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Management of nonparasitic splenic cysts in children

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ABSTRACT

Background: The management of nonparasitic splenic cysts in children is unclear. Options include observation, cystectomy, partial or total splenectomy and percutaneous aspiration with and without sclerotherapy. The aim of this study is to assess the outcomes of these interventions at a children's hospital.

Materials and methods: A retrospective review of patients aged <18 y with splenic cysts over 7 y was performed. Demographics, mode of intervention, and outcome data were collected.

Results: Forty-two patients were identified and their initial management was as follows: 32 patients were observed and 10 underwent intervention (four aspiration and sclerotherapy and six resection). Age (y) was higher for intervention patients than observation patients ($P = 0.004$), as was the cyst size ($P < 0.001$). Incidental finding was the most common presentation in observation patients ($n = 30$; 94%) and abdominal pain for intervention groups: aspiration and sclerotherapy ($n = 3$; 75%) and resection ($n = 5$; 83%).

Two patients failed observation and required aspiration and sclerotherapy due to persistence of symptoms or size increase. Median number of aspiration with and without sclerotherapy interventions was three (range 1-5). All six patients had persistence, with two requiring surgical resection due to symptomatic persistence. Surgical procedures included laparoscopic cystectomy ($n = 3$), laparoscopic partial ($n = 2$) or complete splenectomy ($n = 1$), and/or open splenectomy ($n = 2$). One laparoscopic cystectomy patient had persistence but the other two had no follow-up imaging. Partial and total splenectomy patients had no recurrence and/or persistence.

Conclusions: Observation is an appropriate management strategy for small asymptomatic splenic cysts. Aspiration with and without sclerotherapy and laparoscopic cystectomy are associated with higher rates of recurrence; thus, partial splenectomy may provide the best balance of recurrence and spleen preservation.

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Introduction

Nonparasitic splenic cysts (NPSCs) are rare in children, with most NPSCs being discovered incidentally on physical exam or imaging.[1,2] The frequent use of imaging studies in children has led to an increased number of cysts being diagnosed based on ultrasound, computed tomography, or magnetic resonance imaging.[3,4] Splenic cysts are usually asymptomatic until they are large enough to compress adjacent organs.[5] Abdominal pain, mostly in the left upper quadrant, is typically the main complaint in symptomatic patients.[2,6] Other symptoms and signs include palpable mass,[2,6,7] thrombocytopenia,[8,9] early satiety, or abdominal swelling and distension.

Splenic cysts can be congenital (also referred to as primary) with an inner epithelial lining, or acquired. Some believe that acquired cysts (pseudocysts) are secondary to trauma.[1,10] However, recent studies have stated that trauma does not have a role in the origin of NPSC and that these pseudocysts are actually congenital cysts that have lost their epithelial lining.[1,2,11]

There is no consensus on the best management strategy for NPSCs.[5] Currently asymptomatic smaller cysts (<5 cm in diameter) are treated conservatively with observation and imaging follow-up.[2,11] If the cysts increase in size or become symptomatic, intervention should be considered due to risk of complications.[2] These complications include rupture, hemorrhage, peritonitis, renal compression, hypersplenism, or infection.[1,4,5,12-14]

Options for intervention include cystectomy, partial or total splenectomy, and more recently percutaneous aspiration with or without sclerotherapy.[2,4-6,15] Current literature recommends splenectomy or cystectomy with very rare use of aspiration with and without sclerotherapy.[2,5,15] The rarity of this diagnosis limits comparison to assess the efficacy of these treatment modalities. Aspiration with and without sclerotherapy has been used as an alternative therapy to resection at our institution; however, the efficacy of this procedure has not been measured or compared to other procedures. We thus evaluated the management of NPSC in children at a single children's institution and compared outcomes between treatment options.

Methods

After Institutional Review Board approval, a retrospective review of patients presenting to Children's Medical Center with splenic cyst was carried out. The electronic health record was queried for International Classification of Diseases 289.59 'Other diseases of the spleen' and data were collected for all patients younger than 18 y between May 1, 2009 and February 29, 2016 presenting with this International Classification of Diseases-9 code. Forty-two patients had a diagnosis of splenic cyst. These patients defined the study group. Data collected included, demographics, history, intervention type, relevant diagnostic and interventional studies, and outcome data. Primary outcome was recurrence of symptoms or the cyst. The patients were divided into groups based on initial management type: observation, aspiration with and without sclerotherapy, and surgical resection.

During the study period, an *ad hoc* treatment protocol was developed by the surgery and interventional radiology groups based on previously described management principles given in Figure 1. Symptomatic cysts irrespective of size without other causes of pain underwent intervention. Primary radiologic or surgical intervention was discussed with patients and family members. Patients and families who were concerned about loss of splenic function preferred percutaneous approach over surgical approach.

Aspiration with and without sclerotherapy were performed based on established techniques of cyst drainage and sclerosis in the liver and kidney.[16,17] Aspiration only was performed in small cyst (<3 cm) for diagnosis and establishment of causal relationship to reported pain. Aspiration was also performed as a primary treatment if there was a concern for infection of the cyst based on fevers or elevated white cell count. Retreatment was offered if pain relief occurred with reduction of cyst size with sclerosis performed at that time. Cyst greater than 5 cm were treated surgically or by percutaneous aspiration with and without sclerotherapy with planned successive injections of sclerosing agent due to known effects of dilution on the efficacy of sclerosing agents with large fluid volume cyst. Once the drain was placed, sclerosis was performed with half cyst volume or 50 cc of ethanol or 1000 mg doxycycline. Alcohol was not used if there was any concern for leak. The dwell time was 30 min for ethanol and 1 h for doxycycline, and then, the complete evacuation and drainage by gravity with repeat procedure was carried out three times every other day or once when drain output was less than 20 cc in a 24-hour period. All primary aspiration with and without sclerotherapy procedures were performed under general anesthesia on an outpatient basis; repeat doxycycline sclerotherapy was done without sedation while ethanol sclerotherapy required sedation.

For the purposes of reporting, persistence is defined as no conclusive imaging of cyst resolution, and recurrence is defined as cyst reappearance after previous imaging showed no evidence of cyst. Due to the small numbers, statistical analysis was limited.

Results

Forty-two children were identified with the diagnosis of splenic cyst and their clinical management is summarized in Figure 2. The clinical findings varied and included incidental finding, palpable mass, abdominal pain, shoulder pain, back/flank pain, early satiety, abdominal swelling and/or distension, and symptoms related to the mass effect of the cyst (nausea, vomiting, constipation, or diarrhea). Thirty-two patients were observed, and 10 underwent primary intervention; of them, four underwent aspiration with and without sclerotherapy and six underwent surgical resection (Table 1). Children undergoing intervention were significantly older and had larger cysts than those who were observed ($P = 0.004$, $P < 0.001$).