International Journal of Radiology and Diagnostic Imaging

E-ISSN: 2664-4444
P-ISSN: 2664-4436
www.radiologypaper.com
IJRDI 2023; 6(3): 82-86
Received: 02-06-2023
Accepted: 01-07-2023

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Isolated intricacy: Exploring a solitary renal hydatid cyst-a case report on rare presentation of echinococcosis

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DOI: https://doi.org/10.33545/26644436.2023.v6.i3b.345

Abstract
Echinococcosis, a zoonotic disease of global significance, primarily affects the liver and lungs. While hepatic involvement is the most common presentation of echinococcosis, isolated renal hydatid cysts are a rare entity with limited reported cases in the literature. We report a case of isolated renal hydatid cyst in a 34-year-old female patient who presented with pain in the right flank for 2 years, which was insidious in onset, intermittent in nature with aggravation of pain over the last 3 months. The abdominal examination revealed mild tenderness in right hypochondrium. After ultrasonography and contrast-enhanced CT scan of the abdomen, the differential diagnoses of complex renal cyst, renal hydatid cyst, cystic neoplastic lesion and resolving renal abscess were considered. Partial nephrectomy was performed. Histopathological examination revealed features consistent with Hydatid Cyst with xanthogranulomatous reaction. Therefore, isolated renal hydatid cysts, though rare, necessitate a high index of suspicion and comprehensive radiological evaluation for accurate diagnosis and optimal management.

Keywords: Isolated renal hydatid cyst, echinococcosis, hydatid cyst

Introduction
Isolated renal hydatid cyst, a rare manifestation of echinococcosis caused by the larval stage of *Echinococcus* tapeworm [1], poses a diagnostic and therapeutic challenge due to its infrequent occurrence and diverse clinical presentations. While hepatic involvement is the most common presentation of echinococcosis, isolated renal hydatid cysts are a rare entity with limited reported cases in the literature [2]. The incidence of renal involvement is about 2%–4% in all hydatidosis cases [3].
Accurate diagnosis and timely management are crucial to prevent complications such as cyst rupture, secondary infection, and anaphylactic reactions.
Echinococcosis, a zoonotic disease of global significance, primarily affects the liver and lungs. However, extra pulmonary locations, including the kidneys, can also be involved [1]. Renal hydatid cysts, though rare, require consideration in the differential diagnosis of renal cystic lesions. The clinical presentation may mimic other renal conditions, posing a diagnostic challenge.
Radiological imaging, including ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI), plays a pivotal role in the diagnosis and characterization of isolated renal hydatid cysts [4].
In this report, we present a case of isolated renal hydatid cyst in a 34-year-old female patient, emphasizing the radiological findings. By contributing to the existing literature, we aim to enhance the understanding of this uncommon condition and highlight the importance of considering hydatid cysts in the differential diagnosis of renal cystic lesions.

Case Report
A 34-year-old non-diabetic, non-hypertensive female patient, who was healthy 2 years back, presented to the outpatient department with pain in the right flank, which was insidious in onset, intermittent in nature with aggravation of pain over the last 3 months.

It was not associated with other symptoms. The abdominal examination revealed mild tenderness in right hypochondrium.

Preliminary blood investigations like complete blood count, renal function tests and liver function tests were normal with no eosinophilia. Urine microscopy and cultures were negative with no signs of hydatiduria.

On imaging, abdominal ultrasound (US) (Figure 1) showed a well-defined exophytic hypoechoic lesion in the interpolar region of right kidney, measuring up to 7 cm with internal echoes and echogenic band like structures floating within the lesion, with few peripheral wall calcifications showing posterior acoustic shadowing. On Doppler evaluation, no internal vascularity was noted. No similar lesion in the contralateral kidney, liver and spleen could be detected.

