Case Report

Traumatic rupture of a giant congenital splenic cyst presenting as peritonitis

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ABSTRACT

Splenic cysts are uncommon, with large cysts and complications being rare. We describe a 6-year-old patient who initially presented 1 day after falling onto her abdomen at the playground with worsening abdominal pain and distention. An ultrasound of the abdomen demonstrated free abdominal fluid in all four quadrants. A subsequent contrast-enhanced computed tomography scan of the abdomen and pelvis was performed which showed a large splenic cyst with open communication to the peritoneal cavity. A congenital primary cyst was confirmed on pathology after partial splenectomy was performed. Although the majority of splenic cysts are asymptomatic, rupture can lead to acute peritoneal signs and mimic other significant causes of abdominal pain such as viscous injury or acute appendicitis.

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Introduction

Splenic cysts are an uncommon occurrence seen in 0.07% of patients as described in a large autopsy series of 42,327 patients [1–3]. However, with the increasing prevalence of cross-sectional imaging, splenic cysts are incidentally detected with greater frequency. Splenic cysts are typically classified as primary (true) or secondary (false), which are differentiated by the presence or lack of an epithelial lining. Primary cysts can be further subdivided into nonparasitic and parasitic subsets, while secondary cysts can be classified as traumatic, infectious, or resulting from prior infarction. Congenital cysts tend to present in young females, and while symptoms are rare, they do occur and can mimic other clinical pathologies. We present the rare complication of a traumatically ruptured congenital splenic cyst in a pediatric patient.

Case report

A 6-year-old female with a past medical history of sickle cell trait and asthma presented to our emergency department with abdominal pain. One day prior, she was seen in the emergency department for abdominal pain occurring after a...
fall in gym class where she sustained blunt trauma to her abdomen. An abdominal radiograph showed a nonobstructive bowel gas pattern with moderate stool burden. She was given an enema with partial symptomatic relief and was then discharged home. Abdominal pain persisted and eventually worsened leading to a return to the emergency department approximately 24 hours after the initial presentation.

Physical examination demonstrated abdominal distention, decreased bowel sounds, bilateral lower abdominal tenderness, and rebound worst in the right lower quadrant. Externally, the soft tissues were unremarkable for bruising or other signs of trauma. Cardiovascular and pulmonary examinations were normal. Vital signs were remarkable only for tachycardia up to 120 beats per minute. The patient was normotensive and without fevers. Laboratory analysis, including comprehensive metabolic panel and complete blood count, was unremarkable.

Given the presence of peritoneal signs, there was clinical concern for ruptured appendicitis. An ultrasound (US) of the appendix was ordered (Fig. 1) which showed a moderate to large amount of mildly complicated free fluid throughout the abdomen and a normal appearing appendix. A contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis was performed (Fig. 2) demonstrating a unilocular, well-defined splenic cyst measuring $7.1 \times 6.2 \times 6$ cm and communicating with the peritoneal cavity through a defect within the superior aspect of the spleen. Free fluid throughout the abdomen and pelvis was again noted and demonstrated a similar Hounsfield unit attenuation as the cystic splenic lesion. There was no evidence of abnormal enhancement or calcifications within the cystic splenic lesion. The appendix was normal in appearance.

The patient was admitted to the hospital for close monitoring and symptomatic management. Sonographic examination of the spleen performed on day 2 of admission showed a stable splenic cyst and improving free fluid. The patient was then discharged to home. A 6-week follow-up US (Fig. 3) showed interval enlargement of the splenic cyst despite improving free intraabdominal fluid. The patient was then taken electively for laparoscopic resection of the splenic cyst and recovered uneventfully.

The resected cyst was sent for pathologic evaluation, which demonstrated a benign squamous epithelium-lined splenic cyst, most likely of congenital origin (Figs. 4–6). The postoperative course was unremarkable, and the patient returned to normal activity.

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**Fig. 1** – Gray scale ultrasound of the right lower quadrant showing a moderate to large amount of free fluid with mobile internal echoes.

