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Original Article - Case Report

Giant Isolated Splenic Hydatid Cyst with Multiorgan Compression and Pressure-related Atrophy of the Left Hepatic Lobe: A Case Report

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ABSTRACT

Cystic echinococcosis (CE) typically involves the liver and lungs, with primary isolated splenic hydatid cysts being rare, accounting for only 2–3.5% of cases. We report the case of a 58-year-old woman with a giant splenic cyst (20.5 × 15 × 12.2 cm) showing active, multivesicular pattern of. Diagnosis was confirmed through serology, ultrasonography, and computed tomography. Imaging showed near-complete splenic replacement and marked mass effect, including displacement of adjacent organs and pressure-related atrophy of the left hepatic lobe, a rarely documented finding. The patient underwent successful splenectomy with complete cyst excision; histopathology confirmed hydatid disease, and postoperative albendazole therapy was completed without complications. This case underscores the importance of comprehensive imaging in the diagnosis of splenic hydatid cysts and careful preoperative evaluation of adjacent organs due to possible secondary compression. Splenectomy remains the preferred treatment for large, multivesicular cysts to prevent serious complications.

Keywords

Giant isolated splenic hydatid cyst, left hepatic lobe atrophy, pressure-related atrophy, cystic echinococcosis, Echinococcus granulosus; splenectomy.

Abbreviations

Alanine aminotransferase (ALT); Anti-hepatitis C virus antibody (Anti-HCV); Aspartate aminotransferase (AST); Contrast-enhanced computed tomography (CT); Cystic echinococcosis (CE); Enzyme-linked immunosorbent assay (ELISA); Hepatitis B surface antigen (HBsAg); WHO Informal Working Group on Echinococcosis (WHO-IWGE); World Health Organization (WHO).

INTRODUCTION

Hydatid disease or cystic echinococcosis (CE) is a zoonotic disease caused by the parasite *Echinococcus granulosus*, which often leads to the development of one or more hydatid cysts of the liver and lungs in about 60% and 20–30% of cases respectively, with a lower frequency in the bones, kidneys, spleen,

muscles and the central nervous system[1,2]. The incubation period of the disease can last many years until these cysts grow large enough to elicit clinical symptoms. According to the World Health Organization (WHO), CE represents a substantial disease burden as more than 1 million people worldwide may be impacted by it at any one time[1]. Pakistan, a country that heavily relies on agriculture and livestock farming, has regions that are highly endemic for CE, though epidemiological data are limited[3,4].

Involvement of the spleen in hydatid disease is not commonly encountered, occurring in only 0.5–4% of cases[5]. Primary isolated splenic hydatid cysts are rarer still, representing 2–3.5% of all hydatid cysts[6]. Despite this low overall frequency, the spleen is the third most affected site in hydatid disease[7]. Early manifestations often include a palpable mass in the left hypochondrium or epigastrium. Pain, dyspepsia, constipation due to pressure on the colon or dyspnea due to elevation of the left diaphragm are also reported. However, in approximately 30% of the cases, the findings are incidental in individuals with no prior symptoms[8]. Beyond the mass effect exerted on adjacent viscera, the increasing size of the cysts may also compress segmental splenic vessels, leading to extensive pericystic splenic atrophy with the hydatid cyst entirely replacing the splenic parenchyma[9]. Complications include secondary infection, intraperitoneal rupture and anaphylactic shock, particularly with larger splenic hydatid cysts. Adhesions may also occur with nearby organs such as the kidney, left diaphragm, colon and stomach[9,10]. The rarity of the condition coupled with its mostly asymptomatic course makes early, accurate diagnosis and prompt treatment challenging.

To ensure uniform standards and principles of treatment suited to each cyst type, the WHO Informal Working Group on Echinococcosis (WHO-IWGE) developed a standardized classification system of ultrasound images of CE to be used by clinicians and scientists. The first clinical group includes cyst types CE 1 and 2 which are active, usually fertile cysts containing viable protoscoleces. The second clinical group consists of CE 3 cysts, which are in a transitional stage characterized by compromised cyst integrity due to host immune response or chemotherapy. The third clinical group comprises CE 4 and 5, which are inactive, degenerative cysts that have typically lost their fertility[11].

Here we present a 58-year-old woman with a giant isolated splenic hydatid cyst which not only caused marked anatomical distortion of multiple organs, but also led to significant volume loss of the left hepatic lobe due to pressure atrophy, a finding that is rarely documented in the existing literature.