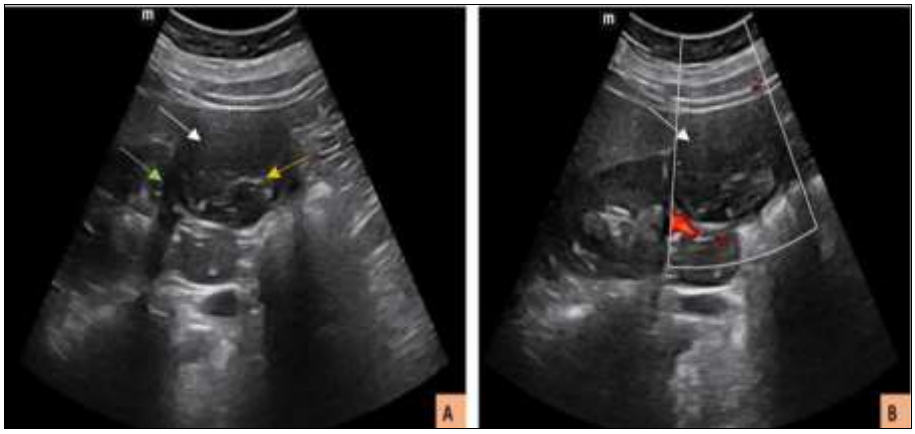

Fig 1: 1A- Abdominal ultrasound (US) showing a well-defined exophytic hypoechoic lesion (white arrow) in the inter-polar region of right kidney, measuring up to 7 cm with internal echoes and echogenic band like structures (yellow arrow) floating within the lesion, with few peripheral wall calcifications showing posterior acoustic shadowing (green arrow). 1B- On Doppler evaluation, no internal vascularity was noted.

After the US, a contrast-enhanced CT scan of the abdomen (Figure 2) was performed which showed a large well defined heterogeneous hypodense lesion with focal peripheral wall calcification with dense linear contents within, arising from interpolar of right kidney, measuring 5 x 5.9 x 7.2 cm. After contrast administration, the lesion didn't show post-contrast enhancement.

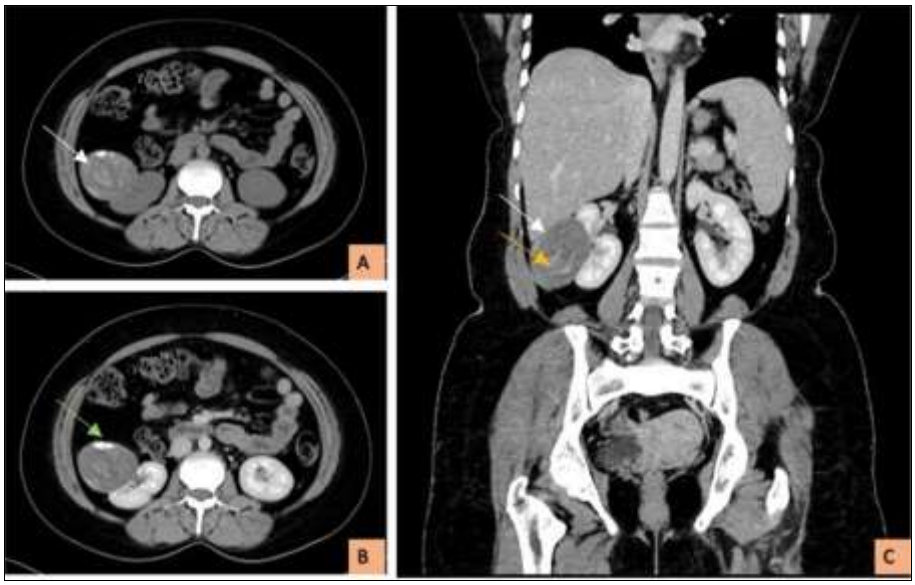

Fig 2: 2A- Axial section of plain CT scan of the abdomen showing a large well defined heterogeneous hypodense lesion (white arrow). Axial (2B) and coronal (2C) sections of post-contrast images showing a non-enhancing lesion with focal peripheral wall calcification (green arrow) with dense linear contents within (yellow arrow), arising from inter-polar region of right kidney.

Chest radiograph was normal. Taking into account the above findings and considering the clinical history, age, and imaging; complex renal cyst, renal hydatid cyst, cystic neoplastic lesion and resolving renal abscess were considered as differential diagnoses.

To rule out underlying malignancy, the patient was taken up for surgery.

An open surgical approach was planned due to the closeness of the lesion to the renal hilum, difficult location in the interpolar region, size of the lesion, anticipated adhesions and the possibility of rupture and spillage. A 11th rib cutting right flank incision was given to gain retroperitoneal entry and to expose the kidney along with the lesion. Intraoperatively the lesion was placed in the interpolar region of the right kidney facing anteromedially, extending deep into the parenchyma, and was densely adherent to the

mesentery of ascending colon and to the duodenum. As adhesiolysis progressed the calcified part of the lesion was evident more anteriorly. Hilar vessel control was achieved and a partial nephrectomy was performed with renal cold ischemia. The lesion was excised in toto with a 2-5mm renal margin following oncological principles as there was a possibility of a renal neoplasm. A post excision gross analysis revealed renal parenchymal salvage to be about two-thirds of the native kidney size. The specimen was sent for histopathological examination.

On gross examination, external surface and cut surface (Figure 3) showed membranous bits and pultaceous material. Entire specimen was replaced by pultaceous material.

