



# Radiological Findings of Hepatic Epithelioid Hemangioendothelioma: A Rare Case Report

## Hepatik Epiteloid Hemanjiyoendotelyomanın Radyolojik Bulguları: Nadir Bir Olgu Sunumu

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### Abstract

Hepatic epithelioid hemangioendothelioma is a rare, low-grade, vascular neoplasm with an unpredictable clinical course and usually misdiagnosed as other hepatic tumors based on radiological characteristic features. The most common organs involved are liver, lung and bone. It is still difficult to identify the tumor because it is usually asymptomatic and rare compared to other liver malignancies. Radiological imaging modalities may play an important role in the early diagnosis of this rare disease. In this report, our aim is to present imaging findings of hepatic epithelioid hemangioendothelioma with possible lung metastases in order to extend differential diagnosis and make accurate diagnosis. We evaluated a 38-year-old female patient with right upper quadrant pain using computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET-CT) imaging modalities. The definitive diagnosis was made after histopathological evaluation of biopsy.

**Keywords:** Computed tomography; epithelioid hemangioendothelioma; magnetic resonance imaging; positron emission tomography computed tomography.

### Özet

Hepatik epiteloid hemanjiyoendotelyoma, klinik seyri öngörülemez, nadir görülen, düşük dereceli, vasküler bir tümördür ve genellikle radyolojik karakteristik özelliklere dayanarak diğer karaciğer tümörleri gibi yanlış teşhis edilir. En yaygın tutulum bölgeleri karaciğer, akciğer ve kemiktir. Genellikle asemptomatik seyirli olması ve diğer hepatic malignitelere kıyasla daha nadir görülmesi nedeniyle bu tümörün teşhisinde hala zorluklar bulunmaktadır. Bu hastalığın erken teşhisinde radyolojik görüntüleme yardımcı olabilir. Bu olguda ayırıcı tanıyı genişletmek ve doğru tanı koymak için olası akciğer metastazlı hepatic epiteloid hemanjiyoendotelyomanın görüntüleme bulgularını sunmayı amaçladık. Sağ üst kadranda ağrısı olan 38 yaşında bir kadın hastayı bilgisayarlı tomografi (BT), manyetik rezonans görüntüleme (MRG) ve pozitron emisyon tomografisi (PET-BT) görüntüleme modaliteleri ile değerlendirdik. Kesin tanı lezyonun biyopsisi sonrasında histopatolojik değerlendirme sonrasında konuldu.

**Anahtar Kelimeler:** Bilgisayarlı tomografi; epithelioid hemangioendothelioma; manyetik rezonans görüntüleme; pozitron emisyon tomografisi bilgisayarlı tomografi.

### Introduction

Epithelioid hemangioendothelioma (EHE) is a rare vascular tumor in adults, which may occur in more than one place in the whole body (1). It should not be confused with infantile hepatic hemangioendotheliomas, an entirely different entity seen in fetuses and neonates, which are lesions of the liver consisting of large vascular channels lined with endothelium. The most common organs involved are liver, lung and bone (2). The clinical spectrum varies from asymptomatic patient to portal hypertension and liver failure (3). It is still difficult to identify the disease because it is usually asymptomatic and rare in comparison to other hepatic malignancies. Radiological imaging may be helpful in early

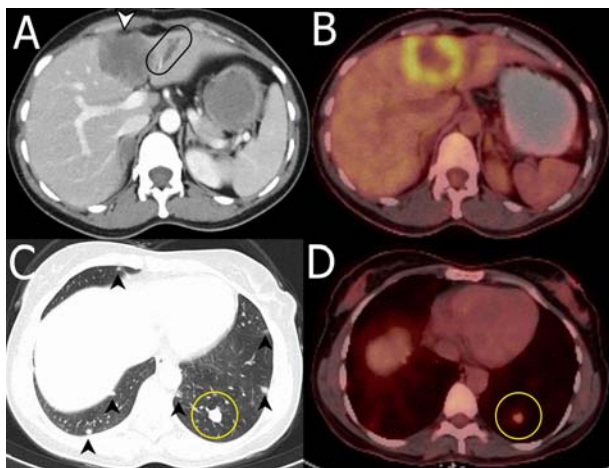
diagnosis of this disease (4). In this report, our aim is to present imaging findings of hepatic EHE (HEHE) with possible lung metastases in a 38-year-old patient using magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography combined with CT (PET-CT). The definitive diagnosis was made after histopathological evaluation of biopsy.

