

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

Takeshi Yamada^{1,2}, Kiyonori Furukawa^{1,2}, Kimiyoshi Yokoi^{1,2},
Yasuhiro Mamada^{1,2}, Yoshikazu Kanazawa^{1,2} and Takashi Tajiri¹

¹Surgery for Organ Function and Biological Regulation, Graduate School of Medicine, Nippon Medical School

²Department of Surgery, Nippon Medical School Chiba Hokusoh Hospital

Abstract

A 56-year-old woman visited our hospital because of high fever and right hypochondralgia. Abdominal computed tomography showed a liver cyst 10 cm in diameter and dilatation of the intrahepatic bile duct. Percutaneous transhepatic drainage of the cyst guided by ultrasonography disclosed that the cyst contained a brown milky fluid, and cystography showed biliary communication. Thus, the cyst was diagnosed as an infectious hepatic cyst with biliary communication. Treatments for liver cysts include aspiration therapy, alcoholic sclerotherapy, laparoscopic fenestration, fenestration by laparotomy, cystojejunostomy, cystectomy, and hepatectomy. Because a simple liver cyst is benign, treatments should be low-risk and minimally invasive; thus, we performed laparoscopic fenestration. Fenestration should not be performed if the case is complicated by infection or biliary communication. Although cystography showed biliary communication, the cyst was not visualized with endoscopic retrograde cholangiography, and we concluded that the biliary communication was small. Operation time was 95 minutes, and blood loss was 10 g. Pathological findings of the liver cyst were consistent with a simple cyst. The postoperative course was good, and the patient left the hospital 10 days after the operation. Eighteen months have passed since the operation, and no recurrent cysts have been detected with computed tomography. This is the second report of liver cyst with biliary communication successfully treated with laparoscopic deroofing. Laparoscopic fenestration is a useful method for treating simple benign liver cysts because of its minimal invasiveness and may be useful in cases with small biliary communication.

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Key words: liver cyst, laparoscopic surgery, fenestration, deroofing

Introduction

Solitary simple liver cysts are present in 2.5% of the population¹. Most cysts are small and

asymptomatic. They are usually detected incidentally on radiographic imaging, and asymptomatic patients do not require treatment. However cases with symptoms, such as jaundice, abdominal pain, and intracystic infection, do require

Correspondence to Takeshi Yamada, Department of Surgery, Nippon Medical School Chiba Hokusoh Hospital, 1715 Kamagari, Inba-mura, Inba-gun, Chiba 270-1694, Japan

E-mail: y-tak@nms.ac.jp

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treatment. Five percent to 10% of patients with solitary simple liver cysts show symptoms². Treatment for symptomatic liver cysts include percutaneous aspiration with or without sclerotherapy with alcohol or minocycline hydrochloride³, laparoscopic fenestration, fenestration by laparotomy, cystojejunostomy, cystectomy, or hepatectomy. However, the recurrence rate is high following percutaneous aspiration with or without sclerotherapy⁴, and many patients eventually require surgical intervention⁵. Because simple liver cysts are benign, treatment should be low-risk and minimally invasive. Fenestration by laparotomy and hepatectomy are highly invasive treatments for benign cysts⁶. For reasons of low risk, minimal invasiveness, and low incidence of recurrence, laparoscopic fenestration is expected to become the first choice of treatment for symptomatic liver cysts². Laparoscopic fenestration is most suitable for symptomatic solitary simple liver cysts and is not suitable for cases with biliary communication²⁷, because postoperative biloma may result². We report a case in which biliary communication was detected with cystography but not with endoscopic retrograde cholangiography (ERC). We concluded that the communication was small and performed laparoscopic fenestration. No recurrence of cysts was detected with computed tomography (CT) scans 10 months after the operation.

Case Report

A 52-year-old woman had had a liver cyst measuring 8 cm in diameter for 8 years but which had been untreated because it was asymptomatic. She visited our hospital with high fever and right hypochondralgia. No nausea, vomiting, dyspepsia, or weight loss was reported. On physical examination, a mass was palpated in the upper right abdomen. After admission a high-grade fever and abdominal pain developed, and CT scan revealed a lesion with a thin, regular cystic wall and homogenous fluid content, which was diagnosed as an inflammatory liver cyst. Percutaneous transhepatic drainage of the cyst guided by ultrasonography (US) disclosed that the cyst contained a brown, milky fluid. Thus, the

Table 1 Biochemical examination of blood

WBC	8,570	CRP	11.9
RBC	361	TP	7.0
HB	10.9	ALB	3.3
HT	33.3	GPT	43
PLT	42.7	GOT	53
		LDH	210
		ALP	1,056
		γ -GTP	336
		TB	0.9

cyst was diagnosed as an infectious hepatic cyst with biliary communication.

