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Single-Incision Laparoscopic Splenectomy for a Large Non-Traumatic Pseudocyst of the Spleen: A Case Report

Pan Chao-wen [1, 2, *], Hsiu-Lung Fan [3], Chen Ya-Cheng [4], Guo-Shiou Liao [3], Mong Fan-Yun [5] and Min-Jen Tsao [1]

[1] Department of Surgery, Zuoying Branch of Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan
[2] Department of Surgery, National Defense Medical Center, Tri-Service General Hospital Penghu Branch, Penghu, Taiwan
[3] General Surgery Division, Department of Surgery, National Defense Medical Center, Tri-Service General Hospital, Taipei, Taiwan
[4] Department of Radiology, National Defense Medical Center, Tri-Service General Hospital Penghu Branch, Penghu, Taiwan
[5] Department of Surgery, St. Joseph Hospital, Kaohsiung, Taiwan

[*] *Corresponding author*: Department of Surgery, Zuoying Branch of Kaohsiung Armed Forces General Hospital, No.553, Junxiao Rd., Zuoying Dist., Kaohsiung City 813, Taiwan. Tel: +886-758171212253, Fax: + 886-75823587, Email: apc0911@gmail.com

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Abstract

Introduction: The incidence of splenic cysts is low, and most are asymptomatic. Symptomatic splenic cysts have rarely been reported. Due to the unspecific clinical and radiologic features, the nature of a cyst is difficult to define in the absence of a history of trauma. Therefore, splenectomy is usually the treatment of choice for obtaining a specimen. In particular, total splenectomy has been the treatment of choice for removal of splenic cysts.
Case Presentation: A 25-year-old male patient visited the outpatient department at Tri-Service General Hospital Penghu Branch, Taiwan, with the chief complaint of abdominal fullness. No obvious history of trauma was reported. A series of examinations were performed, and abdominal computed tomography showed one large splenic cyst within the splenic septum. We performed single-incision laparoscopic splenectomy, and the patient recovered well and returned to daily activities one week later.
Conclusions: In this modern era of minimally invasive surgery, laparoscopic surgery has reduced postoperative pain and improved recovery, with no increase in complications. Laparoscopic splenectomy has become the trend for the management of splenic cysts. Although single-incision laparoscopic surgery is a technical challenge, better cosmetic results and decreased postoperative wound pain are considered to be superior outcomes compared with those of conventional multi-port laparoscopic surgery.

Keywords: Laparoscopy, Outcome, Single-Incision, Postoperative Pain, Pseudocyst, Splenectomy

1. Introduction

Splenic cysts are classified into three categories: benign cyst, neoplasm, and abscess. Benign cysts can be classified as parasitic and non-parasitic. Non-parasitic cysts can be further classified as a true cyst with an epithelial lining, or a pseudocyst. Epidermoid and congenital cysts are true cysts, while pseudocysts are usually associated with recent trauma, inflammation, or degeneration (1). However, if there is no history of recent trauma and no definitive clinical or radiologic features to differentiate a true cyst from a pseudocyst, histology is the only way to confirm the cyst type (1, 2). Symptomatic splenic cysts and those that are larger than 5 cm usually have the potential to generate abdominal pain, splenomegaly, atelectasis, hemorrhage, rupture, and infection, and are candidates for surgical intervention (3). We report a case in which a large symptomatic pseudocyst that contained a septum was successfully managed with single-incision laparoscopic splenectomy.

