

Rare Case of Hepatocellular Carcinoma Invading the Right Atrium

Sir,

A cardiac tumor is a rare entity and classified into primary and secondary, with secondary tumors occurring more frequently. A malignant tumor from any organ in the body may disseminate into the heart, especially the right atrium, by nodular embolus and rarely by direct invasion. As we know, hepatocellular carcinoma (HCC) has a tendency to spread into the venous system, but intracardiac involvement is considered extremely rare with an extremely poor prognosis.^[1-6] These patients often exhibit symptoms of heart failure owing to flow obstruction or thromboembolism upon diagnosis.^[6]

An 82-year-old man presented to the emergency department with jaundice, bilateral lower limb edema and dyspnea of 2 weeks' duration. There was no history of alcohol ingestion or cardiac and pulmonary disease. His vital signs were within normal limits. On physical examination, the patient was jaundiced, ill-looking, had a distended abdomen with engorged superficial veins and a gallop rhythm was detected on auscultation.

Biochemistry results were as follows: white blood cell count - $10.74 \times 10^9/L$, hemoglobin - 123 g/L, platelets - $188 \times 10^9/L$, INR - 1.4, activated partial thromboplastin time

- 44.1 s, prothrombin time - 17.1 s, urea - 4.6 mmol/L, creatinine 99 - $\mu\text{mol/L}$, estimated glomerular filtration rate >60 - ml/min/ 1.73 m^2 , potassium - 4.5 mmol/L, sodium - 127 mmol/L, chloride - 93 mmol/L, bilirubin - 39 $\mu\text{mol/L}$, alanine transaminase - 24.7 U/L, aspartate aminotransferase - 32.4 U/L and alpha-fetoprotein - 258.3 $\mu\text{g/L}$. Other tumor markers, cardiac enzymes and results from hepatitis screening were within normal limits. The electrocardiogram revealed normal sinus rhythm. The chest and abdominal X-rays were normal. An ultrasound showed right hepatic lobe hepatoma at segments 6 and 7 with a tumor extension into the inferior vena cava (IVC) and right atrial mass lesion. An urgent computed tomography (CT) scan abdomen [Figures 1–3] was requested and showed hepatoma at segments 6 and 7 invading the right hepatic vein as well as the confluence of the IVC extending into the right atrium of the heart with small ascites with no splenomegaly or other metastasis. Early arterial enhancement with washout in delayed phases is consistent with infiltrative HCC. An ultrasound of the abdomen [Figure 4] showed a cirrhotic liver with mass in segments 6 and 7 extending into the right portal vein and right hepatic vein into the IVC and right atrium. Ultrasound-guided fine needle aspiration revealed an HCC. An echocardiogram showed sinus rhythm with a large mass noted in the right atrium occupying most of the cavity and extending into IVC with flow obstruction. The patient was admitted and supportive measures commenced, including the consultation of an oncologist. Unfortunately, there was no treatment available as the

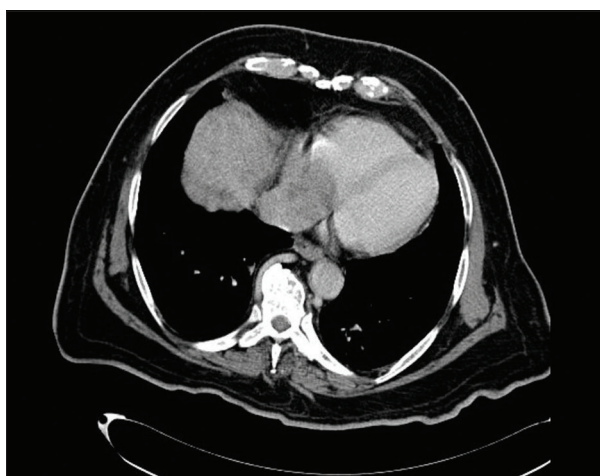


Figure 1: This is an axial plane of Computed tomography scan abdomen that showed hepatoma at segments 6 and 7 invading the right hepatic vein as well as confluence of the inferior vena cava extending into the right atrium of the heart with small ascites with no splenomegaly or other metastasis

