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Case Report

Hepatocarcinoma Revealed by Echocardiography: Discovery of a Neoplastic Thrombus in the Inferior Vena Cava and its Extension into the Right Atrium

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Abstract

Introduction: Hepatocellular carcinoma (HCC) is a primary tumor of the liver that develops in the setting of chronic liver disease with extrahepatic metastases present at the time of diagnosis in approximately 10 to 15% of cases. Cardiac involvement of HCC is rare and mostly explained by vascular invasion and direct extension in the right atrium (RA) via the inferior vena cava (IVC)

Case Presentation: A 64-year-old man with history of chronic liver disease was found to present a mass in the RA originating from the IVC and the hepatic veins during echocardiography. The assessment of the cardiac mass led to the diagnosis of a HCC

Discussion: Diagnosis of HCC by revelation of a cardiac metastasis during echocardiography is rare. In a specific clinical context, echocardiography may guide the clinician towards the diagnosis of cardiac metastasis, especially if vascular invasion of the hepatic veins and/or of the IVC is observed

INTRODUCTION

Cardiac tumors are classified into benign tumors (with myxoma being predominant in adults, and rhabdomyoma in children) and malignant tumors. Metastatic cardiac involvement is more common than primary malignant cardiac tumor (representing only 15% of primary cardiac tumor) [1] and usually results from metastatic hematogenous dissemination and less frequently from direct extension into the right atrium through the inferior vena cava [2].

The diagnosis of the metastatic tumor requires complementary information from multimodality cardiac imaging such as echocardiography (TTE and TEE), cardiac magnetic resonance imaging (CMR) and cardiac computed tomography (CCT) [3].

With the present case report of multifocal hepatocarcinoma revealed by echocardiography with a neoplastic thrombus in the IVC and its extension into the RA, we highlight the major role that echocardiography plays in the assessment of cardiac tumor.

CASE PRESENTATION

A 64-year-old man, with reported history of alcoholic liver cirrhosis Child Pugh B, was referred by his gastroenterologist to the echocardiography laboratory for exertional dyspnea in order to rule out hepatopulmonary syndrome. There was no history of orthopnea, palpitations or chest pain. Medical history included esophageal variceal ligation and Helicobacter Pylori gastric ulcers.

Transthoracic echocardiogram (TTE) revealed a multilobed, hyperechogenic mass (35 x 13 mm) in the right atrium, originating from the inferior vena cava and the hepatic veins (Figure 1). The right ventricle was of normal size, with normal left and right systolic function and no significant valve pathology. The mass was originally suspected as a thrombus versus cardiac tumor.

The patient was promptly admitted to the cardiology department for assessment of the mass. On physical examination, hepatomegaly and bilateral ochre dermatitis was observed. His eletrocardiogram revealed sinus tachycardia at 104 bpm with no other associated abnormalities.

His laboratory findings were as follows: haemoglobin 8,4 g/dl (13-18); platelets 114 000 x10^3/mm^3 (150-440); alkaline phosphatase 193 U/L (40-129); gamma-glutamyltransferase 246 U/L (10-71); aspartate aminotransferase 41 U/L (< 40); serum alpha-fetoproteine 3,7ug/L (< 7); NT pro BNP 41 pg/ml (< 300).

A transoephagian echography (TEE) was performed, showing a bilobular, non-pedonculated, echogenous mass (40x 21 mm) at the start of the IVC, protruding into the right atrium, compatible

with a tumor versus a thrombus and independent of the tricuspid valve (Figure 2).

Cardiac and liver magnetic resonance imaging (MRI) revealed a left multifocal hepatocarcinoma of 10.5 cm within the segment III with macrovascular invasion -by a neoplastic thrombi- extending via the left suprahepatic vein into the IVC and RA (Figure 3).

The patient was transferred to the gastroenterology department. Given the tumor vascular extent, it was deemed unresectable and treated by a double immunotherapy (Durvalumab and Tremelimumab). Six months later and after eight courses of immunotherapy, the tumour was iconographically stable on the abdominal CT scan follow-up. Control TTE's showed a slight reduction in the neoplastic thrombus in the right atrium (23 x 15mm).

