Surg Today (2001) 31:262–265

SURGERY TODAY

Posttraumatic Splenic Cysts and Partial Splenectomy: Report of a Case

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Abstract Nonparasitic splenic cysts are uncommon, with only around 800 cases described in the literature. Posttraumatic splenic pseudocysts constitute most such cases and require surgical treatment when symptomatic or voluminous. Recent studies have provided a better understanding of splenic tissue function and the consequent risks of complete resection of the spleen. Hence surgeons should make every possible effort to preserve splenic tissue. Several spleen-conserving surgical treatments have been proposed, especially for treatment of splenic posttraumatic pseudocysts. The authors report the case of a 13-year-old girl who had a posttraumatic splenic cyst with progressive growth. The diameter of the cyst at surgery was 15 cm, and partial splenectomy was performed. The most common spleen-conserving surgical techniques are briefly reviewed.

Key words Splenic cyst · Splenic pseudocyst · Posttraumatic · Conservative surgery

Introduction

Splenic cysts are uncommon. They tend to be asymptomatic and are identified only occasionally. Owing to the mass effect, the clinical picture may vary (characterized by left hypochondrium pain and symptoms related to compression of the adjacent structures). This varied picture may also be due to complications (infection or rupture, which leads to hemoperitoneum, peritonitis, and sepsis). In addition, these cysts are associated with hypersplenism on rare occasions.[1–3]

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Received: September 20, 1999 / Accepted: September 26, 2000

Splenic cysts are classified as true cysts (which have an epithelial lining) and false cysts or pseudocysts (with no epithelial lining). The first are further classified as parasitic (hydatid) and nonparasitic (neoplastic and dermoid or epidermoid congenital cysts). The false cysts, or so-called pseudocysts, may be secondary to a hematoma or to a splenic infarction, and they usually have a posttraumatic origin.[2,4]

The treatment for splenic cysts may be surgery or no intervention. The surgical treatment of choice has been total splenectomy until recently. There are many other treatment options nowadays, including percutaneous drainage,[5] marsupialization, enucleation, partial splenectomy, and total splenectomy with autotransplantation of splenic tissue. Pseudocysts of the spleen should be treated when complications develop (e.g., infection, rupture, hemorrhaging, torsion, progressive growth) or when they have a diameter of more than 4 cm (a size at which complications are more likely to occur).

Case Report

A 13-year-old girl was referred to our department complaining of a painful swelling in the left hypochondrium, with progressive worsening of her symptoms during the last 3 months. A tumefaction in the left hypochondrium, which was palpable up to 8 cm from the left costal grid and movable with respiratory movements, was detected during the physical examination. Blunt abdominal trauma 1 year earlier associated with the development of a splenic hematoma was reported by the patient. The treatment was no intervention at that time.

An initial radiological investigation was carried out by abdominal ultrasonography, which showed a 15-cm cyst occupying the lower pole of the spleen and gallstones. A computed tomography (CT) scan confirmed these findings (Fig. 1).

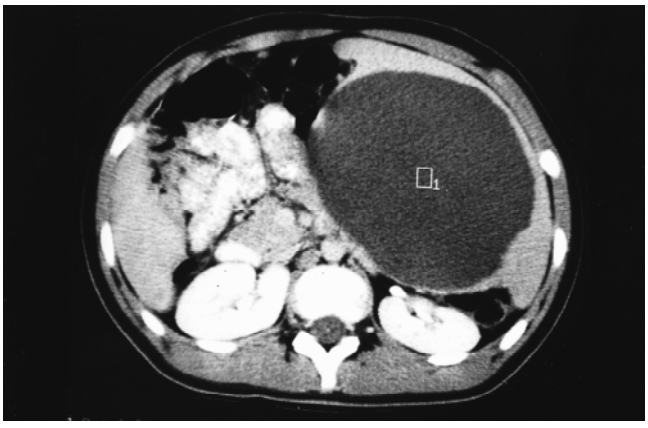

Fig. 1. Axial computed tomography (CT) scan demonstrating a large splenic cyst

The patient underwent surgery by means of an abdominal approach through a left subcostal incision, during which the radiological findings were confirmed (Fig. 2). The gastrosplenic ligament was cut, followed by ligation of the short gastric arteries and veins and mobilization of the spleen and the tail of the pancreas. The splenic artery, which originated in two polar branches (upper and lower), and the correspondent veins were identified. Once ligation of the lower polar vessels was completed a change in the color was observed in the lower half of the organ, and the parenchymal section was therefore delimited. An incision was performed through the kellyclasia, and nonabsorbable ligatures were used to achieve hemostasis. The splenic vessels were clamped for 10 min. Although a minimal amount of hemorrhaging occurred, hemostasis was achieved by application of oxidized cellulose gauze. The appearance of the cyst is shown in Fig. 2. A cholecystectomy was then performed, and an aspirating drain was placed in the left subphrenic space.