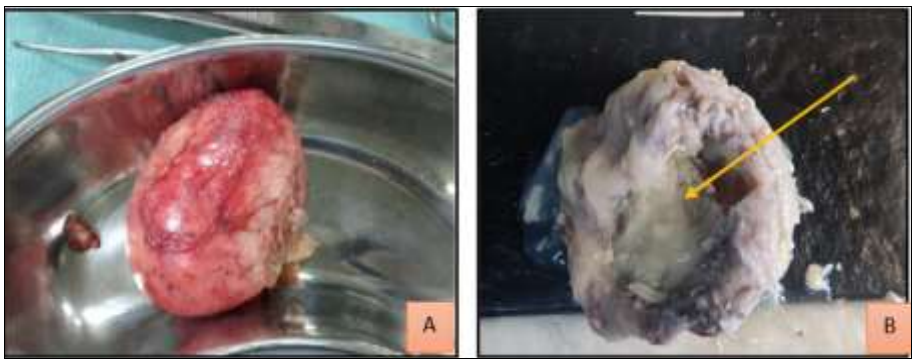

Fig 3: On gross examination, external surface (3A) and cut surface (3B) showed membranous bits and pultaceous material. Entire specimen was replaced by pultaceous material (yellow arrow).

Microscopic examination (Figure 4) showed peri cyst composed of thick bands of collagen. Underlying ectocyst showed lamellated membrane with scattered foamy histiocytes, scolices or daughter cysts, hooklets and multinucleated giant cells. There were extensive areas of necrosis with vague outlines of scolices. Viable kidney was not identified. No evidence of malignancy was studied in the sections. Features were consistent with Hydatid Cyst with Xanthogranulomatous Reaction.

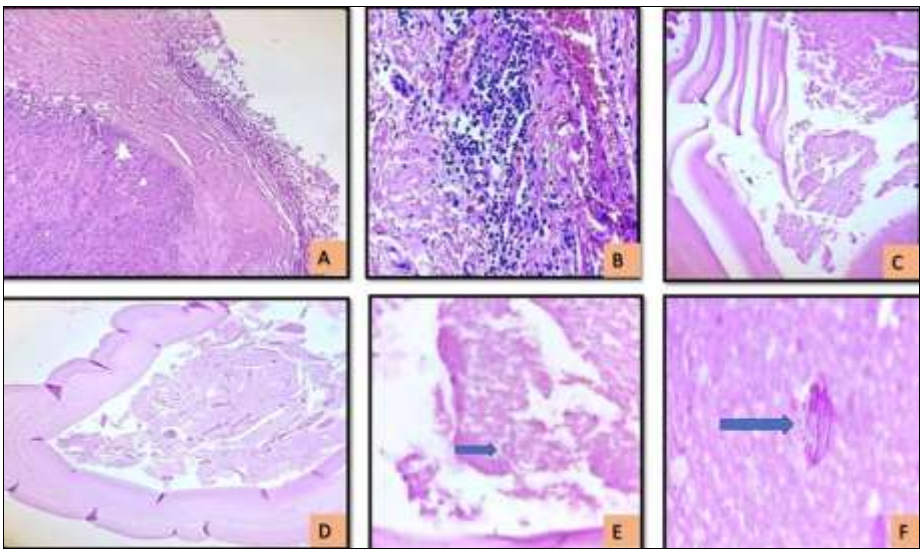

Fig 4: Multiple sections from the specimen submitted under the microscope which showed peri cyst (4A) composed of thick bands of collagen and dense fibrous tissue along with diffuse lymphoplasmacytic infiltrate (4B), eosinophils and multinucleated giant cells. Underlying ectocyst showed lamellated membrane (4C-4D). There were few foci which showed scattered foamy histiocytes, scolices or daughter cysts, hooklets (4E-4F) and multinucleated giant cells. Features were consistent with Hydatid Cyst with Xanthogranulomatous Reaction.

The patient was discharged on postoperative day 5 after an uneventful recovery. She has completed one month course of albendazole taken twice daily in 400mg doses and is asymptomatic at 2 months follow up post-surgery.

Discussion

Isolated renal hydatid cysts, although rare, present a diagnostic dilemma due to their diverse clinical manifestations and limited reported cases in the literature. The unique challenge posed by these cysts lies in their potential to mimic other renal conditions, making accurate diagnosis crucial to ensure timely and appropriate management. Our case report contributes to the existing body of knowledge by highlighting the intricate radiological aspects of isolated renal hydatid cysts.

The clinical presentation of isolated renal hydatid cysts can be misleading, often resembling benign or malignant renal tumors, cystic masses, or infectious lesions. This diagnostic ambiguity emphasizes the significance of imaging techniques in accurately characterizing these cysts. Radiological imaging, including ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI),

plays a central role in discerning the unique features of isolated renal hydatid cysts.

