Hepatic hydatid disease. A case report

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Background: Hepatic hydatidosis is a parasitic zoonosis caused by Echinococcus granulosus. Although it is a benign condition, its presentation with multifocal involvement in multiple evolutionary stages is uncommon in pediatric patients, posing a diagnostic and therapeutic challenge.
Case Presentation: A 9-year-old female presented with a two-month history of chronic right upper quadrant abdominal pain associated with intermittent fever and a palpable mass upon clinical evaluation. Abdominal ultrasound and computed tomography (CT) revealed multiple, randomly distributed hepatic cystic lesions in different evolutionary stages according to the WHO classification: simple unilocular cysts (CE1 stage), a cyst with detached membranes in segment IV (water-lily sign / CE3 stage), and cystic lesions containing internal hyperdense material (CE4 stage). The patient underwent laparoscopic cyst drainage followed by adjuvant therapy with albendazole. She demonstrated a favorable therapeutic response and remains stable during outpatient follow-up.
Conclusions: Computed tomography is an essential diagnostic tool in pediatric multifocal hepatic hydatidosis. It allows precise staging of individual lesions to plan an optimal combined (surgical and pharmacological) therapeutic approach and prevent complications.

Keywords: Hepatic echinococosis; Computed tomography; Pediatrics; Water-lily sign.

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Case Report

Radiology

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Hydatidosis is a zoonotic parasitic infection caused by the larval stage of the tapeworm (cestode) of the genus *Echinococcus*. The two forms of medical importance are cystic echinococcosis, caused by the larval stage of *Echinococcus granulosus*, and alveolar echinococcosis, caused by the larval stage of *Echinococcus multilocularis*, which has a sufficiently high mortality rate to be referred to as "worm cancer." Transmission occurs through the fecal–oral route via direct contact with infected definitive hosts, such as dogs, or through the ingestion of parasite eggs in contaminated food, water, or soil. Ingested embryonated parasite eggs reach the intestine and enter the portal vein toward the liver, which acts as the first filter and traps approximately 75% of the embryos. ELISA is the serological test of choice for initial screening, whereas Western blot is the recommended confirmatory technique. Hydatid disease is diagnosed using medical imaging modalities such as radiography, ultrasonography, and computed tomography (CT) of the abdomen, chest, and brain. Management of hydatid cysts includes percutaneous therapy and surgical intervention. Medical therapy alone with mebendazole or albendazole has a success rate of <30%.

Case report

A 9-year-old female patient, originally from Sibinal, San Marcos. The patient had a 2-month history of abdominal pain in the right hypochondrium, accompanied by intermittent fever. The patient's mother reported palpating a mass in the right hypochondrium, prompting them to seek medical attention at our institution. On physical examination, vital signs were as follows: blood pressure, 90/55 mmHg; temperature, 36.3 °C; heart rate, 88 bpm; oxygen saturation, 98%; and weight, 20.2 kg. A well-defined, non-mobile mass was palpated in the right hypochondrium, measuring approximately 2 × 1 cm. Laboratory tests were performed, revealing a white blood cell count of 11.04 × 10^3/µL, neutrophils of 36.6%, and lymphocytes of 35.40%. Based on these findings, the treating physicians requested an abdominal ultrasound, followed by a triphasic abdominal computed tomography (CT) scan, which demonstrated multiple cystic lesions at different stages, one of which showed membrane detachment, demonstrating the "Water Lily Sign." Therefore, the diagnosis of hepatic hydatidosis was established.

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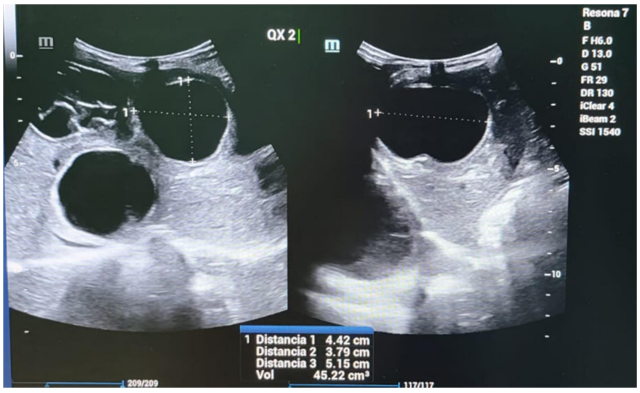

Figure 1. Two cysts are observed at the level of segments I and IV, according to Couinaud's anatomy. These lesions are round with well-defined borders, anechoic with posterior acoustic enhancement, and show no vascular flow upon color Doppler evaluation. These findings are consistent with hydatid cysts in the CE1 stage.

Discussion

Hepatic hydatidosis remains a significant public health concern in endemic regions. While solitary unilocular cysts (WHO stage CE1) are the most common presentation in pediatric patients due to slow parasitic growth, the simultaneous coexistence of multiple cysts in different evolutionary stages (CE1, CE3, and CE4) is an extraordinarily rare entity in children. This polymorphic, multifocal involvement suggests either an early, massive primary inoculation or recurrent, asynchronous exposure episodes over time.

