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CASE REPORT PEER REVIEWED | OPEN ACCESS

Hepatic abscess secondary to the accidental ingestion and lodgment of dental wires in the large bowel: A case report

Tzu-Yi Chuang, Andrew Thomas Sax, Emelia Dauway, Stefaan De Clercq

ABSTRACT

Introduction: Pyogenic hepatic abscess secondary to migration and perforation of the gastrointestinal tract by an ingested foreign object is extremely uncommon. Case Report: This report presents an unusual case of a healthy 25-year-old young male who developed a hepatic abscess subsequent to the ingestion of dental wires, which became lodged in the splenic flexure of the colon. The patient denied any history of swallowing a foreign body. He presented when clinical signs of a hepatic abscess had developed. On microscopy, the specimen revealed Streptococcus milleri 3+. The patient was successfully treated with metronidazole, percutaneous drainage of the abscess, and snare removal of the dental wires. Conclusion: To our knowledge, only one other case report detailing a hepatic abscess secondary to ingested dental wires has been published. As such, more established protocols for the management of an atypical hepatic abscess are required.

Keywords: Foreign body, Hepatic abscess, Dental wire, Perforation

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INTRODUCTION

Pyogenic hepatic abscess is a rare condition with a broad spectrum of etiologies. Within developed countries, it is estimated that 80% of hepatic abscesses result from bacterial infections [1]. Abscess development is accounted for by one of two mechanisms: a) local spread, b) and hematogenous seeding. Most cases originate from hepatobiliary infections. Local spread more commonly leads to a mixed flora infection, including anaerobic and aerobic species; whereas haematogenous seeding characteristically yields isolation of a single organism [2].

Pyogenic hepatic abscesses secondary to perforation of the gastrointestinal (GI) tract by the migration of an ingested foreign object is extremely uncommon, representing approximately 1% of all liver abscesses [3]. The first such reported case was published in 1898, identifying a metal pin during autopsy as the precipitant [4]. Foreign bodies typically move through the GI tract with ease once they have passed the esophagus. As such, the identification of a foreign object is often coincidental when the patient presents due to a secondary infection some time later.

CASE REPORT

A 25-year-old healthy Caucasian male presented to the emergency department following a 2-week history of non-specific symptoms including intermittent febrile illness, right sided nonspecific abdominal discomfort, right shoulder tip pain, night sweats, nausea, diarrhea, and generalized malaise. His past medical history was unremarkable. Specifically, he did not have any history of inflammatory bowel disease. The patient was an active smoker. He denied harmful alcohol intake or the use of illicit drugs. No history of recent travel was reported, nor was the consumption of unusual/underprepared food substances. The patient denied any risky/unprotected sexual behavior and had no history of sexually transmitted diseases.

On physical examination, the patient appeared to be tired and pale. He was febrile with a temperature of 38.3°C and mild tachycardia (pulse rate: 110–120). Respiratory rate was 20 breaths per minute with good oxygen saturation, and blood pressure was 130/70 mmHg. His abdomen was tender in right upper quadrant on deep inspiration, however no signs of peritonism such as percussion and rebound tenderness were noted. Murphey sign was negative and there were no signs of organomegaly or abdominal masses. No further clinical signs of hepatic obstruction were noted.

Biochemical laboratory tests were conducted in the emergency department, highlighting mild anemia (Hb 12.5 g/dL), elevated white cells (21.3 x10^3/mm^3), elevated CRP (29.2 mg/dL) and hypoalbuminemia (2.2 g/dL). Liver function tests including INR were also deranged; total bilirubin – 22 mg/dL, conjugated bilirubin – 5 mg/dL, ALP – 307 U/L, GGT – 227 U/L, ALT – 48 U/L, AST – 4 U/L, INR – 1.6. Other blood analyses that were performed include, Hepatitis A, B, C (negative), toxoplasmosis (negative) and blood cultures (negative). Fecal occult blood test was also negative. EBV nuclear antigen antibody viral capsid antigen antibody (VCA) IgG and EBV-EBNA IgG test was positive. Prior to presentation, an abdominal ultrasound was performed by a general practitioner which revealed a large (13x11.2x8.7 cm) focal lesion in the right lobe of liver at segment 7/8 (Figure 1). The lesion had homogeneous lower level echoes with no vascularity and no perihepatic collection or free fluid, suggestive of a large liquidized abscess.

