

Case Report

Rupture of *Clostridium perfringens* liver abscess treated with continuous irrigation and drainage: a case report

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Received August 6, 2018; Accepted November 8, 2018; Epub December 15, 2018; Published December 30, 2018

Abstract: Hepatic abscesses caused by *Clostridium Perfringens* are extremely rare in pyogenic liver abscesses in China. We are reporting that Spontaneous rupture of a *Clostridium Perfringens* liver abscess into the abdominal cavity was successfully treated with continuous irrigation and drainage. At the most recent followup examination at two months after the cessation of treatment, the patient was observed to be cured without clinical or imaging evidence of disease recurrence. Early abdominal irrigation and continuous drainage were the key factors to achieve a favorable outcome. Therefore, patients with signs of the acute peritonitis and rupture of the liver abscess caused by hepatic abscesses can be successfully treated.

Keywords: Rupture, *Clostridium perfringens*, liver abscess, emergency surgery, irrigation and drainage

Introduction

Although clostridia are widely distributed in nature and a normal resident of the human intestine, invasive pathogens are usually associated with physical trauma that is destroyed by some local tissue [1]. It is usually considered that necrotic tissue without oxygen supply is required for initiation of the infection.

Case report

A 52-year-old man was sent to our Emergency Department due to sudden abdominal pain. The laboratory examination showed: WBC $18.1 \times 10^9/L$, NE% 93.8%, AST 101.9 U/L, ALT 78.5 U/L, TBIL 119.51 $\mu\text{mol/L}$, BUN(S) 11.7 $\mu\text{mol/L}$, Cr(S) 193.4 $\mu\text{mol/L}$. blood pressure 89/59 mmHg, SPO2 96%, heart rate: 103 bpm. Abdominal computed tomography detected that a gas-containing space-occupying lesion on the right posterior lobe measured 25 mm*23 mm*40 mm in size. Multiple gas shadows were observed in the abdomen and pelvis, which may be considered as an infectious lesion in the right posterior lobe of the liver with rupture (**Figure 1**). Right nephrectomy was performed 20 years earlier and the patient suffered from diabetes for the past 3 years.

The patient underwent emergency exploratory laparotomy. During the surgery about 200 ml of purulent liquid were caught in right upper quadrant. Patchy dirty gray white lesions were showed on the V and VI sections of right hepatic surface, which ranged of about 8*6*6 cm, palpable crepitus (**Figure 2**). In the dorsal part of the VI section, purulent fluid outflowed from the wound and the abscess cultures grew out *Clostridium Perfringens*. A large amount of normal saline irrigated the abdominal cavity and there was no active bleeding in the rupture area of the liver lesion. An irrigation tube was placed next to the right liver breach.

After the operation, continuous irrigation and drainage was performed for seven days until the drainage fluid was clear and discharged two weeks later when the liver function, blood routine test, and MRI (**Figure 3**) were normal.

Discussion

Hepatic abscesses caused by *Clostridium Perfringens* are extremely rare in pyogenic liver abscesses in China according to the research of 6,347 subjects of pyogenic liver abscess [2]. In general, this infection occurs in patients with potentially malignant tumors or diabetes melli-

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Figure 1. CT showing the gas-containing liver abscess in the right posterior lobe of the liver.

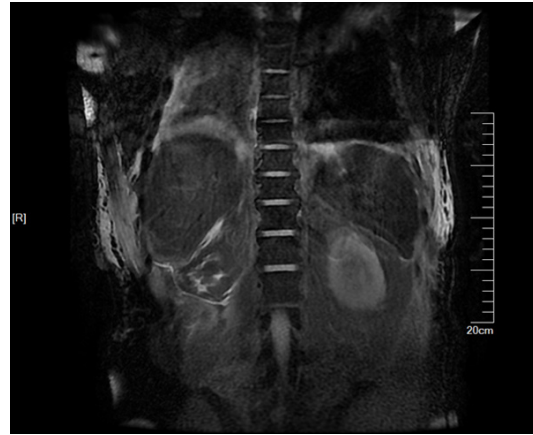


Figure 3. MRI coronal plane showing the postoperative normal liver.

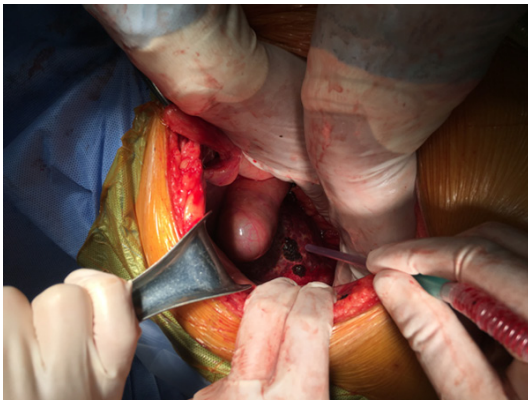


Figure 2. Spontaneous rupture of liver abscess into the abdominal cavity and the enlarged gallbladder.

tus, or in some healthy individuals who have recently had abdominal surgery or abortion [3].

It can cause jaundice through two avenues: 1) Hepatic cell injury caused by hepatic abscess; Alpha toxins are the main virulence factors caused by *C. perfringens* infection by inducing gas gangrene [4, 5]. While *C. perfringens* alpha-toxin can destroy the structural integrity of the red cell membrane by means of phospholipase activity [4], it remains to be researched whether alpha-toxin can damage liver cells by the same mechanism. 2) The alpha toxin of *Clostridium perfringens* induced massive intravascular hemolysis by disrupting red blood cell membranes [6].

During the surgery, when entering the abdomen, the Groff knife can ignite a spark, and we heard the plop, which may be caused by the combustible gas produced by the *Clostridium*

perfringens. The enlarged gallbladder (**Figure 2**) suggested that infection may originate from the biliary system.

In the face of infection and rupture of the liver, it is not clear whether it is necessary to line the liver resection. Taking into account the diabetic patient, this is an independent risk factor in surgical procedures [7] and sufficient evidence was found that increased the risk of adverse events included postoperative complications, liver failure, and infection following hepatectomy [8]. These include: the incision may be easy to bleed, not easy to heal, and higher risk of secondary infection in addition to damaging liver function after emergency hepatectomy. Abundant irrigation and drainage can ensure liver function, may reduce postoperative bleeding, provide sufficient air contact to kill anaerobic bacteria, and can also monitor intra-abdominal infection and prognosis.

After the operation, metronidazole treatment is completely necessary, as a U.S. national survey on anaerobic susceptibility testing found that metronidazole is 89% tested by hospital laboratories [9]. In addition, continuous daily 3000 ml saline drainage is critical for debridement of abscesses and elimination of bacteria.

The most appropriate treatment for liver abscess is ultrasound-guided percutaneous drainage. Due to non-surgical intervention in the latest advances in radiology this treatment can be safely and effectively [10] delivered. However, if signs of acute peritonitis are present and rupture of the liver abscess occurs, such as our patient, the surgical drainage of abscess, then

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continuous intraperitoneal irrigation and drainage, and the application of appropriate antibiotics must be performed.

Conclusion

In conclusion, identification of a gas-forming liver abscess, the prompt initiation of antibiotic treatment, the early abdominal irrigation, and continuous drainage are the key factors to achieve a favorable outcome in patients with signs of acute peritonitis and rupture of the liver abscess.

Acknowledgements

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The patient was contacted by telephone to obtain verbal informed consent.

Disclosure of conflict of interest

None.

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