Journal of
Medical Case Reports

CASE REPORT

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Undifferentiated embryonal sarcoma of the liver masquerading as a cystadenoma in a young adult: a case report

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Abstract

Background Undifferentiated embryonal sarcoma of the liver is an infrequent hepatic malignancy, primarily observed in the pediatric population. This neoplasm is exceedingly rare among adults. Despite its scarcity in adult cases, it remains imperative to accurately discern undifferentiated embryonal sarcoma of the liver utilizing diverse imaging modalities to prevent misdiagnosis with more prevalent benign and malignant hepatic masses. In this case, a comprehensive imaging examination was conducted, encompassing ultrasound, computed tomography, magnetic resonance imaging, and positron emission tomography–computed tomography scans. Notably, the positron emission tomography–computed tomography scan revealed ^{18}F-fluorodeoxyglucose uptake characteristics indicative of malignancy, providing a pivotal clue for prompt diagnosis of undifferentiated embryonal sarcoma of the liver.

Case presentation This report presents the diagnostic procedure employed for a 37-year-old female patient of Han ethnicity in China diagnosed with undifferentiated embryonal sarcoma of the liver. The patient was admitted with a 2-day history of mid-upper quadrant abdominal pain. The patient's temperature and inflammatory markers, such as white blood cell count and hypersensitive reactive protein, were slightly elevated. Ultrasound showed a cystic–solid nodule in the liver. The computed tomography revealed a cystic mass in the right lobe of the liver, characterized by a low-density shadow and a lack of significant enhancement during contrast-enhanced scanning, initially suggesting cystadenoma. Enhanced magnetic resonance imaging revealed a block-like abnormal signal shadow in the right hepatic lobe, suggestive of various etiologies, including benign lesions, cystadenoma with hemorrhage, or hemangioma with hemorrhage. However, the positron emission tomography–computed tomography showed increased ^{18}F-fluorodeoxyglucose consumption within both the cystic wall and lesion, raising suspicion of malignancy. Surgical resection of the posterior hepatic lobe was performed under general anesthesia after comprehensive preoperative preparations. During the procedure, a space-occupying lesion was identified in the right posterior hepatic lobe, adhering to the diaphragm. Surface liver parenchyma overlying the tumor exhibited rupture, with several blood clots visible. The tumor was successfully and completely excised. Pathological examination revealed a fusiform cell tumor, necrosis, hemorrhage, cystic changes, cellular atypia, mitotic images, and eosinophilic globules suggestive of undifferentiated embryonal sarcoma of the liver. Immunohistochemical staining indicated CK (+), vimentin (Vim; +), Desmin (+), actin (–), α1-AT (+), GPC-3 (+), PDGFRa (+), MDM2 (+), P16

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(+), Ki-67 (+) 30–35%, and PAS (+). The patient underwent five cycles of combination chemotherapy with ifosfamide and epirubicin, administered at 21-day intervals at our hospital. Following 3 years of postoperative surveillance, the patient remained stable, with no evidence of hepatic tumor recurrence.

Conclusion On the basis of this case and a comprehensive literature review, we recommend that clinicians consider the possibility of undifferentiated embryonal sarcoma of the liver in patients presenting with non-specific clinical and serological markers, particularly when there is inconsistency between ultrasound and computed tomography imaging findings, along with elevated ^{18}F-fluorodeoxyglucose uptake observed in both the cystic wall and lesion on positron emission tomography–computed tomography examination. Given the rarity and high-grade malignancy of undifferentiated embryonal sarcoma of the liver, heightened clinical awareness and recognition are crucial for early diagnosis and successful therapy.

Keywords Case report, Undifferentiated embryonal sarcoma of the liver (UESL), Cystadenoma, Auxiliary examination, Positron emission tomography–computed tomography (PET-CT)

Background

Undifferentiated embryonal sarcoma of the liver (UESL) is a rare hepatic mesenchymal tumor characterized by high invasiveness and poor prognosis. The etiology of UESL is associated with cytogenetic changes in hepatic interstitial hamartoma [1]. Most reported cases have occurred in the pediatric population, specifically between the ages of 6 and 10 years, making it exceedingly rare in adults [2]. In pediatric cases, the incidence of UESL accounts for ~0.3–2.0% of tumors throughout the body, two-thirds of which are malignant. In adults, however, UESL comprises less than 1% of adult hepatic tumors [3], and its diagnosis is challenging because there are no specific clinical features to differentiate it [4]. Early stage UESL often presents with non-specific symptoms, such as abdominal mass, pain, and distension, which become increasingly prominent as the tumor enlarges. Laboratory tests, including alpha-fetoprotein (AFP), carbohydrate antigen 19-9 (CA19-9), and carcinoembryonic antigen (CEA), frequently show no obvious abnormalities. Imaging studies often depict tumors localized in the right hepatic lobe, characterized by large diameters, encapsulation, and well-defined margins relative to surrounding tissues. Diagnosis commonly relies on pathological and immunohistochemical examinations.