An urgent computed tomography (CT) of the abdomen and pelvis was performed. A 13x11.5 cm non-enhancing space occupying lesion with indistinct margins was identified in the right lobe of the liver (Figure 2). The appearance of this lesion was compatible with an intrahepatic abscess or necrotic liver mass. No dilatation of the biliary duct was identified. A small bilateral pleural effusion was also found. Incidentally, the CT scan of the abdomen and pelvis not only revealed the liver abscess, but also the presence of a two curvilinear foreign bodies indicative of a metallic density within the splenic flexure of the colon (Figures 3). No pneumoperitoneum or

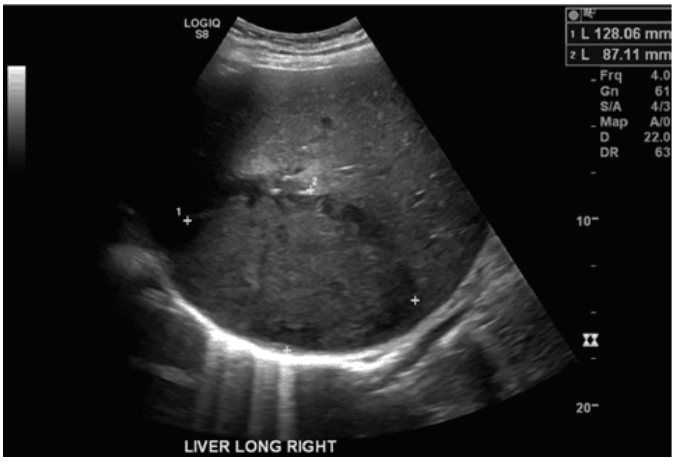

Figure 1: Ultrasound showing 13x11.2x8.7 cm focal lesion in the right lobe of liver at segment 7/8.

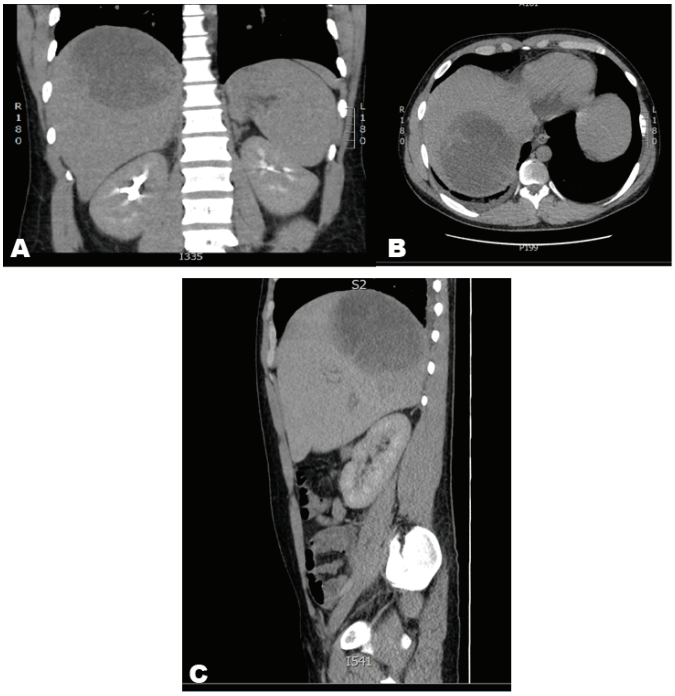

Figure 2: Computed tomography abdomen illustrating the hepatic abscess at time of diagnosis. Contrast media: Iodine, DLP 11.10 (mGy-cm), Power 70 ml with flow rate of 2.5 ml/s between period of 28 secs. (A – coronal view, B – axial view, C – sagittal view).

adjacent inflammatory changes were associated, but the foreign bodies appeared to extend into and possibly through the colon wall.

The patient was admitted to the surgical ward and initially treated empirically with intravenous antibiotics piperacillin and tazobactam. He subsequently had ultrasound guided percutaneous drainage of the hepatic abscess on day-1 following his admission. Approximately 1.1 L of purulent material was drained within the first 24-hours of the in-situ drain being placed. On microscopy, the first specimen revealed *Streptococcus milleri* 3+ (sensitive to penicillin) and the second specimen

grew *Staphylococcus haemolyticus* 3+ (resistant to penicillin and flucloxicllin; sensitive to vancomycin) and *Corynebacterium jeikeium* 3+ (resistant to penicillin; sensitive to vancomycin). Following identification of the bacterial sensitivities on day-5, intravenous antibiotics were changed to ceftriaxone. Despite symptoms typical of abscess/bacteremia such as cyclic high grade fever, rigors, chills and night sweats serial blood cultures remained negative throughout the 10-day admission.

The patient was discharged 10-days post admission with hospital in the home services for ongoing intravenous ceftriaxone. On day 14, his CRP returned to normal range. Serum albumin (3.3 g/dL), hemoglobin (13.5 g/dL) and white cell count (7.7 x10^3/mm^3) also began to normalize during this time. On day-16 the patient received a colonoscopy which confirmed the identity of the foreign body as an old eroded denture with 2 wires. The wires were retrieved using a snare. Upon discussion of this finding with the patient, he noted that he had lost his dentures approximately two years ago whilst inebriated but denied any knowledge of ingesting them.

