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Sarcomatoid Hepatocellular Carcinoma: A Case Report and Review of Literature

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ABSTRACT

Sarcomatoid hepatocellular carcinoma (SHC), which contains variable proportions of sarcomatous and carcinomatous components, is a rare variant of hepatocellular carcinoma and is a special variant of hepatocellular carcinoma. It is highly malignant, progresses rapidly, and has an extremely poor prognosis. However, the molecular pathogenesis of SHC remains unknown. We report a case of a 35-year-old male, previously healthy with no liver disease history, who presented with intermittent fever. Imaging examination during hospitalization revealed focal liver lesions. Without obvious surgical contraindications, right hemihepatectomy, cholecystectomy, and regional lymph node dissection were performed. Postoperative pathology and immunohistochemistry confirmed the diagnosis of SHC. However, due to the financial burden of the disease, the patient and his family chose traditional Chinese medicine as postoperative supplementary treatment rather than targeted drug combined with immunotherapy or other adjuvant therapies. Unfortunately, the patient passed away due to tumor recurrence 8 months after surgery.

1 | Introduction

Liver cancer, especially hepatocellular carcinoma (HCC), has become one of the major causes of cancer-related deaths worldwide [1]. Sarcomatoid hepatocellular carcinoma (SHC), which contains variable proportions of sarcomatous and carcinomatous components, is a rare subtype of HCC and is a special subtype of HCC, with an incidence of 1.7%–1.9% among surgically resected HCC cases and 3.9%–9.4% among autopsied HCC patients [2]. It is associated with a higher recurrence rate after surgical resection—the preferred treatment for early-stage tumors, worse prognosis, and lower 5-year survival rate than conventional HCC. Studies showed that SHC independently increased the risk of tumor recurrence and mortality. However, the molecular pathogenesis of SHC remains unknown; its genetic etiology and therapeutic targets are completely unknown.

In this report, we present a 35-year-old male with a large liver mass, without cirrhosis or major risk factors, with spindle-shaped cells on histopathology. According to histological morphology and immunohistochemistry, the final diagnosis was SHC with necrosis. The rarity of SHC, accounting for less than 1% of HCC cases, highlights the need for awareness and careful evaluation of such lesions to avoid misdiagnosis and ensure timely intervention [3].

2 | Case Presentation

2.1 | Patient Information

A 35-year-old male patient, with no prior history of liver disease, was admitted to the hospital due to intermittent fever lasting more than 1 month.

Summary

- Sarcomatoid hepatocellular carcinoma is a highly malignant type of primary liver cancer with difficulties in early diagnosis.
- Surgical resection is the preferred treatment, but the prognosis remains poor.
- Comprehensive treatment, including chemotherapy, radiotherapy, and biological immunotherapy, aims to prolong survival and improve the quality of life.

2.2 | Clinical Findings

Serum biochemical analyses indicated that liver function indices, renal function, and coagulation parameters were within normal limits. Tests for Hepatitis B and Hepatitis C were negative. Tumor markers were also within normal ranges:

- Alpha-fetoprotein (AFP): 2.07 ng/mL (reference range: 0–7 ng/mL).
- Carcinoembryonic antigen (CEA): 0.83 g/L (reference range: 0–4.7 ng/mL).
- Cancer antigen 125 (CA125): 9.56 U/mL (reference range: 0–35 U/mL).
- Cancer antigen 19–9 (CA19-9): 3.30 U/mL (reference range: 0–39 U/mL).

2.3 | Imaging Studies

Enhanced computed tomography (CT) (Figure 1) revealed a slightly hypodense mass measuring approximately 78 × 110 mm in the right lobe of the liver, characterized by unclear margins and surrounding slightly hypodense shadows. The enhanced scanning showed mild enhancement at the periphery, with more pronounced patchy enhancement in the surrounding tissues.

