



Investigation of Hydatid Cyst with a Focus on Cases with Multiple Locations; A Case Report

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ABSTRACT

Hydatid cyst, a common ailment affecting both humans and animals, has the potential to develop in various anatomical locations, with the lungs and liver being the primary sites where this happens. Individuals in endemic regions, particularly those involved in livestock farming, face an increased risk of exposure to this parasitic disease. The cysts can concurrently manifest in multiple areas of the body, highlighting the intricate nature of their presentation. Despite often being asymptomatic, early detection of hydatid cysts is crucial for effective intervention. Diagnostic tools such as ultrasound, CT scans, and serological tests play a pivotal role in identifying these cysts, even without overt symptoms. The insidious progression of hydatid cysts allows them to persist asymptotically over prolonged periods, posing a latent threat. However, the rupture of these cysts, whether spontaneous or triggered by external factors, can result in severe consequences, potentially leading to fatality. This study reports a compelling case involving a 41-year-old woman investigating the causes of infertility. Through comprehensive examinations, multiple hydatid cysts were serendipitously discovered in her liver, spleen, and kidneys. This case underscores the diverse anatomical locations these cysts can occupy and emphasizes the significance of vigilant diagnostic approaches, even in individuals initially presenting with unrelated concerns such as infertility. Diagnostic findings including elevated levels of specific biomarkers and radiological assessments provided detailed visualization of the cystic lesions, aiding in the formulation of a treatment strategy. The therapeutic regimen comprised albendazole therapy and surgical intervention, resulting in promising progress and enhanced overall well-being for the patient while supporting the patient after surgery.

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Introduction

Hydatid cysts occur in humans and animals and can be seen worldwide, but countries in the Middle East, South America, and Africa are more polluted (1) (19). It is also an important medical and veterinary disease in many countries, and this disease is an important disease transmitted from animals to humans in many parts of Iran

(2). People who are related to animals in relation to their jobs and live in rural areas, such as farmers and ranchers, are more exposed to pollution (3). Hydatid cysts can form anywhere in the body, but the lungs and liver are the most common sites (4). The rate of involvement of the liver is 75%, and that of the lungs is 25%

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(4). The bones, heart, spleen, kidneys, and brain can also rarely be involved (5) (20) Because the worm larvae are trapped after entering the liver or lungs and cannot enter systematic circulation. The incidence of these cases is very low, even in endemic regions (6). Hydatid cysts, from inside to outside, are composed of 3 layers: endocyst, ectocyst, and pericyst, respectively. Increased internal pressure and trauma may cause the cyst to rupture (7). In this study, we report a 41-year-old pregnant woman who was examined for infertility at Besat Hospital in Sanandaj, and several cysts were accidentally observed in the kidney, spleen, and liver.

Case report

Our case was a woman who lived in a village in Kurdistan Province who had been referred to a hospital for infertility treatment. In the initial examination, using ultrasound, several cyst-like areas were observed in different parts of the abdomen. For better evaluation, a CT scan of the guts and pelvis was requested in three phases, in which the following cases were reported. Dimensions and density of liver, pancreas, kidneys, and adrenal glands were normal. Cystic structures with diameters of 29 x 42 mm were seen in the four segments of the right lobe of the liver and sizes 64 and 58 mm in the spleen parenchyma and the inferior bridge of the left kidney in its very close proximity to the diameter of 53 mm. The possibility of a hydatid cyst was raised primarily. In addition, no other lesions were seen on abdominal CT scans. Lymphadenopathy and free fluids were not observed (Figure 1).

Patient history

The female patient, residing in a rural village within Kurdistan Province, was referred to the hospital for infertility treatment. Given the limited access to medical resources and records in her village, there was scant patient history available. Upon initial examination, ultrasound imaging revealed cyst-like formations dispersed throughout various regions of her abdomen, necessitating further evaluation. Concurrently, the patient sought medical attention for chronic abdominal pain. CT imaging unveiled cystic lesions in the liver, spleen, and left kidney, suggestive of hydatid cysts, prompting consideration for surgical or pharmacological intervention to avert potential complications.

Laboratory Findings

Upon laboratory analysis, serum tests revealed elevated levels of specific biomarkers indicative of inflammation and potential parasitic infection. Notably, eosinophilia was observed, suggesting an immune response to the presence of hydatid cysts.

Radiological Assessments

Radiological assessments, encompassing CT scans and ultrasound imaging, provided comprehensive visualization of the cystic lesions in the liver, spleen, and left kidney. These scans delineated the size, area, and extent of the cysts, facilitating the formulation of an appropriate treatment strategy.