DISCUSSION

Cardiac involvement of HCC is rare and is mostly explained by vascular invasion of a neoplastic thrombus in the hepatic veins and by its contiguous extension through the IVC into the RA. Other reported secondary tumors known to invade the cardiac chambers through the IVC are renal cell carcinoma, leiomyomatosis, Ewing s sarcoma and pheochromocytoma [4-7].

Diagnosis of HCC is usually late because of the absence of symptoms in patients with early disease and extrahepatic metastases are present at the time of diagnosis in approximately 10 to 15% of cases - the most common sites being the lung, intra-abdominal lymph nodes and bone [8].

Autopsy series report vascular involvement of the IVC and of the RA in 9 to 26%, and in 2.4% to 6.3% of cases of HCC,

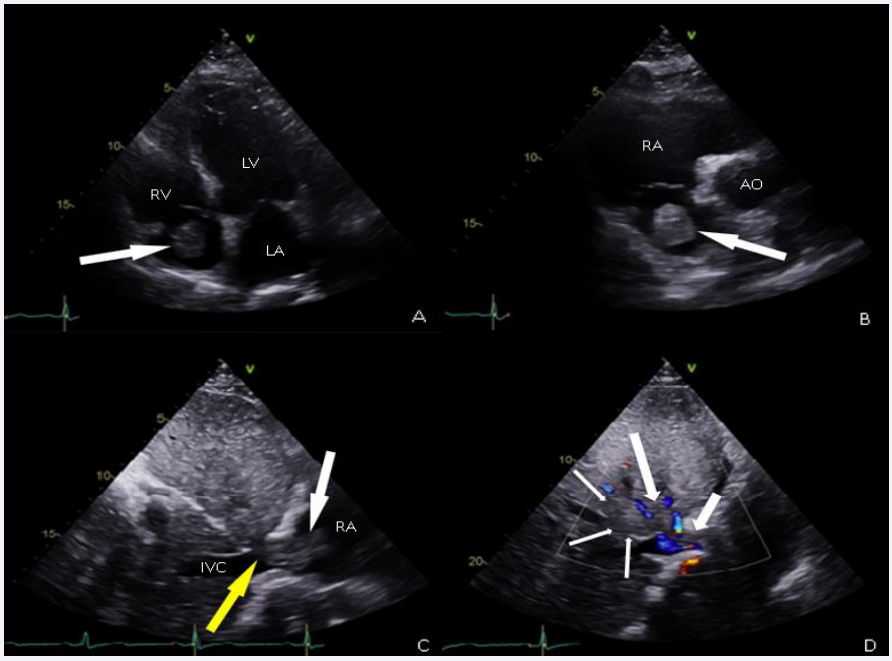

Figure 1 Two-dimensional transthoracic echocardiography. Apical four chamber view showing right atrium mass (white arrow) (A); Parasternal short axis view reveals the mass independent from the tricuspid valve (white arrow) (B); Subcostal 4 chamber view shows mass extending through the inferior vena cava (yellow arrow) in the right atrium (white arrow); (C) Color doppler in subcostal four chamber shows infiltration in the hepatic veins (white arrows) (D)

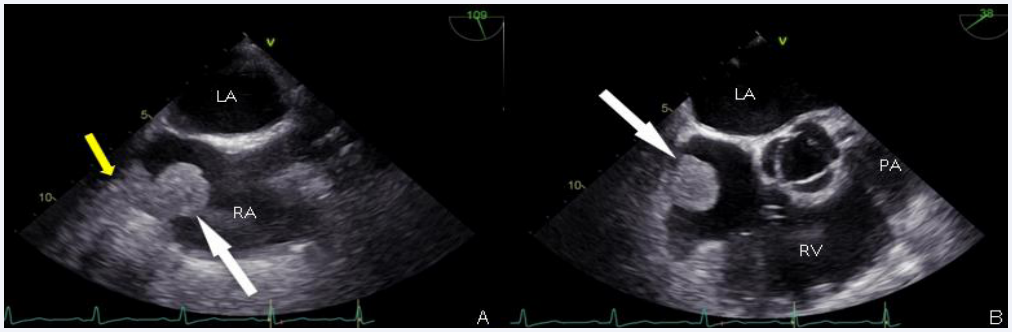

Figure 1 TEE shows mass in the inferior vena cava (yellow arrow) extending in the right atrium (white arrow)