Enhanced magnetic resonance imaging (MRI) (Figure 2) demonstrated an elliptical lesion with long T1 and slightly longer T2 signals, measuring around 80 × 118 × 114 mm, located in the S6 and S7 segments of the right lobe of the liver. This lesion exhibited clear boundaries and heterogeneous signals, with a central area showing patchy longer T1 and T2 signals. Diffusion-weighted imaging (DWI) with a b-value of 800 displayed high signal intensity, accompanied by patchy and slightly longer T1 and T2 signals in the adjacent liver parenchyma. In the arterial phase, a circular mild enhancement was noted at the edges, while a progressive enhancement was observed during the portal and venous phases, again with clear margins.

2.4 | Surgical Intervention

Given the imaging findings suggestive of malignancy and the absence of significant surgical contraindications, the patient underwent right hemihepatectomy, cholecystectomy, and regional lymph node dissection.

2.5 | Pathological Findings

Postoperative pathology and immunohistochemical analysis revealed the presence of spindle cells (Figure 3) with the following immunoprofile:

- CK8/18: Weak positive.
- Glypican-3: Negative.
- Hep Par 1: Scattered individual cells positive.
- CK19: Negative.
- CA19-9: Negative.
- CK: Weak positive.
- CK7: Scattered weakly positive.
- CK20: Negative.
- Vimentin: Positive.
- Desmin: Negative.
- S-100: Negative.
- CD34: Negative.
- CD68: Negative.
- EMA: Weak positive.

There is no invasion of the liver capsule, nor any invasion of microvessels. There are also no satellite nodules.

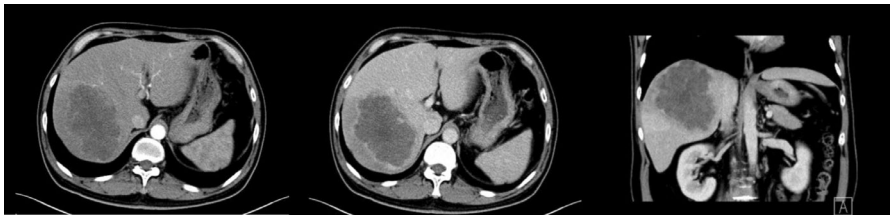

FIGURE 1 | CT showed a slightly hypodense mass measuring approximately 78 × 110 mm in the right lobe of the liver, characterized by unclear margins and surrounding slightly hypodense shadows. The enhanced scanning showed mild enhancement at the periphery, with more pronounced patchy enhancement in the surrounding tissues.

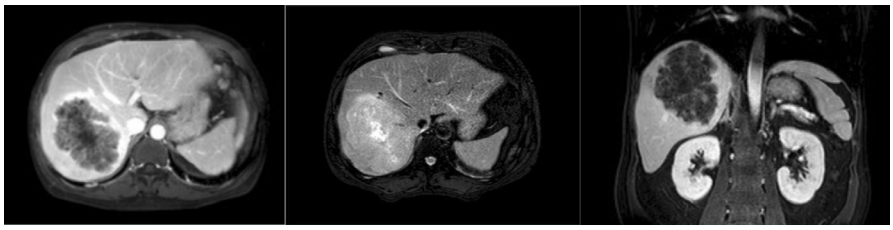

FIGURE 2 | MRI showed an elliptical lesion with long T1 and slightly longer T2 signals, measuring around 80×118×114 mm, located in the S6 and S7 segments of the right lobe of the liver. This lesion exhibited clear boundaries and heterogeneous signals, with a central area showing patchy longer T1 and T2 signals. DWI with a *b*-value of 800 displayed high signal intensity, accompanied by patchy and slightly longer T1 and T2 signals in the adjacent liver parenchyma. In the arterial phase, a circular mild enhancement was noted at the edges, while a progressive enhancement was observed during the portal and venous phases, again with clear margins.

