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Case Report

Surgical treatment of hepatic abscess guided by intraoperative ultrasound

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Abstract: Pyogenic liver abscesses are one of the complications of acute cholecystitis. Its dissemination can occur hematogenous, through the hepatic artery or the portal vein, or through biliary dissemination, due to ascending cholangitis. The germs involved are *Escherichia Coli*, *Klebsiela pneumoniae*, *Anaerobic Streptococci* and *Enterococci*. The importance of a prompt diagnosis and treatment is based on the severity of the clinical picture and its complications, such as morbidity and mortality. The main risk factors are Diabetes, Hypertension, cholelithiasis and previous abdominal surgery. The purpose of this study is the evaluation of the case and discussion about the forms of treatment and the demonstration of the importance of using the Ultrasound for localization of deep intrahepatic collections.

Keywords: Pyogenic abscesses; Liver; Liver abscesses; Ultrasound.

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1. Introduction

Pyogenic liver abscesses (PLA) represent a serious medical condition with high mortality rates among hospitalized patients, ranging from 5.6% to 10%, depending on their underlying cause [3, 5]. Its incidence has been on the rise and is linked to various factors such as cirrhosis, hypertension, chronic kidney disease, and diabetes. Additionally, it is closely associated with abdominal surgeries, particularly cholelithiasis (gallstones) and acute cholecystitis [2, 3]. Its incidence is increasing and carries a considerable mortality rate [9]. In recent years, there has been a trend away from surgery as the initial approach, with aggressive antibiotic therapy and percutaneous aspiration or drainage as pillars of treatment [10].

Liver abscesses linked with cholecystitis have an incidence rate of up to 20%. They may be linked to gallbladder perforation, which can lead to abscesses being categorized as either pericolecystic (located in segments IV and V) or distant (occurring in non-contiguous segments) [4]. Pericholecystic abscesses, in most cases, stem from type 2 gallbladder perforations (perforations in the subacute phase), as per Fletcher's classification. Early intervention for acute cholecystitis plays a pivotal role in reducing the occurrence of complications such as PLA [6] and subsequently lowers mortality rates, which can be notably high in cases where gallbladder perforation is the underlying cause, potentially reaching 40% [6].

Typically, perforation takes place at the base of the gallbladder, as it is the region with the poorest vascular supply. This area is farthest from the cystic artery and consequently more prone to perforation (referred to as Niemeier type 2 perforation) [7]. The

primary cause of perforation is the obstruction of the cystic duct, leading to an increase in gallbladder volume and distension of its walls, thereby compromising vascularization [7]. C-reactive protein is often elevated - in 100% of cases in one series [9]. The most commonly isolated germs from blood or pus cultures among American patients are species of Streptococcus, followed by *Escherichia*, *Staphylococcus*, and *Klebsiella* [10]. The incidence of PLA is increasing: a large American series described an incidence of 3.59 cases per 100,000 inhabitants per year, and this rate is increasing by 4% annually [10].

Its incidence is increasing and carries a considerable mortality rate [9]. In recent years, there has been a trend away from surgery as the initial approach, with aggressive antibiotic therapy and percutaneous aspiration or drainage as pillars of treatment [10]. Pyogenic liver abscess (PLA) appears to be associated with diabetes mellitus. Although the initial presentation is like PLA caused by other bacteria, distant infection, including high rates of bacteremia, endophthalmitis, meningitis, septic pulmonary emboli, and empyema, has been reported. The finding of a K. pneumoniae infection outside the liver should prompt an examination for hidden PLA. Other notable pathogens include Yersinia enterocolitica, which is reported to cause PLA in patients with hemochromatosis, and Staphylococcus, prevalent in trauma-associated [11].

The etiology of PLA can be divided into six categories: biliary infection, portal vein seeding (pyelophlebitis), direct extension, hepatic arterial seeding, penetrating trauma, and cryptogenic cause. The Johns Hopkins series that defined these categories described a shift from appendicitis with transvenous spread as the primary cause of PLA to biliary obstruction, commonly by cholangiocarcinoma, especially after palliative stent placement [12]. Immunosuppression should also be considered in the etiology of PLA. Potential causes include systemic chemotherapy, immunosuppressive drugs in transplant recipients and those with inflammatory and autoimmune disease, hereditary immunodeficiency syndromes, and acquired immunodeficiency states such as HIV/AIDS [13]. It is reported that ultrasound has a sensitivity of 94% for PLA, allows for the evaluation of the biliary tree, and is widely available; therefore, it is an appropriate initial imaging modality [14].