Complete resection of the tumor followed by postoperative chemotherapy remains the primary treatment approach for UESL [5–8]. This therapeutic strategy has demonstrated improved overall survival and disease-free survival rates compared with radical resection alone [9–11]. Nevertheless, it is important to acknowledge that most patients diagnosed with UESL are in advanced stages of the disease, often accompanied by compromised liver function and various complications, rendering them unsuitable candidates for surgical intervention. Therefore, early detection, complete surgical resection, and adjuvant therapy are aspects critical to achieving good clinical outcomes.

The present case report offers a comprehensive account of the clinical diagnosis and treatment of an adult patient with UESL, thereby contributing to the existing body of knowledge on this condition and providing valuable insights for future therapeutic strategies.

Case presentation

A 37-year-old Chinese female of Han ethnicity presented to our hospital (Affiliated Hangzhou First People's Hospital, Westlake University School of Medicine) with persistent epigastric pain lasting over a 2-day period. Prior to this, the patient reported no obvious cause of upper abdominal discomfort, nor exhibited symptoms such as nausea, vomiting, melena, or jaundice. There was no discernible disparity in the physical examination. The patient's temperature and inflammatory markers, such as white blood cell count and hypersensitive reactive protein, exhibited a slight elevation. The patient had been in excellent health and possessed no familial history of disease. Ultrasound showed cystic–solid nodule in the liver. Initial computed tomography (CT) scans performed at the Chun'an Traditional Chinese Medicine Hospital indicated hepatic occupancy in the right lobe. For further diagnosis and treatment, the patient was subsequently admitted to our hospital with a preliminary diagnosis of "liver focal masses." Physical examination revealed no tenderness, rebound pain, or muscle tension in the abdomen and no percussion pain in the liver or kidney regions. Comprehensive laboratory evaluations revealed no significant abnormalities in tumor markers, including AFP and CEA, or in complete blood counts, liver and kidney function tests, and coagulation profiles. Electrocardiographic assessment also showed no abnormal results. The ultrasound examination revealed a well-defined cystic–solid nodule in the right liver, measuring approximately 11.6 × 9.7 × 9.7 cm in size. The internal echogenicity of the nodule appeared heterogeneous, while minimal

blood flow signals were observed surrounding it on color Doppler flow imaging (CDFI; Fig. 1). Further CT imaging revealed a cystic mass in the right hepatic lobe, with a clear boundary and measuring 9.1×7.6 cm in size, characterized by low-density shadowing, scattered flocs, and no obvious contrast enhancement, raising the possibility of cystadenoma (Fig. 2). Subsequent enhanced magnetic resonance imaging (MRI) identified a well-defined, block-like abnormal signal in the right hepatic lobe, measuring 10.3×8.9 cm in size, with nodular short T1 signals and slight post-contrast enhancement, suggestive of benign lesions, including cystadenoma with hemorrhage or hemangioma with hemorrhage (Fig. 3). The positron emission tomography-CT (PET-CT) scan reveals a mass in the right liver lobe, exhibiting a significant enhancement of ^{18}F-fluorodeoxyglucose (^{18}F-FDG) metabolism heterogeneity within the cyst wall and lesion with a standardized uptake value (SUV) of 4.7, indicating the possibility of malignancy (Fig. 4). Surgical resection of the posterior hepatic lobe was performed under general anesthesia on 13 October 2020 after thorough preoperative preparations. Intraoperative findings revealed a space-occupying lesion in the right posterior hepatic lobe, adhering to the diaphragm. The liver parenchyma on the surface of the tumor exhibited rupture, with the presence of several visible blood clots. Complete excision of the tumor was successfully achieved. Pathological findings (Fig. 5) demonstrated fusiform cell tumor, necrosis, cellular atypia, mitotic images, and eosinophilic globules suggestive of a diagnosis of UESL of the liver. Immunohistochemical staining showed vimentin (Vim;+), α1-AT (+), and Ki-67 (+) 30–35%. Postoperatively, the patient underwent five cycles of combined ifosfamide and epirubicin chemotherapy administered at 21-day intervals. Three-year postoperative follow-up confirmed stable patient status, with no evidence of liver tumor recurrence.