In this scenario, Computed Tomography (CT) represents the gold standard for defining the structural mapping, assessing complication risks, and determining the viability of individual lesions using the WHO classification. In our patient, CT accurately demonstrated the complete evolutionary spectrum: the active unilocular CE1 cysts; the transitional CE3 stage in segment IV, marked by the pathognomonic "water-lily sign" from endocyst membrane detachment; and the inactive, degenerating CE4 matrix characterized by internal hyperdense material.

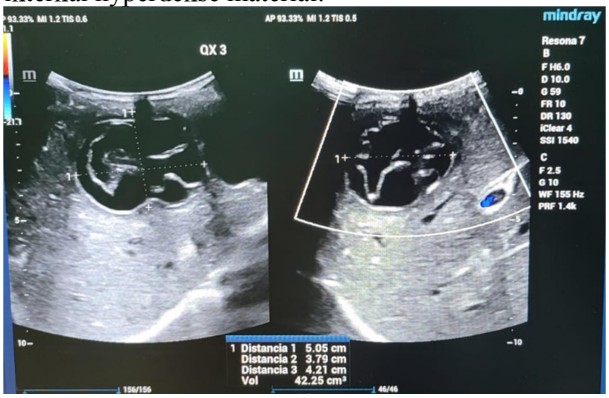

Figure 2. A cystic image is observed in segment IV, exhibiting membrane detachment characteristic of the water-lily sign, corresponding to the CE3 stage.

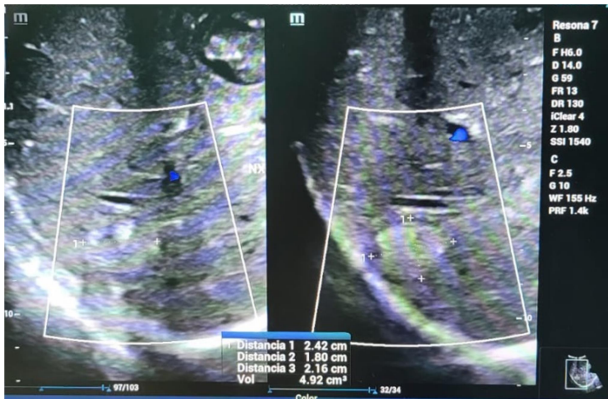

Figure 3. A cyst containing internal echogenic material is observed in segment V, corresponding to the CE4 stage.

Managing pediatric multifocal hydatid disease requires an aggressive yet conservative approach. While smaller, single cysts can be managed pharmacologically, large symptomatic masses with multiple stages carry a high risk of rupture and secondary anaphylaxis, necessitating surgical intervention. Laparoscopic cyst drainage has emerged as a safe, effective, and minimally invasive alternative to open surgery in children, offering reduced postoperative pain and faster recovery while maintaining strict scolicidal precautions to prevent intraperitoneal spillage.

Finally, perioperative adjuvant therapy with albendazol is mandatory in multi-stage disease to reduce intracystic pressure, sterilize active layers, and minimize recurrence rates, which can reach up to 10% in complex cases. The successful outcome and stable outpatient follow-up of this 9-year-old patient validate the efficacy of combining minimally invasive surgery with targeted antiparasitic therapy.

Conclusion

Computed tomography plays a pivotal role in the diagnosis and management of pediatric multifocal hepatic hydatidosis, particularly when cysts present at different evolutionary stages. Accurate identification and staging of each lesion using the WHO classification allows individualized treatment planning, supporting a combined surgical and antiparasitic approach that can achieve favorable outcomes while minimizing complications and recurrence.

Conflicts of interests

The authors declare that there are no financial, personal, or institutional conflicts of interest that could have influence the work reported in this manuscript.

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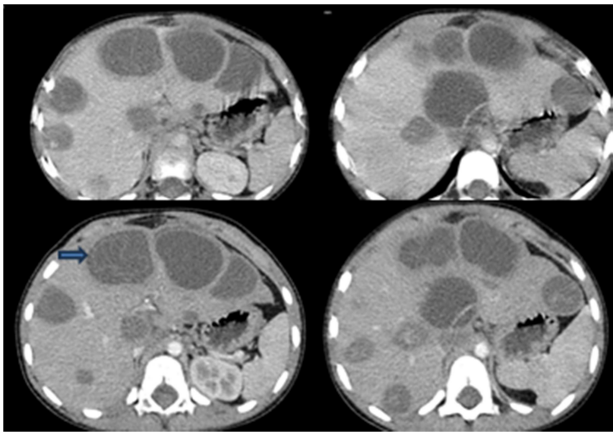

Figure 4. Axial arterial-phase CT images demonstrate multiple, diffusely distributed cystic lesions throughout the hepatic parenchyma, which are oval-shaped, hypodense, and variable in size and characteristics. On non-contrast images, the lesions demonstrate attenuation values ranging from 7 to 20 uH, with no enhancement following intravenous contrast administration. Some lesions contain internal septations, while one demonstrates a detached membrane, producing the characteristic "water-lily sign". Radiographic findings compatible with hydatid cysts.

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