A repeated CT of the abdomen and pelvis was conducted on day-18, showing a marked improvement in the size of the hepatic abscess (7x7x2 cm), however a small fluid collection remained in subcapsular region (Figure 4). The percutaneous drain was kept in situ with daily measurements, until day-26, at which point

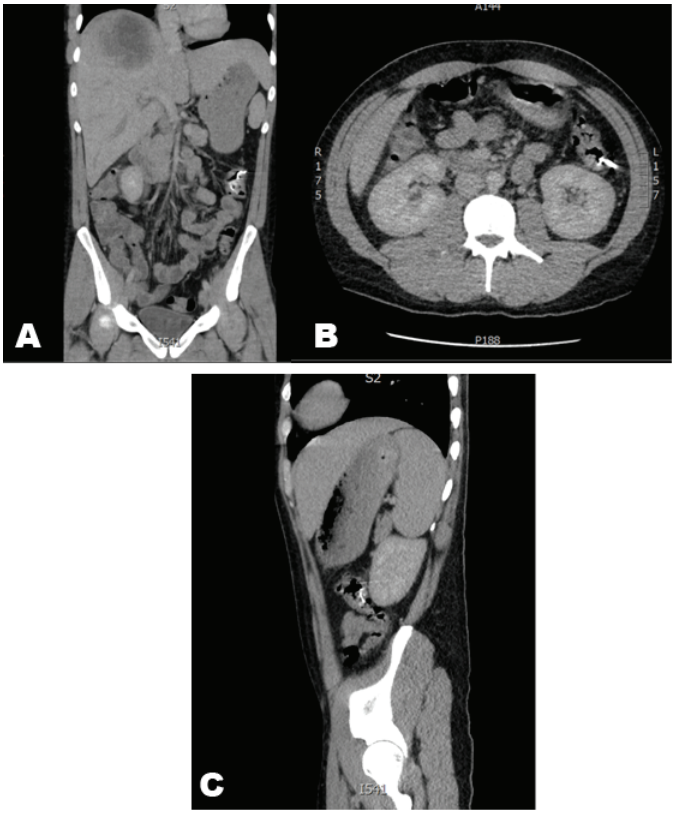

Figure 3: Computed tomography abdomen illustrating the dental wires lodged in the large bowel. Contrast media: Iodine, DLP 11.10 (mGy-cm), Power 70 ml with flow rate of 2.5 ml/s between period of 28 secs. (A – coronal view, B – axial view, C – sagittal view).

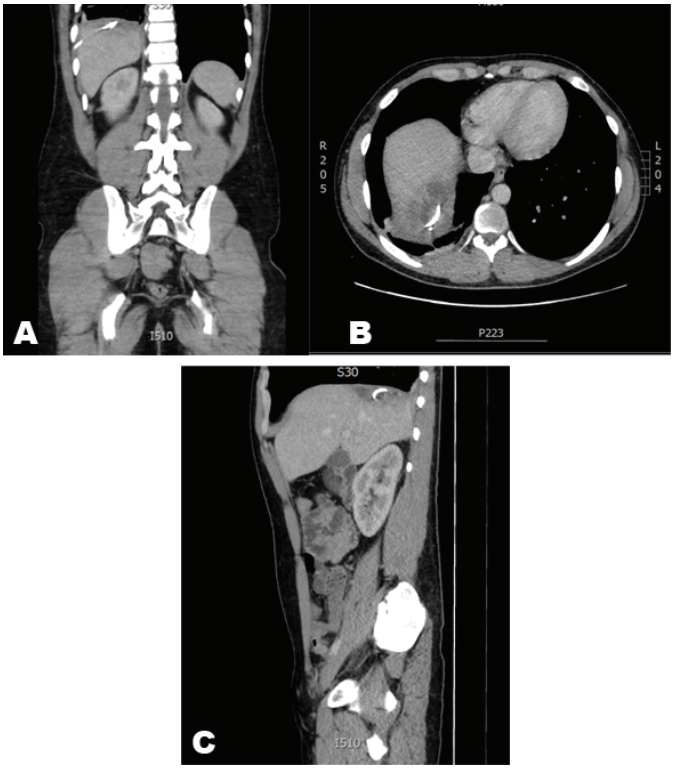

Figure 4: Computed tomography abdomen illustrating the resolution of the hepatic abscess. Contrast media: Iodine, DLP 11.10 (mGy-cm), Power 70 ml with flow rate of 2.5 ml/s between period of 28 secs. (A – coronal view, B – axial view, C – sagittal view).

it was removed along with the intravenous line and the patient was stepped down to oral Augmentin duo forte for 2 weeks. The patient was followed up at first, second and fourth weeks following removal of the percutaneous drain. During this time, there was no clinical indication for further imaging or a repeat scope. Routine blood tests completed over the 4-week follow up period identified a gradual improvement in liver function.

