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Editorial Board Member of *World Journal of Clinical Cases*, Muhammad Hamdan Gul, MD, Assistant Professor, Department of Internal Medicine, University of Kentucky, Chicago, IL 60657, United States.
hamdan3802@hotmail.com

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CASE REPORT

Primary hepatic angiosarcoma: A case report

Jian Wang, Li-Tao Sun

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Jian Wang, Li-Tao Sun, Cancer Center, Department of Ultrasound Medicine, Zhejiang Provincial People's Hospital, Affiliated People's Hospital, Hangzhou Medical College, Hangzhou 310014, Zhejiang Province, China

Corresponding author: Li-Tao Sun, PhD, Doctor, Cancer Center, Department of Ultrasound Medicine, Zhejiang Provincial People's Hospital, Affiliated People's Hospital, Hangzhou Medical College, No. 158 Shangtang Road, Gongshu District, Hangzhou 310014, Zhejiang Province, China. litaosun1971@sina.com

Abstract

BACKGROUND

Primary hepatic angiosarcoma (PHA) is a rare malignant tumor of the vascular endothelium. Clinical manifestations and laboratory and imaging examinations often lack specificity for PHA. We report a case of PHA, and describe the ultrasound characteristics and characteristic changes in laboratory values associated with PHA.

CASE SUMMARY

A 75-year-old woman presented with right upper quadrant abdominal pain for half a month. Magnetic resonance imaging (MRI) at a local hospital revealed multiple liver space-occupying lesions, and she was admitted to our hospital for further diagnosis. Contrast-enhanced ultrasound (CEUS) revealed multiple slightly hyperechoic nodules in the liver, which were suspected to be of malignant vascular origin. Contrast-enhanced computed tomography revealed multiple low-density nodules in the liver, considered to be metastatic hematopoietic malignancies. Contrast-enhanced MRI showed that the multiple liver nodules shared features with infectious lesions. Laboratory examination revealed normal alpha-fetoprotein levels, slightly increased other liver enzymes, decreased platelets, and significantly increased D-dimer levels. Liver biopsy and histopathology confirmed the presence of PHA.

CONCLUSION

CEUS can provide valuable clues for the diagnosis of PHA and greatly improve the success rate of puncture biopsy.

Key Words: Primary hepatic angiosarcoma; Ultrasonic diagnosis; Imaging; Pathology; Case report

Core Tip: In this study, we showed a rare reported disease named primary hepatic angiosarcoma (PHA). In this case report, we focused on diagnosing PHA by contrast-enhanced ultrasound (CEUS). Meanwhile, we introduced a new ultrasound technology, and CEUS has many specific signs in the diagnosis and differential diagnosis of PHA. It has great advantages in displaying microperfusion, microvessels and necrosis of PHA and has great clinical value in diagnosing PHA. Our findings regarding CEUS contribute to the more accurate and earlier diagnosis of PHA and provide a longer survival time in the future.

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INTRODUCTION

Primary hepatic angiosarcoma (PHA) is an invasive malignant stromal tumor that is extremely rare, accounting for approximately 2% of primary liver tumors. Studies have proposed that PHA is related to chemical pollution[1]. The clinical manifestations and laboratory tests for PHA lack specificity; therefore, imaging examinations are important for diagnosing PHA. Current studies have focused on the description of computed tomography (CT) and magnetic resonance imaging (MRI) of PHA; however, reports on ultrasound, especially contrast-enhanced ultrasound (CEUS), are still limited[2,3]. Herein, we report the case of a patient with PHA, rectal cancer, and syphilis.

CASE PRESENTATION

Chief complaints

A 75-year-old woman presented with right upper quadrant abdominal pain.

History of present illness

The patient experienced sudden right upper quadrant abdominal pain for half a month without obvious induction. MRI at the local hospital revealed multiple space-occupying hepatic lesions. The patient was admitted to our hospital for further evaluation.

History of past illness

The patient had a history of hypertension, syphilis (active period and receiving treatment), lower extremity deep venous thrombosis, and pulmonary embolism.

Personal and family history

The patient revealed no pertinent personal or family history.

Physical examination

Physical examination revealed marked tenderness in the right upper quadrant of the abdomen and with no obvious abnormalities during the remainder of the examination.

Laboratory examinations

Tumor biomarkers including neuron-specific enolase of 50.4 ng/mL (normal range: 0.0-20.0 ng/mL), human epididymal protein of 174.3 pmol/L (normal range: 0.0-121.0 pmol/L), carbohydrate antigen 125 of 139.4 U/mL (normal range: 0.0-35.0 U/mL), gastrin-releasing peptide precursor of 109.2 pg/mL (normal range: 25.0-78.0 pg/mL). The D-dimer level was 31200 μg/L (normal range: 0.0-550.0 μg/L), and the platelet count was 39 × 10^9/L (normal range: 125.0-350.0 × 10^9/L).

