Liver Cyst With Biliary Communication Successfully Treated With Laparoscopic Deroofing: A Case Report

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ABSTRACT
A 71-year-old Japanese woman complained of right upper abdominal fullness and pain. Computed tomography revealed a huge cyst in the right lobe of the liver, measuring 16 cm in diameter. She underwent laparoscopic deroofing of the liver cyst. On operation, needle aspiration of the cyst yielded clear serous fluid without any bile contamination. However, after the cyst was deroofed with laparoscopic coagulating shears, bile leakage was recognized from a tiny orifice in the cyst cavity. A catheter was inserted via the orifice for cholangiography, which demonstrated a communication with the biliary tract. The orifice was easily closed with a laparoscopic suturing device. Operation time was 5 hours and 30 minutes, and blood loss was 300 grams. Pathological examination of the liver cyst was consistent with a simple cyst. The postoperative course was uneventful, and the patient has had no recurrence to date at 13 months. Laparoscopic deroofing is a recommended treatment for a liver cyst even in the presence of cystobiliary communication.

Key Words: Liver cyst, Laparoscopic deroofing, Biliary communication.

INTRODUCTION
Among various types of treatment options for a liver cyst, deroofing of the cyst is recommended as a safe and reliable procedure. Recently, it has been possible to perform deroofing laparoscopically because of the advances in laparoscopic techniques. However, the place of laparoscopic deroofing is controversial when the cyst has a biliary communication. Besides, it is difficult to diagnose the presence of the cystobiliary communication preoperatively or even during operation. Overlooking the cystobiliary communication leads to postoperative bile leakage, which is a serious complication.1 We, herein, present the case of a liver cyst with biliary communication diagnosed intraoperatively and successfully treated by laparoscopic procedures.

CASE REPORT
A 71-year-old Japanese woman presented with right upper abdominal fullness and pain of 18-months duration. When a huge cyst, measuring 14 cm in diameter, was pointed out in the right lobe of the liver at a nearby hospital, percutaneous aspiration was performed and resulted in disappearance of the cyst. However, the patient noted right upper abdominal distention again in 11 months and was admitted to the Department of Surgery I, Kyushu University Hospital. The blood cell count and serum chemistry showed no abnormalities except for mild anemia. Computed tomography indicated a cyst in the right lobe of the liver, showing homogeneous water density without any mural nodules and measuring 16 cm at its largest diameter (Figure 1). Computed tomography also showed a pigeon egg sized paraovarian cyst. Endoscopic retrograde cholangiography was performed but unsuccessful. With a colonoscopic examination, adenocarcinoma, 1.3 cm in diameter, was found at the splenic flexure of the transverse colon. The patient underwent laparoscopic deroofing of the liver cyst, together with laparoscopy assisted transverse colectomy for transverse colon cancer and laparoscopic resection of paraovarian tumor. At operation, the huge liver cyst was seen to protrude extrahepatically with mild adhesion to the surrounding tissue (Figure 2). Needle aspiration of the cyst showed clear serous fluid without...
any macroscopic bile contamination. A cytological examination of the fluid was negative for malignancy. After the cyst was deroofed with laparoscopic coagulating shears (Harmonic Scalpel, Ethicon Endo-Surgery, Inc., Cincinnati, OH) (Figure 3), however, laparoscopic inspection of the inner surface of the cyst cavity revealed a small orifice of bile leakage (Figure 4). A catheter was inserted into the orifice for cholangiography, which demonstrated a communication of the cyst with the right anterior inferior hepatic branch of the bile duct (Figure 5). Indocyanine green diluted in saline was subsequently injected to detect any other leakage points, but no other communications were found. The orifice was closed with interrupted sutures by using a laparoscopic suturing device (Endostitch, Tyco Healthcare Japan, Tokyo, Japan) (Figure 6). The inner surface of the remaining cavity as well as the resected margin was coagulated with an argon beam coagulator. Total operation time was 9

Figure 1. Computed tomography reveals a liver cyst in the right lobe, measuring 16 cm in diameter.

Figure 2. The liver cyst protrudes extrahepatically with mild adhesion to the surrounding tissues.

Figure 3. The cyst being deroofed with laparoscopic coagulating shears.

Figure 4. Macroscopic inspection of the cyst cavity shows bile leakage (arrow).
hours 15 minutes, and that for the deroofing of the liver cyst was 5 hours 30 minutes. Total blood loss was approximately 500 grams, and that for the deroofing of the liver cyst was approximately 300 grams. According to the pathological examination of the resected specimen, the liver cyst was deemed consistent with a simple cyst, which was lined with cuboidal epithelial cells. The tumor of the transverse colon was adenocarcinoma, invading submucosa, and the paraovarian tumor was cellular fibroma. The postoperative course was uneventful, without any bile leakage. The patient was discharged on postoperative day 27 and had no recurrence of the liver cyst during the 13-month follow-up.

Figure 5. Cholangiography via the orifice (arrow) demonstrates the communication to a branch of the anterior inferior segmental duct.

Figure 6. The biliary orifice being closed with a laparoscopic suturing device.

