—Case Reports—

Laparoscopic Unroofing of a Large Pseudocyst of the Spleen: Report of a Case

Takeshi Matsutani[1,2], Eiji Uchida[1], Tadashi Yokoyama[1,2], Akira Matsushita[1,2], Akihisa Matsuda[1,2] and Koji Sasajima[1,2]

[1]Surgery for Organ Function and Biological Regulation, Graduate School of Medicine, Nippon Medical School
[2]Department of Surgery, Nippon Medical School Tama Nagayama Hospital

Abstract

The treatment of splenic cysts remains controversial. A 25-year-old Japanese woman with a 10-cm-long abdominal mass in the left upper quadrant of the abdomen complained of mild, dull pain. A huge splenic cyst was confirmed on computed tomography and magnetic resonance imaging. The cyst wall was adherent to the splenic parenchyma to approximately 30% of its maximum diameter, calculated with magnetic resonance imaging. Laparoscopic unroofing of the cyst was performed. After the great omentum adhering to the cystic wall of the spleen was dissected, branches from the splenic hilar vessels were clipped. Histological examination of the cyst revealed pseudocyst of the spleen. The postoperative course was uneventful. Laparoscopic unroofing is a safe surgical procedure for patients with symptomatic pseudocyst of the spleen.
(J Nippon Med Sch 2009; 76: 319–322)

Key words: splenic cyst, pseudocyst, laparoscopic unroofing

Introduction

The optimal treatment strategy for patients with splenic cysts remains controversial. Treatment options for splenic cysts depend on the type and size of the lesion. A cyst greater than 5 cm in maximum diameter should be considered as the main surgical indication, even if the lesion is asymptomatic[1,2]. Cysts greater than 5 cm in diameter can cause abdominal pain, splenomegaly, atelectasis, hemorrhage, rupture, and infection/abscess formation. Splenectomy was previously considered the initial surgical treatment for symptomatic cysts owing to their size, but carries risks of postoperative complications, such as bleeding and infection[3]. The laparoscopic management of a splenic cyst was first described by Salky et al. in 1985[4]. As splenic cysts are rare, most reports of laparoscopic approaches to treatment for splenic cyst have been presented as case reports. However, laparoscopic unroofing of true splenic cysts is reportedly associated with a high rate of recurrence in children[5]. Herein, we describe a case of splenic cyst that was treated successfully with a laparoscopic approach.

Case Report

A 25-year-old Japanese woman was admitted to our department with a complaint of lower abdominal pain. Her past history was negative for abdominal trauma. On physical examination, a slightly tender

Correspondence to Takeshi Matsutani, MD, Department of Surgery, Nippon Medical School Tama Nagayama Hospital, 1–7–1 Nagayama, Tama, Tokyo 206–8512, Japan
E-mail: matsutani@nms.ac.jp
Journal Website (http://www.nms.ac.jp/jnms/)

Fig. 1 Abdominal CT showing a large cystic tumor with homogenous liquid contents in the upper pole of the spleen, compressing the gastric body of the stomach.

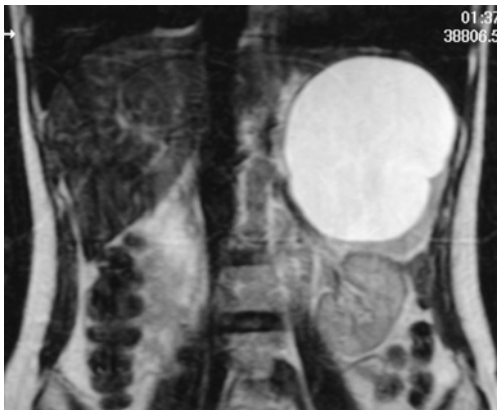

Fig. 2 MRI showing a high-intensity mass on T2-weighted imaging.

mass was palpable in the left upper quadrant of the abdomen. Hematologic examination yielded normal results. Serum levels of carbohydrate antigen (CA) 19-9 were within the normal range. Ultrasonography demonstrated a hypoechogenic 10-cm-long ovoid mass. Computed tomography (CT) of the abdomen with intravenous contrast showed a large mass, 9.1× 10.5 cm in diameter, extending from the upper pole of the kidney to the diaphragm **(Fig. 1)**. Magnetic resonance imaging (MRI) revealed a monolocular mass with high intensity on T2-weighted imaging **(Fig. 2)**. The cyst wall of the spleen was adherent to the parenchyma for approximately 30% of its maximum diameter, as calculated with MRI. Surgical treatment was undertaken using a laparoscopic approach, placing the patient in the supine position with divaricated legs, the left arm by the side of the body, and the right arm at 90°, in axial anti-Trendelenburg inclination under general anesthesia.