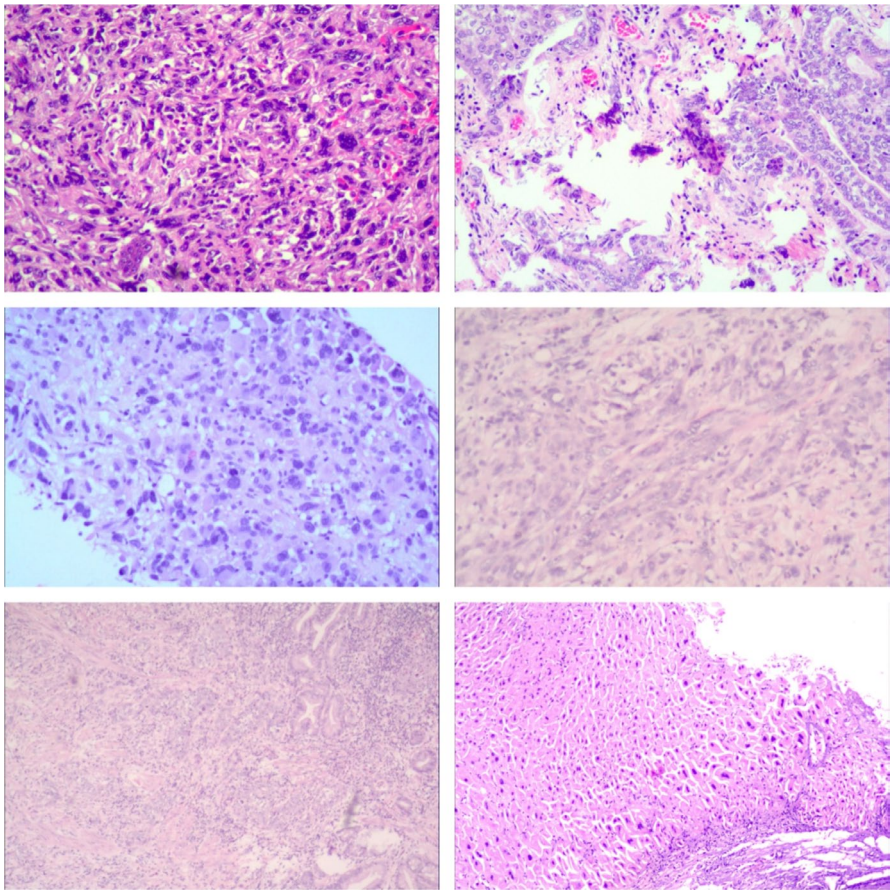

FIGURE 3 | Tumor cell nuclei appear dark purple due to chromatin condensation. Necrotic regions show pinkish-white hues resulting from disrupted cellular structures. Healthy liver tissue exhibits lighter purple staining compared to the cancerous region.

2.6 | Final Diagnosis

The definitive diagnosis was SHC, pT1bN0M0.

2.7 | Prognosis

Due to the financial burden of disease, the patient and his family choose traditional Chinese medicine as postoperative supplementary treatment rather than targeted drugs combined with immunotherapy or other adjuvant therapies. Unfortunately, 8 months later, the patient passed away due to liver, lung, and bone metastases.

3 | Conclusion and Results

In summary, SHC is highly malignant, progresses rapidly, and has an extremely poor prognosis. There are no specific and effective therapies for SHC. For patients with the early stage of SHC, radical surgery should be actively performed, and effective adjuvant therapy should be given after surgery; for patients with advanced stage, local treatment combined with targeted drug and immunotherapy should be implemented, and individualized management should be implemented to prolong the survival of patients as much as possible to improve the quality of life of patients.

