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Letter to Editor

## Emergency laparoscopy-treated spontaneous bleeding and cystobiliary communication of multiple liver cysts



### Keywords:

Liver cysts  
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Emergency

To the editor,

Rupture of non-parasitic liver cysts is rare, especially with hemorrhage, biliary communication, and a large amount of fluid in the abdominal cavity.<sup>1</sup> We report the case of an elderly patient with a liver cyst with bleeding and biliary communication that spontaneously ruptured and was successfully treated by laparoscopic deroofting and closure of the communication.

A 74-year-old man was admitted to the emergency center with sudden right upper abdominal pain for 24 h duration. His abdominal pain was full and persistent, without radiating pain, diarrhea, vomiting and fever. No blood in the stool and urine. His vital signs were as follows: T, 36.7 °C; P, 95/min; R, 26/min; BP, 160/93 mmHg and oxygen saturation, 96%. The shape of abdomen was normal, the right upper abdomen was tender, no rebound pain, the liver wasn't palpable. Non-coagulated blood was drawn out by diagnostic abdominal puncture. He had discovered liver multiple cysts 5 years ago, the largest diameter was about 4.5 cm in 2014, and then it had been growing slowly without abdominal symptoms. This elderly patient has a history of chronic bronchitis, emphysema, hypertension, and renal insufficiency, all of which were well controlled and taken drugs regularly.

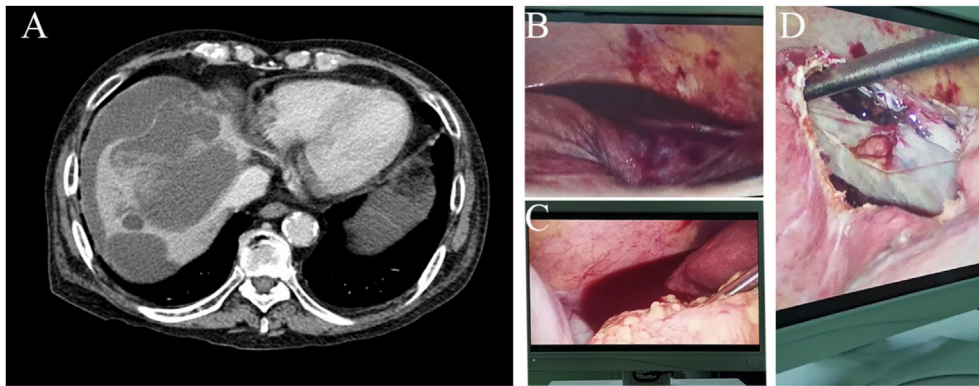
Enhanced CT scans showed that there were many no enhanced low-density liver nodules and mass shadows (Fig 1A). The larger one had a diameter of about 9.0 cm. The capsules of two lesions on the top of the liver were collapsed, were considered the cysts rupture and hemorrhage. Scattered fluid in the pelvic and abdominal cavity, mesenteric swelling, signs of peritonitis. The COVID-19 virus RNA and total Antibody were negative. Hemoglobin 60 g/L, red blood cell count  $2.01 \times 10^{12}/L$ , platelet count  $53 \times 10^9/L$ , white blood cell count  $9.46 \times 10^9/L$ , prothrombin time 12.0s, hepatitis B surface antigen and hepatitis C antibody were negative, total bilirubin 6.9  $\mu\text{mol}/L$ , alanine disease aminotransferase 47 IU/L, albumin 34.4 g/L, estimated glomerular filtration rate 7.35 ml/min/ $1.73 \text{ m}^2$ , creatinine 596 $\mu\text{mol}/L$ , sodium, potassium and calcium were normal. Natriuretic peptide 1277 ng/L, troponin-T 232.3 ng/L.

L. Echinococcus antibody was negative.

Therefore, we mainly considered hepatic cysts rupture and hemorrhage, and renal insufficiency. Then, we performed an emergency laparoscopic exploratory operation. It was found that the dark red bloody ascites in the abdomen (Fig 1B) and pelvis was about 800 ml, there were multiple cysts of different sizes in the left and right livers, the diameter of the biggest cyst was about 10 cm, and this cyst near the diaphragm collapsed (Fig 1B), ruptured and blood leaked (Fig 1C, D). After deroofting the cyst wall, we were surprised to find that the cyst fluid was mixed with blood, blood clots, especially yellow bile (Fig 1B, C, D). After cleaning up, we found that there was a daughter's cyst behind the cyst with a broken small blood vessel and bile duct on its wall. These were the source of active bleeding and bile leakage. The rupture of this small bile duct and blood vessel were about 2 mm in diameter. Then, the damaged bile ducts and blood vessels were sutured thoroughly. The operation time was 3 h, blood loss was about 200 ml, 1100 ml blood input, and 2 drainage tubes were placed around the liver. After the operation, the patient was transferred to surgical ICU to continue treatment. Blood transfusion, cefoxitin to prevent infection, phlegm, nutritional support and other supportive treatments. Histopathological examination of the specimens revealed bile duct origin liver cyst. The patient was discharged on postoperative day 10, and remains well without recurrence of the symptoms 2 months after surgery.