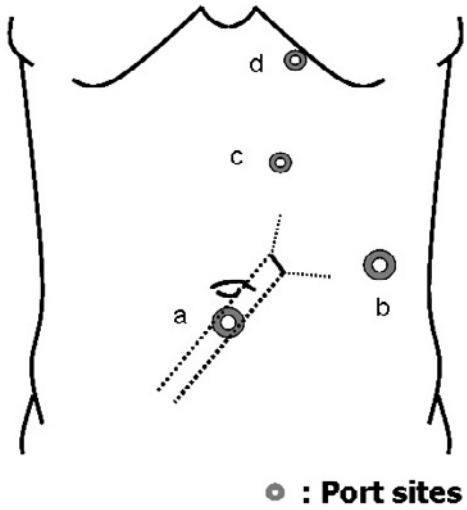

Fig. 3 Port positions. a) A 12-mm port for laparoscopy. b) A 12-mm port for right working. c) A 5-mm port for left hand working. d) A 5-mm port for retraction.

The surgeon stood between the legs of the patient, with the first assistant on the right and the second assistant on the left. Two monitors were used. A 12-mm trocar was inserted in the umbilicus, followed by the introduction of a 10-mm flexible laparoscope. Two 5-mm trocars were positioned in the area between the xyphoid process and the umbilicus. A 12-mm trocar was introduced in the lower left abdomen **(Fig. 3)**. Pneumoperitoneum was maintained at 8 to 10 mm Hg. After the greater omentum adhering to the cystic wall of the spleen was dissected, the cyst was seen at the upper pole of the spleen, compressing the stomach to the left **(Fig. 4a)**. Since the cyst was located in the splenic hilar vessels, the distal branches of the splenic artery and vein that supply the upper part of the spleen were carefully dissected **(Fig. 4b)**. Needle puncture of the cyst then yielded 800 mL of a brown liquid **(Fig. 4c)**. The CA19-9 level in cyst contents was low (54.1 U/mL). Histological examination of intraoperative frozen sections showed pseudocyst of the spleen. Short gastric vessels and tissues between the parenchyma and splenic cyst were divided with laparosonic coagulating shears (Harmonic Ace scalpel®, Ethicon Endosurgery, Cincinnati, OH, USA). Approximately 70% of the cyst wall was then unroofed **(Fig. 4d)**. Total operative time was about 120 minutes. Histological examination of the cyst wall revealed fibrotic pseudocyst with splenic remnants and hemosiderin deposits. The

