

## Biliary Obstruction Due to a Huge Simple Hepatic Cyst Treated with Laparoscopic Resection

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### Abstract

Most hepatic cysts are asymptomatic, but complications occasionally occur. We describe a patient with biliary obstruction due to a huge simple hepatic cyst treated with laparoscopic resection. A 60-year-old Japanese woman was admitted to our hospital because of a nontender mass in the right upper quadrant of the abdomen. Laboratory tests revealed the following: serum total bilirubin, 0.6 mg/dL; serum aspartate aminotransferase, 100 IU/L; serum alanine aminotransferase, 78 IU/L; serum alkaline phosphatase, 521 IU/L; and serum gamma glutamic transpeptidase, 298 IU/L. Abdominal computed tomography, ultrasonography, and magnetic resonance cholangiopancreatography revealed a huge hepatic cyst, 13 cm in diameter, at the hepatic hilum, accompanied by dilatation of the intrahepatic bile duct and obstruction of the common bile duct. We diagnosed biliary obstruction due to a huge hepatic cyst at the hepatic hilum, and laparoscopic surgery was performed. A huge hepatic cyst was seen at the hepatic hilum. After needle puncture of the huge cyst, the anterior wall of the cyst was unroofed, and cholecystectomy was done. Intraoperative cholangiography through a cystic duct revealed stenosis of the duct. Subsequent decapsulation of the cyst was performed in front of the common bile duct. After this procedure, cholangiography revealed that the stenosis of the common bile duct had resolved. Histopathological examination of the surgical specimen confirmed the hepatic cyst was benign. The postoperative course was uneventful, and the results of liver function tests normalized. The patient was discharged 7 days after operation. Computed tomography 3 months after operation revealed disappearance of the hepatic cyst and no dilatation of the intrahepatic bile duct.

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**Key words:** biliary obstruction, hepatic cyst, laparoscopic resection, decapsulation

### Introduction

Most hepatic cysts are asymptomatic, but

complications occasionally occur. Biliary obstruction due to a nonparasitic hepatic cyst is rare. Most previous cases have involved an enormous, centrally located cyst riding on the hilum<sup>1–17</sup>. We describe a

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Fig. 1 Abdominal CT demonstrated an enlarged hepatic cyst, 13 cm in diameter, with dilatation of the intrahepatic bile duct.

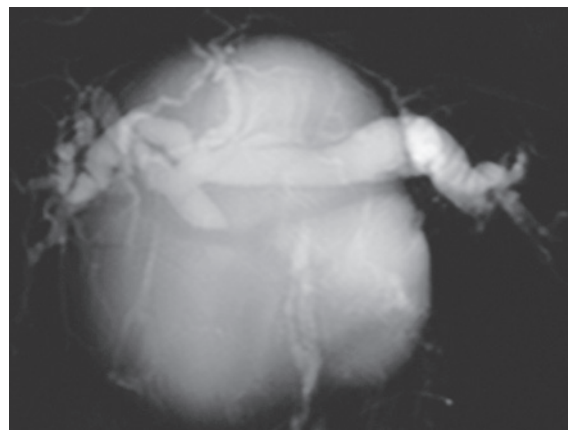


Fig. 2 Magnetic resonance cholangiopancreatography revealed a huge hepatic cyst at the hepatic hilum, accompanied by dilatation of the intrahepatic bile duct and obstruction of the common bile duct.

patient with biliary obstruction due to a huge simple hepatic cyst treated with laparoscopic resection.

### Case Report

A 60-year-old Japanese woman was admitted to our hospital because of a nontender mass in the right upper quadrant of the abdomen. She had undergone total gastrectomy, Roux-en-Y reconstruction, and splenectomy via an abdominal median incision for advanced gastric cancer (poorly differentiated adenocarcinoma, T2N0M0P0) approximately 3 years before this admission. We found a hepatic cyst at this operation, and puncture was performed.

She had no gastrointestinal symptoms for 3 years after the initial surgery. Follow-up laboratory tests revealed the following: serum total bilirubin, 0.6 mg/dL (normal, 0.2–1.2 mg/dL); serum aspartate aminotransferase, 100 IU/L (normal, <28 IU/L); serum alanine aminotransferase, 78 IU/L (normal, <33 IU/L); serum alkaline phosphatase, 521 IU/L (normal, 66 to 220 IU/L); serum lactic dehydrogenase, 554 IU/L (normal, 180 to 460 IU/L), and serum gamma glutamic transpeptidase, 298 IU/L (normal, 8 to 39 IU/L). The serum concentration of carcinoembryonic antigen was 3.0 ng/mL (normal, <5.0 ng/mL), and that of CA19-9 was 29.6 u/mL (normal, <37). Physical examination revealed a soft, elastic mass in the right upper quadrant of the abdomen. Abdominal computed tomography (CT) demonstrated an enlarged hepatic cyst, 13 cm in

diameter, with dilatation of the intrahepatic bile duct (**Fig. 1**). Ultrasonography revealed a huge anechoic mass at the hepatic hilum with dilated intrahepatic bile ducts. Magnetic resonance cholangiopancreatography revealed a huge hepatic cyst at the hepatic hilum, accompanied by dilatation of the intrahepatic bile duct and obstruction of the common bile duct (**Fig. 2**). Biliary obstruction due to a huge hepatic cyst at the hepatic hilum was diagnosed.