Imaging examinations

The patient underwent contrast-enhanced CT (CECT) and contrast-enhanced MRI (CEMRI) at our hospital, which revealed multiple low-density nodules with mild enhancement in the liver, considered to have metastasized from hematopoietic malignancies; moreover, CEMRI suggested infectious lesions (Figure 1). Conventional ultrasound revealed multiple slightly hyperechoic nodules with unclear boundaries and loose inner structures in the liver; some exhibited vascular-like structures and anechoic areas; therefore, we suspected angiogenic tumors (Figure 2). CEUS and liver needle biopsy were performed for further diagnosis. CEUS revealed nodular peripheral enhancement in the arterial and

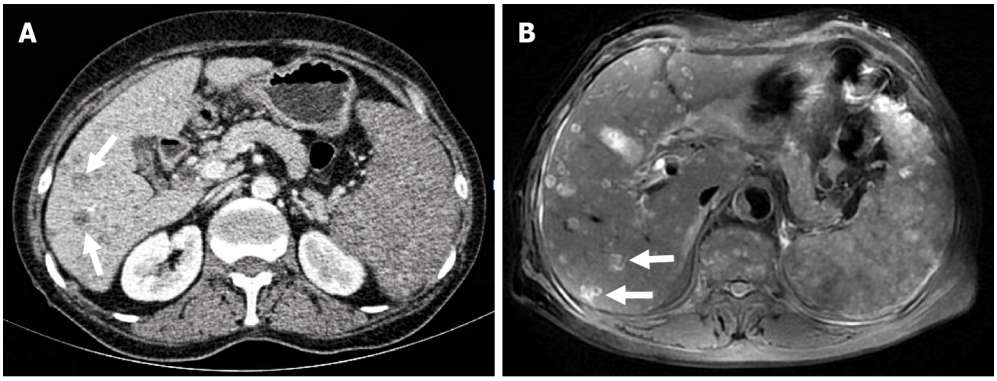

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Figure 1 Contrast-enhanced computed tomography and contrast-enhanced magnetic resonance imaging reveal multiple low-density lesions in the liver with slightly low enhancement. A: Contrast-enhanced computed tomography; B: Contrast-enhanced magnetic resonance imaging.

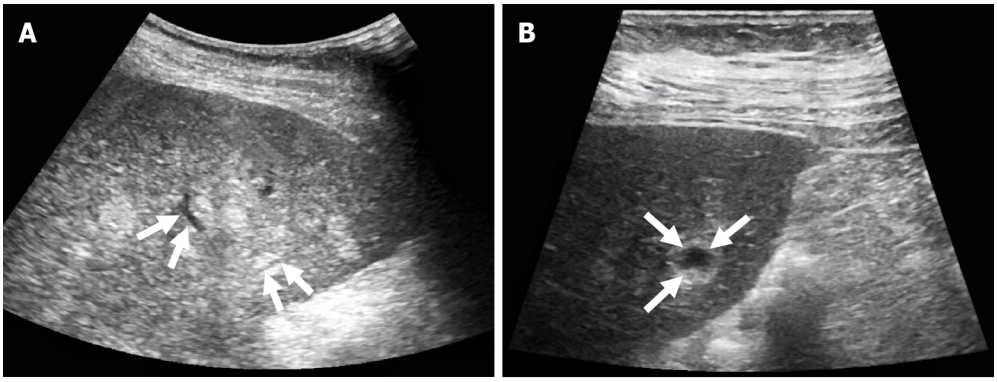

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Figure 2 Conventional ultrasound. A and B: Multiple intrahepatic hyperechoic nodules with unclear boundaries, loose structures, vascular-like structures (A) and anechoic areas (B).

portal phases and low enhancement in the late phase. Non-enhanced areas appeared in the nodules, suggesting angiogenic malignant tumors (Figure 3). PHA was pathologically diagnosed based on the needle biopsy results.

FINAL DIAGNOSIS

Liver biopsy results confirmed that the nodules were malignant. Immunohistochemistry supported the presence of angiogenesis, indicating angiosarcoma. Immunohistochemical staining revealed the following: CD34 (+), CD31 (+), CK (Pan) (-), CK7 (-), desmin (-), WT (-), and Ki67 (hot spot 60%) (Figure 4).

TREATMENT

Due to the multiple metastases and poor body condition, the patient had missed the opportunity to receive the optimal treatment. Next, tislelizumab injection was used as antitumor therapy. Moreover, some measures, including blood transfusions, were used for symptomatic treatment.

