

Right Atrial Mass Associated with Hepatoma

-2 Case Reports-

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Hepatoma has a tendency to spread into the venous system, but intracavitary cardiac extension or metastasis of hepatocellular carcinoma is an uncommon form of cardiac malignancy.

When the carcinoma grows from the hepatic vein into the right atrium, the right atrial tumor thrombus may hinder the blood flow. Therefore, these patients have the risk of sudden death.

In the past, antemortem diagnosis of right atrial tumor thrombi in patients with primary hepatocellular carcinoma was difficult. But, echocardiography allowed easy detection of the intracardiac tumor thrombi.

We describe two cases of hepatocellular carcinoma with right atrial tumor thrombi. In these cases, the right atrial tumor thrombi was detected by two-dimensional echocardiography.

Recently, successful surgical removal of the right atrial tumor thrombi are reported in several cases.

We advocate performing echocardiographic examination in patients with hepatoma who have cardiac symptoms and signs.

Key Words : *Hepatocellular carcinoma, Right atrial mass*

INTRODUCTION

Hepatocellular carcinoma has a tendency to spread into the venous system. Several reports have described malignant cardiac metastasis with hepatoma. The reported incidence of metastatic involvement of the heart is about 10%^{1,2)}. The most common site of cardiac metastasis is the pericardium³⁾. However, metastases occur rarely in the cardiac cavities.

These patients usually have a short life span because of pulmonary embolism, heart failure, or cancer progression. And the tumor thrombus can hinder the blood flow into the right atrium and ventricle⁴⁾. Therefore, early detection of intracavitary tumor thrombus and effective surgical resection are important factors of survival prolongation.

Herein we report an echocardiographic detection of the right atrial mass in two cases of hepatocellular carcinoma.

CASE REPORT

Case 1

A 61-year-old man, with a history of NIDDM ten years previously, was admitted due to epigastric pain, indigestion, and malaise. On admission, he had a regular pulse rate, was normotensive and relatively well-looking. There was no icterus, spider angioma, palmar erythema or cardiac murmur. Liver and spleen were not palpable.

Laboratory examinations showed serum transaminase (SGOT: 89 IU/L, SGPT: 33 IU/L, and GGT 105 IU/L). Blood count was normal. Abdominal ultrasonogram favored a hepatoma of the right lobe with a right hepatic vein thrombus (Fig. 1). Liver biopsy showed a poorly differentiated hepatocellular carcinoma (Fig. 2). The electrocardiogram was normal. Two-dimensional echocardiographic examination and transesophageal echocardiogram were performed, showing a large

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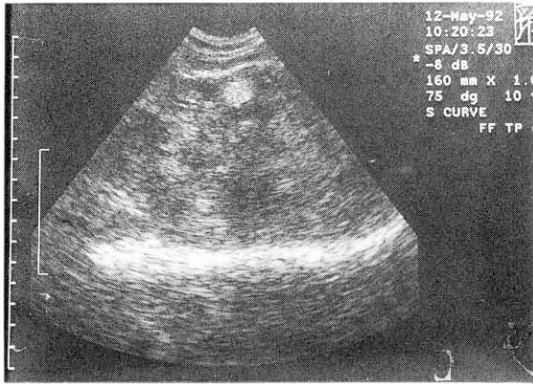


Fig. 1. Ultrasonography of the liver showing inhomogeneous mildly echogenic mass with well defined small echogenic nodules.