There were no postoperative complications; the drain was removed on the second postoperative day, and the patient was discharged on the third postoperative day. Ultrasonography 30 days later showed that the splenic parenchyma had a normal appearance, and there was no intraabdominal fluid collection. The 1-year follow-up revealed an asymptomatic patient, and a CT scan demonstrated normal splenic parenchyma (Fig. 3).

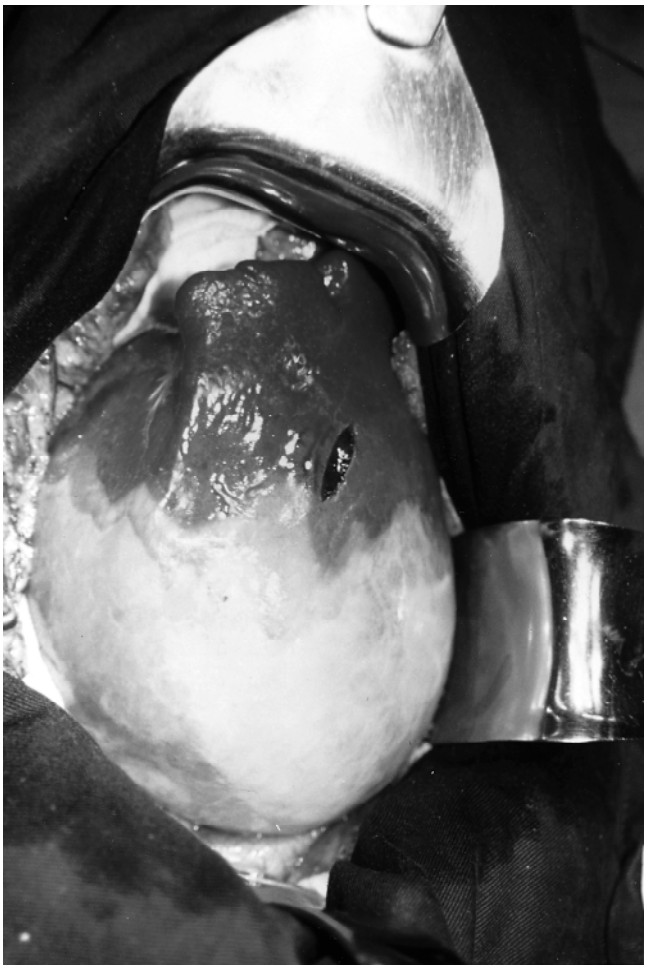

Fig. 2. Intraoperative photograph of the splenic pseudocysts

Fig. 3. Axial CT scan 1 year after surgery

Discussion

The spleen is a fully vascularized, almost sessile friable abdominal organ. It is the most common intra-abdominal organ injured during blunt trauma. It can be ruptured by a direct contusion or a countershock effect.[2,6]

The hemorrhagic spleen pseudocyst is a rare disease, its most frequent cause being blunt abdominal trauma. Many factors contribute to generation of a posttraumatic hemorrhagic splenic pseudocyst, including the

type and intensity of the abdominal trauma, the site of the vascular injury in the parenchyma, and the blood coagulation pattern, among others. A history of strong-intensity blunt trauma and the development of a conservatively treated splenic hematoma, revealed by CT scan, is herein presented. Previous reports showed no correlation between the trauma intensity and the development of a splenic cyst. In addition, the traumatic event is often reported only after a detailed history of trauma.

In fact, the capsule could have an injury to the pulp of the spleen. If such bleeding is superficial or severe enough, delayed capsule rupture may occur (delayed rupture of the spleen). If the bleeding occurs deeper in the pulp but is contained by the splenic tissue, a hematoma may develop. A pseudocapsule then appears owing to compression of the subjacent tissues and the sclerotic tissue reaction. The hematic contents thereafter undergo changes through the processes of absorption and metabolic degradation, and thus acquire a serous aspect, later developing into a pseudocyst.[2]

The clinical picture varies according to the size and location of the cyst.[2] Small cysts are usually asymptomatic and tend to be discovered accidentally during routine examinations. Symptoms may emerge with large cysts because of a mass effect (left hypochondrium pain or symptoms secondary to compression of adjacent organs, such as the stomach, left colon, left kidney, and renal artery),[1] or they may be due to complications such as pseudocyst infection, torsion, hemorrhage, or rupture, which can lead to hemoperitoneum, peritonitis, and even sepsis.[1,6,7]

Small cysts may remain asymptomatic or even be reabsorbed by the organism. Some of them grow progressively, however, eventually leading to symptoms. Pseudocysts larger than 4 cm must be treated, as they are likely to develop complications. Others have reported rupture of 25% of cysts measuring more than 5 cm in diameter, which resulted in hemorrhaging and peritonitis.[6,7]

Concerning the above reported case; no reason could be found to explain the pseudocyst's growth. An interventional treatment was selected because of the progressive growth and the appearance of symptoms.