Ultrasound serves as the initial imaging modality of choice, offering a non-invasive means of detecting and characterizing renal cystic lesions. The characteristic appearance of hydatid cysts on ultrasound, with their well-defined anechoic compartments and septations, aids in distinguishing them from other cystic masses [5]. Moreover, the visualization of daughter cysts and the classic "hydatid sand" appearance contribute to a more accurate diagnosis [6].

CT scans provide a comprehensive assessment of the cyst's anatomical location, size, and relationship with adjacent structures. The "water lily sign," a pathognomonic feature observed on CT imaging, underscores the expanding endocyst within a larger peri cyst, confirming the diagnosis of hydatid cysts and aiding in differentiation from other cystic lesions [7]. The ability to visualize intracystic structures and the peri cyst, as well as the potential for rupture or compression of neighboring organs, further highlights the importance of CT in guiding therapeutic decisions [8].

MRI, with its superior soft tissue contrast and multiplanar imaging capabilities, offers a detailed evaluation of the cyst's contents and its impact on surrounding structures. MRI aids in confirming the diagnosis, especially when complex cystic masses are encountered. It also facilitates assessment of potential complications, such as cyst rupture or infection, by providing insights into tissue characteristics and inflammation [9].

Radiological Differential Diagnosis of Isolated Renal Hydatid Cyst are as follows:

Simple Renal Cyst: These are common benign fluid-filled lesions that are often identified incidentally on imaging. They typically appear as well-defined, round or oval anechoic structures on ultrasound. Differentiating them from isolated renal hydatid cysts can sometimes be challenging, especially in the absence of daughter cysts or the "hydatid sand" appearance. However, simple renal cysts lack the internal septations and pathognomonic features associated with hydatid cysts.

Complex Renal Cyst: These exhibit more irregular morphology and may contain internal septations, calcifications, or solid components. The presence of these features can create confusion with isolated renal hydatid cysts. However, a careful analysis of imaging characteristics, including the absence of daughter cysts and the "water lily sign," can help differentiate complex cysts from hydatid cysts.

Cystic Renal Neoplasms: Cystic renal neoplasms, such as cystic renal cell carcinoma (RCC) and multilocular cystic nephroma, can mimic isolated renal hydatid cysts due to their cystic nature. On imaging, these neoplasms may display enhancing septations or solid components within the cystic lesions. However, unlike hydatid cysts, they often exhibit enhancement on contrast-enhanced CT scans, and clinical history and additional imaging features are crucial for differentiation.

Infected Renal Cysts or Abscesses: These can present with clinical and imaging features similar to isolated renal hydatid cysts, including fever, pain, and a cystic appearance on imaging. However, careful attention to the presence of daughter cysts, floating membranes, and the "hydatid sand" appearance on ultrasound can aid in distinguishing hydatid cysts from infected renal cysts or abscesses.

While the radiological features of isolated renal hydatid cysts are crucial for diagnosis, they also guide treatment decisions. Medical management with anti-parasitic drugs, percutaneous procedures, and surgical intervention using open or minimally invasive approaches are the various treatment modalities for renal hydatid cysts [10].

Surgery remains the mainstay of treatment for renal hydatid cysts. Cystectomy or peri cystectomy may be appropriate for superficially placed cysts. However deeper parenchymal involvement may need a formal partial nephrectomy or total nephrectomy based on the morphological complexity of the lesion and function of the contralateral kidney with the aim of achieving maximal nephron sparing [11]. The decision to opt for open vs laparoscopic/retroperitoneoscopic surgery or partial vs total nephrectomy is facilitated by careful preoperative imaging that defines the cyst's relationship with adjacent structures. Percutaneous aspiration guided by imaging techniques may also be considered in select cases where there is no communication of cyst to the renal collecting system but is fraught with the risk of daughter cyst dissemination and anaphylactic reactions.

Conclusion

In conclusion, isolated renal hydatid cysts, though rare, necessitate a high index of suspicion and comprehensive radiological evaluation for accurate diagnosis and optimal management. Radiological imaging plays a pivotal role in characterizing these cysts and guiding therapeutic decisions. Our case report emphasizes the significance of understanding the radiological intricacies of isolated renal hydatid cysts, contributing to enhanced diagnostic precision and improved patient outcomes.

Conflict of Interest

None

Financial Support

None

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How to Cite This Article
Amin D, Sama SK, Reddy NV, Kendyala S, Rajani, Dheeraj SSS. Isolated intricacy: Exploring a solitary renal hydatid cyst-a case report on rare presentation of echinococcosis. International Journal of Radiology and Diagnostic Imaging. 2023;6(3):82-86.