

Case Report: Total Nephrectomy for Renal Hydatidosis

Gustavo Hernández-Córdova,^{1,6} Virgilio E. Failoc-Rojas,^{2,3*} Rigel Tarco,^{4,5} Sebastian Iglesias-Osores,¹ and Franco Romani^{5,6}

¹Facultad de Ciencias de la Salud, Universidad Privada Norbert Wiener, Lima, Peru; ²Unidad de Investigación para la Generación y Síntesis de Evidencias en Salud, Universidad San Ignacio de Loyola, Lima, Peru; ³Instituto de Evaluación de Tecnologías en Salud e Investigación – IETSI, EsSalud, Lima, Peru; ⁴Universidad Nacional San Antonio Abad, Cusco, Peru; ⁵Hospital Regional del Cusco, Cusco, Peru; ⁶Universidad Tecnológica del Peru, Lima, Peru

Abstract. Cystic echinococcosis, known as hydatidosis, is a parasitic zoonosis caused by the larvae of *Echinococcus granulosus*. Renal hydatidosis is a very rare condition, representing 1% to 2% of cases. We present an 18-year-old patient who, after suffering a trauma, experienced severe lower back pain and persistent gross hematuria disproportionate to the trauma. Ultrasonography and tomography revealed cystic images compatible with right renal hydatidosis and hemoperitoneum. In addition, rapid clinical deterioration was observed with decreased hematocrit, leading to lumpectomy with abundant cysts inside and outside the right kidney, without viable parenchyma. Therefore, a total nephrectomy was performed. The patient was discharged with albendazole treatment. Pathological anatomic analysis confirmed the diagnosis of hydatidosis. Surgery remains the best therapeutic option. The use of ultrasonography improves the early detection of zoonosis, especially in pediatric patients, and favors the use of more conservative therapeutic techniques.

INTRODUCTION

Echinococcosis, known as hydatidosis, is a neglected tropical disease¹ that is reported in three forms in humans: cystic echinococcosis (CE), alveolar echinococcosis, and polycystic echinococcosis.² CE is caused by *Echinococcus granulosus*. It impacts the economy of developing societies. The total impact of CE in developed countries costs an average of €11,033 in medical and administrative expenses,³ and an average USD 73 million in total annual losses,⁴ making it an important economic issue, aside from health.

CE affects the urinary tract, liver, lung, and brain. Kidney occurrence is rare, representing 1% to 2% of cases.⁵ Imaging tests are essential for differential diagnosis because of their nonspecific and asymptomatic clinical pictures.⁶

We describe a teenager from a CE endemic region who presented with macroscopic hematuria after a lumbar trauma. Clinical, imaging, and pathological analyses were performed, along with a literature review.

CASE REPORT

An 18-year-old patient from the rural highland area of Sicuani in the department of Cusco in the Peruvian Andes was taken emergently to a hospital after falling off a bicycle and displaying sudden, intense disproportionate lower back pain. No other epidemiological, pathological, surgical, or family-relevant antecedent was reported except for rearing poultry, guinea pigs, and dogs.

The patient was pale, very irritable, and adopted an analgesic posture in the left lateral decubitus position on initial evaluation. Physical examination revealed a blood pressure of 90/60 mmHg, a heart rate of 118 beats/min, and had pulsus celer. No ecchymosis in the lumbar region was noted on visual inspection. Macroscopic hematuria appeared 30 minutes after presentation.

Lumbar percussion revealed intense pain; deep flank palpation suggested an enlarged right kidney and reflex abdominal tension. Diuresis was 2,000 mL/d, and

macroscopic hematuria was confirmed, which worsened at the end of urination. The rest of the examination was normal. Nonsteroidal anti-inflammatory drug treatment showed no improvement.

Ultrasound revealed an echogenic image with irregular borders at the renal sinus level, suggesting renal trauma and hemoperitoneum of the right kidney. No alterations were seen in the left kidney (Figure 1A). A rapidly decreasing hematocrit level was observed, decreasing from 35% on admission to 17% after 10 hours of hospitalization (Table 1).

Computed tomography showed multiple cystic images within the right renal parenchyma and adjacent renal pelvis, with fluid collection in the retroperitoneum (Figure 1B). No eosinophilia was found. Hydatidosis immunoblot was unavailable.