Ultrasound, however, may not depict smaller abscesses and is less capable of distinguishing metastases from abscesses compared to CT scans. While hypointense on T1 and hyperintense on T2, it is not favored for diagnosis due to longer image acquisition times. It is inadequate for drainage guidance and has lower sensitivity in detecting other intra-abdominal pathology compared to CT [13].

2. Case Report

Female patient, 52 years old, admitted for elective laparoscopic cholecystectomy (LC). During the surgery, a gallbladder with thickened walls (indicative of acute cholecystitis) and a hepatic bulge in segments 6 and 7 were identified. LC and drainage of the hepatic abscess were then performed, involving de-roofing and irrigation of the hepatic space, along with the placement of a tubular drain. The patient received a course of antibiotic therapy with Ciprofloxacin and Metronidazole for 7 days. She was discharged on the 8th day, without the drain, and was asymptomatic.

The patient returned to the hospital 38 days after the initial surgery with symptoms of fever, chills, and abdominal pain. An abdominal tomography was performed, revealing a sizable hepatic abscess. Intravenous antibiotic therapy was initiated, and she underwent a reoperation the following day, during which the abscess was drained once again. However, this time, the surgery was performed conventionally, through a supraumbilical midline incision. The patient experienced a protracted postoperative clinical course without improvement. A repeat computed tomography (CT) of the abdomen and pelvis was performed 17 days after the second surgery (Figures 1 and 2), which showed persistent abscess, located in segments V, VI, and VIII.

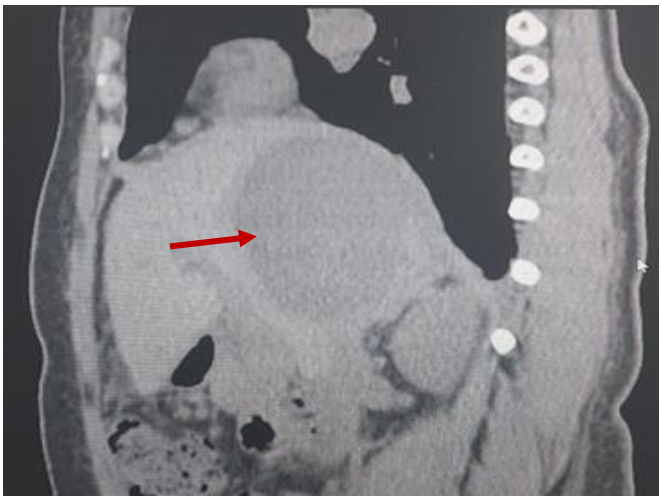

Figure 1: Abscess - CT scan – Sagittal.

Figure 2: CT Scan showing Pyogenic Liver Abscess.

4. Conclusion

In the case reported here, the patient underwent three surgeries. The first surgery involved the removal of the gallbladder and drainage of the hepatic abscess. The second surgery only drained the subhepatic collection. It was only during the third intervention, with the use of ultrasound (US) (Figure 3 and 4), that it was possible to not only select the optimal drainage site, but also ensure the proper emptying of the abscess and placement of the drain, as the abscess occupied three segments of the liver. The absence of ultrasound guidance during the second surgical approach led to unsuccessful abscess drainage, resulting in uncontrolled infection. This holds significant clinical importance, as previously mentioned, given that the mortality rate for a pyogenic liver abscess can be as high as 20%.

We aim to demonstrate the importance of intraoperative ultrasound (US) in hepatic approaches for abscess drainage. It is not always possible to visually identify the exact location on the hepatic surface. In this case, it became evident that with the guidance of ultrasound, we achieved a broad and effective abscess drainage. Therefore, whenever feasible, we should utilize imaging methods like ultrasound during surgical procedures to accurately address an intrahepatic collection.