OUTCOME AND FOLLOW-UP

After discharge from our hospital, the patient received follow-up evaluations and symptomatic treatment at a local hospital. Ultimately, the patient died of septic shock due to poor physical condition.

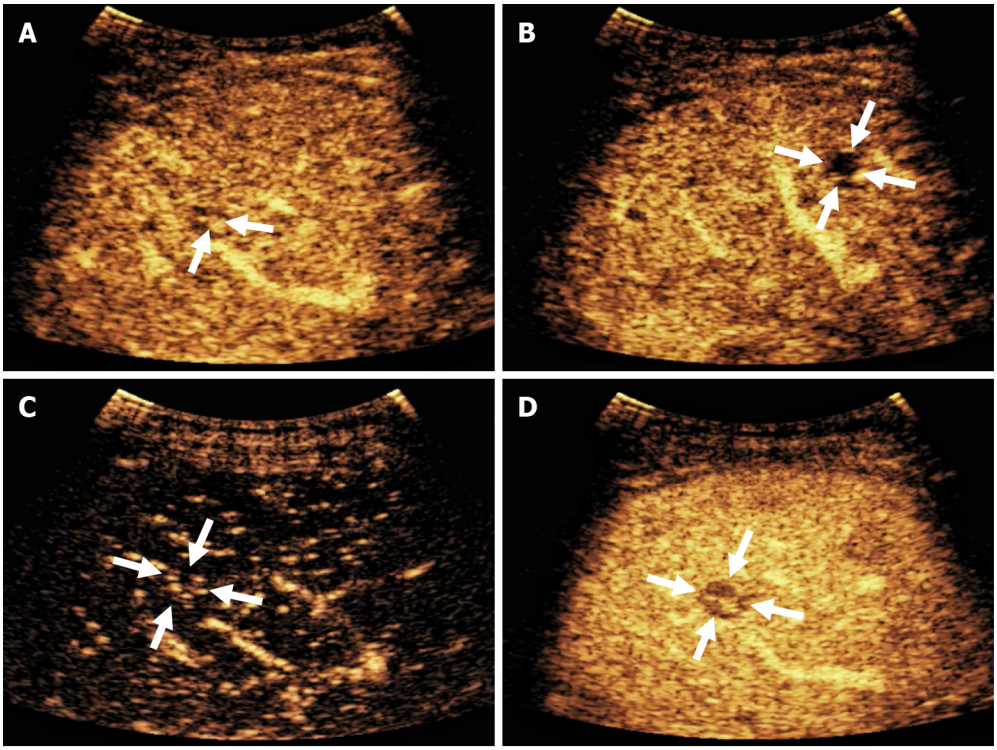

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Figure 3 Contrast-enhanced ultrasound reveals nodular peripheral enhancement in the arterial and portal phases and low-enhancement and non-enhanced areas in the late phase. A: Nodular peripheral enhancement; B: Non-enhanced area; C: The arterial phase showed low enhancement at 13 s; D: The portal vein was cleared at 58 s.

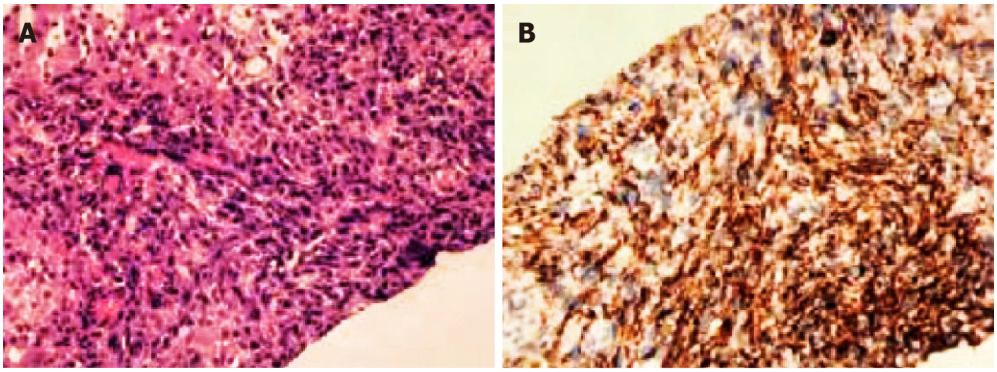

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Figure 4 Histopathology reveals angiosarcoma of vascular origin. A: Obvious pleomorphic and heterotypic tumor cells arranged in clusters (magnification 100 ×); B: Immunohistochemical staining (magnification 100 ×) reveals CD31 positivity.