2. Case Presentation

A 25-year-old male patient visited our outpatient department at Tri-Service General Hospital Penghu Branch, Taiwan in 2017. The patient was 172 cm tall, 63 kg in weight, and had a systolic blood pressure of 114 mmHg and a diastolic pressure of 58 mmHg. The patient presented with progressive abdominal fullness of six months' duration without history of abdominal injury. A palpable mass at the left upper quadrant was noted. The patient did not have nausea, vomiting, diarrhea, fever, or weight loss. Laboratory results were negative for leukocytosis and neutropenia (Table 1). He visited another hospital, where sonography was performed. The sonogram showed one large cystic lesion

Table 1. Laboratory Investigation Results

Parameter	Value	Unit
White blood cell count	5.9	$10^3/\mu L$
Hemoglobin	13.5	g/dL
Platelet count	168	$10^3/\mu L$
Blood urea nitrogen	14.4	mg/dL
Creatinine	0.8	mg/dL
Aspartate transaminase	18	U/L
Alanine transaminase	18	U/L
C reactive protein	0.49	mg/dL

of unknown origin. He visited our department for a second opinion. We performed abdominal computed tomography with contrast, which revealed one large, fluid-filled cyst within the splenic septum, without calcification (Figure 1). The cyst was 24.5 × 20 cm and occupied the entire left upper quadrant, pushing the left kidney into the left lower quadrant (Figure 2).

The patient was placed in the supine position under general anesthesia. The operator and assistant stood at the patient's right side. A single-incision laparoscopic splenectomy was performed via a 5-cm periumbilical incision. We used a 10-mm, 30° side-view laparoscope (Karl Storz, Tuttlingen, Germany) and two other working channels, which were 11 mm and 5 mm ports, respectively. Carbon dioxide was insufflated to create a pneumoperitoneum, while maintaining pressure at 15 mmHg. We identified the cystic lesion first and aspirated 4900 mL of fluid, which was dark brown in color and accompanied by some yellowish debris. We dissected the splenic hilum meticulously with Sonicision (Covidien, Mansfield, MA) and identified the splenic artery and vein. We ligated the splenic artery and vein using Endo Clip (Covidien, Mansfield, MA) separately. Short gastric vessels were ligated via Sonicision and Endo Clip. Then, we performed dissection of the splenocolic, splenorenal, and splenophrenic ligaments. The spleen was mobilized and retracted via a periumbilical incision. One Jackson-Pratt drain was placed in the splenic fossa. The Jackson-Pratt drain was removed on postoperative day 2. No additional analgesic agent was used on postoperative day 3. The patient recovered well and was discharged on postoperative day 5. The histologic examination showed a splenic pseudocyst containing necrotic debris, cholesterol cleft, and giant cells with a thick, dense fibrotic wall, but lacking any epithelial component. The fluid in the cyst contained no malignant cells per cytological examination and no pathogens were present when cultured. The patient visited the outpatient department one month later and showed no complications, with satisfactory wound appearance.

3. Discussion

Most pseudocysts of the spleen will result from previous trauma. Most are unilocular and range in size from 1 cm to 16 cm (4). Approximately 75% of splenic pseudocysts are asymptomatic (4) but can cause symptoms when enlarged (1, 5). When occupying a large amount of space, large pseudocysts may cause a sensation of abdominal fullness. Pain, nausea, vomiting, flatulence, and diarrhea may result from pressure on the surrounding organs. In addition, pressure on the cardiopulmonary system may cause pleuritic pain, dyspnea, and cough (4). Complications, including rupture of the spleen, hemorrhage, and infection, may present more frequently as the pseudocyst becomes enlarged (Table 2).