CASE PRESENTATION

A 58-year-old woman presented with a 2–3 week history of epigastric and left hypochondrial discomfort accompanied by postprandial vomiting. She had no known comorbidities or prior surgical history. Abdominal examination revealed mild tenderness and a palpable mass in the epigastrium and left hypochondrium.

Laboratory investigations showed elevated hepatic transaminases (alanine aminotransferase [ALT] 106 U/L, aspartate aminotransferase [AST] 81 U/L) with a slightly decreased albumin-to-globulin ratio (1.03). Echinococcus IgG ELISA serology was positive (ELISA index value 2.0). Anti-hepatitis C

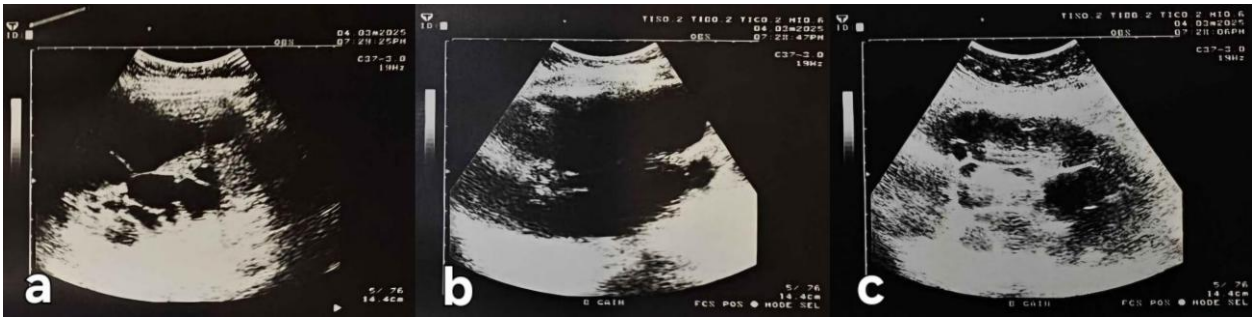

Figure 1. *Ultrasound images of the spleen demonstrating features consistent with a hydatid cyst*. **(a)** Longitudinal view showing a well-defined cystic lesion with internal septations and daughter cysts. **(b)** Alternate plane demonstrating the extent of the cyst and its relation to the surrounding splenic parenchyma. **(c)** Detailed view showing multiple daughter cysts producing a characteristic "honeycomb" appearance.

virus antibody (Anti-HCV) was reactive, while hepatitis B surface antigen (HBsAg) was non-reactive. HCV RNA was positive, consistent with chronic hepatitis C. The mild elevation in ALT/AST likely reflected chronic hepatitis C infection. These findings did not alter the perioperative management. Renal function tests were within normal limits, and urinalysis demonstrated no remarkable findings.

Abdominal ultrasonography identified a large cystic lesion of splenic origin with internal septations (see **Figure 1**). Contrast-enhanced computed tomography (CT) revealed a well-circumscribed cystic lesion with daughter cysts consistent with hydatid disease - the dominant lesion replacing most of the splenic parenchyma and pushing it to the periphery (see **Figure 2 and Figure 3**). The multivesicular architecture with numerous daughter cysts was consistent with a CE2 hydatid cyst[11]. The splenic lesion measured 20.5 × 15 × 12.2 cm (craniocaudal × anteroposterior × transverse), extending to the left hemidiaphragmatic surface. Marked mass effect from the splenic cyst with

