CardioVascular and Interventional Radiology

Published Online: 15 September 2005

Cardiovasc Intervent Radiol (2006) 29:469–472
DOI: 10.1007/s00270-004-0194-2

Percutaneous Treatment of Congenital Splenic Cysts: Drainage and Sclerotherapy with Polidocanol

A. Yigit Goktay,[1] Mustafa Secil,[1] Mehmet Ali Ozcan,[2] Oguz Dicle[1]

[1]Department of Radiology, Dokuz Eylul University Hospital, Inciralti, 35340, Izmir, Turkey
[2]Department of Medicine, Dokuz Eylul University Hospita, Inciralti, 35340, Izmir, Turkey

Abstract

Congenital ''true'' splenic cysts are rare lesions. Therapeutic methods for the management of these lesions have been based on preserving splenic function due to the immunologic role of spleen. We report three different cases of congenital splenic cysts treated by percutaneous drainage and polidocanol sclerotherapy. This less invasive treatment appears to be safe and effective after 6 to 36 months of follow-up.

Key words: Splenic cyst—Percutaneous treatment—Sclerotherapy

Splenic cysts of all types are relatively rare and have been classified as ''true'' cysts with epithelial or mesothelial lining and ''pseudocysts,'' which represent a late manifestation of posttraumatic intrasplenic or subcapsular hematoma. Congenital ''true'' nonparasitic splenic cysts represent approximately 2.5% of all splenic cysts [1, 2]. Splenectomy has been considered as the standart treatment of choice for symptomatic splenic cysts; however, during the last decade, spleen-conserving procedures, such as total cystectomy with partial splenectomy or partial cystectomy, have gained popularity and been performed by the laparoscopic approach [1–3]. During this period, percutaneous interventional procedures have also been proposed as an alternative method for the treatment of nonparasitic ''true'' splenic cysts and there are reports with various results [4–6]. The purpose of this study was to evaluate the effectiveness of percutaneous drainage and polidocanol sclerotherapy for the treatment of congenital splenic cysts.

Materials and Methods

Patients

Over a 5-year period, three patients with splenic cysts were treated by percutaneous intervention. Data of the patients are presented in Table 1. There were one male and two female patient, ranging in age between 13 and 40 years. All of the patients were admitted to the hospital with the complaints of left upper quadrant discomfort, mass sensation, and/or shortness of breath. None of the patients had previously undergone any kind of abdominal surgery and none of them had a history of abdominal trauma. On physical examination, all patients have a palpable large left upper quadrant abdominal mass with pain. All of the lesions were clearly demonstrated by ultrasonography (US) and all patients were also examined by computed tomography (CT) for the determination of the exact size and nature of the lesions. Written informed consent was obtained from all patients before the interventional procedure, and a complete blood count with coagulation screen and biochemical analysis was performed. Serological studies were also done for excluding the possibility of parasitic infection.

Interventional Procedure

Using sterile procedures and under US guidance, the lesion was punctured directly from the cyst wall, sparing the splenic tissue if it was possible. A Cruiser introducer set (PBN Medicals, Denmark) was used for the initial puncture with a 21-gauge needle, and 20–30 ml of cyst fluid was aspirated for laboratory and pathological examinations at this stage. After the advancement of a 0.018-in. guidewire and placement of a 4F sheath over a tapered dilator, the dilator was removed and approximately 40% of the cyst content was aspirated to prevent leakage during the dilation. After that, a 0.035-in. guidewire was advanced into the cyst, allowing for further dilation and subsequent 7F pigtail drainage catheter placement (TCD; PBN Medicals, Denmark). The tip of the drainage catheter was positioned at the most dependent part of the cyst cavity to facilitate spontaneous drainage (Fig.1). Because the procedure was performed on an outpatient basis, catheter drainage records were checked daily by telephone calls and US examinations were performed at the third day after the procedure and weekly thereafter. It was decided to remove the catheter if the drainage stopped or was less than 10 ml per day and the cystic cavity was collapsed on US, but the cysts continued to drain in all three patients. Because the drainage persisted for more than 2 weeks, sclerotherapy by using polidocanol was performed; a control cystography for checking the possibility of leakage was obtained under fluoroscopy, and after complete aspiration of the cyst content, 10 mL of 3% polidocanol (Aethoxysclerol, Kreussler & Co GmbH, Germany) was injected into the cyst cavity. The drainage of the catheter was stopped with a stopcock and the catheter left in place. After 8 h, the stopcock was opened and free drainage was restarted. The next day, US control was performed. The catheter was withdrawn if the drainage was stopped or was less than 10 ml per day and the cystic cavity was collapsed on this final US examination. After the treatment was completed, follow-up US examinations were done at the 1st, 3rd, 6th, 9th, and 12th months and every year thereafter.