DISCUSSION

Hepatic abscess secondary to gastrointestinal tract (GIT) perforation is extremely rare. It has been estimated that 80-90% of ingested foreign bodies pass through the GIT without any luminal damage, with approximately 1% causing bowel perforation [5, 6]. Patients are generally unaware of the events surrounding the ingestion of the foreign body. Thus they only present for medical care when signs of abscess of systemic infection become evident [7]. Indeed, the patient who came to our medical attention is representative of this.

The common perforation sites in the gastrointestinal tract are the ileocecal junction, rectosigmoid region and duodenum, where the lumen is most narrow [8, 9]. Objects with sharp elongated shapes such as chicken bones, fish

bones and toothpicks are most frequently reported as the entity responsible for perforation. Further, foreign body ingestion is more often seen in elderly patients, along with persons with dental prosthesis, mental health issues and a history of alcohol misuse disorders [6]. As such, the presented case of a dental wire lodged in the splenic flexure of young healthy male is extremely novel.

Fewer than 50 case reports have been published of foreign bodies that penetrated the gastrointestinal wall and led to subsequent abscess development [9]. To our knowledge, only one other case detailing a hepatic abscess secondary to the ingestion of dental wires has been published [5]. Much like the current report, this patient presented with a brief history of an intermittent febrile illness with nausea, vomiting, malaise and diaphoresis. Radiological investigations identified a 10 cm cystic mass in the right lobe of the liver and a per-colic abscess in the descending colon secondary to perforation by a dental plate. The 39-year old male similarly reported being intoxicated at the time of foreign body ingestion [5].

Echerichia coli, *Klebsiella spp.* and *Enterococcus spp.* are the most common microorganisms responsible for hepatic abscess development [1, 10]. *Staphylococcus haemolyticus*, *Corynebacterium jeikeium* and *Streptococcus milleri* were identified in the present. Of the three organisms identified, *Streptococcus milleri* was the predominant species (with the other two flora likely due to contamination) hence, the antimicrobial treatment was changed to ceftriaxone. It was believed that *Staphylococcus haemolyticus and corynebacterium jeikeium* could potentially represent contamination as they were grown from the second specimen. Nevertheless, identification of these orgaisms still warrants discussion. *Staphylococcus haemolyticus* is an unlikely organism to cause a hepatic abscess, however it is known to be associated with infection caused by foreign body insertion such as prosthetic valves, cerebrospinal fluid shunts and orthopedic prostheses [11]. In contrast, *Corynebacterium jeikeium* is a commensal flora of skin and mucous membranes; given the foreign body responsible for the hepatic abscess in our case was a dental plate, identification of this organism is not unexpected. It has been shown to cause serious infections and is almost uniformly resistance to penicillin, but sensitive to vancomycin, as demonstrated in the current case. *Corynebacterium jeikeium* has previously been reported as responsible for hepatic abscess formation in a patient with human immunodeficiency virus [12].

Of clinical significance in the current case is the identification of *Streptococcus milleri*; a commensal anaerobic gram-positive coccus with uniform resistance to metronidazole. *Streptococcus milleri* is known to be responsible for many pyogenic infections (including hepatic abscess) due to its colonization of the mouth, gastrointestinal tract, and vagina [13]. The only other case reporting a hepatic abscess secondary to GIT perforation by a dental plate also identified a non-hemolytic streptococcus as the responsible organism [5].

According to Chung et al. [14], percutaneous image guided drainage with antibiotics is the appropriate first line treatment for a hepatic abscess if there are no surgical indications such as a multiloculated abscess, concomitant biliary pathology, intrahepatic calculi or suspected tumor. Indeed, none of these comorbidities were seen in our case. Treatment of the foreign body will ultimately depend on its location. Foreign bodies in the esophagus, stomach and large bowel can be removed endoscopically. In contrast, objects in the small bowel or the presence of complications such as gastrointestinal hemorrhage and obstruction may require a bowel resection [6].

CONCLUSION

This case represents an atypical presentation of a hepatic abscess due to the nature and location of the ingested foreign body, and demographics of the reported patient. In such cases, diagnosis is challenging given that the presentation is delayed due to non-specific symptoms and a lack of awareness regarding the ingestion of the precipitating foreign body. The protocol for management of patients with a hepatic abscess secondary to an ingested foreign objects is yet to be established, therefore a high level of clinical suspicion and thorough workup is required in these cases.

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Author Contributions

Tzu-Yi Chuang – Substantial contributions to conception and design, Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published

Andrew Thomas Sax – Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Emelia Dauway – Substantial contributions to conception and design, Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published

Stefaan De Clercq – Substantial contributions to conception and design, Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Consent Statement

Written informed consent was obtained from the patient for publication of this case report.

Conflict of Interest

Authors declare no conflict of interest.

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