A rare case of hepatocellular carcinoma with right atrial invasion

A 67-year-old man presented with loss of appetite and weight loss for the past 3 months. On evaluation, prothrombin time (57.6 sec), activated partial thromboplastin time (42.4 sec), international normalized ratio (4.15) values were high and serum Alfa-fetoprotein was normal (1.5 ng/ml, range 0-7ng/ml). The patient was Hepatitis B positive.

**Imaging Findings:**

On USG (Fig. 1), the liver was enlarged with a heteroechoic rounded mass lesion in segment VII & VIII with necrotic areas within. Echogenic intraluminal lesion was noted in the upper third of hepatic segment of IVC with extension to the right atrium, where a lobulated mass of 6.5 x 4.5 cm was noted. Minimal ascites was also present.

CECT of abdomen & lower thorax (Fig. 2-5) was performed, which revealed a heterogeneously enhancing mass lesion in the liver with central areas of necrosis. The lesion showed extension into the inferior vena cava and the right atrium. Portal vein was dilated (16 mm) but patent. Few enlarged periportal lymph nodes were seen.

Ultrasound-guided fine needle aspiration from the liver mass revealed features of well-differentiated hepatocellular carcinoma. As the patient could not afford it and the diagnosis was established on CECT and FNAC, MRI was not performed.

The patient was given palliative treatment. Patient succumbed to the disease after 2 months.

**Discussion:**

Hepatocellular Carcinomas (HCC) commonly metastasizes to lung, bone, brain, and adrenal glands [1]. About 70% patients with HCCs have hepatic and portal vein invasion, but encroachment into the right atrium is very rare. [5]

The formation of the right atrial embolus has a growth process. Firstly, the tumour perforates the wall of the hepatic veins and/or inferior vena cava, then the tumour extends into the lumen of the vein and grows within. The tumour in the lumen can grow upward and/or downward, and if it grows upward it may get into the right atrium (RA) and continues its slow growth there [2]. Isolated cardiac metastases that are discontinuous with an intrahepatic HCC are extremely rare. Cardiac metastases are notably located in the right ventricle (RV), RA and left ventricle (LV) [3].

Virtually all reported cases of HCC with intracaval invasion have pre-existing liver cirrhosis and/or at least one classical risk factor for HCC as in our case.

The symptoms may be insignificant, such as lower leg oedema resistant to diuretic therapy, or asymptomatic patients might be incidentally diagnosed during surveillance abdominal imaging with chest extension. Typical
complications of intravascular tumour extension leads to secondary Budd-Chiari syndrome, right heart insufficiency, or massive pulmonary embolism secondary to detached tumour tissue or superimposed thrombotic material. [4]

The diagnosis of HCC is typically reached by radiological liver imaging without need for biopsy, especially in patients with cirrhosis or chronic hepatitis B infection. Revised AASLD guidelines for diagnosing HCC do not require elevation of AFP > 200 ng/mL, as it is observed that there are significant false-positives (in cirrhotic patients) and false negatives [1]. Our patient had an underlying hepatitis B infection and all the typical radiological features of HCC, and normal AFP values.

The prognosis of HCC with atrial invasion is poor, with median survival ranging from 1 to 4 months. The risk for cardiopulmonary collapse is higher, with heart failure or sudden death. [6]

Surgical interventions such as en bloc hepatectomy and resection of the RA thrombus under cardiopulmonary bypass, as well as nonsurgical approaches, like transcatheter arterial chemoembolisation and radiotherapy, have been used in the treatment of patients with symptomatic IVC/Right atrial tumour thrombi [5].

**Differential Diagnosis List:** Hepatocellular carcinoma with right atrial metastasis., Hepatic sarcoma with right atrial invasion, Renal cell carcinoma metastasizing to the right atrium via the inferior vena cava

**Final Diagnosis:** Hepatocellular carcinoma with right atrial metastasis.

**References:**


Hong-Yan Cheng, Xiao-Yan Wang, Guo-Li Zhao, Dong Chen (2008) " Imaging findings and transcatheter arterial chemoembolization of hepatic malignancy with right atrial embolus in 46 patients". World J Gastroenterol June 14; 14(22): 3563–3568 (PMID: 18567087)


Figure 1

Description: USG abdomen shows hepatic mass invading IVC and right atrium. Origin: Department of Radiodiagnosis, father Muller Medical College, Mangalore, India
Description: NECT axial section showing heterodense lesion in liver and similar lesion in the right atrium. Origin: Department of Radiodiagnosis, Father Muller Medical College, Mangalore, India
Figure 3

Description: CECT axial section showing heterogeneously enhancing mass lesion in liver with central areas of necrosis (black arrow) and similar lesion in the right atrium (white arrow). Origin: Department of Radiodiagnosis, Father Muller Medical College, Mangalore, Indial
Description: CECT coronal reformatted image showing heterogeneously enhancing mass lesion in liver (white arrow), similar lesion in the right atrium (black arrow). Invasion of hepatic vein and IVC (white open arrow). Origin: Department of Radiodiagnosis, Father Muller Medical College, Mangalore, India
Description: CECT MIP axial images showing arterial (black arrow) supply from right hepatic artery to the mass lesion in the liver (white arrow). Origin: Department of Radiodiagnosis, Father Muller Medical College, Mangalore, India.