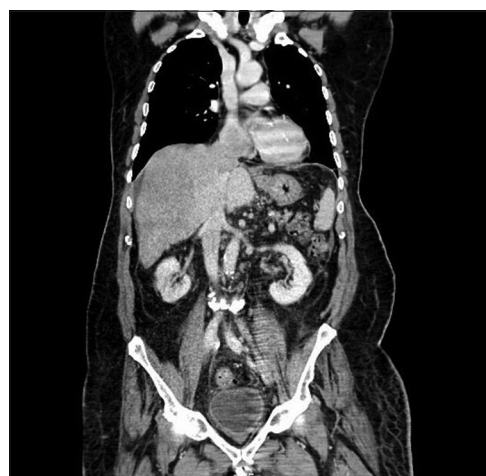


Figure 2: This is a coronal plane of Computed tomography scan abdomen that showed hepatoma at segments 6 and 7 invading the right hepatic vein as well as confluence of the inferior vena cava extending into the right atrium of the heart with small ascites with no splenomegaly or other metastasis

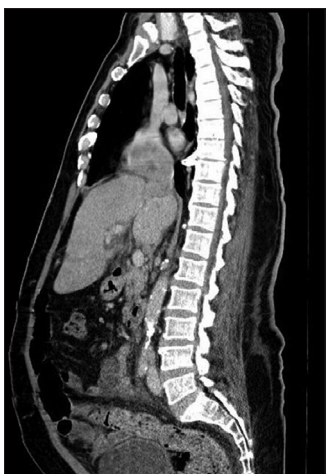


Figure 3: This is a sagittal plane of Computed tomography scan abdomen that showed hepatoma at segments 6 and 7 invading the right hepatic vein as well as confluence of the inferior vena cava extending into the right atrium of the heart with small ascites with no splenomegaly or other metastasis

disease was at an advanced stage and the patient was not a candidate for Kutapressin. The patient was advised of the findings and within 2 days his condition rapidly deteriorated. He suffered from a cardiac arrest from which he did not recover.

HCC has a tendency toward venous invasion; however, an extension of metastatic HCC into the right atrium has been rarely reported. The most common mechanism of intracardiac involvement from HCC is via direct invasion through the IVC into the right atrium into through a patent foramen ovale. A screening examination using trans-esophageal echocardiogram in HCC patient showed the prevalence of subclinical cardiac metastasis to be as high as 11%.^[7] The majority of patients are asymptomatic, but some may present with lower leg edema and exertional dyspnea.^[8]

The median and mean survival time from the time of diagnosis of cardiac metastasis were 102 and 161 days, respectively.^[8] Recent reports suggest aggressive treatments may prolong patient survival. Transcatheter arterial chemoembolization therapy has been challenged with HCC and venous invasion. Chern *et al.* demonstrated in their series of 26 patients with HCC and IVC invasion that transarterial chemoembolization TACE resulted in a 53.8% response rate with a median of 13.5 months survival among the responders. Notably, five patients with right atrium involvement all responded to TACE therapy. Three patients responded to this treatment (60%), and one patient survived for approximately 6 years.^[9] Although surgical intervention has been used, such therapeutic



Figure 4: Abdomen ultrasound showed cirrhotic liver with mass in segments 6 and 7

modalities are usually not feasible when a patient shows a poor general performance.

In conclusion, such cases alert us to consider cardiac metastasis in patients presenting with unexplained cardiac symptoms with a background of chronic liver disease. Once diagnosed, the early involvement of surgeons and interventionists is advised.

Learning points:

1. This case should alert the emergency physicians that HCC with cardiac metastasis should be considered in patients with a history of chronic hepatic disease present who present with unexplained cardiac symptoms, such as exertional dyspnea, orthopnea and bilateral lower leg edema
2. Keeping a low threshold for cardiac image surveillance is suggested
3. Early consultation of surgeons or intervention radiologists.

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Conflicts of interest

There are no conflicts of interest.

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