

AN UNUSUAL CAUSE OF PROGRESSIVE DYSPNOEA: HEPATOCELLULAR CARCINOMA WITH A METASTATIC MASS IN THE RIGHT ATRIUM - A CASE REPORT AND REVIEW OF LITERATURE

Amusa GA, Uguru SU, Idoko PO, Onuh JA, Okeahialam BN

Cardiology Unit, Department of Internal Medicine, Jos University Teaching Hospital, P.M.B. 2076, Jos, Nigeria.

Correspondence: Ganiyu A. Amusa

E-mail: drganiyamusa@gmail.com

CASE REPORT

A 51-year-old woman presented to the Cardiology Clinic with a 2-week history of dyspnoea which initially occurred on moderate exertion but had progressed to occur at rest. This was associated with recurrent cough, palpitations, chest pain, orthopnoea, paroxysmal nocturnal dyspnoea and progressively increasing bilateral leg swelling. There was also an associated history of recurrent right upper quadrant abdominal pain and swelling which was associated with anorexia and early satiety.

On examination, she was pale, anicteric, had mild bilateral pitting pedal oedema and peripheral stigmata of chronic liver disease. Her pulse rate was 106 beats per minute, small volume with multiple ectopics. Blood pressure was 106/70 mmHg, jugular venous pressure was raised. Her apex beat was palpated at the 6th left intercostal space, anterior axillary line. Heart sounds were 1st, 2nd (with a loud pulmonary component) and 3rd. A grade 3/6 apical pansystolic murmur was also heard. Fine crepitations were heard in the right lower zone of her chest posteriorly. Her liver was palpable 8 cm below the right costal margin. It was hard, nodular and tender.

Blood serologic tests revealed positive hepatitis B virus (HBV) surface antigen. HBV envelope and core antibodies were also positive. Hepatitis C virus (HCV) antibody was negative. Alpha-fetoprotein level was 340 ng/mL (normal: <10 ng/mL). Abdominal ultrasound scan showed an enlarged liver with multiple heterogeneous lesions of varying sizes especially in the left lobe with the largest measuring 6.2 x 5.7 cm² (Figure 1). Fibroscan done revealed severe fibrosis. Echocardiography done showed a mass in the right atrium measuring 15 x 15 cm which protruded through the tricuspid valve with each heartbeat (Figure 2). Electrocardiography done showed sinus tachycardia. Chest x-ray done did not show evidence of lung metastases (Figure 3). Packed cell volume was 35% and platelet count was 274,000 cells/mm³. Her international normalized ratio was 1.6.

She was managed as an out-patient in the clinic in conjunction with the gastroenterologists and did well for a while. She however presented 3 months later with symptoms of hepatic decompensation (and new symptoms of constipation and pruritus) and was admitted into the ward. Chest x-ray done at that time showed multiple cannonball opacities in the lung fields (lung metastases). She was managed conservatively and subsequently died.



Figure 1: Abdominal ultrasound scan showing a large mass in the left lobe of the liver.

Figure 2: 2-D echocardiography (apical 4-chamber view) showing a mass in the right atrium.

(a). At Presentation



(b). Three months later (shortly before her demise; showing an increase in the size of the mass).



Figure 3: Chest x-ray.



(a). At presentation.



(b). Three months later

Discussion

Hepatocellular carcinoma (HCC) is the most common primary cancer of the liver and has a survival of <5% at 5 years¹. HCC is one of the leading causes of cancer mortality in the world. The highest incidence rates are in developing countries where infection with HBV is common. Worldwide, the prevalence of HCC is estimated to be about 180 million people and the incidence continues to rise annually². The majority of HCC arises from viral hepatitis. In the United States, 16% of HCC are attributed to HBV and 48% to HCV. HBV-related HCC, tends to develop 25 – 30 years after chronic infection³.

The common organs of metastasis from HCC are lung, bone, brain and the adrenals^{4,5}. Cardiac metastasis from HCC is however not common⁶. The reported incidence of metastatic involvement of the heart is about 10%^{7,8}. Such cardiac metastasis occur through the lymphatic system or by infiltration from adjacent organs such as the lungs and breasts. Therefore, cardiac metastases occur mainly in the pericardium and myocardium. Intracavitary cardiac metastasis or tumour invasion is an uncommon form of secondary cardiac malignancy. Metastasis to the right atrium if even less common (0.67 – 4.8%)^{9,10}. When the carcinoma grows from the hepatic vein into the right atrium, the right atrial tumour thrombus may hinder the flow of blood. Therefore, these patients have a risk of sudden death¹¹.

Metastatic invasion of the left atrium, left ventricle and pericardium is thought to be the result of the local progression of the primary lesion or by lymphatic invasion. Metastatic extension into the right cardiac cavities is usually haematogenous, along the inferior vena cava¹². Generally, malignant tumours of various organs and tissues, originating from all over the body, may disseminate to the right atrium (RA) by a nodular embolus and rarely by direct extension².

Various cardiac symptoms or findings such as dyspnoea, massive lower extremity oedema, dilatation of the jugular veins or sudden death are generally seen in HCC patients with intracardiac involvement^{13,14}. The prognosis of HCC with right atrial invasion is very dismal. Surgical resection, liver transplantation, transarterial chemoembolization, as well as systemic chemotherapy have been reported as various therapeutic modalities. Median survival is however around 2 – 20 months in spite of therapy^{15,16}.

In the past, antemortem diagnosis of right atrial tumour thrombi in patients with primary HCC was difficult. Echocardiography has now allowed easy detection of intracardiac tumour thrombi¹¹. When a right atrial mass is detected by echocardiography, the differential diagnosis can be oriented by the history of neoplastic disease or thrombophlebitis of the lower body. The degree of mobility of the mass is another feature which can contribute to the diagnosis. Myxomas, which are rarely located in the right atrium, are usually highly mobile. Thrombi can be mobile but can also be mural and fixed, while metastases are usually fixed¹⁷.

The site and type of attachment to the atrial walls also provide information as to the nature of the mass. Myxomas are generally pedunculated and attached to the interatrial septum, while metastases are usually largely adherent to the atrial walls, especially at the level of the vena cava. The echogenicity of the mass does not seem to be highly informative. Cardiac involvement should be suspected in all HCC patients and a screening transthoracic echocardiography may be done even in absence of any cardiac manifestations². Transoesophageal echocardiography may however be a more sensitive screening tool than transthoracic echocardiography¹⁸.

Tumour thrombus in the right atrium hinders blood flow. Therefore, abnormal cardiac sounds and murmurs may develop. When the tumour thrombus is mobile, this symptom is termed the ball-valve thrombus syndrome¹¹. Because of the high risk of sudden death from tricuspid valve obstruction in patients with mobile right atrial mass, prompt diagnosis and surgical intervention may prolong the patient's life. Despite progress in liver surgery, HCC with a tumour thrombus extending into the right atrium has been considered beyond the reach of resection. Although sporadic reports of successful diagnosis have been published, surgical removal has rarely been reported. These patients who have hepatoma with intracardiac invasion usually die within a short period because of pulmonary embolism, heart failure or cancer progression. There is however little doubt that prompt diagnosis and palliative surgical intervention would relieve suffering and prolong life^{11,19}.

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