4 | Discussion

SHC, for which the molecular pathogenesis remains unknown, is primarily observed in elderly males, with an age range of 58–62 being most common [4, 5]. Besides, the liver enzymes, serum bilirubin, and alpha-fetoprotein tend to be within the normal range [5], which is similar to our study. The risk factors for the development of SHC are similar to those of conventional HCC, being hepatitis B, hepatitis C, and liver cirrhosis [5]. However, in our study, there were no risk factors found. Studies indicated that certain anticancer therapies, such as transcatheter arterial chemoembolization (TACE), new anti-angiogenic drugs (Sunitinib), radiofrequency ablation (RFA) and percutaneous ethanol injection (PEI) and other treatments can lead to more frequent sarcomatous changes in HCC [6]. However, an increasing number of SHC cases without anticancer therapy before have been reported [2, 7]. In our report, the patient did not have any history of tumor diseases before. Although the molecular pathogenesis of SHC remains unknown, we may distinguish it into primary SHC and secondary SHC.

The clinical diagnosis of SHC is difficult. The imaging manifestations of SHC, which include dual imaging features of sarcoma and carcinoma simultaneously, have no clinical and imaging specificity. PET/CT imaging shows the neoplasm presented intense uptake of 18F-FDG may be helpful for diagnosis [8]. So far, histological morphology and immunohistochemistry are still the gold standard for diagnosis.

Existing literature on SHC is limited, primarily focusing on its association with atypical presentations and poor prognosis. Studies indicate that SHC is characterized by aggressive behavior and a propensity for early metastasis, making timely and accurate diagnosis crucial for improving patient outcomes [3]. The diagnostic difficulty is compounded by the lack of specific serum tumor markers and the challenges in histopathological identification, especially in cases where imaging findings may suggest benign processes [9]. The case presented herein is of significant clinical importance as it highlights the challenges in diagnosing and treating atypical liver tumors, particularly SHC. This subtype is rare and often misdiagnosed due to its overlapping features with other hepatic lesions, such as abscesses or cholangiocarcinomas.

To date, there are no specific guidelines for the treatment of SHC. Radical surgery, the preferred treatment for early-stage tumors, is still recognized as the most effective treatment, which can significantly prolong the survival time of patients. Whether liver transplantation could achieve a better outcome than resection remains unclear. In our patient, the treatment strategy chosen—surgical intervention with right hemihepatectomy—aligned with current clinical guidelines for managing liver malignancies. Surgical resection remains the cornerstone of treatment for localized SHC, although recurrence rates can be high due to the aggressive nature of the disease [10].

The prognosis of SHC is very poor; the 6-month and 1-year recurrence rates were 46.7% and 69.5%, respectively; the 1-year and 2-year cumulative survival rates were 59.3% and 37.0% [11]. In our study, the patient passed away due to tumor recurrence 8 months after surgery. This case highlights the aggressiveness of SHC and the current limitations in its treatment options. Although surgery is the primary treatment, the choice of adjuvant therapy after surgery is crucial for improving patient survival rates. However, due to financial constraints, the patient was unable to receive potentially more effective modern medical adjuvant therapies, which affected the treatment outcome to a certain extent. This case serves to remind clinicians of the necessity for vigilant follow-up and the potential for disease recurrence in patients with SHC. The findings suggest that ongoing research into the biological behavior of SHC and the development of targeted therapies is warranted, given the limited treatment options available for this aggressive malignancy [12].

In summary, our report underscores the complexity of diagnosing and managing SHC. It emphasizes the importance of advanced imaging techniques and thorough histopathological evaluation in arriving at a definitive diagnosis, which is crucial for determining the appropriate therapeutic approach. Future clinical practice should incorporate a multidisciplinary framework to optimize outcomes for patients with SHC and similar liver tumors. Furthermore, this case also reminds us that for highly malignant tumors such as SHC, more in-depth research is needed to understand their pathogenesis and develop more effective treatments. At the same time, it is also important to pay attention to the economic and psychological conditions of patients and provide them with comprehensive medical and social support to improve their quality of life and prognosis.

Author Contributions

Bo Gao: writing – original draft. **Yan Liu:** supervision. **Wendu Duan:** writing – review and editing.

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Ethics Statement

Our institution does not require ethical approval for reporting individual cases or case series. Written informed consent was obtained from the participant's family for the publication of the details of their medical case and any accompanying images.

Consent

Written informed consent has been obtained from the participant's family included in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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