Biochemical Examination of Blood and Imaging Studies

The white blood cell count was normal, but the C-reactive protein level was elevated. Levels of alkaline phosphatase (1,056 U/L) and γ glutamyl transpeptidase (336 U/L) were high, but levels of aspartate aminotransferase, alanine aminotransferase, and bilirubin were normal (**Table 1**).

US and CT scan demonstrated a solitary liver cyst measuring 10 cm in diameter. The cyst was located in segment 4 of the liver and showed typical imaging findings of a thin, regular cystic wall and homogenous fluid content, without intracystic unilocular separation, calcification, intracystic papillary projections, or hemorrhage (**Fig. 1a, 1b**). We aspirated the liver cyst, and 500 mL of a foul-smelling, brown, milky fluid was removed. However, the cyst did not completely disappear. Culture was negative for bacteria, and cytological examination was negative for neoplastic cells. Biliary communication was detected with cystography (**Fig. 2**) but was not detected with endoscopic retrograde cholangiography (ERC) (**Fig. 3**). The role of ERC has rarely been discussed, and because the intracystic pressure was high, biliary communication may not have been detected with ERC⁷. The cyst content did not show evidence of bile in the preoperative period. After percutaneous aspiration, magnetic resonance imaging also showed no findings to suggest malignancy (**Fig. 4**).

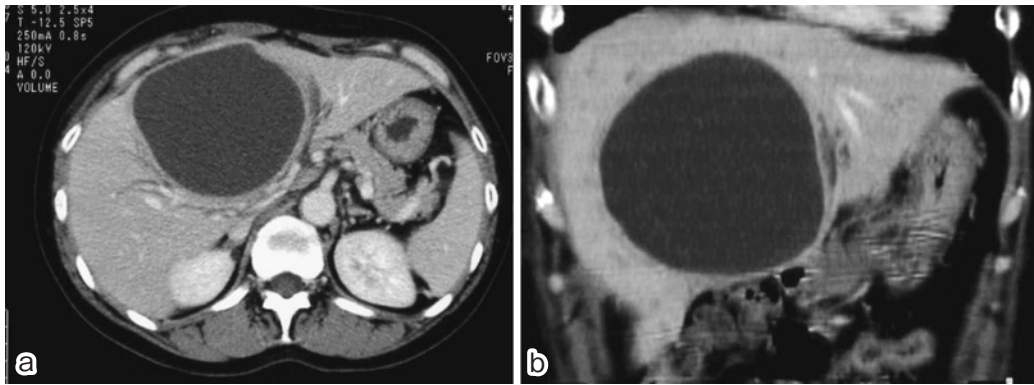


Fig. 1 a, b: Computed tomography demonstrated a solitary liver cyst measuring 10 cm in diameter in segment 4 of the liver and mild dilation of the intrahepatic bile duct.

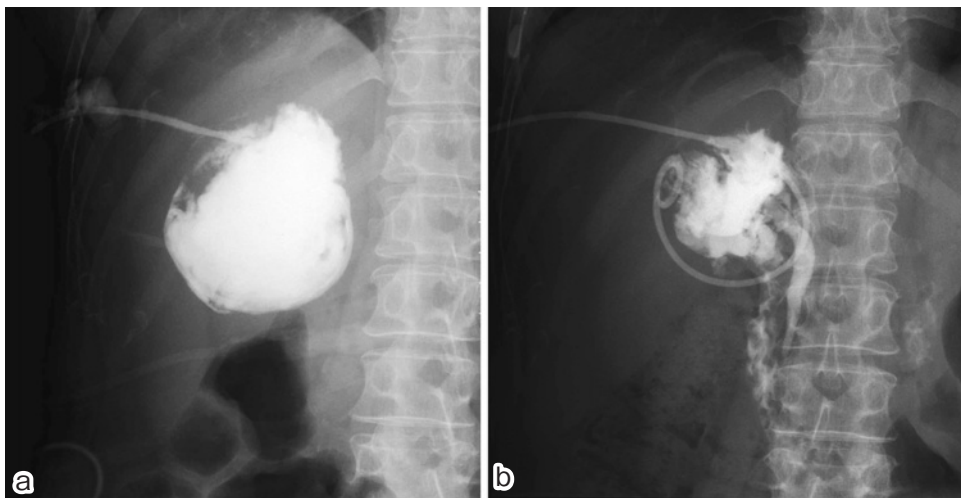


Fig. 2 a: Cystography performed immediately after aspiration, did not reveal the biliary communication. b: However, biliary communication was detected with cystography 7 days after aspiration.