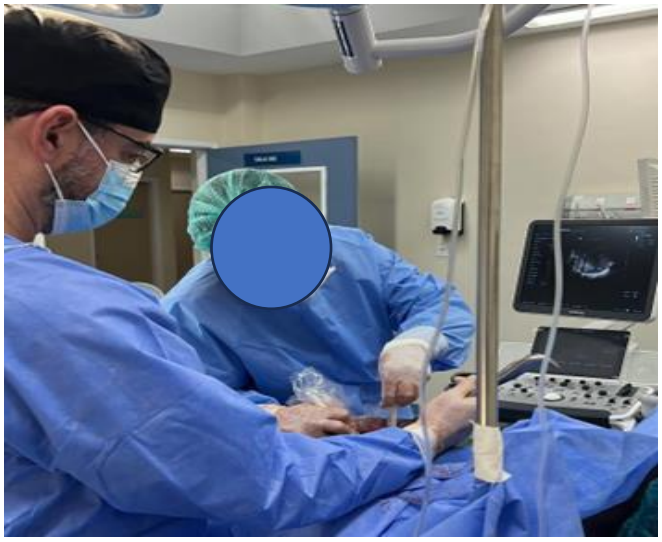

Figure 3: Puncturing the liver abscess.

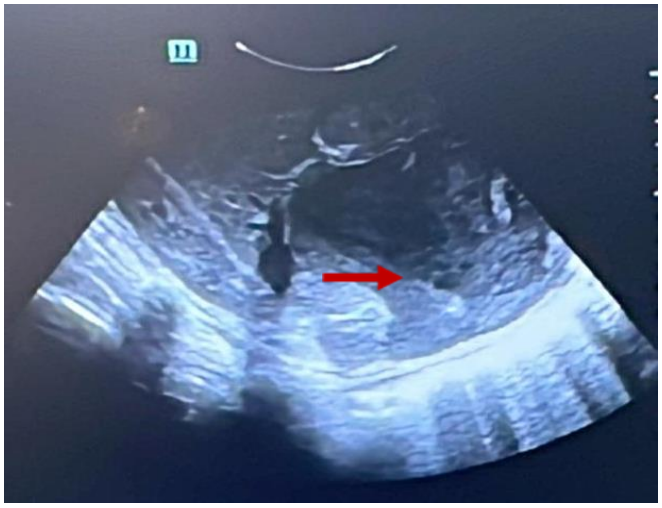

Figure 4: Pyogenic Liver Abscess shown on US.

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Research Ethics Committee Approval: We declare that the patient approved the study by signing an informed consent form and the study followed the ethical guidelines established by the Declaration of Helsink.

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Conflicts of Interest: None.

Supplementary Materials: None.

References

1. Hussain T, Adams M, Ahmed M, Arshad N, Solkar M. Intrahepatic Gallbladder Perforation Causing Hepatic Abscesses: Case Studies and Literature Review of a Rare Complication. Ann R Coll Surg Engl. 2016 Jul;98(6):e88-91. DOI: 10.1308/rcsann.2016.0115. EPub 2016 Apr 8. PMID: 27055407; PMCID: PMC5209960.
2. Machado, M.M. Couinaud's hepatic segmentation: beyond the radiologist's eyes. DOI:10.1590/SO100-39842003000400001. Arq. Bras. Radiologia, 36 (4) – August 2003.
3. Heneghan HM, Healy NA, Martin ST, et al. Research Note BMC 2011; 4:80.
4. Population-based study of pyogenic liver abscesses in the United States: incidence, mortality, and temporal trend. Am J Gastroenterol 2009; 105:117–24.
5. Klebsiella pneumoniae liver abscess: a new invasive syndrome. Lancet Infect Dis 2012; 12:881–7.
6. Huang CJ, Pitt HA, Lipsett PA, et al. Changing trends over 42 years. Ann Surg 1996; 223:600.

7. Kurland JE, Brann OS. Pyogenic and Amebic Liver Abscesses. Curr Gastroenterol Rep 2004; 6:273–9.
8. Johannsen CE, Sifri CD, Madoff LC. Pyogenic Liver Abscesses. Infect Dis Clin North Am 2000; 14:547–63
9. Heneghan HM, Healy NA, Martin ST, et al. Research Note BMC 2011; 4:80.
10. Population-based study of pyogenic liver abscesses in the United States: incidence, mortality, and temporal trend. Am J Gastroenterol 2009; 105:117–24.
11. Klebsiella pneumoniae liver abscess: a new invasive syndrome. Lancet Infect Dis 2012; 12:881–7.
12. Huang CJ, Pitt HA, Lipsett PA, et al. Changing trends over 42 years. Ann Surg 1996; 223:600.
13. Kurland JE, Brann OS. Pyogenic and Amebic Liver Abscesses. Curr Gastroenterol Rep 2004; 6:273–9.
14. Johannsen CE, Sifri CD, Madoff LC. Pyogenic Liver Abscesses. Infect Dis Clin North Am 2000; 14:547–63.