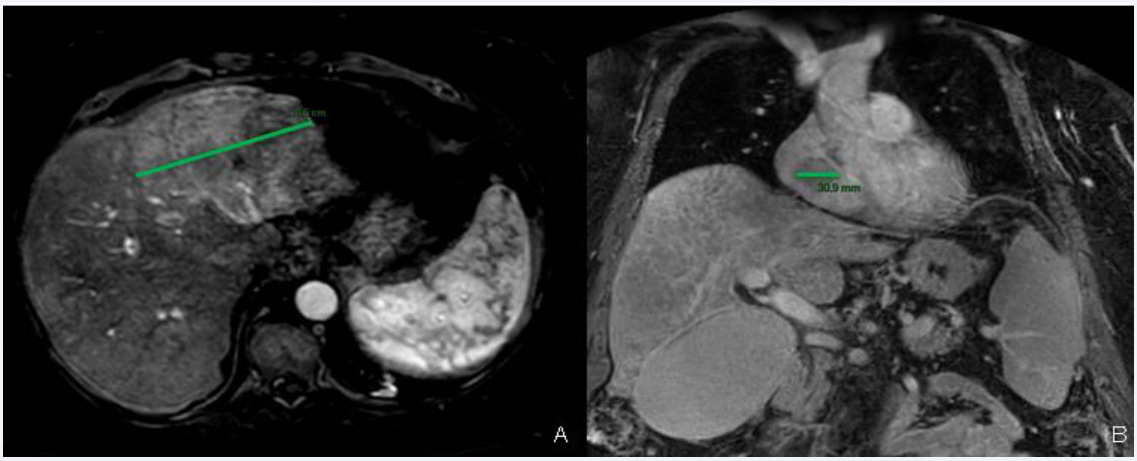

Figure 3 Upper abdomen MRI showing hepatocarcinoma of segment III of 10.5 cm (A); and cardiac metastasis in the right atrium (B)

respectively [9]. Solitary cardiac metastases remote from intrahepatic HCC are extremely rare (18 cases) [10].

Patients can either be asymptomatic or present with signs and symptoms of right-sided heart failure such as dyspnea (in 31.3% of cases - as seen in our case, and bilateral lower limb oedema in 37.5% of cases [10]. Other complications include those of portal hypertension, tricuspid valve insufficiency, ventricular outflow tract obstruction, secondary Budd–Chiari syndrome, and massive pulmonary thromboembolism [10].

In regard to isolated metastasis, Kawakami et al., found that those were detected by CCT in 23.5% of cases and by TEE in 58% of cases [11,12]. Concerning cardiac involvement of the right chambers through the IVC, most cases are diagnosed using multimodality imaging in patients with reported history of HCC. Some cases are described to reveal the HCC with the cardiac mass mostly with MRI and CT and less frequently with TTE

Our case report illustrates the usefulness of a straightforward and non invasive evaluation by means of a two-dimensional echocardiography, as a first diagnostic approach in the workup of a cardiac mass. It depicted the aspect and the location of the mass, which can help orientate the diagnosis (metastasis being more prevalent in right atrium compared to thrombus in the left atrium) [13]. TEE with its better resolution confirmed the presence of a RA tumor originating from the IVC. Given the clinical context, with the past medical history of chronic liver disease of the patient, and the location of the mass in the right atrium, originating from the IVC and from the hepatic veins, HCC was suspected. MRI revealed the primary tumor in the liver

Untreated, patients with HCC and cardiac metastasis have a poor prognosis, with a median survival of 1 to 4 months [12]. There is currently no established standard treatment for cardiac metastatic HCC. Surgical resection of primary tumour and tumor thrombosis, TAE, transcatheter arterial chemoembolization (TACE), and radiotherapy have been described. In a retrospective study, Yi Wang and al. showed that patients treated with surgery had a better median survival time compared to patients treated with TACE (19 months vs. 4.5 months) [14]. However, such therapeutic modalities may not be feasible especially if the patient has a poor general performance, metastatic disease or underlying hepatic dysfunction, as depicted in our case

CONCLUSION

Two-dimensional echocardiography remains the primary non -invasive diagnostic tool for the assessment of intracardiac masses. It may help in the diagnosis of cardiac metastasis of hepatocarcinoma, particularly when invasion of the inferior vena cava and/or of the hepatic veins is visualized. Multimodal imaging is however necessary for final diagnosis.

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