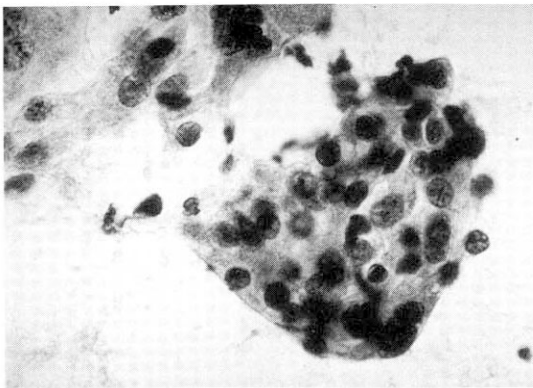


Fig. 2. Fine needle aspiration biopsy of the liver showing undifferentiated, large nucleated malignant cells. (Hematoxylin and eosin stain)

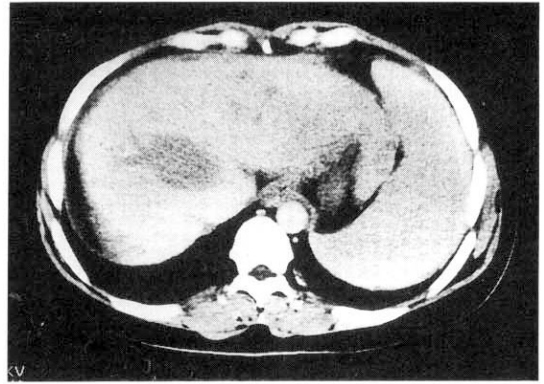


Fig. 4. Abdominal computed tomography showing ill-defined large inhomogeneous mass filling the entire right lobe of the liver.

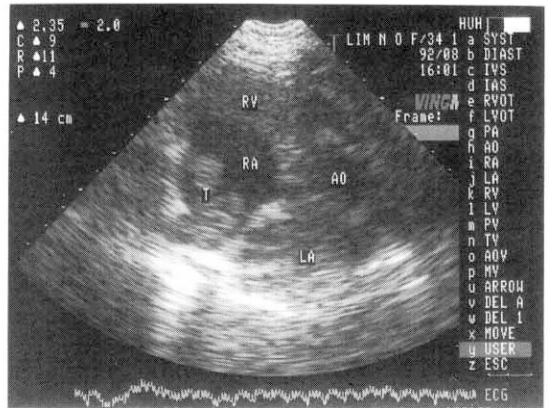


Fig. 5. 2-D echocardiography showing thrombus in the right atrium.

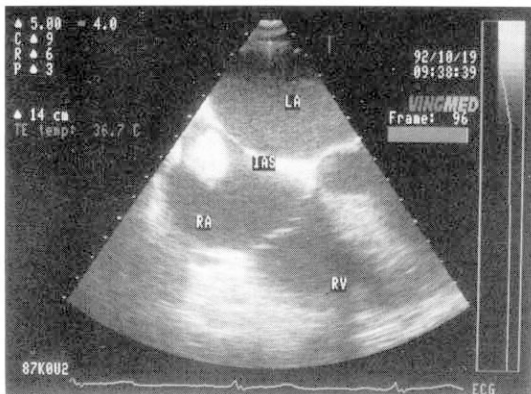


Fig. 3. Transesophageal echocardiography demonstrates 2.5×3.5cm sized mass in the right atrium.

right atrial mass(Fig. 3). The IVC had a tumor, which appeared to be continuous with the right atrial mass.

Hence, chemotherapy with 5-fluorouracil, adriamycin and mitomycin was started. The serial echocardiogram showed no significant change in the right atrial mass.

The patient expired 6 months later due to hepatic failure.

Case 2

The patient was a 34-year-old woman. One year prior to admission, she had began suffering from an abdominal fullness and weakness. Physical findings revealed a hard non-tender mass in the right upper quadrant.

Laboratory examinations manifested serum ALT of 391IU/L, serum AST of 341IU/L, alkaline

phosphatase of 279IU/L, gamma glutamyl transferase of 298IU/L, alpha-fetoprotein of more than 7000ng/ml and alpha 1-antitrypsin of 410mg/dl. Blood count was normal.

Abdominal computed tomography revealed an ill-defined large inhomogeneous mass filling the entire right lobe of the liver with underlying liver cirrhosis and tumor thrombus in the upper portion of the IVC and the right atrium (Fig. 4). The electrocardiogram was normal. Two-dimensional echocardiogram manifested thrombus in the right atrium (Fig. 5). She expired 4 months later.