Currently, there is no definite treatment algorithm for splenic cysts due to their rarity. When the cysts become larger than 5 cm or become symptomatic, surgery should be considered in order to reduce the possibility of complications (6). The gold standard approach for the treatment of these cysts is open total splenectomy (6). A more conservative management method was suggested after the 1970s due to the overwhelming rates of post-splenectomy infection. Percutaneous drainage, with or without a sclerotic agent, has been performed in the past (7). However, in this era of minimally invasive surgery, we advocate that this method should be abandoned due to the high rate of recurrence and the possibility of abscess formation (3), unless the patient is not fit for further surgery. Total splenectomy is suggested only in cases of huge cysts, cysts that are located near the hilum, or those with the possibility of malignancy (8). For a primary epidermoid cyst, laparoscopic partial splenectomy or decapsulation can be performed. For a pseudocyst, laparoscopic partial cystectomy (unroofing) may be an option. Currently, minimally invasive surgery is indicated for patients with a splenic cyst, and single-incision laparoscopic splenectomy should be considered in order to reduce wound pain, decrease the length of hospitalization, and provide a better cosmetic result. In our case, a single-incision laparoscopic splenectomy was done. The patient was pleased with the appearance of the surgical wound, and wound pain was well tolerated. Daily activity returned to near normal by postoperative day one. There were no complications noted at the follow-up performed two weeks later. In conclusion, single-incision laparoscopic splenectomy should be the first option for symptomatic large splenic cysts, and can

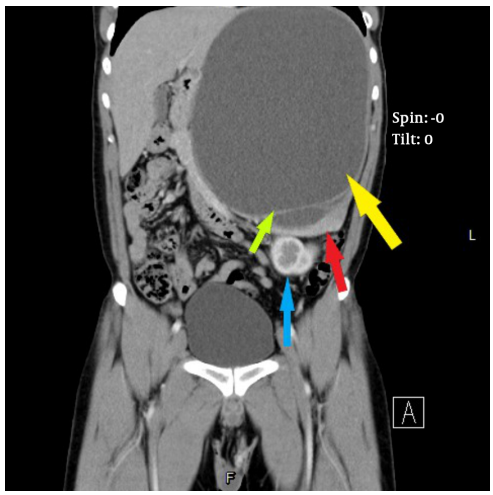

Figure 1. Coronal view of contrast-enhanced CT of the abdomen; red arrow: the spleen; yellow arrow: the cyst; green arrow: the septum; blue arrow: the kidney

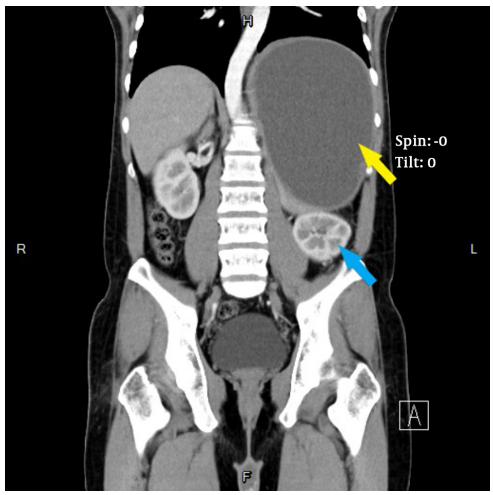

Figure 2. A massive cyst pushing the left-sided kidney downward, coronal view of contrast-enhanced computed tomography of the abdomen, yellow arrow: the cyst; blue arrow: the kidney

Table 2. Summary of the Articles

Author's name	Journal's Name	The Case	Management	The Year of Publishing
Sarwal A et al.	Journal of Minimal Access Surgery	Large splenic pseudocyst	Laparoscopic splenectomy	2018
Galyfos G et al.	International Journal of Surgery Case Reports	Oversized pseudocyst of the spleen	Open total splenectomy	2014

be performed safely without any postoperative complications. This is a case report of the management of a pancreatic pseudocyst patient with single-port laparoscopy. Further studies on more cases with longer follow-up of postoperative recovery could be helpful.

Footnotes

Authors' Contribution: Study concept and design: Pan Chao-Wen; acquisition of data: Chen Ya-Cheng; analysis and interpretation of data: Hsiu-Lung Fan and Guo-Shiou Liao; drafting of the manuscript: Pan Chao-Wen; critical revision of the manuscript for important intellectual content and statistical analysis: nil; administrative, technical,

and material support: Hsiu-Lung Fan and Guo-Shiou Liao; study supervision: Mong Fan-Yun and Min-Jen Tsao.

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