Liver Abscess Caused by *Citrobacter Freundii* Secondary to Cholecysto-antral Fistula: A Case Report

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Abstract—Liver abscesses secondary to bilio-enteric fistulas are rare and therefore unknown to the attending physician. In this report, we present a bilio-enteric communication, between the gallbladder; which was macro lithiasic; and the stomach revealed by an upper digestive hemorrhage in a septic context in a 34 year old man. A pyogenic bacterial liver abscess developed because of the fistula without biliary obstruction. The patient was treated surgically with disconnection of the fistula and drainage of the abscess. The liver abscess is probably due to the contamination of the bile by the cholecysto-gastric fistula. The germ isolated was a *Citrobacter freundii* which is rarely involved in liver abscesses.

Index Terms— bilio-enteric fistula, *Citrobacter freundii*, liver abscess.

I. INTRODUCTION

Cholecystogastric fistula is a rare complication of chronic cholecystitis or chronic cholelithiasis. It results from progressive erosion of the chronically inflamed wall of the gallbladder and stomach with subsequent formation of fistulas [1,2]. Bilio-enteric communications leading to the formation of hepatic abscesses are rare and are therefore not easily diagnosed [3]. In this case, we report our experience in the management of a cholecystogastric fistula complicated by a liver abscess and review the current literature.

Case report

A 34 years old, chronic alcoholic and smoker with 14 pack/year came with complaints of fever, right upper quadrant pain in abdomen, a few episodes of maelena and nausea evolving in a context of asthenia, weight loss since 2 months. Clinical examination found a conscious patient, hemodynamically and respiratory stable, febrile with a temperature of 38.5°C, and right upper quadrant tenderness. Upper gastro-intestinal endoscopy revealed an erythematous antro-fungal gastritis with a small antral orifice possibly related to a fistula. Colonoscopy was normal.

Laboratory tests showed anaemia with hemoglobin level at 8,9 g/dl, a white blood cell count of 24600/mm³, elevated liver enzymes (GGT: 272 U/L, and ALP: 472 U/L), C-Reactive protein was raised and VIH, echinococcal and amoebic serologies were negatives. The abdominal ultrasound showed multiple collections occupying most of the right liver, the largest of which is located at segment VII, measuring 9.7x6 cm. Abdominal CT (Figure 1) showed

multiple abscesses, the largest of which is situated in segment VII, measuring 92x65 mm, with dilation of the intrahepatic bile ducts and the common bile duct, which measures 14 mm seat of aerobilia. The gallbladder was schlerotrophic with gallstone and air bubbles within it.

Fig. 1. Abdominal CT injected on cross-sectional scans showing the presence of multiple hepatic abscesses (red arrows) in the right liver with dilation of the common bile duct (green arrow) and the intrahepatic bile duct with aerobilia (blue arrows) and schlerotrophic macrolithiasic gallbladder (yellow arrow).

The biliary MRI (Figure 2) showed multiple hepatic abscesses occupying the entire right liver. The common bile duct was dilated measuring 11 mm, with a regular narrowing in its distal part.

Fig. 2. Biliary MRI radial sequence showing dilation of the common bile duct, without detectable obstacle with regular narrowing at its terminal part.

The patient was operated. Surgical exploration (Figure 3) found three pyogenic non-parasitic liver abscesses situated in segments VI, VII and VIII measuring respectively 5 cm, 6 cm and 2 cm. The gallbladder was schlero-atrophic with a big gallstone within it measuring 2cm. A bilio-enteric fistula involving the gallbladder and the antrum was discovered. The common bile duct was dilated measuring 2 cm without detectable obstacle. The abscess was drained, and cholecystectomy was performed with disconnection of the bilio-enteric communication. The common bile duct was drained by Kehr's drain.

Fig.3. intraoperative image of the fistula (yellow arrow) communicating the antrum (blue arrow) with schlerotrophic gallbladder (red arrow).

The postoperative course was uneventful. There was no further bleeding. Kehr's drain brought back 700 ml of bile on day 1, then its flow gradually decreased until it dried up on day 12. The patient had a postoperative cholangiography through the Kehr's drain at day 21 which revealed a good duodenal passage with no extravasation of the contrast product and dilation of the common bile duct measuring 15mm (Figure 4). The patient was discharged after Kehr's drain removal. The organism isolated from the liver abscess was *Citrobacter Freundii*. The decline was 1 year.