Laparoscopic surgery was performed. The patient was placed in the supine position with divaricated legs under general anesthesia. A 12-mm trocar was inserted into the umbilicus, followed by the introduction of a 10-mm flexible laparoscope. Two 5-mm trocars were positioned in the lower right quadrant. A 12-mm trocar was introduced in the upper left quadrant. Pneumoperitoneum was maintained at 8 to 10 mm Hg. The greater omentum adhered to the cystic wall and was dissected, revealing a huge hepatic cyst at the hepatic hilum (**Fig. 3a**). Needle puncture of the cyst yielded 800 mL of serous brown fluid, with no evidence of malignancy or parasitic infection. The CA19-9 level in the cyst contents was low (54.1 U/mL). The tissues between the parenchyma and the cyst were divided with laparoscopic coagulating shears (Harmonic Ace scalpel®, Ethicon Endosurgery, Cincinnati, OH, USA). The anterior wall of the cyst

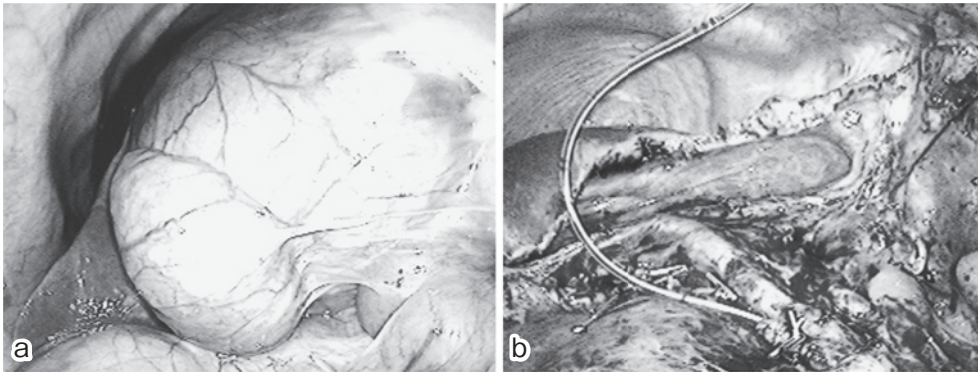


Fig. 3 **a:** A huge hepatic cyst was seen at the hepatic hilum. **b:** Decapsulation of the cyst in the front of the common bile duct was performed.

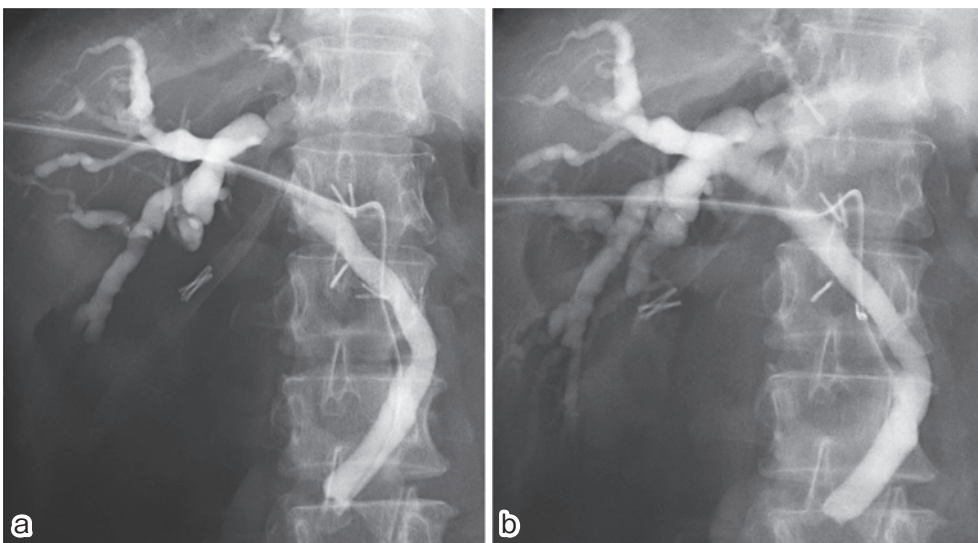


Fig. 4 **a:** Intraoperative cholangiography revealed stenosis of the common bile duct. **b:** After decapsulation of the cyst in front of the common bile duct, repeated intraoperative cholangiography revealed that the stenosis of the common bile duct had resolved.

was then unroofed. Cholecystectomy was performed, and the catheter was inserted into the common bile duct through the cystic duct. Intraoperative cholangiography revealed the stenosis of the common bile duct (**Fig. 4a**). Subsequent decapsulation of the cyst was performed in front of the common bile duct (**Fig. 3b**). After this procedure, intraoperative cholangiography showed that the stenosis of the common bile duct had resolved (**Fig. 4b**).