Results

On US examination, the splenic cysts were well-marginated and purely anechogenic lesions with floating, small echo enhancements. All of the lesions were well delineated and low attenuating with a thin, unenhanced wall on CT (Fig. 1). The cysts were all located in the spleen without any accompanying lesions; there was lobulation on the posterior margin of one of the cysts, giving the impression of accompanying smaller cysts possibly connected to each other. The size of the cysts varied between 12 and 18 cm. The results of all three patients are summarized in Table 1.

Correspondence to: A. Yigit Goktay; *email:* yigit.goktay@deu.edu.tr; goktayay@superonline.com

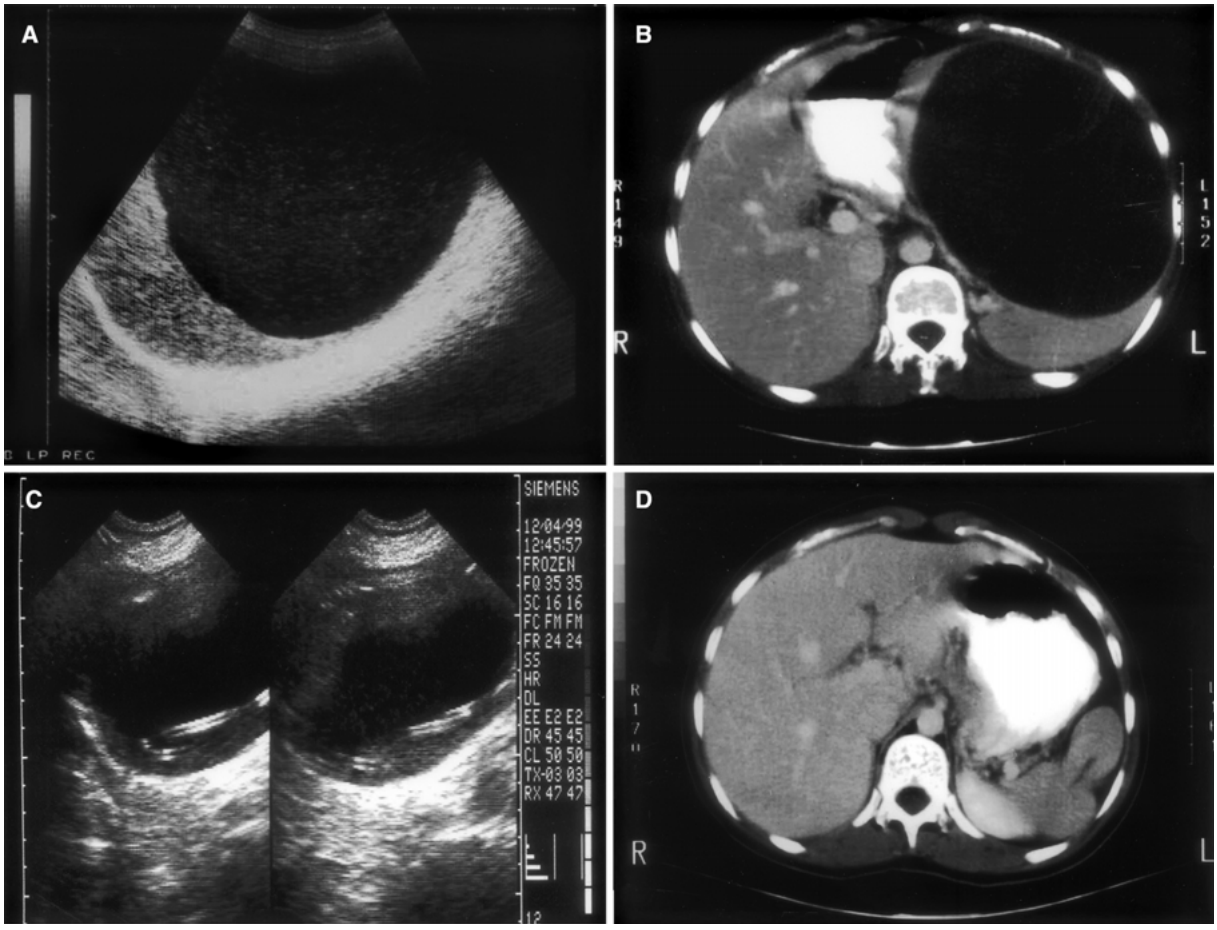

Fig. 1. The patient (# 1) with a giant nonparasitic ''true'' splenic cyst. **A** Longitudinal US scan shows well-marginated and purely anechogenic cystic lesion of the spleen with floating small echo enhancements. **B** Axial contrast-enhanced CT image shows a large, well-defined, homogenous, low-attenuating splenic mass compressing the normal splenic tissue; note the displacement of stomach and compression of left hepatic lobe. **C** Axial US scans obtained the second week showing the position of the catheter and significant reduction of the cyst content, but the drainage was more than 1000 ml per day at the moment. **D** Axial contrast-enhanced CT image obtained 2 years after the sclerotherapy shows a very small sized ($0.5 \times 2 \times 0.5$ cm) linear cyst remnant located in the middle of the spleen; note the prominent changes in the configuration of spleen and liver.

Aspirated and drained fluids were clear or slightly turbid and yellow in serous nature. The cytopathological examinations were negative for malignant cells and revealed no atypical cells; there were only debris, scant cells, and macrophages. There were no laboratory findings of parasitic or bacterial infection. The total drainage volume varied between 9000 and 20,200 ml (mean: 12,950 ml). The duration of catheterization was 15 and 22 days (mean: 18 days). The drainage did not stop after 2 weeks in any of the patients and sclerotherapy with polidocanol was applied. In two of these cysts, drainage ceased the day after the sclerotherapy and catheters were withdrawn after the US controls. In one patient, the cyst continued to drain 40–80 ml per day over the following 5 days; the drainage gradually decreased and ceased on the eighth day after the sclerotheraphy. The fluid content of all cysts was significantly reduced during the follow-up; small residual cysts (2–5 cm) remained in two patients and the cyst completely disappeared in the remaining one patient (patient #1) (Fig.1). No procedural or postprocedural complication occurred in any of the patient. During the follow-up (6–36 months; mean: 24 months), no recurrence was detected and no secondary infection developed related to the procedure.