Operation

Laparoscopic fenestration required the insertion of 4 trocars with the patient in the supine position. The first port was introduced into the peritoneal cavity from the umbilicus with an open laparoscopy method. Pneumoperitoneum was created by insufflation of carbon dioxide gas with a maintenance pressure of 8 mmHg, and another 3 ports were inserted into the peritoneal cavity. Although we performed percutaneous aspiration before the operation, the cyst was only partially reduced. We performed wide cystic wall deroofing with laparoscopic coagulating shears and took great care to achieve complete hemostasis. We injected indocyanine green (ICG) systemically but did not detect ICG emission from the cyst. Although we

considered the possibility of bile leakage, we concluded that the biliary communication was small because we found no evidence of bile in the cyst or ICG emission from the cyst. Most of the remaining contents of the cyst was gelatinous, which is the reason for the incomplete aspiration. We aspirated the remnant gelatinous liquid content and placed a Penrose drain into the cavity of the cyst. We did not destroy the secreting epithelium in the residual cystic cavity and did not perform omentoplasty. We did not encounter any major biliary or vascular injuries, and the overall blood loss was 10 mL. The operation took 95 minutes.

Pathological Findings

Histological examination of the excised cyst wall



Fig. 3 Biliary communication was not detected with ERC performed 10 days after aspiration

confirmed the diagnosis of simple liver cyst, and no malignant cells were detected.

Postoperative Course

Because we detected no cholic transudation, we removed the drain on the 7th day after the operation. We retained the drain for a long time because the cyst had biliary communication. The postoperative course was good, and the patient was discharged 10 days after the operation. Eighteen months have passed since the operation, and no recurrence of cysts has been detected with CT (Fig. 5).

Discussion

Because of the low incidence of symptomatic liver cysts, uniform guidelines for their management have not been established⁷. The simplest method of treatment is percutaneous aspiration, which may be effective for the immediate palliation of symptoms but invariably results in cyst recurrence^{7,8}, particularly when the cyst exceeds 10 cm in diameter⁸. Attempts at improving percutaneous treatment have included the instillation of sclerosing agents into the cyst. This procedure, despite being more effective than aspiration alone, may lead to

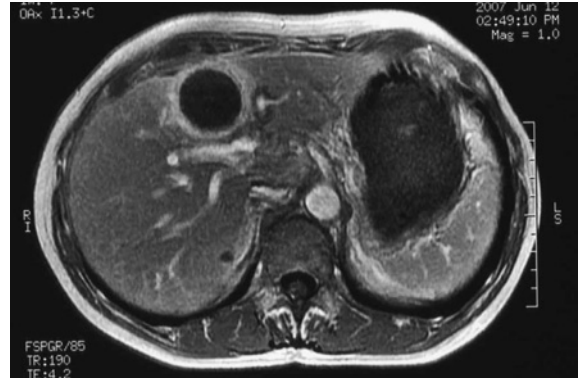


Fig. 4 Magnetic resonance imaging performed after aspiration, showed no evidence of malignancy.

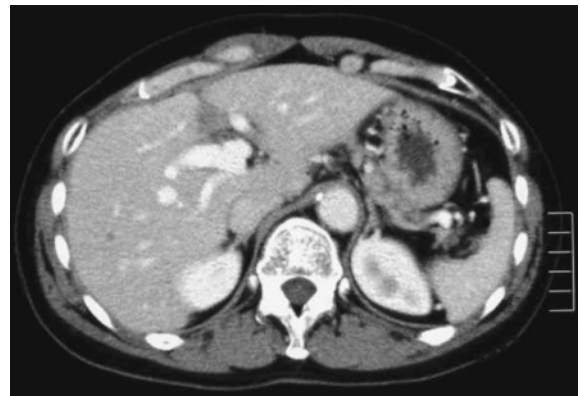


Fig. 5 No recurrence of cysts detected by CT scans performed ten months after the operation.

irreversible sclerosing cholangitis, and is not indicated for cases, such as ours, with biliary communication⁸. Several surgical procedures, including cystectomy, partial liver resection, cystojejunostomy, and fenestration, have also been used to treat liver cysts. To remove a liver cyst, normal hepatic resection is necessary, but this procedure is considered too invasive. Cystojejunostomy is well suited for use for cysts with biliary communication. However, the recurrence rate of cysts following cystojejunostomy is approximately 50%⁹, and this procedure may carry the danger of ascending infection⁷.