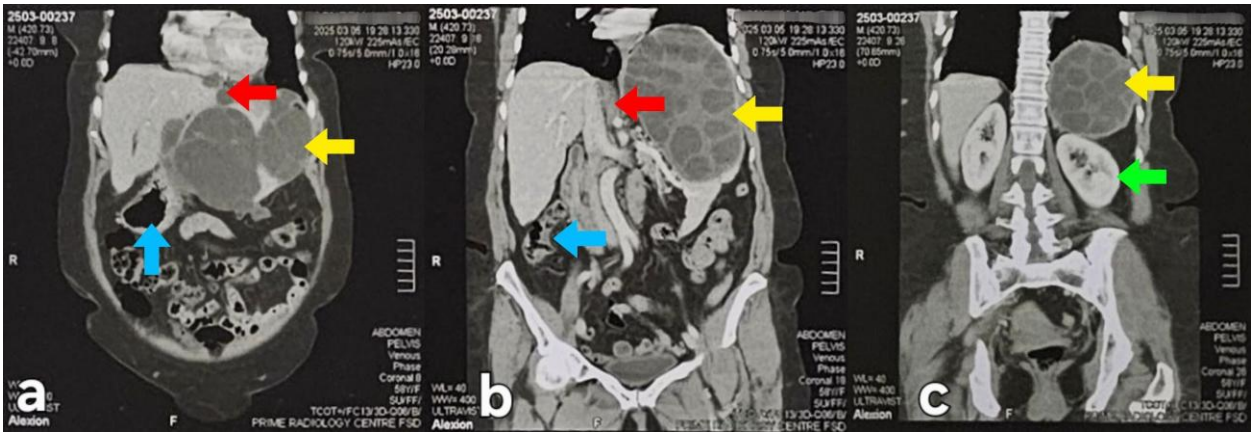

Figure 2. *Coronal contrast-enhanced CT images*. (**a)** The cyst (yellow arrow) shows a multivesicular daughter-cyst pattern, with visible displacement of the stomach (blue arrow). The left hepatic lobe (red arrow) is displaced medially. (**b)** The left hepatic lobe appears thinned and vertically molded against the cyst (red arrow), suggesting pressure-related volume loss. The splenic cystic lesion remains prominent (yellow arrow), with associated medial displacement of the stomach (blue arrow). (**c)** Inferior displacement of the left kidney (green arrow) due to the hydatid cyst (yellow arrow) is seen, while the right kidney remains in a normal anatomical position.

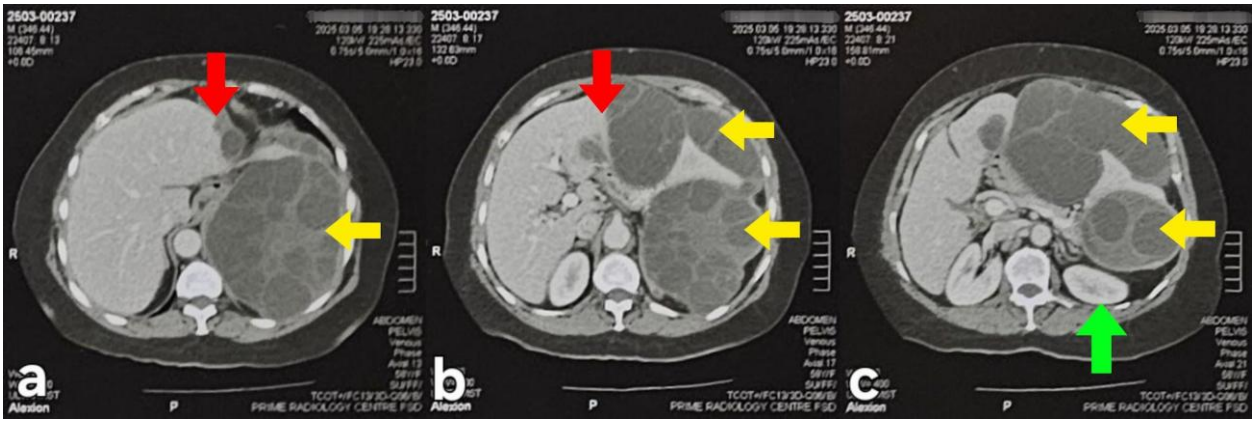

Figure 3 Axial contrast-enhanced CT images. (**a**) The cyst shows a multivesicular daughter-cyst pattern (yellow arrow) with medial displacement of the left hepatic lobe (red arrow). (**b)** Marked mass effect with thinning and molding of the left hepatic lobe against the cyst (red arrow), consistent with pressure-related compression. Multiple daughter cysts are visible (yellow arrows). (**c**) Inferior displacement of the left kidney (green arrow) which appears more caudally due to the hydatid cyst (yellow arrows).

associated volume loss of the left lobe of the liver was seen. The left hepatic lobe appeared atrophied, reflecting chronic mass effect despite the relatively recent onset of symptoms. There was no suspicion of anatomical anomaly or congenital lobar hypoplasia. Additionally, significant inferior displacement of the left kidney was present, with preserved cortical outline and no obvious hydronephrosis. The lesion also displaced the stomach rightward, abutting the pancreatic parenchyma. The transverse colon and proximal small bowel were pushed inferomedial with no obstruction evident.