Therapeutic Regimen

After thorough evaluation and consultation with

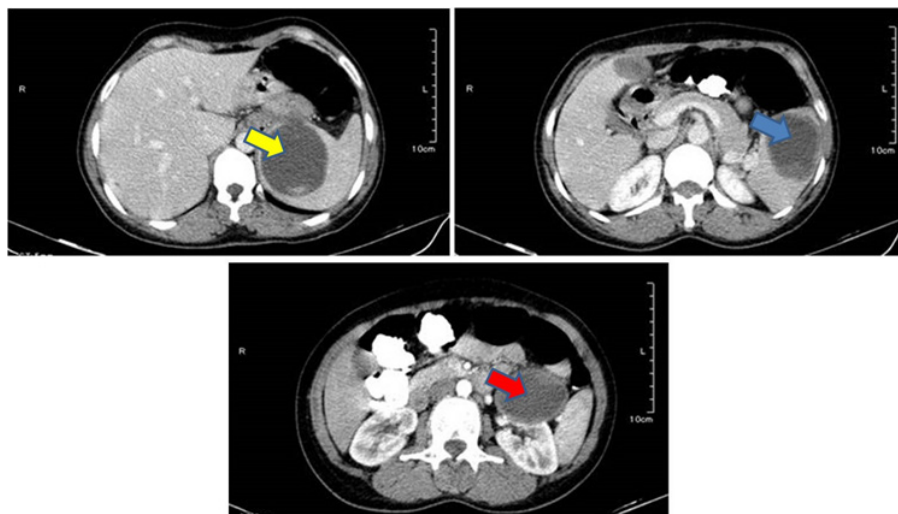


Figure 1. Axial CT-scan images with IV contrast of the abdominal region reveal various hydatid cysts. Highlighted are the Liver hydatid cyst (yellow arrow), Spleen hydatid cyst (blue arrow), and Kidney hydatid cyst (red arrow), indicative of the parasitic infection caused by the tapeworm *Echinococcus*.

specialists, a therapeutic regimen was devised. The patient commenced a course of albendazole, a broad-spectrum anthelmintic medication, to target and diminish the size of the hydatid cysts. Additionally, surgical intervention was planned to address the larger cysts and mitigate the risk of rupture.

Follow-up Results

Subsequent follow-up assessments revealed promising progress. Imaging studies demonstrated a reduction in the size of the cystic lesions, indicating a favorable response to albendazole therapy. Surgical intervention proceeded successfully, with the removal of the larger cysts achieved without complications. The patient experienced significant symptom improvement and enhanced overall well-being during the postoperative period. Continued monitoring and regular follow-up appointments were scheduled to ensure sustained management and surveillance of the hydatid cysts.

Discussion

The etiology of hydatid cysts stems from the larval stage of a cestode known as *Echinococcus granulosus* (8). Human transmission occurs through ingestion of worm eggs via sullied water or food sources (8, 9), or through coordinate contact with contaminated pets, particularly dogs. The larvae typically infiltrate the lungs and liver, forming cysts, though they can also impact other organs such as the spleen, kidneys (2-3%), heart (up to 2%), brain (2%), and bones (0.5-4%) (10). Clinical manifestations are often nonspecific (11), and cysts can remain asymptomatic for several years, gradually enlarging throughout 5 to 20 years (12). Symptomatology varies depending on cyst size and location (2), with reports of infection, dull aching pain, and heartburn in cases of splenic involvement (13). Notably, eosinophilia is not a consistent finding (10), observed in approximately 25% of cases (14) (21).

Diagnosis typically occurs incidentally, with CT scans and ultrasound serving as primary imaging modalities to assess for other pathologies. Serological tests, coupled with thorough patient history, CT scans, and ultrasound, can aid in diagnosis. Although ELISA testing may provide supportive evidence, it lacks definitiveness (13). PCR testing, based on DNA sequencing, offers accurate diagnosis, particularly in identifying different strains of *Echinococcus granulosus* through mitochondrial DNA analysis. The G1 genotype, most commonly affecting humans, can be identified via PCR, enhancing diagnostic precision. (2) Rupture of cysts poses significant

risks, particularly following trauma or pressure (7). Hepatic cyst rupture can lead to secondary infection and contamination of adjacent tissues, such as the spleen (10), and may precipitate acute pancreatitis, acute cholecystitis (15), or even anaphylactic shock (16), occasionally resulting in fatal outcomes (2).

Physical examination includes abdominal palpation for tenderness and organ enlargement, assessment of vital signs, and evaluation for respiratory and cardiovascular abnormalities. Additionally, gynecological examination and vigilance for signs of anaphylaxis are crucial, especially considering the patient's pregnancy status and potential risks associated with cystic lesions.

Treatment options include surgical drainage (13) or pharmaceutical intervention with drugs like albendazole (17). Surgical intervention is often preferred for certain cysts, such as splenic hydatid cysts, due to their elevated risk of rupture (18). In cases where internal cyst pressure needs reduction, drainage can be achieved through cyst puncture (19). Timely intervention is crucial to prevent cyst rupture, subsequent dissemination, and secondary infection (10).

Conclusion

This case study underscores the diverse anatomical manifestations and diagnostic challenges posed by hydatid cysts, emphasizing the importance of vigilance in clinical practice. While often asymptomatic and detected incidentally, these cysts can harbor significant morbidity and mortality risks upon rupture. Early detection through imaging modalities such as ultrasound and CT scans, coupled with serological testing, remains pivotal in effective management. Surgical intervention and drug therapy stand as mainstays in treatment, aiming to prevent rupture and mitigate associated complications. Asymptomatic persistence underscores the latent threat posed by these cysts, warranting continued surveillance and prompt intervention to avert adverse outcomes.

Authors' contributions

The author contributions include conception and design by Mohammad Bakhtiar Hesam Shariati, administrative support by Kaveh Haji-Allahverdipoor, provision of study materials or patients by Susan Mohammadi, collection and assembly of data by Mohammad Bakhtiar Hesam Shariati and Kaveh Haji-Allahverdipoor, data analysis and interpretation by all authors, manuscript writing by Koosha Rokhzadi, and final approval of the manuscript by all authors.

Ethics approval and consent to participate

This study has been approved by the Research Center of Kurdistan University of Medical Sciences and Ethics Committee with the file number IR.MUK.REC.1400.073

Consent for publication

Written informed consent was obtained from a legally authorized representative(s) for the publication of anonymized patient information in this article, which received approval from the Research Center of Kurdistan University of Medical Sciences.

Conflict of interest

All authors affirm that there are no conflicts of interest that could compromise the impartiality of this scientific work.

Availability of data and materials

The availability of data and materials supporting the findings of this study is detailed in the supplementary information provided with this manuscript

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