### Case

A 38-year-old female patient admitted to the hospital with many years history of pain in her right upper quadrant. Contrast-enhanced abdominal and chest CT was planned after ultrasonography revealed a lobulated contoured heterogeneous hypoechoic nodular solid lesion with a peripheral subcapsular location in the left

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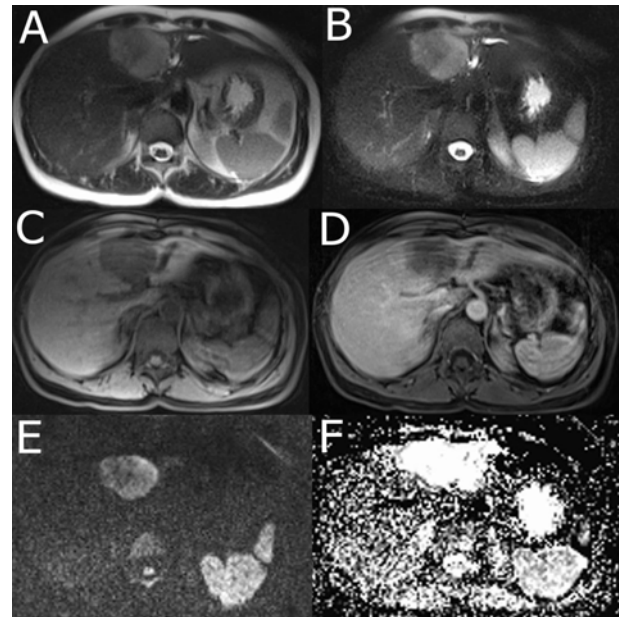
lobe of the liver. The lesion also had peripheral vascularity in color doppler examination. No history of primary cancer, chemotherapy, weight loss, night sweats, alcohol, or smoking were recorded. Viral and tumor markers including hepatitis, alpha-fetoprotein (AFP) and carbohydrate antigen (CA) 19-9 and liver function tests were normal. On the portal venous phase of abdominal contrast-enhanced CT, a heterogeneous lobulated contoured hypodense subcapsular mass lesion of approximately 56x52 mm with the necrotic center, capsular retraction, and mild peripheral contrast enhancement was observed in segment 4 of the liver. In the neighborhood of the lesion, there was dilatation in intrahepatic bile ducts. Chest CT showed multiple small pulmonary nodules, which may be consistent with metastases randomly distributed at all levels of bilateral lung parenchyma. The largest nodule was approximately 13x14 mm in the left lower lobe (Figure 1).



**Figure 1.** A. CT shows a hypodense subcapsular mass lesion with necrotic center, capsular retraction (arrowhead) and mild peripheral enhancement in segment 4 of the liver with intrahepatic bile ducts dilatation (circle). B. The lesion has peripheral elevated FDG uptake on PET-CT. C. CT shows multiple small nodules with random distribution in bilateral lung parenchyma (arrowheads). D. The nodule in the left lower lobe of the lung has elevated FDG uptake on PET-CT (circle).

Abdominal MRI showed a lobulated contoured mass lesion of 56x52 mm size with heterogeneous hyperintense signal intensity on T2-weighted images (WI) including central necrotic areas with no fat suppression. The lesion had hypointense signal intensity on T1-WI. In contrast-enhanced dynamic series (gadolinium-based contrast agent, non-specific to the liver), there was a peripheral and heterogeneous delayed enhancement. The

lesion had no diffusion restriction on diffusion MRI (Figure 2).



**Figure 2.** A. Mass lesion is heterogeneous hyperintense on T2W image with central necrosis. B. The lesion has no fat suppression on T2W fat suppressed image. C. The lesion shows hypointense signal intensity on T1W fat suppressed image. D. The lesion has mild peripheral enhancement on post-gadolinium T1W fat suppressed image. E-F. The lesion is also hyperintense in b-1000 images and ADC map (ADC value:  $2,56 \times 10^{-3} \text{ mm}^2/\text{s}$ ) and showed no diffusion restriction on DW-MRI.

The lesion on the liver had pathologically elevated FDG uptake (SUVmax.: 6,2) on 18F-FDG PET-CT. There was central hypometabolic activity due to the central necrosis. Additionally, the nodule in the left lower lobe of the lung showed pathological elevated FDG uptake (SUVmax.: 2,2) (Figure 1). Considering the available radiological findings cholangiocarcinoma, metastasis and sclerosing variant of hepatocellular carcinoma were considered for the differential diagnosis. A biopsy was planned for the definitive diagnosis of the lesion. The liver lesion was evaluated by percutaneous ultrasound-guided tru-cut biopsy. Histopathological findings showed a vascular lesion compatible with HEHE. CD31 and CD34 as vascular markers were positive in neoplastic cells in immunohistochemical examination. Informed written consent was obtained from the patient for this study.