DISCUSSION

PHA has a low incidence rate, occult onset, and an unknown etiology. Studies have indicated that 25% of PHA are related to exposure to vinyl chloride, thorium oxide, arsenic, and radium; however, most are idiopathic. PHA is associated with high invasiveness, easy recurrence and metastasis, poor prognosis, and a short survival time, generally between 6 and 16 mo[4]. According to morphology, it may present as large masses, diffuse nodules, and multiple nodules[5].

As the disease onset is insidious, symptoms such as pain, weakness, fatigue, and weight loss are usually caused by the secondary effects of the tumor. To date, PHA lacks specific tumor markers. Studies have reported that PHA is closely related to D-dimer and platelet levels, manifesting as increased D-dimer levels and thrombocytopenia. Physiological conditions caused by malignant endodermic cells can promote platelet adhesion and activation, leading to the excessive consumption of platelets and coagulation factors at the tumor site[6,7].

Imaging is an effective method for preliminary diagnosis. Conventional ultrasound examination of this case suggested angiogenic tumors; however, it is difficult to distinguish between hemangioma, metastasis, and hepatocellular carcinomas. In particular, it seems more difficult to distinguish it from metastasis from an earlier rectal cancer. The patient underwent CEUS and CECT, as well as CEMRI for further diagnosis. CEUS revealed nodular peripheral enhancement in the arterial and portal phases and low enhancement in the late phase, accompanied by non-enhanced areas in the nodules. These non-enhanced areas were filled with hemorrhagic, necrotic, and fibrous components, resulting in the non-enhanced signs[8]. This case differed from the angiography mode of hemangioma, metastasis, and hepatocellular carcinomas. CEUS of the hemangioma revealed nodular hyperenhancement in the arterial phase, which continued into the delayed phase. Among metastatic tumors, ring enhancement of nodules can be observed in the arterial phase, which begins to subside in the portal phase. The characteristics of CEUS in hepatocellular carcinoma include high enhancement in the arterial phase and clearance in the late arterial phase or early portal phase (wash-in and wash-out)[9]. In the present case, CEUS imaging revealed completely different signs from the typical signs of hemangioma, metastasis, and liver cancer. According to the literature, CEUS has high diagnostic value for PHA[10]. In brief, when tumors exhibit nodular peripheral enhancement in the arterial and portal phases and low enhancement in the late phase, some may be accompanied by non-enhanced areas, and PHA should be considered[10,11]. However, CECT imaging revealed features typically associated with hematological malignancies, while CEMRI suggested infectious lesions. Therefore, liver biopsy is necessary for a definitive diagnosis. Koyama *et al*[12] reported a 78% success rate for biopsy, which was due to the high probability of necrosis and bleeding in the tumor. CEUS can identify necrotic and hemorrhagic areas, and reduce false-negative results from biopsy. Finally, a CEUS-mediated biopsy was performed to clarify the nature of the nodules.

Pathologically, PHA has highly disordered vascular characteristics and heterogeneity; therefore, 80% of PHA show heterogeneous branches and scaffold-like vascular structures, distinguishing them from hepatic hemangioma[13,14]. The present study showed that PHA expresses at least one among CD31-, CD34-, and factor 8-related antigens and that the Ki-67 value-added index is > 10%, which is a common diagnostic feature of angiosarcoma[15,16]. In this study, CD34 (+), CD31 (+), and Ki67 (hot spot 60%) expression was consistent with that reported in the literature.

Due to the low incidence rate of PHA, no clear treatment guidelines currently exist. The main therapeutic strategy for PHA is surgery, supplemented by radiotherapy and chemotherapy[17,18]. Surgery is considered the optimal treatment method, as it provides the best survival outcomes, especially for single tumors with a diameter of < 10 cm[19,20]. Recent studies have found that targeted therapy has good efficacy in PHA, mainly because the overexpression of VEGF is considered the most important angiogenic factor in different types of sarcomas, including angiosarcoma. However, these few clinical cases need to be confirmed *via* multicenter studies[21-23].

CONCLUSION

Owing to the low incidence rate of PHA, its etiology, pathogenesis, and prognosis are unclear, which makes it difficult to diagnose. The presence of thrombocytopenia, D-dimer elevation, and suspicion of PHA on imaging examinations can assist in the diagnosis. CEUS can provide valuable information for diagnosis; however, the diagnosis depends on pathology results. Currently, surgery is the optimal treatment, and targeted therapy may become a promising approach in the future.

FOOTNOTES

Author contributions: Wang J drafted the manuscript; Sun LT revised the manuscript.

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ORCID number: Li-Tao Sun 0000-0002-4724-0971.

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