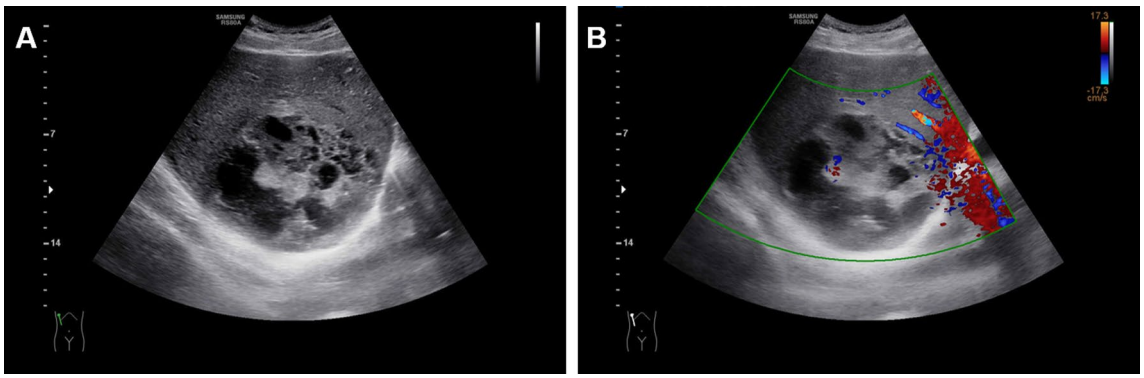

Fig. 1 The findings of an ultrasound examination. **A** The right liver exhibits a cystic–solid nodule with well-defined boundaries and a regular shape. The internal echogenicity appears heterogeneous. **B** Color Doppler flow imaging (CDFI) reveals minimal blood flow signals surrounding the nodule

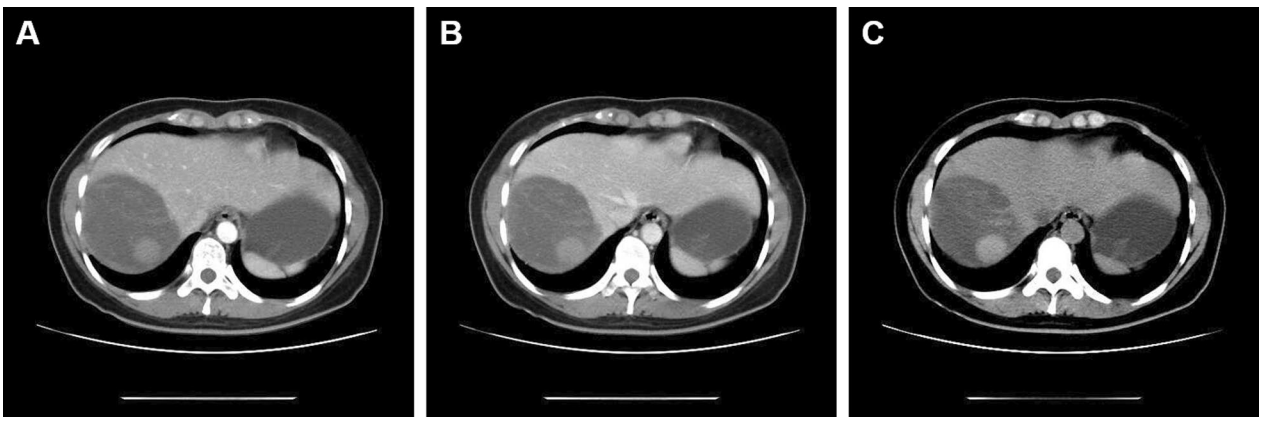

Fig. 2 Three-phase contrast-enhanced abdominal CT. **A** Arterial phase CT image showing irregular patch-like enhancement; CT images of (**B**) portal venous phase and (**C**) delayed phase. Cystic density in the tumor was low, accompanied by slight high-density flocculent or septal separation, or potential mural nodules. Enhanced imaging of the cystic elements was inconclusive. Mild to moderate heterogenous enhancement of the parenchyma and septa was observed