Discussion

Splenic cysts are rare lesions. They are classified as primary (true) cysts, with epithelial lining, and secondary (pseudocysts), without an epithelial, transitional or mesothelial lining. Pseudocysts are presumed to be posttraumatic in origin and represent 75% of all splenic cysts [1, 2]. True splenic cysts could be parasitic or nonparasitic. Nonparasitic splenic cysts are divided into congenital and neoplastic types [1, 6]. Congenital cysts are also divided into epidermoid and mesothelial subtypes, which are presumed to share a common histogenesis [3, 6]. Careful evaluation of the patients in this study excluded the possibility of previous abdominal trauma. Hydatid disease is endemic in our country; however, laboratory examinations of serology and parasitology excluded the infectious origin. Biopsy of the cyst wall might have been performed for the diagnosis of the exact nature of the cysts, but complication risk was not undertaken and the cysts were defined as congenital true

Table 1. Data of splenic cysts treated percutaneously with catheter drainage and sclerotheraphy

Patient no.	Age	Gender	Clinical presentation	Lesion size (cm)	Drained fluid (ml)	Cath. (days)	Follow-up (months)	Final lesion size (cm)
1	18	F	Abd. discomfort and pain shortness of breath	16 × 18 × 15	20,200	22	36	0.5 × 2 × 0.5
2	40	F	Abd. discomfort and mass sensation shortness of breath	16 × 16 × 15	9,000	17	30	3 × 5 × 3
3	13	M	Abd. discomfort and mass sensation	12 × 10 × 10	9,650	15	6	5 × 4 × 4

Abd, abdominal; Cath, catheterization period

nonparasitic cysts of the spleen. Laboratory studies and cytopathological evaluations have supported this diagnosis.

Congenital splenic cysts can usually attain large sizes before they cause symptoms related to the compression of adjacent organs. They should be treated because of the chronic symptoms and the risk of rupture [1, 2]. Ultrasonography and CT can be used for the diagnosis and planning of the treatment. Congenital ''true'' nonparasitic splenic cysts are rare lesions, but the frequency of reports has increased due to the improved availability of imaging modalities. All recent therapeutic innovations regarding the management of splenic cysts have been based on preserving the splenic tissue due to the immunologic role of the spleen [1–6]. Surgical laparoscopic management has been recommended as the treatment of choice. However, some studies have reported cyst recurrence after laparoscopic surgery and there are also questions about the efficiency of this treatment [1, 7]. Definitive therapy of congenital splenic cysts should exclude the possibility of recurrence and preserve adequate splenic tissue. Splenectomy is not the appropriate management, as it brings the risk of serious complications [1–7].