## Discussion

HEHE is a very rare vascular neoplasm arising from endothelial cells in the liver and has a prevalence of 1 to 2 in 1,000,000. Patients with

HEHE has a mean age of 42 with predilection for females at a ratio of 1,6. Hepatomegaly, right upper quadrant discomfort and / or weight loss occurs in about half of patients with HEHE, and about a quarter of patients are asymptomatic (3). The tumor may present with Budd-Chiari syndrome, Kasabach-Merritt syndrome and intra-abdominal hemorrhage caused by rupture of the large tumor (5). AFP, CEA, and CA 19-9 values are typically normal in these patients. Liver function tests are within normal limits in 15% of HEHE patients. In the World Health Organization classification, HEHE is defined as a low/moderately differentiated malignant tumor (6). It is a moderate tumor in the spectrum of vascular tumors between hemangiomas and angiosarcomas. Cases with varying spectrum have been reported, ranging from patients who died within weeks to patients who survived up to 27 years without treatment (3,7). HEHE is often diagnosed incidentally by imaging modalities which is made for other reasons. It routinely occurs as multiple nodules with a peripheral or subcapsular growth pattern, involving both lobes of the liver (3,7,8). Multifocal nodular type which is thought to be the early stage and diffuse type thought to be a late stage in which nodules grow and combine into larger, more-complex masses.<sup>4,8</sup> Retraction of the liver capsule with peripheral subcapsular distribution in the liver parenchyma is shown as an important finding for the diagnosis of HEHE (9). Relatively hypocellular center with fibrous myxoid stroma and fibrous septa causes flattening in capsule and retraction as it progresses. Extrahepatic involvement is observed at the time of diagnosis in 27-36% of the patients. Lung, peritoneum, lymph nodes and bones are the most frequently affected areas (3). In our case, a single large lesion in the left lobe of the liver was compatible with the diffuse type. HEHE usually shows hypointense and heterogeneous hyperintense signal intensities on T1 and T2-WI in MRI respectively (3,8). In non-contrast CT, tumor nodules are mostly seen hypodense and may show capsular retraction. The less common findings include compensatory hypertrophy of unaffected liver tissue, calcifications, or cystic degeneration (3). Dynamic contrast-enhanced imaging plays an important role in the diagnosis of HEHE. As a vascular tumor, HEHE generally shows a pattern of delayed enhancement on dynamic contrast scans. Three patterns of enhancement were identified in one study, including mild homogeneous enhancement of lesions, ring-like enhancement, and heterogeneous delayed

enhancement. In the same study, it was also stated that contrast enhancement patterns were closely related to the size of the lesions. Lesions less than 2 cm are mostly mild homogeneous enhancement; lesions measuring 2.0–3.0 cm are ring-like and heterogeneous with delayed enhancement, and lesions larger than 3 cm were found to show heterogeneous delayed enhancement (8). In our case, the findings on CT and MRI demonstrated typical imaging characteristics of HEHE, consistent with literature, including subcapsular distribution, nodular integration, capsular retraction, and peripheral heterogeneous delayed enhancement (8,9). In the limited number of studies performed with PET/CT imaging for the diagnosis of HEHE, it is stated that HEHE may show intense FDG uptake (10). In a large series, while relatively homogeneous FDG uptake was observed in small lesions, heterogeneously increased FDG uptake was observed in large lesions. There was an increased peripheral FDG uptake accompanied by a central hypometabolic area, in larger lesions (10). In our case subcapsular liver lesion showed increased peripheral FDG uptake. In addition, there was low FDG uptake in the lesion in the lower lobe of the left lung. Histopathological evaluation is required for definitive diagnosis of HEHE. The diagnosis is mostly confirmed by immunohistochemical evaluation of endothelial cell differentiation. Several well-defined endothelial cell markers, such as CD31, CD34, and factor VIII-associated antigen, are used to confirm EHE (7).

## Conclusion

HEHE is a rare tumor of vascular origin located in the peripheral areas of the liver. The tumor may cause capsular retraction due to fibrosis and scarring, and may cause a confluent mass that may grow progressively and even suppress the normal liver parenchyma. Although the radiological appearance of the tumor is non-specific, knowing the radiological features allows the tumor to be considered in the differential diagnosis. The definitive diagnosis of the lesion is made histopathologically and its treatment is surgical resection in the early stages or transplantation when the tumor becomes multifocal and too large.

**Informed Consent:** Informed written consent was obtained from the patient for this study.

**Conflict of Interest:** The authors declare that they have no conflict of interest for this study.

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