The surgical team suggested immediate surgical intervention. Intraoperative findings revealed multiple ruptured cysts of various sizes, without viable right kidney tissue, which compromised the upper pole and the middle region of the kidney, with ureter compression toward the lower pole (Figure 2). Surgical treatment consisted of an en bloc ligation of the renal pedicle, with total right renal nephrectomy and

TABLE 1
Auxiliary examinations on patient admission

Laboratory test	Entry
Hematocrit	35% on entry, 24% at 4 hours, 17% at 10 hours
Leukocytes	11 (10 ³ /μL)
Stocked	8%
Segmented	71%
Eosinophils	< 0.5%
Basophils	0.5%
Monocytes	2%
Lymphocytes	19%
Urinary sediment	None
Leukocytes	2–3/field
Red blood cells	100/field
Glucose	7 mmol/L
Urea	12.852 mmol/L
Creatinine	0.1326 mmol/L
Amylase	28 U/L
Alkaline phosphatase	97 U/L (NV, 34–114)
Alanine aminotransferase	30 U/L (NV, 8–33)
Aspartate aminotransferase	58 U/L (NV, < 35)
Total bilirubin	0.27 mg/dL

NV = normal value.

*Address correspondence to Virgilio E. Failoc-Rojas, Av. La Fontana 501, La Molina, Lima, Peru. E-mail: virgiliofr@gmail.com

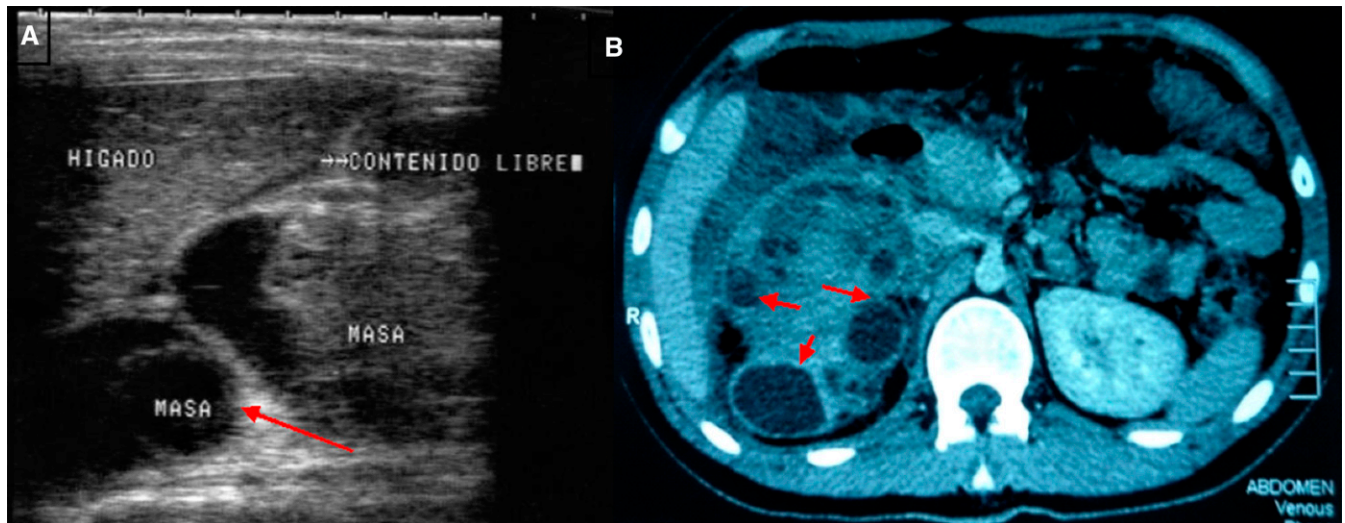


FIGURE 1. Diagnostic aid images (A) ultrasonography and (B) computerized axial tomography. (A) Echogenic image of irregular borders in the right renal sinus, fluid in the peritoneal cavity, and loss of corticomedullary differentiation. (B) Contrast tomography showing several liquid-density images in the right renal parenchyma separated by higher density septa, with loss of morphology of the right kidney and renal pelvis without contrast enhancement. This figure appears in color at www.ajtmh.org.

cyst removal. A laminar drain was placed and the patient received 2 U of blood intraoperatively. The patient recovered favorably, was discharged without complications, and was placed on albendazole treatment at 400 mg/d twice a day.

Pathological anatomic analysis showed a degenerated laminated membrane of a hydatid cyst adhering to the fibrinoid wall of the host adjacent to the renal parenchyma. An inflammatory reaction was found, with foci of ischemic coagulative necrosis at the tubules, interstitium, and glomeruli (Figure 3).

DISCUSSION

A diagnosis of urinary tract CE is challenging because cysts take 5 to 20 years to grow and develop symptoms. We

assume our patient was infected during childhood.^{2,5,7} Kidney disease in CE occurs in 1% to 2% of cases⁵ and is mostly unilateral and single.⁷ A series of 19 patients with urinary tract CE revealed an affected right kidney in 63.2% of cases.⁵ Our patient had right-side involvement with multiple cysts.