Fenestration of a liver cyst was first reported by Lin et al. in 1968¹⁰. The fenestration procedure involved deroofting, drainage of the cyst fluid, and ablation of the remnant cyst wall. Endoscopic surgery has advanced markedly over the past

several years. Its indications have expanded markedly following advances in operative techniques. Laparoscopic fenestration was first performed in 1991^{11,12}, and, thereafter, the operation has become widespread. Laparoscopic fenestration is reported to be a safe and effective^{5,13} alternative to fenestration with open surgery for patients with solitary liver cysts²⁵. Laparoscopic fenestration is the optimal procedure as the primary operation for treating symptomatic liver cysts⁵.

Laparoscopic fenestration is a suitable treatment for solitary liver cysts or polycystic liver disease without malignancy or biliary communication^{7,14}. Cases of liver cysts with biliary communication are rare, and in such cases, if the biliary communication is not blocked, bile leakage may occur. In such cases drainage can be achieved with Roux-en-Y cystojejunostomy². There is only one report of the usefulness of laparoscopic deroofing for liver cysts with biliary communication¹⁵. In our case, biliary communication was detected with cystography but not with ERC, and the cyst content did not show evidence of bile. During surgery, we injected ICG systemically but did not detect ICG emission from the cyst. Although we considered the possibility of bile leakage, we concluded that the biliary communication was small because we did not detect an evidence of bile in the cyst or ICG emission from the cyst. Thus, we selected laparoscopic fenestration, which is less invasive than cystojejunostomy. We believe that for the treatment of such benign but symptomatic cysts, the goal should be to achieve symptomatic relief and that we should not choose to perform highly invasive surgery simply because small biliary communication is detected. For benign diseases, minimally invasive surgery is optimal, if the patients do not have symptomatic recurrence.

Postoperative recurrence is often observed following fenestration. Reported recurrence rates range from 0% to 25%^{5,16-23}. Regev et al. have reported that there was no significant difference in the recurrence rates between laparoscopy and open surgery procedures for fenestration of liver cysts²⁰. To prevent the recurrence of cysts, wide cyst wall excision, destruction of the secreting epithelium in the residual cystic cavity, and omentoplasty are

reportedly important¹⁰. However, omentoplasty and the effects of the destruction of the secreting epithelium in the residual cystic cavity remain controversial⁷. Although we performed wide excision of the cyst wall, we did not perform these 2 procedures. The aim of fenestration is the wide excision of the roof of the cyst, opening of the cyst wall, long-term maintenance of the opening of the cyst wall, and absorption of persistent fluid by the peritoneal serosa. The main reason for the recurrence of cysts following fenestration is the reconstitution of the cyst, with the diaphragm forming part of the cyst wall⁵. Thus, we determined that no procedures were necessary without wide excision. To prevent the recurrence of cysts, the location of the cyst is an important factor in selecting treatment⁷, and cases located in segments 2, 3, 4, 5, or 8 are less likely recur¹⁹. Fenestration is technically difficult for cysts near the phrenic dome in segments 4 or 8 and near the bare area, and in such cases recurrence frequently occurs. Tagaya et al. have reported that this recurrence is due to adhesion of the deroofing margin and adjacent organs, which allows the cyst to reform¹⁹. Katkhouda et al. have reported that laparoscopic fenestration is safe if liver cysts are located in segment 2, 3, or 4 of the left lobe or in segment 5 or 6 of the anterior segments of the right lobe¹⁸. In our case, the cyst was at the surface of segment 4, so we may achieve a good outcome. The patient has had neither radiological nor symptomatic recurrence 18 months after the operation. However, cysts can recur several years after the operation; thus the patient requires long-term follow-up.

Conclusion

If we select suitable cases, laparoscopic fenestration may be useful for solitary liver cysts, even in cases with small biliary communication.

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