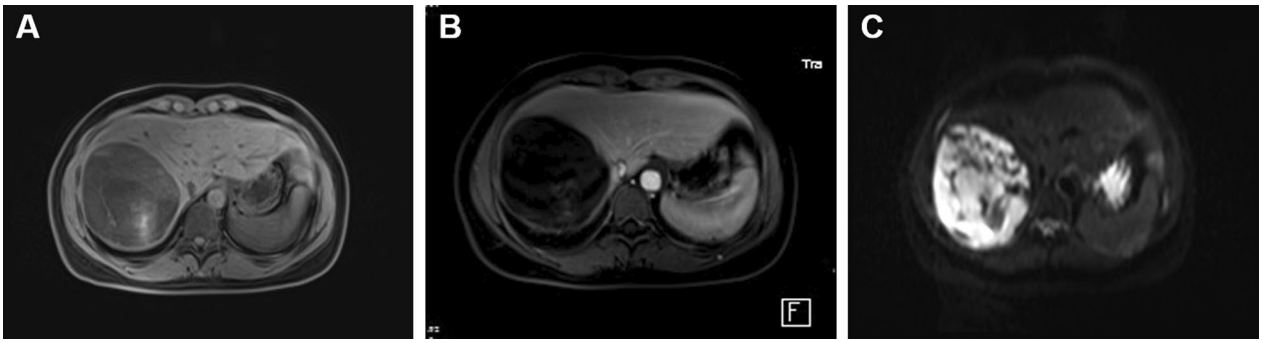

Fig. 3 Magnetic resonance imaging (MRI) of the liver, gallbladder, and spleen. **A** T1-weighted (T1W1) image. **B** Contrast-enhanced T1-weighted image. **C** Diffusion-weighted image (DWI)

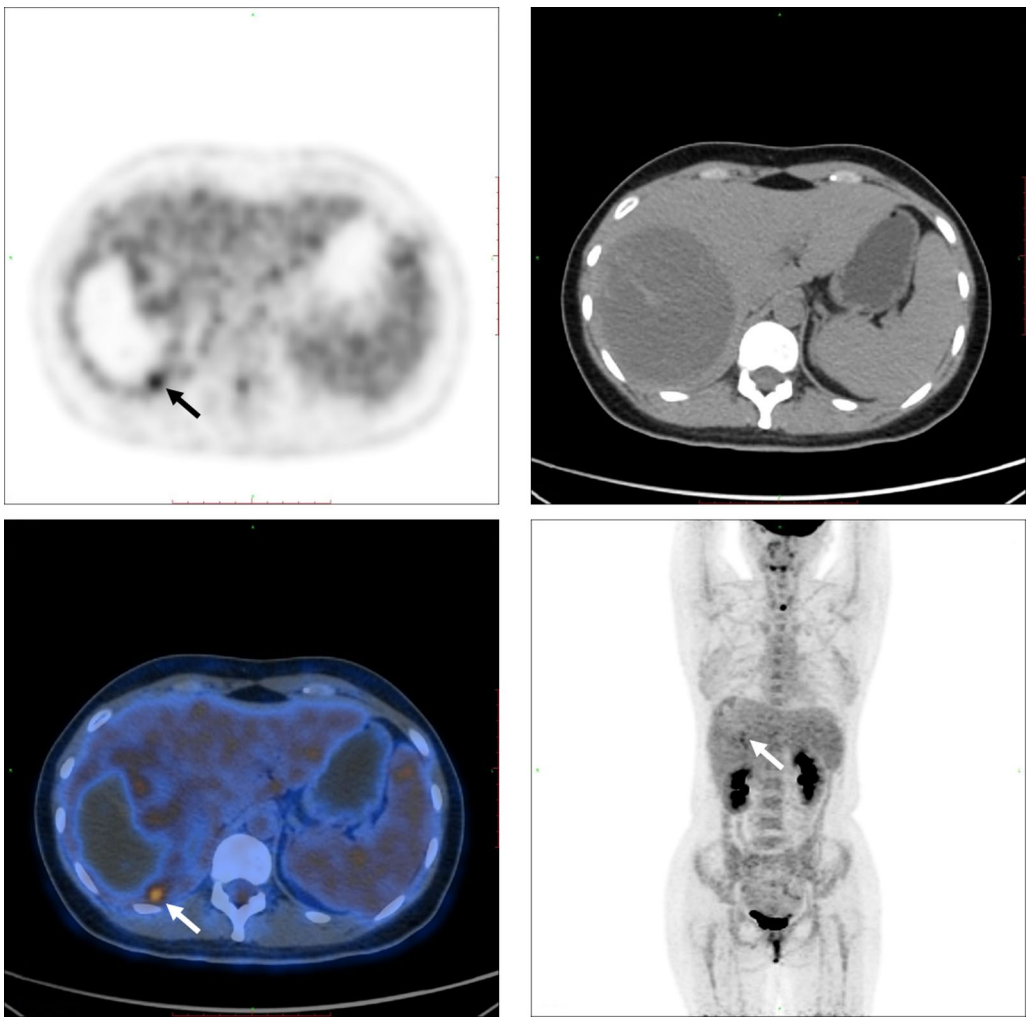

Fig. 4 The PET-CT scan revealed a mass in the right liver lobe, showing a slight increase in uneven glucose metabolism within the cyst wall and lesion with a standardized uptake value (SUV) of 4.7. The arrows indicate mural nodules exhibiting slightly elevated ^{18}F-FDG uptake within the cystic wall on MIP, axial PET, and axial PET/CT images