The clinical presentation of renal CE is nonspecific and remains asymptomatic for years.^{2,8} A series of patients with kidney disease found that 84% presented with lumbar-abdominal pain and 28% with hydaturia.⁹ In one instance, the sensation of an abdominal mass was experienced in a clinical case of a 5-year-old boy.¹⁰

Serological and immunological tests were unavailable for a renal CE diagnosis in our acute care setting. Eosinophilia, the Casoni test, and indirect hemagglutination tests are useful for diagnosis, but have a low sensitivity and

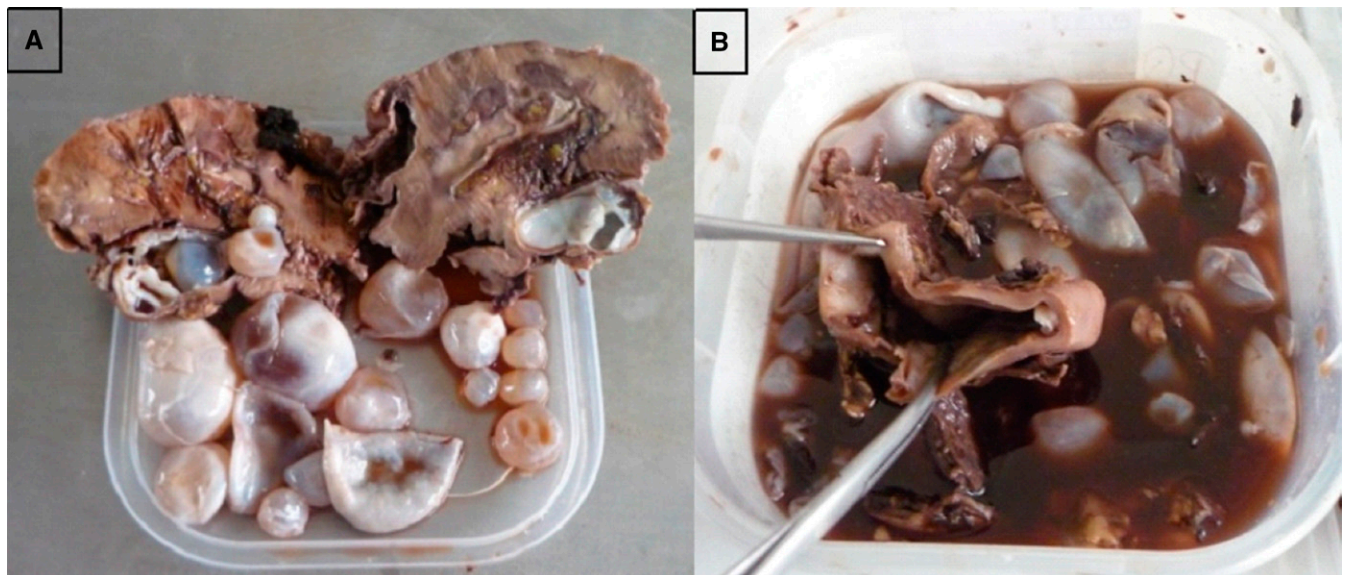


FIGURE 2. Surgical specimen, multiple hydatids, and hydatid membrane. (A) Right kidney, 11.5 × 8 × 3.5. The section shows the parenchyma with multiple translucent white cysts in the hilar and medullary areas. (B) Cystic capsule approximately 6.5 cm in diameter. This figure appears in color at www.ajtmh.org.