Fig. 4. postoperative cholangiography through the Kehr drain showing good duodenal passage of the contrast product.

II. DISCUSSION

The biliary is normally sterile in healthy people due to the Oddi's sphincter which prevents the entry of bacteria from the intestinal tract [4]. Bacterial pyogenic abscess is most often associated with secondary biliary bacterial colonization in a biliary ducts partially or completely obstructed by a stone, tumor or stenosis [3]. In our case, no biliary obstruction was found. The organisms can also contaminate the hepatic parenchyma by the hematogenous route (most often portal), or by contiguity in particular near the gall bladder [5]. The contamination pathway in our patient was a cholecysto-gastric fistula which communicated organisms from the digestive tract with the biliary tract. Biliary fistulas occur in 3 to 5% of patients with gallstones, the duodenum being the most common fistulization site followed by the stomach [6]. They are usually linked to chronic cholecystitis or long-standing cholelithiasis [1]. Our patient had a macro-lithiasic schlerotrophic gallbladder.

The pyogenic hepatic abscess symptoms are multiple and non-specific, fever is the most common symptom [7,8] although most patients also suffer from anorexia, nausea, weight loss and asthenia. Pain or tenderness in the upper right quadrant occurs in about 60% of cases. Jaundice is generally apparent when the bile ducts are blocked [8] This corresponds to the clinical presentation of our patient except jaundice. Liver function blood tests may be disturbed depending on the extent of the abscess, its etiology and its consequences. The diagnosis is mainly based on imaging tests [5]

Ultrasound and CT are sensitive to make the diagnosis in more than 90% of the cases, and to direct to the etiology [5] Computed tomography features of a bilioenteric fistula include pneumobilia, the joining of the two organs with an edematous wall, pericholecystic infiltration, gallstones in the gastrointestinal tract, and intestinal distension. A clear delineation of the fistulous tracts on cross-sectional scans is usually difficult to achieve because of the irregular routes of the fistulas [2]. In this report, the gallbladder and stomach were not closely adhered together, and the wall was neither edematous nor thickened.

Since most cases are diagnosed intraoperatively, preoperative planning is difficult to achieve [1]. The treatment in the first place is the drainage of abscesses and the control of sepsis. The etiological treatment consists of cholecystectomy and the treatment of the fistula. Abscess drainage and cholecystectomy can be done in one or two steps by conventional or laparoscopic approach. Sometimes non-operative management via the placement of internal stents in a non-operable patient has also been described [9]. In our case a conventional surgical approach in one step was performed with good post-operative recovery.

The most common organisms isolated in pyogenic liver abscesses are Gram negative aerobes, especially *Escherichia coli* and *Klebsiella pneumonia* in which only a few strains exhibited resistance to the commonly used antibiotics [7, 10]. Here we present a case of liver abscess caused by the multidrug-resistant *Citrobacter freundii*. *Citrobacter* is a genus of Gram-negative coliform bacteria in the Enterobacteriaceae family. *Citrobacter* species are commonly found the intestinal tracts of humans. The patients at risk of acquiring *Citrobacter* infections are debilitated or immune-compromised patients [11]. Liver abscess caused by *Citrobacter* is a rare entity with only a

few cases reported so far, with *Citrobacter koseri* being more frequent than *C freundii* [10].

III. CONCLUSION

The management of liver abscesses is based on drainage, the management of sepsis and the treatment of its etiology. The diagnosis of an enterobiliary fistula is difficult given the non-specific nature of the symptoms. In these cases, computed tomography as an imaging modality should be considered for diagnosis and for adequate preoperative planning in order to obtain a better therapeutic approach. Thus, the choice of the appropriate treatment must be guided by the clinical condition of the patient, the expertise of the surgeon and the best postoperative outcome for the patient.

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Conflicts of interest: None to declare.

Author contributions: All authors have contributed to the conduct of this work. All authors also declare that they have read and approved the final version of the manuscript.

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