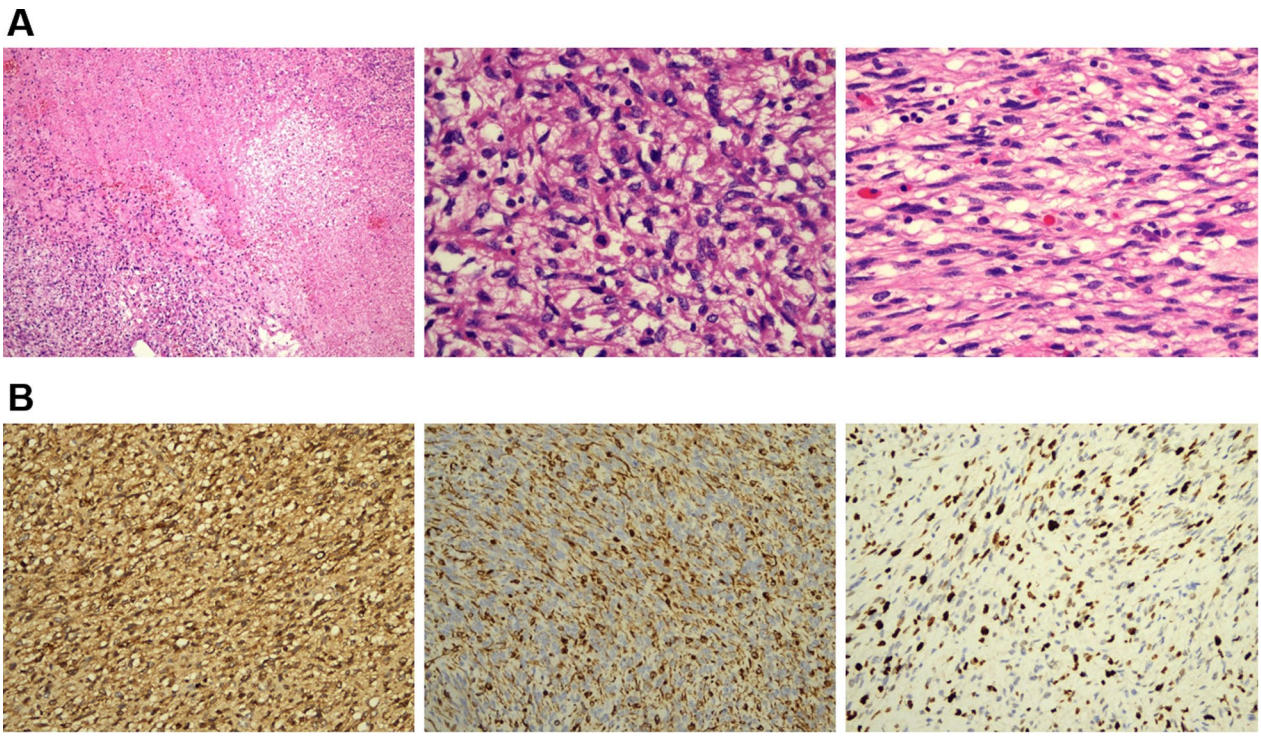

Fig. 5 Pathological findings. **A** Hematoxylin and eosin (HE) stain demonstrated that the tumor is composed of fusiform cell tumor and necrosis (left, ×100); cellular atypia and mitotic images (middle, ×400); eosinophilic globules (right, ×400; black arrow) suggestive of UESL of the liver. **B** Immunohistochemical staining demonstrated that tumor cells were positive for vimentin, α1-AT, and ki67 (30–35%; from left to right, ×200)