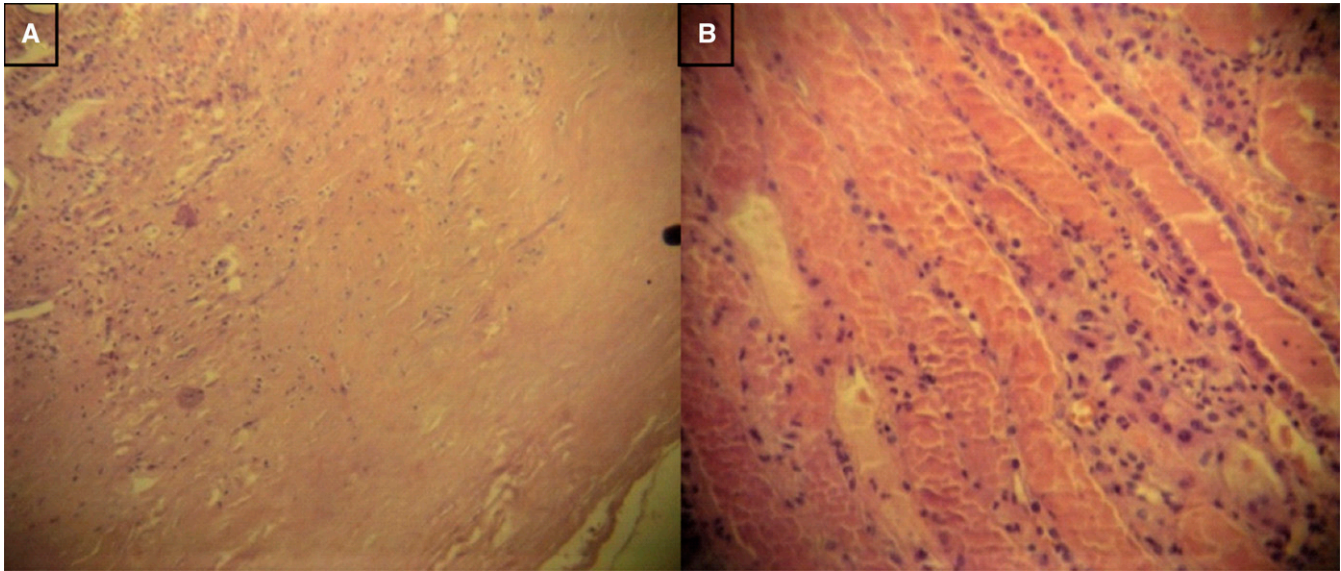


FIGURE 3. Anatomic histopathology. (A) Degenerated laminated membrane of a hydatid cyst adhered to the host fibrinoid wall. (B) Adjacent renal parenchyma presents a chronic inflammatory reaction with foci of ischemic coagulative necrosis that compromises tubules, interstitium, and glomeruli. Hematoxylin–eosin stain $\times 10$ magnification. This figure appears in color at www.ajtmh.org.

specificity.^{8,11} Ultrasound aids in the diagnosis, treatment, and follow-up in patients with renal CE,¹² which correlates the stages of individual cysts with natural history and the involution process of treatment-induced cysts.¹³

In our patient, a consensus was reached based on the staging method shown by the image for renal CE: percutaneous treatment, surgery, anti-infectious treatment, or watch-and-wait approach.¹⁴ Intraoperatively, multiple cysts that affected the right kidney extensively with characteristics similar to CE3 of the WHO classification (heterogeneous cystic mass) were confirmed, which was an active, fertile state with viable prototypes. Urinary tract cysts are similar structurally to liver cysts; therefore, this classification system is also useful for a renal CE diagnosis.²

Renal CE should be suspected in patients who come from infectious endemic areas and who have ultrasound images or computed tomographic scans that suggest hydatid cyst.¹² In ultrasound B mode (glow mode) or two-dimensional mode, the linear transducer array simultaneously scans a plane passing through the human body.¹⁵ Ultrasound in bright mode is the initial diagnostic tool for CE, considering its advantages of being simple, inexpensive, and quick in providing results.

Renal hydatidosis treatment is mainly surgical, with enucleation, marsupialization, cystectomy, or cyst perichystectomy.^{2,7,10} Treatment with cyst percutaneous puncture using ultrasound guidance does not increase the risk of anaphylaxis, which causes death in patients.^{2,5} Some authors propose a total or partial nephrectomy as the treatment of choice.¹⁶

Nephrectomy is performed without a clear hydatid cyst diagnosis, as in our patient, as a result of renal parenchymal destruction, renal tumor suspicion, or vasculogenic hypertension. Partial nephrectomy is a risk factor for disease spread.¹² A retroperitoneal approach is preferable to avoid peritoneal cavity contamination unless organs located in this space (e.g., liver) are also affected.¹⁶ Previous reports

described successfully treated patients who underwent total nephrectomy resulting from cystic hydatidosis, with favorable postoperative resolution.^{17,18}

Anthelmintic agents are usually administered for up to 3 months after surgery.^{8,10} History taking and ultrasound pointed to the diagnosis of kidney trauma with hemoperitoneum. The large blood accumulation explained progressively decreasing hematocrit levels, and a diagnosis of renal hydatidosis was confirmed pathologically after nephrectomy. An early diagnosis of hydatidosis allows for successful pharmacological treatment in most cases, thus avoiding more invasive methods.

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Authors' addresses: Gustavo Hernández-Córdova and Sebastian Iglesias-Osores, Facultad de Ciencias de la Salud, Universidad Privada Norbert Wiener, Lima, Peru, E-mails: hernandezjorgegustavo@gmail.com and sebasiglo@gmail.com. Virgilio E. Failoc-Rojas, Unidad de Investigación para la Generación y Síntesis de Evidencias en Salud, Universidad San Ignacio de Loyola, Lima, Peru, E-mail: virgiliofr@gmail.com. Rigel Tarco, Universidad Nacional San Antonio Abad, Cusco, Peru, and Hospital Regional del Cusco, Cusco, Peru, E-mail: rigeltarco@yahoo.es. Franco Romani, Hospital Regional del Cusco, Cusco, Peru, and Instituto Nacional de Salud de Peru, Lima, Peru, E-mail: fromanir@gmail.com.

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