**Fig. 2** – Axial (A) and coronal (B) contrast-enhanced CT images of the upper abdomen demonstrate a well-circumscribed, lobulated cystic lesion in the spleen. Coronal image (B) shows a communication with the peritoneal cavity through a defect within the superior aspect of the spleen. Moderate free fluid in the abdomen and pelvis was similar in density to the splenic lesion. CT, computed tomography.
Splenic cysts are uncommon with an incidence of 0.07% based on a large autopsy series. Ruptured splenic cysts are even more rare with only 13 or so cases reported in the medical literature \[3\]. More frequent imaging and advancements in imaging have contributed to an increase in the detection of incidental splenic cysts. Splenic cysts are classified as primary (true) cysts when there is an epithelial lining or secondary (pseudocysts) cysts when the epithelial lining is absent. Primary cysts are further separated into parasitic and nonparasitic types with most parasitic cysts occurring secondary to echinococcal infection \[3\]. Parasitic cysts account for approximately 60% of primary splenic cysts worldwide \[4,5\]. However, in many parts of Europe and North America, nonparasitic cysts dominate. Nonparasitic splenic cysts are separated into congenital or neoplastic subtypes, with congenital splenic cysts representing only 10% of nonparasitic cysts. Congenital cysts are subdivided into epidermoid (90%), dermoid, and simple (endodermal) cysts \[6\]. Secondary splenic cysts are more common overall representing nearly 80% of all splenic cysts and can develop after abdominal trauma, infarction or, less frequently, as a result of infection such as mononucleosis or tuberculosis \[6\].

Differentiating splenic cystic lesions on imaging can be challenging and frequently requires histologic evaluation for definitive diagnosis. However, certain features may suggest a specific etiology. Congenital cysts tend to be simple, presenting as a unilocular cyst with smooth borders and the absence of calcifications. Secondary posttraumatic cysts display similar features but tend to demonstrate wall calcifications. Echinococcal cysts typically present as multilocular cysts, but can also be multifocal and be associated with wall calcifications. Pyogenic abscesses demonstrate variable imaging presentations, may be unilocular multilocular, and present as single or multifocal lesions; they tend to have thick, irregular, and enhancing borders. Unfortunately, multiple benign and malignant neoplastic conditions can mimic splenic cysts such as hemangioma, lymphangioma, lymphoma, and metastasis \[7,8\]. As with

**Discussion**

**Fig. 3** – Five-week follow-up gray scale US of the spleen showing a mildly increasing cystic lesion within the spleen measuring 10.5 cm in maximum dimension with increasing internal echoes. Interval near complete resolution of perisplenic free fluid. US, ultrasound.

**Fig. 4** – Fragments of cyst wall with trabeculated red tan lining.

**Fig. 5** – Splenic parenchyma with cyst wall (H&E, original magnification ×40).

**Fig. 6** – Cyst wall lined by stratified squamous nonkeratinized epithelium (H&E, original magnification ×200).
any lesion, careful evaluation of the patient’s clinical history and laboratory findings is crucial to narrow the differential diagnosis.

The nonspecific symptoms and rarity of splenic cysts lead to inconsistencies in the diagnostic approach. In adults, CT evaluation of the abdomen is the most common modality leading to the detection of incidental cysts. For pediatric patients, abdominal US is usually considered a first-line modality for evaluating abdominal pathology. Magnetic resonance imaging can occasionally be a useful modality for further characterization of splenic cysts, but given the significant overlap in imaging characteristics, magnetic resonance imaging usually provides little benefit over CT or US [9].

Most splenic cysts are asymptomatic; however, ruptured cysts typically produce symptoms. While nonspecific, patients may complain of a wide range of symptoms including abdominal pain, distention, left shoulder pain, and/or vomiting. Free peritoneal fluid that typically accompanies rupture can help aid in diagnosis after laboratory analysis. The mechanisms involved in splenic cyst rupture are not clearly known, but likely etiologies include trauma, infection, and increasing cyst size [3]. Elective treatment is usually reserved for nonparasitic splenic cysts measuring greater than 5 cm [5,6]. In the setting of ruptured or symptomatic splenic cyst, a total or partial splenectomy is generally considered the first-line treatment, particularly in the emergent setting. Other treatments options include aspiration, injection, and fenestration. These alternative options are typically reserved for asymptomatic splenic cysts and have demonstrated mixed results [3,6].

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