Discussion

Malignant UESL, also known as malignant stromal tumor or fibromyxoid sarcoma, originates from the mesenchymal tissue of the liver. Following hepatoblastoma and hepatocellular carcinoma, it is the third most common primary malignant tumor of the liver in children, especially in those aged between 6 and 10 years. However, it is rarely observed in adults. In the present case study, we offer a comprehensive account of the clinical diagnosis and treatment of a 37-year-old female patient with UESL. First described in the medical literature in 1978, UESL constitutes a significant fraction of pediatric liver malignancies, ranking third in incidence [12]. Children with this condition often seek medical care for symptoms such as abdominal pain, hemorrhage, or necrosis due to spontaneous tumor rupture, possibly accompanied by atypical manifestations such as anorexia, nausea, vomiting, diarrhea, and weight loss [13]. The diagnosis of UESL is particularly challenging in its early stages and in adult populations, as the disease may either be asymptomatic or present with a range of nonspecific symptoms, including nausea, vomiting, weight loss, fever, abdominal pain, and abdominal distension. Xu et al. [14] posited that the clinical presentation of UESL often lacks specific manifestations and may include symptoms such as acute abdominal pain and diarrhea, thereby complicating its differentiation from other hepatic malignancies. Consistently, in the case under consideration, the patient experienced upper abdominal discomfort but did not exhibit other symptoms such as nausea, vomiting, melena, or jaundice. In addition, most laboratory indicators yield negative results for liver function and tumor markers (for example, AFP and CEA), although elevated levels of carbohydrate antigen (CA) 125 and CA 19-9 have been observed in some patients [14]. Furthermore, biopsy is generally not suitable for cystic–solid tumors. In the current case, laboratory tests for tumor markers, AFP, and liver function revealed no abnormal results, consistent with previous research [14].

The ultrasound examination primarily reveals liver cyst-solid tumors with a predominance of mixed echogenicity, characterized by hyperechoic areas resulting from numerous small interfaces within the mucinous matrix. This often leads to frequent misdiagnosis of UESL as a benign liver lesion. The CT imaging of UESL also lacks specificity, manifesting as large solitary lesions with distinct boundaries, primarily in the right hepatic lobe. These lesions can be categorized into cystic tumors (single-loculated lesions with a large

cystic cavity containing irregular soft tissue density shadows that may be complicated by bleeding) and predominantly solid tumors (solid components mainly located at periphery, with visible segmentation shadows within). The majority of UESL cases present as cystic tumors. The enhanced scan reveals enhancement along the tumor's edge and varying degrees of enhancement within the inner soft tissue density. The solid portion exhibits rapid wash-in and wash-out or delayed enhancement, while the cystic area does not enhance [15]. The discrepancy observed between ultrasound and CT imaging was considered beneficial for enhancing the precision of preoperative diagnosis [16, 17]. In the present case, we have observed a phenomenon akin to that previously reported [16, 17], wherein ultrasound imaging revealed a cystic–solid nodule within the hepatic parenchyma; CT scans identified a low-density cystic mass in the right hepatic lobe. In MRI T1 imaging of UESL, a mixed low-signal and high-signal focus often appears, indicative of intratumoral bleeding, while T2 imaging commonly exhibits cystic or solid lesions with multipartite mixed high-signal intensity. On enhanced MRI, the tumor parenchyma may show varying degrees of enhancement, ranging from mild to moderate or even significant. These non-specific imaging characteristics frequently contribute to the misdiagnosis of UESL as hepatic abscesses [18]. In the current case, enhanced MRI of the liver displayed a block-like abnormal signal in the right hepatic lobe, suggestive of benign lesions such as cystadenoma with bleeding or hemangioma with bleeding. The PET-CT imaging provides a unique perspective on the molecular metabolism of tumors, offering valuable insights into their biological activity and metabolic processes. This modality has demonstrated higher sensitivity in detecting undifferentiated liver sarcoma compared with other imaging techniques, enabling more accurate diagnosis and staging. In the present case, the PET-CT scan detected a mass in the right hepatic lobe exhibiting significant elevation in ^{18}F-FDG uptake within both the cystic wall and lesion, indicating potential presence of malignancy.

Diagnosis of UESL primarily relies on postoperative pathological and immunohistochemical results from surgically resected lesions. Superior clinical outcomes are generally achieved through early diagnosis, complete surgical resection, and postoperative adjuvant therapy. Typical pathological features include the dispersion of fusiform or stellate tumor cells in a mucous matrix, accompanied by marked atypia, multinucleation, megakaryocytes, and frequent nuclear division. Furthermore, the presence of eosinophilic bodies within tumor cells or stroma represents a highly specific pathological indicator [19, 20]. In the current case, pathological evaluation revealed fusiform cell tumor, necrosis, hemorrhage, cystic changes, cellular atypia, mitotic images, and eosinophilic globules suggestive of UESL of the liver and the observations of Kyu et al. [20]. At present, no definitive immunohistochemical markers for UESL exist, with most immunohistochemical tests only serving to exclude other diagnoses. Given the mesenchymal origin of UESL, certain immune markers, such as Vim and α1-antitrypsin (α1-AT), may be positively expressed [17]. Notably, in the current case, immunohistochemical analysis showed positive results for Vim (+) and ki67 (+), consistent with existing studies [17].

