

# Inferior vena cava and intra-cardiac invasion of hepatocellular carcinoma: a rare but catastrophic complication

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### SUMMARY

**Intra-cardiac extension of hepatocellular carcinoma (HCC) is an uncommon but serious condition related to poor prognosis. We report a 57-year-old male diagnosed with HCC with intra-cardiac extension into the right atrium at presentation. There were no symptoms related to cardiac involvement and intra-cardiac extension was incidentally noted on radiological imaging. He was offered palliative treatment and succumbed to his disease within 50 days of first diagnosis.**

### KEY WORDS:

*Intra-cardiac involvement; hepatocellular carcinoma; inferior vena cava*

### INTRODUCTION

Hepatocellular cancer is a common cancer in the developing countries with number on the rise owing to increasing prevalence of Hepatitis B and C. Current effective treatment for HCC includes transarterial chemoembolization (TACE), radiofrequency ablation (RFA) or surgical hepatectomy with chemotherapy. There are certain conditions that offer unresectable or poor resectable status to HCC and intra-cardiac involvement is one such condition.

### CASE REPORT

A 57-year-old male presented with diarrhoea for one to two weeks associated with abdominal bloating and loss of appetite. He provided a history of drinking five bottles of beer per day for five years in the past and of smoking cumulating to 40 pack years. There was no history of chest pain, shortness of breath or paroxysmal nocturnal dyspnoea. On examination, his heart rate was 107/min with normal rhythm and the blood pressure 126/72 mmHg. There was no pallor, icterus or pedal oedema. Palmar erythema and spider naevi were present. The cardiovascular examination was unremarkable. The liver was enlarged on examination (two cm below the mid-clavicular line) and ascites was present. Laboratory investigations demonstrated transaminases with elevated gamma glutamyl transferase (GGT) and alkaline phosphatase (ALP). The hepatitis B virus surface antigen was positive. The level of alpha fetoprotein (AFP) at the time of presentation was 1.2 µg/L.

A contrast-enhanced contrast scan (CECT) of the abdomen and pelvis was performed to investigate source of sepsis. The

CECT demonstrated areas of arterial heterogeneous enhancement with washout within segments 4, 5 and 8 of the liver worrisome for hepatocellular carcinoma. Note was made of distension of the inferior vena cava (IVC) with heterogeneous enhancement within it suggesting extension of HCC within the IVC. This was continuous with a lobulated hypodensity within the RA indicating intra-cardiac involvement.

A contrast-enhanced magnetic resonance imaging (MRI) of the liver confirmed extensive hypervascular tumour within the segments 4, 5 and 8 with tumour thrombus extending via the middle hepatic vein into the IVC and RA. Subscapular patches of venous phase hypo-enhancement in segments 5 and 7 suggested microscopic peripheral portal venule thrombi resulting in areas of portal hypo-perfusion. A long, non-enhancing thrombus was also seen in the left portal vein.

In view of its extension into the IVC and RA, the HCC was deemed un-resectable and the patient was started on Sorafenib 200mg which was discontinued in a few weeks due to its hepatotoxic effect.

Comfort palliative measures and supportive care were provided till the patient's demise.

### DISCUSSION

Hepatocellular carcinoma is the most common primary tumour of the liver. Although HCC usually metastasizes to regional lymph nodes, lung, or bones, it can also invade major local blood vessels with intravascular extension.<sup>1</sup> This usually occurs with involvement of hepatic or portal veins with further involvement of IVC and RA with reported frequency of 2% in various series. In a study of 439 autopsied cases of HCC, intra-atrial tumour was found in 18 cases with continuous tumour thrombus involving the hepatic vein, IVC and the RA in 15 cases. Five cases demonstrated extension of tumour thrombus into the right ventricle across the tricuspid valve.<sup>2</sup>

Cardiac metastases can occur as a contiguous extension of tumour thrombus from the HCC via the IVC, the other routes being haematogenous or lymphatic spread. Solitary cardiac metastases remote from intrahepatic HCC are extremely rare.

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Patients with cardiac involvement in HCC can either be asymptomatic or present with disastrous complications of sudden death syndrome owing to a ball-valve thrombus syndrome. Bilateral lower limb oedema as seen in 37.5% and exertional dyspnoea in 31.3% are other presentations.<sup>3</sup> Other cardiac symptoms such as sudden dyspnoea and dilatation of the jugular veins can be seen in patients with intra-cardiac involvement in HCC.

Cardiopulmonary complications including tricuspid stenosis or insufficiency, ventricular outflow tract obstruction, secondary Budd-Chiari syndrome, pulmonary embolism as well as pulmonary metastases increase the risk of cardiopulmonary collapse.

CECT of the liver is performed for staging of HCC and intra-cardiac metastases may be encountered such as in our case. However, the superiority of trans-oesophageal echocardiography (TEE) in early detection of subclinical cardiac metastases as demonstrated by Tse et al. in 1996 showed the prevalence of cardiac metastases to be as high as 11%.<sup>4</sup> The prevalence of RA involvement in HCC patients is reported to be 2.4-6.3%.

The prognosis of HCC with intracardiac involvement is grave with a median survival range of 1 to 4 months and very few patients are suitable candidates for local surgery. The risk for cardiopulmonary collapse remains high and is related to heart failure, sudden cardiac death and pulmonary embolism.<sup>5</sup>

## CONCLUSION

In conclusion, this case report alerts physicians and radiologists to HCC patients with IVC and cardiac extension which is rare bearing a grave outcome. Cardiac involvement may not be clinically apparent, as in the case presented and a screening TTE may facilitate earlier detection and treatment.

## REFERENCES

1. Chang JY, Ka WS, Chao TY, Chuang TR, Chen LT. Hepatocellular carcinoma with intra-atrial tumour thrombi. A report of three cases responsive to thalidomide treatment and literature review. *Oncology* 2004; 67(3-4): 320-6
2. Kojiro M, Nakahara H, Sugihara S, Murakami T, Nakashima T, Kawasaki H. Hepatocellular carcinoma with intra-atrial tumour growth. A clinicopathologic study of 18 autopsy cases. *Arch Pathol Lab Med* 1984; 108(12): 989-92.
3. Liu YC, Ho YL, Huang GT, Chen DS, Sheu JC, Chen CH. Clinical manifestations and survival of patients with hepatocellular carcinoma and cardiac metastasis. *J Gastroenterol Hepatol* 2010; 25 (1): 150-5.
4. Tse HF, Lau CP, Lau YK, Lai CL. Transesophageal Echocardiography in the Detection of inferior vena cava and cardiac Metastasis in hepatocellular carcinoma. *Clin Cardiol* 1996; 19(3): 211-3.
5. Sung AD, Cheng S, Moslehi J, Scully EP, Prior JM, Loscalzo J. Hepatocellular carcinoma with intracavitary cardiac involvement: A case report and review of the literature. *Am J Cardiol* 2008; 102(5): 643-5.