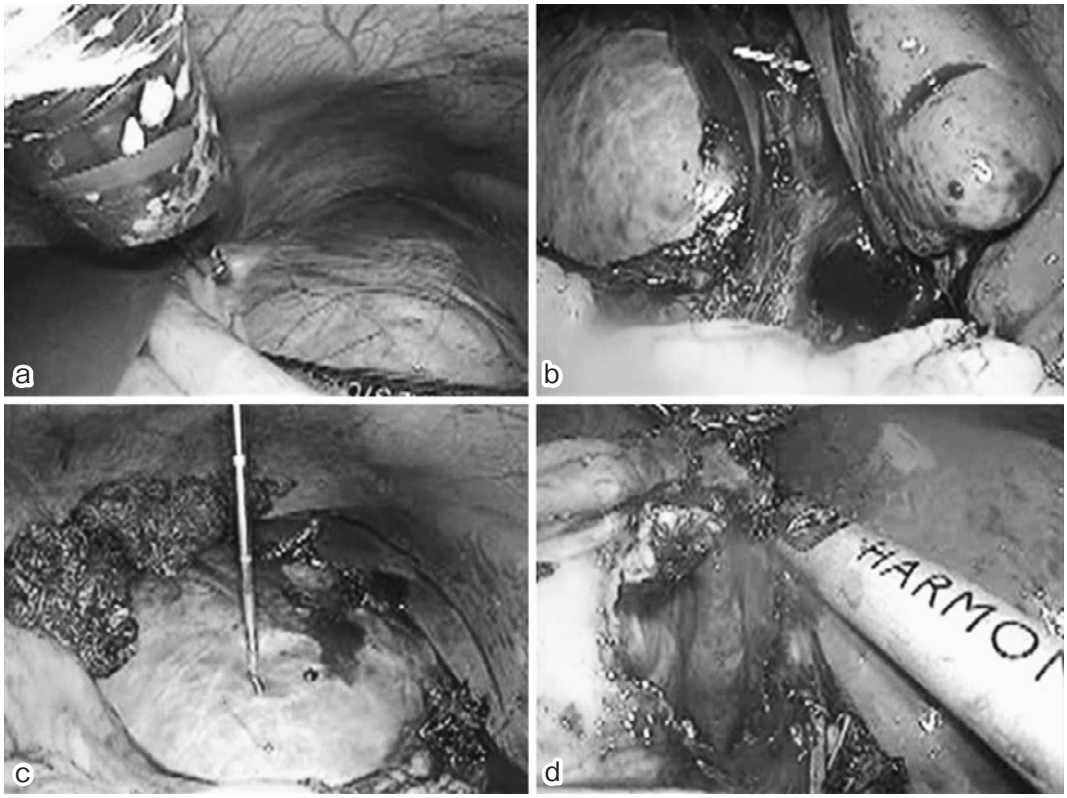

Fig. 4 Laparoscopic view during the operation. a) Large cyst located at the upper pole of the spleen. b) Clipping distal branches from the splenic artery and vein. c) Draining the cyst cavity. d) Decapsulation of the splenic cyst wall using a harmonic scalpel.

Fig. 5 Abdominal CT demonstrating absence of recurrence at the 12-month follow-up.

postoperative course was uneventful, and the patient was discharged on postoperative day 4. Follow-up CT of the abdomen after 12 months showed no recurrence **(Fig. 5)**.

Discussion

A definitive algorithm for the treatment of splenic cysts is unclear and difficult to determine, because splenic cysts are uncommon. The few published reports of patients have predominantly been limited to single case reports, frequently of pediatric patients. Follow-up evaluation is often incomplete. Experiences with these conditions are therefore lacking, with no evidence-based treatment guidelines. The optimal surgical strategy for splenic cyst is also controversial. Previously, laparoscopic splenectomy had become the standard approach for symptomatic cysts or huge cysts of the spleen[6]. However, splenectomy carries a risk of overwhelming postoperative infection and thrombocytosis. Spleen-preserving alternatives to the treatment of splenic cysts have thus been proposed and have included aspiration, marsupialization, fenestration, decapsulation, and partial splenectomy[7]. Percutaneous cyst aspiration and intracystic injection with tetracyclins or sclerosing substances such as alcohol and formol is associated with high recurrence rates and a risk of abscess formation[8]. Partial splenectomy is technically challenging, but can also be performed with low morbidity, and is recommended for deeply located

cysts[7]. Laparoscopic spleen-preserving procedures have the advantages of being both minimally invasive and spleen-preserving. However, when the spleen is mostly occupied by cyst, total splenectomy is required for eradication[3,9]. The objectives of the treatment are to eliminate the cyst, conserve the spleen and avoid recurrence, preferably with minimally invasive techniques. After surgical treatment, cyst recurrence has been described following incomplete cyst wall removal[3,10–12]. Laparoscopic marsupialization or fenestration of splenic cysts provides the benefits of minimal access surgery, but has shown a high recurrence rate at multiple institutions. Laparoscopic excision of splenic cysts in children shows a higher recurrence rate than does partial splenectomy[5,13].