Gabor et al. [1] posited that surgical intervention serves as the primary treatment for UESL, often accompanied by radiotherapy, chemotherapy, and interventional therapy. Given the high degree of malignancy and rapid progression of UESL, tumors are frequently identified at an advanced stage and large size, and are still prone to recurrence and metastasis after complete resection, with poor long-term survival. Gabor [1] also suggested that complete surgical resection in combination with postoperative chemotherapy is a recognized treatment for improving clinical outcomes for UESL patients, although the standard chemotherapy regimen is yet to be established. Moreover, radiotherapy is commonly administered to UESL patients who present with metastatic tumors. Despite these interventions, no definitive treatment protocol for UESL currently exists, necessitating further case studies for establishing a consensus on effective therapeutic approaches. In cases of unresectable UESL, a limited number of patients undergo orthotopic liver transplantation [21]. Subsequent adjuvant chemotherapy is commonly recommended. Due to the scarcity of donor organs, orthotopic liver transplantation serves as an alternative treatment option for those who are not candidates for radical resection. During the surgical procedure presented here, a space-occupying lesion was identified in the right posterior hepatic lobe, adhering to the diaphragm. The liver parenchyma overlaying the surface of the tumor showed signs of rupture, with minimal blood clotting observed. The tumor was successfully and completely excised. Subsequently, the patient underwent five cycles of combined ifosfamide and epirubicin chemotherapy, administered at 21-day intervals. At the 3-year postoperative mark, the patient exhibited stable clinical status, with no liver tumor recurrence. The favorable prognosis may be attributable to the absence of vascular infiltration in the excised specimen.

Conclusions

UESL is a rare condition characterized by non-specific clinical manifestations and serological findings, making accurate diagnosis challenging. Although there is a lack of specificity in any imaging examination for UESL, a comprehensive analysis of various imaging modalities can provide crucial clues for our diagnosis of UESL: (1) a large, well-defined tumor with cystic components displays heterogeneous density and spaciousness; (2) low density within the cystic portion is accompanied by slightly elevated-density flocculent or cable-like separations, possibly presenting mural nodules; (3) there is uncertain enhancement of the cystic region upon contrast-enhanced scanning; mild to moderate uneven enhancement is observed in both parenchyma and septa; (4) owing to the presence of a water-absorbing acidic mucopolysaccharide matrix, UESL often demonstrates predominantly cystic–solid mixed echogenicity on ultrasound imaging, while CT scans typically reveal primarily cystic components (The inconsistent imaging findings are regarded as distinctive characteristic features of UESL); and (5) notably, an increased ^{18}F-FDG uptake in a cystic liver mass during PET-CT evaluation further strengthens the possibility of diagnosing UESL. When these imaging findings are evident, it is imperative to contemplate the possibility of UESL and expeditiously conduct a pathological examination to validate our suspicions. The management of UESL in adults may benefit from early surgical resection and postoperative adjunctive therapy, based on our extensive experience. Therefore, this case study will contribute to the advancement of our understanding regarding UESL, thereby facilitating its future diagnosis and treatment.

Abbreviations

UESL	Undifferentiated embryonal sarcoma of the liver
CT	Computed tomography
MRI	Magnetic resonance imaging
PET-CT	Positron emission tomography–computed tomography
^{18}F-FDG	^{18}F-fluorodeoxyglucose
AFP	Alpha-fetoprotein
CA19-9	Carbohydrate antigen 19-9
CA125	Carbohydrate antigen 125
CEA	Carcinoembryonic antigen
CDFI	Color Doppler flow imaging
SUV	Standardized uptake value

Acknowledgments

We would like to thank Hangzhou First People's Hospital for allowing us to conduct this project. We would also like to express our gratitude to Dr. Shao Chang from the Department of Pathology of Hangzhou First People's Hospital for her professional and meticulous guidance on the interpretation of pathological results and the shooting of typical pictures during the revision process of the manuscript.

Author contributions

X-LZ and P-YW conducted a thorough analysis of existing literature, gathered data, composed the initial draft, and finalized the manuscript. L-YS provided the PET-CT pictures, and Y-LZ provided the laboratory examination data. XH and Y-FH actively engaged in a critical review of the paper. The article was collaboratively contributed to by all authors and received unanimous approval for submission.

Funding

This study was supported by the Educational and Teaching Reform Research Project of Zhejiang Chinese Medical University (ZB22004), Educational Reform Research Project of Zhejiang University School of Medicine (jgzd20221008), and Project of Zhejiang Institute of Higher Education (KT2023397).