The patient received pre-splenectomy vaccination four weeks prior to surgery as per local guidelines and subsequently underwent splenectomy via a half-Chevron incision with complete cyst excision. Intraoperatively, the spleen was markedly enlarged and its parenchyma almost entirely replaced by the hydatid cyst (see **Figure 4**), with adherence to the transverse colon and left diaphragmatic dome. A markedly reduced left hepatic lobe (≈50% of the expected size) was also noted by the surgeon, consistent with localized pressure atrophy. No obvious fibrosis or necrosis was observed. The procedure was completed without complications.

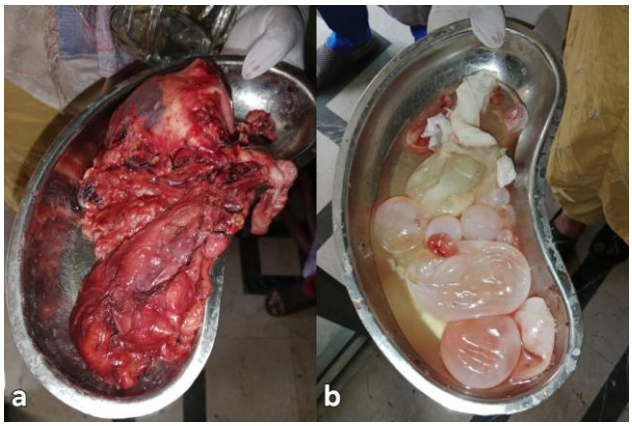

Figure 4. *Intraoperative findings following splenectomy*. (**a)** Excised spleen showing a markedly enlarged organ with distortion of the normal splenic architecture. (**b)** Multiple intact daughter cysts and hydatid membranes removed from the splenic cyst cavity.

Histopathology confirmed an echinococcal hydatid cyst, demonstrating laminated acellular membranes, germinal epithelium, and protoscolices, along with multiple collapsed daughter cysts. Residual splenic tissue was unremarkable, with no evidence of malignancy or necrosis.

Postoperative recovery was uneventful. Albendazole (400 mg twice daily) was administered in three 28-day cycles, each separated by a 14-day drug-free interval. The patient subsequently received antiviral therapy for chronic hepatitis C infection, and a subsequent negative HCV RNA confirmed virologic clearance on follow-up.

DISCUSSION

Primary isolated splenic hydatid cysts are exceptionally rare, as hydatid disease predominantly affects the liver and lungs[1,2,6]. This report describes a giant isolated splenic hydatid cyst, highlighting the diagnostic and management complexity associated with such rare presentations. Diagnosis is established through a combination of clinical evaluation, imaging studies, and serological testing. Commonly used serologic assays include ELISA, indirect hemagglutination, and immunoelectrophoresis. While modern radiological imaging techniques help describe hydatid cysts with precision, abdominal ultrasonography remains at the heart of diagnosis, staging and follow-up of the condition[12,13]. Even with highly specific and sensitive diagnostic procedures, roughly 10% of cases are missed, making the diagnosis of splenic hydatid cysts challenging even in endemic regions[13]. Early recognition and timely intervention are crucial, as cyst rupture can lead to life-threatening complications such as anaphylactic shock[9,10].

The parasitic infection occurs when the eggs of *Echinococcus granulosus* bypass the lung and liver barriers before entering the systemic circulation and settling in the spleen. Retrograde spread via the portal and splenic vein may also take place. After leaving the digestive tract and crossing to portal circulation, parasites continue to retrograde through the portal and lienal vein to the spleen parenchyma[13]. The spleen's strong lymphoid defense and lower vascular trapping efficiency contribute to the rarity of splenic hydatid cysts, accounting for fewer than 4% of cases[14].

Several treatment modalities are available for splenic hydatid disease which include pharmacotherapy, percutaneous drainage and surgery. Surgical management remains the preferred approach, offering better long-term results with minimal postoperative complications and recurrence risk. A wide range of surgical procedures, from splenectomy to organ-sparing surgery including partial splenectomy, cyst enucleation or partial

pericystectomy can be employed after careful assessment of each individual case[10,13,15,16]. Preservation of the spleen is increasingly advocated with the intention of preventing splenectomy-associated complications. However, only the complete removal of the involved organ ensures the patient is free of a potentially infected cavity which may cause future recurrence. Therefore, complete splenectomy is often favoured, as it can be performed with very low mortality and morbidity[10,16].