Histopathological examination of the surgical specimen confirmed the hepatic cyst was benign. The postoperative course was uneventful, and the results of liver function tests normalized. The patient was discharged 7 days after operation.

Follow-up CT 3 months after operation demonstrated disappearance of the hepatic cyst without dilatation of the intrahepatic bile duct (**Fig. 5**).

### Discussion

Most hepatic cysts are asymptomatic, but complications, such as rupture<sup>18</sup>, infection<sup>19-21</sup>, and intracystic hemorrhage<sup>15,17,22,23</sup>, can occur. However, biliary obstruction caused by a hepatic cyst is extremely rare. Solitary nonparasitic cysts of the liver causing biliary obstruction were first reported by Caravati et al in 1950<sup>1</sup>. Clinically, solitary hepatic cysts accompanied by biliary obstruction are characterized by huge lesions exceeding 10 cm in

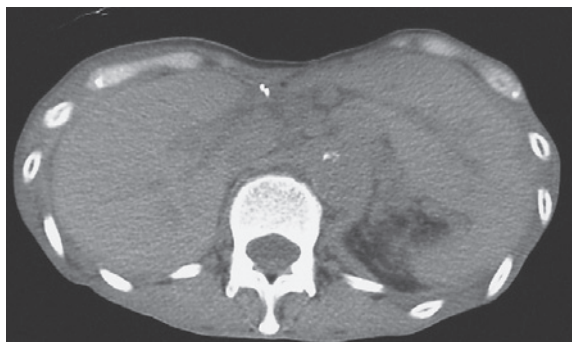


Fig. 5 Follow-up computed tomography 3 months after operation demonstrated disappearance of the hepatic cyst, without dilatation of the intrahepatic bile duct.

diameter, located in the center of the liver just above the hepatic hilum<sup>15</sup>. The huge cyst (diameter, 13 cm) in our patient was located in the hepatic hilum and was accompanied by dilatation of the intrahepatic bile ducts.

The prevalence of congenital hepatic cysts in the general population ranges from 2% to 4%<sup>24</sup>. Congenital hepatic cysts are classified into solitary cysts and polycystic cysts. The findings of the present patient are consistent with a solitary cyst. Gavisser<sup>25</sup> reported that the wall of a hepatic cyst consists of 3 layers: an inner layer of loose connective tissue lined with cylindrical or cuboidal epithelium, a middle layer of compact connective tissue containing blood vessels, and an outer layer of loose connective tissue with large blood vessels, bile ducts, and occasional von Meyenburg complexes. The epithelial lining may undergo necrosis and slough if the intracystic pressure becomes too high.

Diagnostic-imaging techniques, such as CT and ultrasonography, are useful for distinguishing simple cysts from biliary cystadenomas<sup>26</sup> and cystadenocarcinomas<sup>27</sup>, which have a more distinctive configuration. The presence of a solid, nodular, multilocular cystic mass with coarse calcifications along the walls or septa strongly suggests a cystadenocarcinoma<sup>28</sup>. In the present patient, none of the imaging studies showed solid elements, and no enhancement was seen on contrast CT. The diagnosis in this case was therefore a simple hepatic cyst.

Laboratory findings showed that levels of

hepatobiliary enzymes were elevated on admission but were normalized after operation. Because other causes of elevated hepatobiliary enzymes were absent, this elevation was attributed to biliary obstruction.

Treatment recommendations for symptomatic hepatic cysts include surgery<sup>29-34</sup> and the injection of a sclerosing agent into the cyst<sup>35,36</sup>. Lin et al.<sup>31</sup> introduced the technique of cyst unroofing, followed by internal drainage into the free peritoneal cavity. This technique has become the standard treatment for symptomatic multiple cysts and simple cysts of the liver. The cysts should be aspirated intraoperatively, and the fluid examined. Complete decompression of the cyst facilitates resection. Because the most common cause of recurrence is inadequate collapse of the cavity, wide fenestration or resection is necessary to prevent adhesion of the cyst wall and refilling of the cyst<sup>33</sup>. Cystic excision is performed near the hepatic parenchyma; removal of the entire cyst wall is unnecessary<sup>32</sup>. In our patient, the anterior wall of the hepatic cyst was unroofed, but intraoperative cholangiography revealed stenosis of the common bile duct. Subsequent decapsulation of the cyst in the front of the common bile duct was therefore necessary. After this procedure, intraoperative cholangiography revealed that the stenosis of the common bile duct had resolved. In the present case, stenosis of the common bile duct was unlikely to resolve after unroofing of the cyst alone.

Gamblin et al.<sup>34</sup> performed laparoscopic resection as standard treatment for benign symptomatic hepatic cysts. A laparoscopic approach to these cysts carries several important advantages, including reduced postoperative pain, early mobilization, no ileus, a short hospital stay, rapid recovery, and cosmetic benefits<sup>37</sup>.

Solitary nonparasitic cysts of the liver with biliary obstruction have a favorable prognosis<sup>14</sup>. Laparoscopic resection is useful for the treatment of biliary obstruction due to simple hepatic cysts at the hepatic hilum.

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