Availability of data and materials

Available from corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The studies involving human participants were reviewed and approved by Hangzhou First People's Hospital, Westlake University School of Medicine (ZN-2024283-01). The patient provided written informed consent for the use of her images and other clinical information in this study. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

There are no competing interests.

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Received: 12 June 2024 Accepted: 22 September 2024
Published online: 02 November 2024

References

1. Gabor F, Franchi-Abella S, Merli L, Adamsbaum C, Pariente D. Imaging features of undifferentiated embryonal sarcoma of the liver: a series of 15 children. Pediatr Radiol. 2016;46(12):1694–704.
2. Pachera S, Nishio H, Takahashi Y, *et al*. Undifferentiated embryonal sarcoma of the liver: case report and literature survey. J Hepatobiliary Pancreat Surg. 2008;15(5):536–44.
3. Noguchi K, Yokoo H, Nakanishi K, *et al*. A long-term survival case of adult undifferentiated embryonal sarcoma of liver. World J Surg Oncol. 2012;10:65.
4. Rammohan R, Joy M, Magam SG, *et al*. An adult with undifferentiated embryonal sarcoma of the liver: a case report of a rare encounter. Cureus. 2023;15(9): e45018.
5. Lenze F, Birkfellner T, Lenz P, *et al*. Undifferentiated embryonal sarcoma of the liver in adults. Cancer. 2008;112:2274–82.
6. Pu T, Chen JM, Guo Q, *et al*. Surgical diagnosis and treatment of adult huge undifferentiated embryonal sarcoma of the liver. Zhonghua Wai Ke Za Zhi. 2021;59:848–53.
7. Zhang C, Jia CJ, Xu C, *et al*. Undifferentiated embryonal sarcoma of the liver: clinical characteristics and outcomes. World J Clin Cases. 2020;8:4763–72.
8. Bahador A, Forooghi M, Shahriarirad R, *et al*. A large undifferentiated sarcoma of the liver in a 13-year-old girl treated with anatomical resection: a case report and review of the literature. BMC Gastroenterol. 2022;22:2.

9. Shu B, Gong L, Huang X, *et al*. Undifferentiated embryonal sarcoma of the liver in adults: retrospective analysis of a case series and systematic review. Oncol Lett. 2020;20:102.
10. Li XW, Gong SJ, Song WH, *et al*. Undifferentiated liver embryonal sarcoma in adults: a report of four cases and literature review. World J Gastroenterol. 2010;16:4725–32.
11. Huang J. Undifferentiated embryonal sarcoma of the liver in adults. Exon Publications. 2021;6:165–78.
12. Stocker JT, Ishak KG. Undifferentiated (embryonal) sarcoma of the liver: report of 31 cases. Cancer. 1978;42:336–48.
13. Muthuvel E, Chander V, Srinivasan C. A clinicopathological study of paediatric liver tumours in a Tertiary Care Hospital. J Clin Diagn Res. 2017;11(3):EC50–3.
14. Xu HF, Mao YL, Du SD, *et al*. Adult primary undifferentiated embryonal sarcoma of the liver: a case report. Chin Med J (Engl). 2010;123(2):250–2.
15. Martins-Filho SN, Putra J. Hepatic mesenchymal hamartoma and undifferentiated embryonal sarcoma of the liver: a pathologic review. Hepat Oncol. 2020;7(2):19.
16. Li Y, Cai Q, Jia N, *et al*. Pre-operatively misdiagnosed undifferentiated embryonal sarcoma of the liver: analysis of 16 cases. Ann Transl Med. 2015;3:353.
17. Luan T, Mei H, Yuan L, Hu Y. Undifferentiated embryonic sarcoma of the adult liver with paraneoplastic syndrome: a case report. Transl Cancer Res. 2022;11(12):4465–73.
18. Patel RK, Pathak S. Undifferentiated embryonal sarcoma masquerading as liver abscess: a case report with typical imaging features. SA J Radiol. 2021;25(1):2179.
19. Putra J, Ornvold K. Undifferentiated embryonal sarcoma of the liver: a concise review. Arch Pathol Lab Med. 2015;139:269–73.
20. Kyu HL, Maratovich MN, Lee KB. Undifferentiated embryonal sarcoma of the liver in an adult patient. Clin Mol Hepatol. 2016;22:292–5.
21. Khan ZH, Ilyas K, Khan HH, *et al*. Unresectable undifferentiated embryonal sarcoma of the liver in an adult male treated with chemotherapy and orthotopic liver transplantation. Cureus. 2017;9(10): e1759.

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