DISCUSSION

Various therapeutic options for a symptomatic liver cyst have been described, including percutaneous aspiration, cystojejunostomy, deroofing or excision of the cyst, partial liver resection, and even liver transplantation. Among them, deroofing of the cyst is now recommended as the gold standard treatment in cases of nonpoly-cystic liver diseases, because of its simplicity, effectiveness, and low morbidity. This procedure was introduced by Lin et al in 1968 and was performed laparoscopically by Paterson-Brown and Garden for the first time in 1991. The laparoscopic technique is not only less invasive than the conventional counterpart, causing less pain and promoting faster recovery, but also is as reliable as open surgery in terms of recurrence rates. However, deroofing has been considered a contraindication for cysts with cystobiliary communication, for which cystojejunostomy has often been used. Because postoperative bile leakage can lead to serious complications, the cystobiliary communication must never be missed.

Despite technological advances in imaging modalities, the presence of the cystobiliary communication is still difficult to demonstrate preoperatively. Endoscopic retrograde cholangiography, which was unsuccessful in the present patient, is considered a standard method for detection of cystobiliary communication. However, it is
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not always useful because high intracystic pressure might prevent opacification of the cavity through the biliary tract.3,9 Meanwhile, percutaneous aspiration and inspection of the content of the cyst is a direct diagnostic tool to prove bile contamination. However, even when aspirated fluid reveals no bile content, the cyst can still demonstrate leakage from an intrahepatic duct, just as in this case.9 These suggest that very careful intraoperative examination is necessary so as not to overlook the possible existence of biliary communication.

For intraoperative detection of the cystobiliary communication, meticulous inspection of the cyst cavity is most reliable as stated by Lai and Wong9 and Hodgson et al.10 In our patient, the cystobiliary communication was found by careful laparoscopic observation, which was very useful as a sensitive new tool. Operative cholangiography or cystography is another valuable examination for detecting biliary communication and defining the anatomic relationship between the cyst and major bile ducts.11,12,13 Injection of methylene blue through a transcystic catheter has also been reported to be useful.14 When an orifice of the biliary communication has been detected, the dye injection is helpful to further demonstrate other possible communications.

Once recognized, laparoscopic closure of the biliary communication is not technically difficult because of the recent advances in surgical instruments. Cystojejunostomy, recommended by Longmire et al15 as an excellent alternative for a cyst with cystobiliary communication, might possibly be complicated by sepsis when the previously sterile cyst becomes infected with enteric organisms after the operation.4,8,9

CONCLUSION

Laparoscopic deroofing is recommended as the first choice for treatment of simple liver cysts even in the presence of cystobiliary communication, which can be closed by laparoscopic suturing.

References:
1. Kabbej M, Sauvanet A, Chauveau D, Farges O, Belghiti J. Laparoscopic fenestration in polycystic liver disease. Br J Surg. 1996;83;1697-1701.
2. Giot JF, Legrand M, Hubens G, et al. Laparoscopic treatment of nonparasitic liver cysts: adequate selection of patients and surgical technique. World J Surg. 1996;20;556-561.
3. Klingler PJ, Gadenstatter M, Schmid T, Bodner E, Schwellberger HG. Treatment of hepatic cysts in the era of laparoscopic surgery. Br J Surg. 1997;84;438-444.
4. Litwin DEM, Taylor BR, Greig P, Langer B. Nonparasitic cysts of the liver: the case for conservative surgical management. Ann Surg. 1987;205;45-48.
5. Lin TY, Chen CC, Wang SM. Treatment of non-parasitic cystic disease of the liver: a new approach to therapy with polycystic liver. Ann Surg. 1968:168;921-927.
6. Paterson-Brown S, Garden OJ. Laser-assisted laparoscopic excision of liver cyst. Br J Surg. 1991;78;1047.
7. Martin IJ, Mckinley AJ, Currie EJ, Holmes P, Garden OJ. Tailoring the management of nonparasitic liver cysts. Ann Surg. 1999:228;167-172.
8. Koperna T, Vogl S, Satzinger U, Schulz F. Nonparasitic cysts of the liver: results and options of surgical treatment. World J Surg. 1997;21;850-855.
9. Lai ECS, Wong J. Symptomatic nonparasitic cyst of the liver. World J Surg. 1990:14;452-456.
10. Hodgson WJB, Kuczabski GK, Malhotra R. Laparoscopic management of cystic disease of the liver. Surg Endosc. 1998:12;46-49.
11. Harris KM, Morris DL, Tudor R, et al. Clinical and radiographic features of simple and hydatid cysts of the liver. Br J Surg. 1986;73; 835-838.
12. Zacherl J, Scheuha C, Imhof M, Jakesz R, Fugger R. Long-term results after laparoscopic unroofing of solitary symptomatic congenital liver cysts. Surg Endosc. 2000:14;59-62.
13. Wellwood JM, Madara JL, Cady B, Haggitt RC. Large intrahepatic cysts and pseudocysts: pitfalls in diagnosis and treatment. Am J Surg. 1978;135;57-64.
14. Katkhouda N, Hurwitz M, Gugenheim J, et al. Laparoscopic management of benign solid and cystic lesions of the liver. Ann Surg. 1999;229;460-466.
15. Longmire WP, Mandiola SA, Gordon HE. Congenital cystic disease of the liver and biliary system. Ann Surg. 1971;174;711-726.