Spontaneous rupture of the liver cysts is a rare complication, but once it occurs, the mortality rate is high. We first report a 74-year-old man who was cured by laparoscopic surgery due to spontaneous rupture and bleeding of a giant liver cyst, combined with bile leakage. A total of less than 20 cases of hepatic non-parasitic cyst rupture have been reported globally.<sup>2</sup> These patients have pure cyst fluid or bile flowing into the abdominal cavity, and no severe anemia and mixed abdominal effusion have occurred. So, it was the first case of rupture bleeding and bile leakage. Laparoscopic liver resection is currently performed as a therapeutic method for liver lesions. In an emergency setting such as liver cysts bleeding or rupture, however it has not been well documented. The study showed that laparoscopic deroofting and closure of the communication was achievable. In emergency situations, we do not recommend TACE or partial hepatectomy for the treatment of hepatic cyst rupture and bleeding, after all, the bleeding of the cyst was not so rich and continuous.

There are many reasons that may be related to liver cysts rupture. Tong et al.<sup>3</sup> reported that a 70-year-old woman with an about 8.0 cm simple hepatic cyst was collapsed during anticoagulation (pulmonary embolism was initially considered). A 67-year-old woman suffered from abdominal pain caused by a non-parasitic



**Fig. 1.** a) The abdominal enhanced contrast computed tomography (CT) showed multiple cysts in the liver, part of the cyst wall ruptured, and blood around the liver. b) During laparoscopic surgery, dark red blood around the liver was found, mixed with bile, blood clots, and cyst fluid. c) During laparoscopic surgery, dark red blood around the liver was found, mixed with bile, blood clots, and cyst fluid. d) During the operation, it was confirmed that the hepatic cysts spontaneously ruptured and hemorrhage, and part of the cysts wall was pale yellow with bile duct communication.

liver cyst. After 2 weeks of anti-infection treatment, it was found that a 10.5 cm cyst was ruptured. Yuki Imaoka reported<sup>4</sup> the patient was treated with elective laparoscopic deroofing. Compared with this study, this patient was more urgent because of the excessive blood loss. As reviewed by Yuki Imaoka, our report may be the third case of emergency laparoscopic deroofing for liver cysts. Hepatic cyst combined with bile duct infection was also the most common cause of rupture.<sup>5</sup> Biliary communication, repeated infection of bile in the cyst fluid could easily cause damage to the cyst wall. We also confirmed this phenomenon in this case. Advanced polycystic liver was also the most likely to rupture.<sup>2</sup> If there was no abdominal bleeding, abdominal puncture and drainage were sufficient. Rupture of liver tumors often indicates a poor prognosis. For example, liver cancer, liver cavernous hemangioma, hepatoblastoma, liver teratoma. After ruptured, it may lead to abdominal implantation and metastasis, such as peritoneal metastasis in liver cancer, about 12%. Hepatic parasite cysts may even cause anaphylactic shock. But for non-parasitic liver cysts, we pay more attention to the possibility of cyst recurrence and re-infection.

In conclusion, we succeeded the emergency laparoscopic surgery for ruptured liver cysts with intraabdominal bleeding, bile leakage, and cystic fluid leakage. Old age, combined with other diseases, or long-term drug use, and those with unstable huge cysts are the main risk factors for cysts rupture.

#### Authors contributions

Xianwei Yang prepared the report and draft the manuscript. Tao Wang and Wentao Wang gave critical revision of the manuscript for important intellectual content. All authors have approved the submitted manuscript.

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#### Declaration of competing interest

The authors declare that they have no known competing

financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.asjsur.2020.09.013>.

#### References

1. Poggi G, Gatti C, Delmonte A, et al. Spontaneous rupture of non-parasitic hepatic cyst[J]. *Int J Clin Pract.* 2006;60(1):99–103.
2. Maki T, Omi M, Kaneko H, et al. Spontaneous rupture of non-parasitic or non-neoplastic multiple and giant liver cysts: report of a case[J]. *Surg Case Rep.* 2015;1(1):45.
3. Tong KS, Hassan R, Gan J, et al. Simple hepatic cyst rupture exacerbated by anti-coagulation[J]. *BMJ Case Rep.* 2019;12(9).
4. Imaoka Y, Ohira M, Kobayashi T, et al. Elective laparoscopic deroofing to treat the spontaneous rupture of a large simple liver cyst: a case report[J]. *Surg Case Rep.* 2016;2(1):148.
5. Shimada S, Hara Y, Wada N, et al. Spontaneously ruptured hepatic cyst treated with laparoscopic deroofing and cystobiliary communication closure: a case report[J]. *Asian J Endosc Surg.* 2016;9(3):208–210.

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