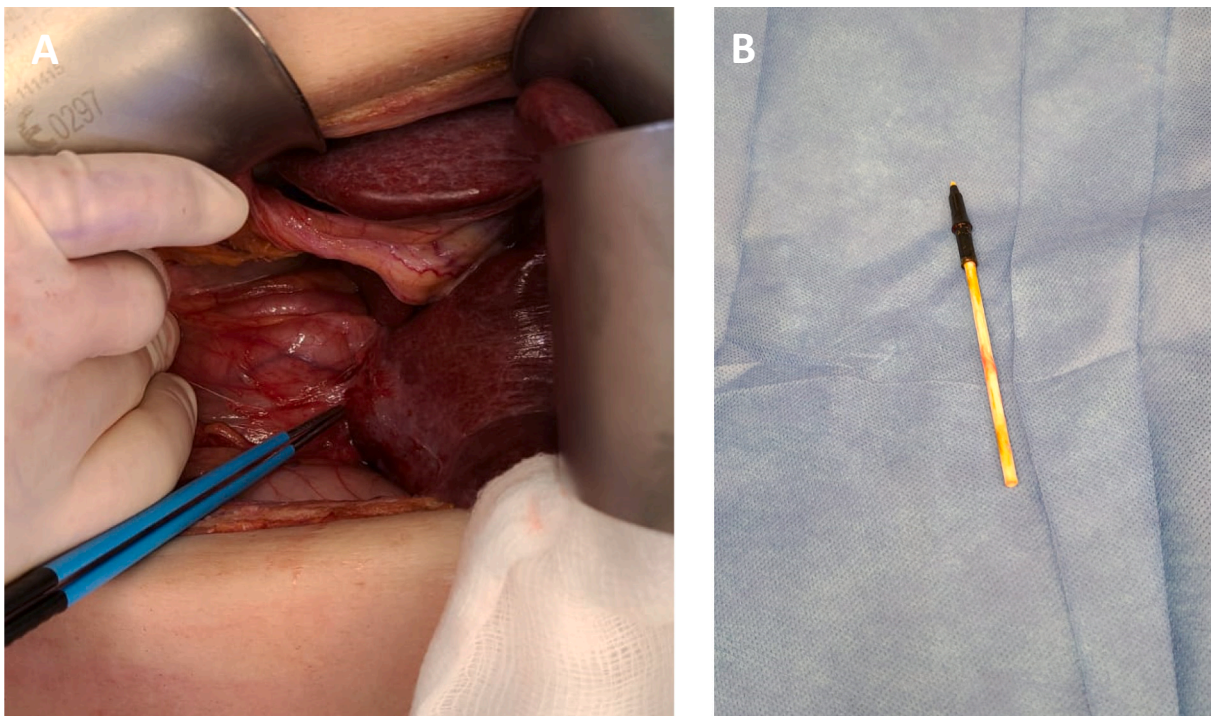


Fig. 4. Intraoperative image (A) before foreign body removal showing communication between the left lobe of the liver and the duodenum. The extracted pen (B) measuring 12 cm in length.

increasingly reported [8]. A variety of foreign bodies have been implicated in previous reports including fish bones, chicken bones, needles, and toothpicks [9].

The stomach is most frequently the site of alimentary perforation causing hepatic abscess [10], but as seen in our case, hepatic abscesses may also result from duodenal perforation. Among the literature for hepatic abscesses secondary to foreign body migration and duodenal perforation, most cases are due to ingested bone fragments including fish and chicken bones [11,12]. Other foreign bodies included toothpicks [8], sewing needles [10], and a teaspoon [13]. Interestingly, there is one other case of an ingested pen reported by Perkins in 1999 [14]. Similar to our case, this patient had a psychiatric disorder and a previous history of foreign body ingestion. Unlike our case, however, the patient underwent CT-guided percutaneous abscess drainage followed by endoscopy for removal of the pen. We opted for operative management to manage the duodenal perforation site at the same time.

Epigastric or abdominal pain is the most common presenting symptom and was identified in up to 85% of cases, as reported by a systematic review of liver abscesses caused by migrated foreign bodies [2]. Our patient did not experience any abdominal pain but instead first presented with an unexplained pericardial effusion which, in retrospect, was likely secondary to local inflammation from the ongoing hepatic abscess. The patient then re-presented seven months later with a fever and was again noted to have a larger pericardial effusion on imaging. The differential diagnosis for pericardial effusion is broad including infectious, neoplastic, traumatic, inflammatory, endocrine, renal, and cardiac aetiologies [15]. In our case, CT abdominal imaging led to the eventual diagnosis. When there is no obvious cause or explanation for a pericardial effusion, investigating for intra-abdominal pathology with a CT abdomen should be considered.

Several reports additionally mention the utility of ultrasound as an accessible initial tool, but ultimately most other reported cases used CT imaging as part of the diagnostic pathway [16]. Of note, a post-mortem diagnosis was made in three of the reported instances [13,17,18]. Similar to our case, most previously reported cases were managed with laparotomy for abscess drainage and foreign body removal [8,10,19].

Other management options employed include percutaneous abscess drainage, laparoscopic or endoscopic foreign body removal, and conservative management with antibiotics [20]. In retrospect, an alternative approach may have been considered for our case including percutaneous liver abscess drainage with endoscopic foreign body removal and duodenal repair laparoscopically. However, due to the patient's underlying psychiatric condition we felt that an open approach would provide the most rapid and definitive treatment of her abscess. Her body habitus allowed us to keep the open incision fairly small.

Our case emphasizes the difficulty in making a correct diagnosis of liver abscess, particularly among individuals with psychiatric conditions which may preclude a reliable history. The non-specific nature of our patient's presenting symptoms also highlights the occult nature of hepatic abscesses of this etiology which can remain indolent and minimally symptomatic for months. To our knowledge, this is the first reported case of a hepatic abscess caused by foreign body migration to present initially with a pericardial effusion.

4. Conclusion

Hepatic abscess formation is a rare sequela of ingested foreign body migration, and even less commonly may involve the duodenum rather than stomach as the site of perforation. Abdominal pain is often noted, however, presenting symptoms may be non-specific and as seen in this case, include fever and possibly pericardial effusion. Abdominal CT imaging should be considered when no clear explanation for pericardial effusion can be found. Most patients may not recall the episode of foreign body ingestion; as such, a high level of suspicion and imaging are essential to make the right diagnosis. Fish bones, chicken bones, and toothpicks are the most common culprits, and our case represents the second reported case of an ingested pen causing a hepatic abscess. As in our case, management is often by laparotomy for abscess drainage and foreign body extraction, but percutaneous, laparoscopic, endoscopic, and conservative options have been reported with success.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Sources of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

The need for institutional review board approval was waived.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Tyler Yan: Conceptualization, Data Curation, Writing – Original Draft;

Philemon Leung: Data Curation, Writing – Original Draft;

Charles Zwirwich: Writing – Review & Editing, Supervision;

Allison Harris: Writing – Review & Editing, Supervision;

Stephanie Chartier-Plante: Writing – Review & Editing, Supervision

Research registration

N/A.

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Declaration of competing interest

The authors have no conflicts of interest to declare.

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