Percutaneous treatment of various intra-abdominal visceral cysts, parasitic hydatid cysts, and lymphoceles by simple drainage and sclerotherapy is well established with high success rates [4–6, 8–13]. Alcohol, formalin, phenol, Pantopaque, doxycycline, or tetracycline have been used as sclerosing agents for these percutaneous procedures. Among those agents, alcohol has been widely used with high success rates [6, 8–13]. There are also some reports about the percutaneous treatment of congenital splenic cysts and posttraumatic pseudocysts of the spleen [2, 4–6, 13]. In order to avoid potentional serious complications and diminish the risk of trauma, percutaneous treatment seems to be the best option for congenital splenic cysts. However, the reports are usually about a single case, the methods and results of sclerotherapy are different, and follow-up periods are usually less than 1 year [2, 4–6]. These reports have shown different results with sclerosing agents; most of the treatments failed with tetracycline, but there is a case report showing the successful eradication of a splenic cyst with minocycline sclerotherapy [2, 4, 5]. Alcohol has been the preferred sclerosing agent for various types of cystic lesion with good results and there is a report about the successful result after application for a congenital splenic cyst [6, 8–13]. Akhan et al. [6] performed a method consisting simple cathater drainage of the lesion in two different sessions to reduce the volume, and at the third intervention, they used alcohol for sclerotherapy; after 9 months of follow-up, the volume of the cyst cavity was reduced to 8 ml. There is an other report describing of failed case of sclerotherapy by alcohol; however, these authors used alcohol without reducing the volume of the cyst cavity, and the amount of alcohol (50 ml) they used for sclerosis was extremely low for a cystic lesion reaching 20 cm in diameter [2]. Their technique is also questionable, as they rolled the patient to the left and to the right only 45°. The failure of alcohol to cover the complete surface of the cyst wall might result in the survival of some cells along the cyst wall and cause the continuation of fluid secretion by these cells. It is important to use an adequate amount of alcohol (30–35% of the volume) and to completely rotate the patient while the sclerosing agent is in the cavity [6, 13]. These probably are the reasons for their unsuccessful result.

We used a simpler method with a different sclerosing agent; after a single intervention of drainage, sclerotherapy was performed after 2 weeks and the treatment was completed within 3 weeks at most. Polidocanol, a sclerosing agent, has been widely used for the treatment of varicose veins, venous malformations, telangiectasias, and lymphoceles [14, 15]. There are also various reports about the successful eradication of renal cysts, hydroceles, and epididymal cysts with polidocanol sclerotherapy [16, 17]. Polidocanol consists of 5% ethyl alcohol as a preservative and 95% hydroxypolyethoxydodecane as the active component of the product. It is a urethane local anesthetic that differs from the more classic ester and amide anesthetic agents by lacking an aromatic ring [14]. Its detergent action induces a rapid overhydration of the cells, leading to destruction. Because its sclerosing effect can be obtained with only a small amount of the agent, its application is easier than the use of ethanol. The primary clinical application of polidocanol is its endovascular use for sclerosing varicose veins and, therefore, it is a safer agent for using without reaspiration. It can be left in the cyst cavity to achieve a complete adhesion with only a one-step application. It is painless upon injection and has shown an extremely low incidence of complications even after endovascular applications [14–17]. Concerning the above-mentioned benefits, we preferred to use polidocanol as the sclerosing agent for the treatment of congenital splenic cysts. We used 10 ml of 3% aethoxysclerol, which is equal to 300 mg polidocanol. There is a report about the use of higher amounts of polidocanol as the sclerosing agent for percutaneous renal cyst treatment [17], but we decided to use a standard dose and repeat it if the first injection fails. There had been no need for a second injection of sclerosing agent in our patients. Simple catheter drainage was not effective enough for the treatment after 2 weeks in any of these three cases with giant splenic cysts. This is probably because of the presence of true secreting epithelial lining of the cyst wall, as it has been described previously [2, 6, 9, 13]. Polidocanol was applied after 2 weeks of simple cathater drainage because the procedure was performed on an outpatient basis and longer catheter drainage might carry the risk of infection, catheter occlusion, and patient discomfort. The drainage ceased the next day after the sclerotherapy in two patients and in 8 days in the remaining one. However, in this patient, it was observed that the amount of daily drainage had been significantly reduced after the sclerotherapy and it gradually decreased and ceased on the eighth day. In our opinion, the finding of decreased drainage after the sclerotherapy is a good indicator of procedural success and waiting for complete