Cyst location is considered the most important factor when the laparoscopic surgical procedure is planned. Posterior cysts are more difficult to treat using a laparoscopic approach, as the spleen must be widely mobilized. In the case of centrally located cysts, which are typically covered by splenic parenchyma, laparoscopic procedures should not be attempted. Cysts on the anterior and surface areas may thus be the best suited for laparoscopic surgery. In our case, the huge cyst was located between the splenic hilar vessels and the splenic parenchyma. The distal branches of the splenic and short gastric vessels thus needed to be dissected with a laparoscopic technique. We then performed unroofing of the cyst wall by approximately 70%.

The most effective laparoscopic technique for splenic cysts has been decapsulation of splenic cysts with has achieved excellent results in a small series[14]. Chin et al.[15] have reported that laparoscopic decapsulation is associated with a significantly lower recurrence rate. However, evaluation of long-term follow-up after laparoscopic decapsulation is needed. Previous studies have found higher recurrence rates for primary cysts than for secondary cysts[12]. In our opinion, splenic cysts will tend to recur when the wall of the epidermoid primary cyst has not been completely removed. Complete removal of the cyst wall should be curative and remains a good choice for safe treatment in cases of epidemoid primary cyst[6]. For epidermoid primary cyst, laparoscopic partial splenectomy or decapsulation can be performed. For a pseudocyst, we might select laparoscopic unroofing.

In conclusion, we believe that laparoscopic unroofing is an appropriate surgical approach for the initial treatment of splenic pseudocyst in young patients.

References

1. Walz MK, Metz KA, Sastry M, Eigler FW, Leder LD: Benign mesothelial splenic cyst may cause high serum concentration of CA 19-9. Eur J Surg 1994; 160: 389–391.
2. Losanoff JE, Richman BW, Jones JW: Nonparasitic splenic cysts. J Am Coll Surg 2002; 195: 437–438; author reply 438.
3. Musy PA, Roche B, Belli D, Bugmann P, Nussle D, Le Coultre C: Splenic cysts in pediatric patients—a report on 8 cases and review of the literature. Eur J Pediatr Surg 1992; 2: 137–140.
4. Salky B, Zimmerman M, Bauer J, Gelernt I, Kreel I: Splenic cyst—definitive treatment by laparoscopy. Gastrointest Endosc 1985; 31: 213–215.
5. Schier F, Waag KL, Ure B: Laparoscopic unroofing of splenic cysts results in a high rate of recurrences. J Pediatr Surg 2007; 42: 1860–1863.
6. Yagi S, Isaji S, Iida T, et al.: Laparoscopic splenectomy for a huge splenic cyst without preoperative drainage: report of a case. Surg Laparosc Endosc Percutan Tech 2003; 13: 397–400.
7. Balzan SM, Riedner CE, Santos LM, Pazzinatto MC, Fontes PR: Posttraumatic splenic cysts and partial splenectomy: report of a case. Surg Today 2001; 31: 262–265.
8. Mahomed A, Merry C, Guiney EJ: Splenic cysts—aspiration or partial splenic decapsulation? S Afr J Surg 1998; 36: 84–86.
9. Di Carlo I, Fasone MA, Toro A: Epidermoid cyst of the spleen in the laparoscopic era. Dig Surg 2005; 22: 53–54.
10. Touloukian RJ, Seashore JH: Partial splenic decapsulation: a simplified operation for splenic pseudocyst. J Pediatr Surg 1987; 22: 135–137.
11. Yavorski CC, Greason KL, Egan MC: Splenic cysts: a new approach to partial splenectomy—case report and review of the literature. Am Surg 1998; 64: 795–798.
12. Ganti AL, Sardi A, Gordon J: Laparoscopic treatment of large true cysts of the liver and spleen is ineffective. Am Surg 2002; 68: 1012–1017.
13. Fisher JC, Gurung B, Cowles RA: Recurrence after laparoscopic excision of nonparasitic splenic cysts. J Pediatr Surg 2008; 43: 1644–1648.
14. Calligaris L, Bortul M: Laparoscopic treatment or a nonparasitic splenic cyst : case report. J Laparoendosc Surg 1996; 6: 431–434.
15. Chin EH, Shapiro R, Hazzan D, Katz LB, Salky B: A ten-year experience with laparoscopic treatment of splenic cysts. JSLS 2007; 11: 20–23.

(Received, July 21, 2009)
(Accepted, September 25, 2009)