Several notable case reports have documented large-sized splenic hydatid cysts, with relatively fewer ones reporting a range between 20 and 30 cm. The largest splenic cysts described include sizes of 30 × 20 cm (Belli et al.)[17], 20 × 16 × 18 cm (Ghabisha et al.)[18], 20.05 × 15.95 × 26.71 cm (Lukman et al.)[19], and 20 × 22 cm (Pukar and Pukar)[9]. With dimensions of 20.5 × 15 × 12.2 cm, the cyst in our patient falls within this upper range. A common theme among these cysts is compression and displacement of the surrounding abdominal structures including the stomach, pancreas and the left kidney with occasional adhesions to the diaphragm, similar to what was seen in our patient[17-19].

However, few reports mention compression of the left lobe of the liver[18,19]. A thorough literature search was conducted in PubMed and Google Scholar using combinations of keywords including splenic hydatid cyst, splenic hydatidosis, echinococcosis, hepatic lobe atrophy, volume loss and extrinsic compression of the liver. We found that previous reports of giant isolated splenic hydatid cysts have not specifically described pressure-mediated atrophy or volume loss of the left hepatic lobe. In our patient, both preoperative imaging and intraoperative assessment demonstrated marked reduction in the volume of the left hepatic lobe, consistent with pressure atrophy. While hepatic lobe atrophy due to intrahepatic hydatid cysts has been described in literature, including CT volumetric confirmation of atrophy-hypertrophy complexes[20], to our knowledge no published report has documented pressure-related atrophy of the left hepatic lobe secondary to an extrahepatic splenic hydatid cyst. Additionally, it must be noted that though the patient reported a short symptomatic period, the left hepatic lobe atrophy most likely reflects a chronic process of subclinical extrinsic compression from the slowly enlarging lesion, with symptoms appearing after the cyst reached a critical size. This is consistent with the insidious nature of the condition[1,8].

Alternative explanations for left hepatic lobe atrophy were considered. Chronic HCV may result in progressive fibrosis and cirrhosis, and advanced cirrhosis often leads to hepatic volume reduction[21]. However, such changes are typically diffuse rather than isolated to a single hepatic lobe. In this case, the right hepatic lobe appeared preserved, and imaging demonstrated focal thinning and molding of the left hepatic lobe in direct contiguity with the splenic cyst, making a viral-based etiology less likely. Vascular causes, including portal or hepatic venous compromise, were also considered. However, contrast-enhanced CT did not demonstrate thrombosis, vascular occlusion, or features of chronic hepatic ischemia. Furthermore, the absence of intraoperative fibrosis or necrosis supports a mechanical rather than intrinsic hepatic process. Therefore, the overall findings suggest that chronic extrinsic compression from the splenic cyst remains the most plausible explanation for the observed left hepatic lobe atrophy.

This report does not come without certain limitations. These include the unavailability of prior abdominal imaging, preventing comparison of the liver with its pre-cystic baseline size. Secondly, formal CT volumetric analysis was not conducted so the degree of volume loss could not be quantitatively measured. Nonetheless, the combined radiologic and intraoperative findings provide compelling evidence of localized pressure-related volume reduction.

In conclusion, this report underscores the importance of thorough imaging assessment to guide timely surgical intervention and prevent complications such as rupture, infection, and anaphylaxis[9,10]. Splenectomy remains the preferred management approach for large, multivesicular cysts. This case also demonstrates that long-standing extrinsic compression from a giant splenic hydatid cyst may also contribute to localized morphological changes in neighboring organs, including pressure-related atrophy of the left hepatic lobe. Despite being clinically silent, this finding broadens the range of secondary anatomical abnormalities linked to splenic hydatid disease and emphasises the importance of closely examining nearby structures during preoperative imaging. Further documentation of similar cases may help determine the true frequency, mechanisms, and clinical relevance of such compressive changes.

Conflict of Interest
The authors have no relevant financial or non-financial interests to disclose.

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Author contributions
MAH and QZ screened through patient data and prepared the initial draft. FH was involved in conceptualization, project administration, interpretation of patient data and substantial revisions to the final draft. All authors have read and approved the final manuscript.

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