resolving is not a waste of time. No complication was observed in any of the cases and recurrence was not noted after a mean of 24 months follow-up. Compared to the previously described successful method of alcohol sclerotherapy, percutaneous drainage and polidocanol sclerotherapy has the advantages of a single intervention and complete result within a few weeks. Percutaneous drainage and polidocanol sclerotherapy of congenital splenic cysts seems to be a better and less invasive alternative for the treatment. The technique appears to be safe and effective, but the role of spleen-preserving surgical procedures might be reserved for the complicated cases.

The high success rate achieved with drainage and polidocanol sclerotherapy is a promising result for future applications and should encourage the use of this treatment as the primary approach in the management of congenital splenic cysts. Percutaneous treatment of congenital splenic cysts gives the best alternative for preserving sufficient amount of splenic parenchyma with a minimal invasive approach.

References

1. Seshadri PA, Poenaru D, Park A (1998) Laparoscopic splenic cystectomy: a case report. J Pediatr Surg 33:1439–1440
2. De Caluwe D, Phelan E, Puri P (2003) Pure alcohol injection of a congenital splenic cyst: a valid alternative? J Pediatr Surg 38:629–632
3. Tsakayannis DE, Mitchell K, Kozakewich HP, et al. (1995) Splenic preservation in the management of splenic epidermoid cysts in children. J Pediatr Surg 30:1468–1470
4. Shimanuki K, Satake M (1996) Non-surgical treatment of splenic cyst, using with installation of minocycline chloride. Fukushima J Med Sci 42:23–30
5. Yoshikane H, Suzuki T, Yoshioka N, et al. (1996) Giant splenic cyst with high serum concentration of CA 19-9. Failure of treatment with percutaneous transcatheter drainage and injection of tetracycline. Scand J Gastroenterol 31:524–526
6. Akhan O, Baykan Z, Oguzkurt L, et al. (1997) Percutaneous treatment of a congenital splenic cyst with alcohol: a new therapeutic approach. Eur Radiol 7:1067–1070
7. Ganti AL, Sardi A, Gordon J (2002) Laparoscopic treatment of large true cysts of the liver and spleen is ineffective. Am Surg 68:1012–1017
8. Bean WJ (1981) Renal cysts: treatment with alcohol. Am J Radiol 138:329–332
9. Bean WJ, Rodan B (1985) Hepatic cysts: treatment with alcohol. Am J Radiol 144:237–241
10. Simonetti G, Profili S, Sergiacomi GL, et al. (1993) Percutaneous treatment of hepatic cysts by aspiration and sclerotherapy. Cardiovasc Intervent Radiol 16:81–84
11. Akhan O, Dincer A, Ozmen M, et al. (1996) Liver hydatid disease: long-term results of percutaneous treatment. Radiology 198:259–264
12. Akhan O, Cekirge S, Ozmen M, et al. (1992) Percutaneous transcatheter ethanol sclerotherapy of postoperative pelvic lymphoceles. Cardiovasc Intervent Radiol 15:224–227
13. Volk M, Rogler G, Strotzer M, et al. (1999) Post-traumatic pseudocyst of the spleen: sclerotherapy with ethanol. Cardiovasc Intervent Radiol 22:246–248
14. Marrocco-Trischitta MM, Guerrini P, Abeni D, et al. (2002) Reversible cardiac arrest after polidocanol sclerotherapy of peripheral venous malformation. Dermatol Surg 28:153–155
15. Jain R, Bandhu S, Sawhney S, et al. (2002) Sonographically guided percutaneous sclerosis using 1% polidocanol in the treatment of vascular malformations. J Clin Ultrasound 30:416–423
16. Ohta S, Fujishiro Y, Fuse H (1997) Polidocanol sclerotherapy for simple renal cysts. Urol Int 58:145–147
17. Brunken C, Pfeiffer D, Tauber R (2002) Long term outcome after percutaneous sclerotherapy of renal cysts with polidocanol. Urologe A 41:263–266