DISCUSSION

There are several reports about secondary cardiac malignancy. Hepatoma, testicular teratoma and smooth muscle sarcoma may cause the right atrial tumor growth through the inferior vena cava^{1,5-7}. Especially, hepatocellular carcinoma is known for its tendency to grow in the venous system. Frequently, hepatoma extends into the portal vein or inferior vena cava. But, the most common sites of metastasis are the regional lymph nodes and the lungs⁹.

The incidence of metastatic involvement of the heart in hepatoma ranges from 1.5 to 18.3%². However, such cardiac metastasis occur through the lymphatic system or by infiltrating from neighboring organs, such as the lung and breast. Therefore, cardiac metastases occur mainly in the pericardium and myocardium. Intracavitary cardiac metastasis or tumor invasion is an uncommon form of secondary cardiac malignancy, and metastasis to the right atrium is even less common (0.67-4.8%)^{9,10}. A report by Hanfling showed that intracardiac tumor thrombus occur from above the pulmonary vein to the left cardiac cavities, and from below the superior and inferior vena cava to the right cavities². Tumor implantation to the right ventricle without right atrial involvement and extensive myocardial invasion is unusual in hepatoma. The left atrial involvement is probably related to tumor growth from the pulmonary veins following massive metastasis to the lung, direct invasion of the atrial septum or tumor implantation via subclinical right-to-left shunt through the patent foramen ovale. Lei et al. reported unusual patterns of cardiac metastasis in three cases of hepatocellular carcinoma: one patient was noted to have a large right ventricular tumor mass with intracavitary growth and myocardial invasion; the second had massive

pulmonary and left atrial metastasis; and the third patient had a right atrial tumor mass with concomitant right ventricular and left atrial involvement¹¹.

In the past, antemortem diagnosis of right atrial tumor thrombi in patients with primary hepatoma was difficult, and such cases were reported by angiography¹². Okuda described the angiographic findings of the right atrial tumor thrombi from the liver; thread and streak sign¹³. Recently, EKG-gated magnetic resonance imaging (MRI), computerized tomography (CT), transthoracic echocardiography and transesophageal echocardiography are available to detect the right atrial tumor thrombus from hepatoma. Transthoracic echocardiography can be considered the first step in case of suspected cardiac masses, but it is sometimes limited by the thoracic conformation and not always discriminant. The resolutive diagnosis is possible thanks to MRI. Therefore, MRI can be considered the second step in the imaging of cardiac masses. CT is limited by the only axial or para-axial scans with low quality reconstructions, worsened in these cases by respiratory and cardiac movements. Transesophageal echocardiography is semi-invasive, so esophageal varices were relative contraindication to transesophageal echocardiography. Chua and colleagues reported two cases of right atrial tumor associated with hepatoma diagnosed by two-dimensional echocardiography¹⁴. Molinari et al. reported that MRI compared to CT in the intracardiac spread of hepatocellular carcinoma¹⁵.

Tumor thrombus in the right atrium hinders the blood flow. Therefore, abnormal cardiac sounds and murmurs subsequently develop. When the tumor thrombus is mobile, this symptom is termed the ball-valve thrombus syndrome.

According to Kato, 3 percent (5 of 156) of hepatocellular carcinoma cases had right atrial metastasis, and these patients had edema in the legs, venous dilatation in abdominal wall, ascites, and dyspnea; secondary Budd-Chiari syndrome^{10,16}.

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, hepatocellular carcinoma with a tumor 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. Fujisak et

al. reported the removal of a tumor thrombus in the right atrium using cardiopulmonary bypass¹⁷⁾. Similar procedures have been carried out by Ehrlich¹²⁾, Hill and Hetzer¹⁸⁾, and Miller¹⁹⁾. The survival periods have ranged from 4 weeks to 1 year.

These patients who have hepatoma and intra-cardiac extending mass usually die within a short period because of pulmonary embolism, heart failure or cancer progression. There is little doubt that prompt diagnosis and surgical intervention relieved suffering and prolonged life.

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