The treatment approach of splenic pseudocysts varies from no intervention (for small asymptomatic cysts) to total splenectomy. Until recently total splenectomy was the initial form of treatment for traumatic lesions and splenic pseudocysts,[6] as described by Péan in 1867. Today, because of the important biological function of the spleen and the well-documented risk of sepsis after splenectomy, treatments to preserve the splenic parenchyma have been proposed, especially for pediatric patients.[8–13] Removal of immunocompetent splenic tissue has been shown to expose patients of all ages to an increased risk for pneumococcal infection, although there is a higher incidence and a more dramatic outcome in young people. In addition, experts propose that 25% of the splenic tissue should be preserved in continuity with the splenic vessels instead of performing autotransplantation.

Therefore, several options of conservative treatment have been proposed for splenic pseudocysts: percutaneous drainage, marsupialization, enucleation, splenectomy with autotransplantation of splenic tissue, and partial splenectomy. Percutaneous drainage, with or without chemical sclerotherapy, can be used as an isolated treatment or as a preoperative method to decrease the size of large cysts. Percutaneous aspiration can also be used for infected cysts.

Marsupialization (first described by Millar in 1982[14]) and enucleation can be carried out in peripheral pseudocysts. When the cyst volume is large, the residual space may become a site for liquid collection and abscess formation. The laparoscopic approach can be safely used with these techniques, and even endocavitary ultrasonography has been used for deep cysts to determine the site where the cystic wall is thinnest. Marsupialization has been performed by mechanical suturing.[1,7]

Total splenectomy with autotransplantation of splenic tissue has been proposed, and the results have been satisfactory. Various studies have demonstrated adequate functioning of the transplanted tissue with restoration of some splenic function. The fragments preferably remain within the portal circulation, and the most frequently chosen site is the greater omentum.[15–22] This technique is considered to be the optimal modality for large and deep cysts that involve both splenic poles.

Partial splenectomy seems to be an excellent option when one of the splenic poles is not affected and so can remain with preserved parenchyma.[23,24] This technique requires full anatomic knowledge of the splenic vascularization. The splenic artery is divided into two to three groups of branches that provide vascularization to the upper pole, intermediate portion, and lower pole of the spleen.[6] Adequate mobilization of the organ is achieved by ligating the gastrosplenic ligament and by dissecting the short gastric vessels. The retroperitoneum is them opened and the spleen and tail of the pancreas detached to allow identification of the splenic vessels and their branches. Clamping or ligation (or both) of the branches directed to the pole to be removed causes alteration in the color of such poles, and the parenchymal sectioning line is then determined on the transition zone between the ischemic and normal parenchyma. Section of the parenchyma can be achieved by techniques similar to those used for section of the hepatic parenchyma, and it may or it may not be associated with clamping the splenic artery. A resection

achieved through kellyclasia, as performed in this case report, allows identification and ligature of large-diameter vessels and prevents excessive hemorrhage. Application of oxidized cellulose gauze over the sectioned area helps achieve hemostasis and promotes the development of a physical matrix that helps healing; the gauze is fully reabsorbed in 3 weeks, as demonstrated by studies on splenic laceration.[25] The size of the cyst is not a contraindication for use of this technique, as described in the current case, in which the diameter of the pseudocyst was around 15 cm.

Although the risk of severe hemorrhage is minimal, total splenectomy may be necessary for difficult cases. Therefore, the patient must be immunized against pneumococcus, meningococcus, and type B *Haemophilus influenza* prior to surgery. Prophylactic use of penicillin is also recommended during the first 3 months after surgery (or until satisfactory splenic activity is detected by scintigraphy), as it may take the remaining spleen many months to return to an adequate level of immune competence.

In conclusion, a better understanding of splenic function is required by surgeons to preserve a sufficient amount of the splenic parenchyma. Based on our findings, we believe that partial splenectomy is the best surgical approach for treatment of pseudocysts because it preserves an adequate amount of parenchyma irrigated by the splenic vessels. All surgeons must therefore have sufficient knowledge of the anatomy of the spleen. The use of conservative techniques must also be carefully considered when treating splenic pseudocysts.

Acknowledgments. We thank Carolina Ponzi and Andre Manica for their valuable assistance.

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