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Cardiac

Right upper pulmonary vein metastasis from hepatocarcinoma

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ABSTRACT

Metastatic tumor involvement of the heart is uncommon but may occur with all types of primary neoplasms. We report the case of a 51-year-old male who developed a massive mass involving the upper right pulmonary vein. The tumor was removed and the final pathology report disclosed metastatic hepatocellular carcinoma. Hepatocellular carcinoma affecting the pulmonary veins is a very rare condition.

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Introduction

Cardiac tumors are rare and usually indicate metastatic disease. Heart metastasis usually arises from lung, blood (leukemia, lymphoma), breast, esophagus, renal cancer, and melanomas [1–3]. In cases of hepatocellular carcinoma (HCC) with cardiac involvement, the tumor has the tendency of extension into the venous system, such as to the portal vein, hepatic vein, and inferior vena cava (IVC). Right atrial extension from HCC is a usual condition, while a left atrial invasion is rare. Pulmonary vein involvement by metastasis from HCC is extremely

rare [2,4–6]. We report another rare case of right upper pulmonary vein (RUPV) metastasis from hepatocarcinoma, documented by computed tomography (CT) and magnetic resonance imaging (MRI).

Case report

A 51-year-old male was admitted to the hospital for routine control after liver transplantation. He had a history of heavy smoking, chronic hepatitis C and liver transplantation for

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Fig. 1 – Chest CT with contrast, showing a low density enhanced mass (arrow) in the left atrium and the RUPV. CT, computed tomography; RUPV, right upper pulmonary vein.

hepatocellular carcinoma on cirrhosis in 2013. Physical examination, blood analysis, brain and abdominal CT were normal. Chest CT revealed a low-density enhancing mass located in the left atrium involving the RUPV (Fig. 1). MRI with intravenous contrast showed a 3-cm lobulated mass in these locations and its signal characteristics (Fig. 2). The patient was evacuated to a European hospital. He underwent thoracotomy and atriotomy using cardiopulmonary bypass and cardiac arrest. The tumor completely adhered to the right superior pulmonary vein and was completely free inside the left atrium. Lung

parenchyma was not involved. The tumor and the vein were completely removed by right upper and middle lobectomy. Histologically the specimen was heterogeneous with white majority areas and blood foci (Fig. 3A). The lung had few anthracosis lesions but the pulmonary vein was enlarged containing a gray tumoral material (Fig. 3B). Immunohistochemical analysis (hepatocyte antigen was positive other tumor markers were negative) concluded to HCC (grade III of Edmondson-Steiner) with massive involvement of right pulmonary vein and its branches. Postoperatively, the patient had no major complication.

Discussion

Cardiac tumors are rare. Literature search revealed 0.0017%-0.19% of primary tumors and 10%-12% of metastasis in heart autopsy series [1,2,7,8]. Therefore, metastases are frequent in cardiac malignancy and are generally located on pericardium. They can occur with all types of primary neoplasm: lung, blood (leukemia, lymphoma), breast, esophagus, renal cancer, and melanomas [1,2]. Only 2% of secondary tumors arise from HCC. Here is the first case in our experience. The most common mechanism of intracardiac involvement from HCC is a direct extension of the tumor via the inferior vena cava into the right atrium. Left atrial metastasis is extremely rare and could occur by hematogeneous spread of HCC in the lung within the lumen of pulmonary veins into the atrium as in our case. Another possible way of spread is HCC's extension from the right atrium to the patent foramen ovale and left atrium [1,9-12]. Most

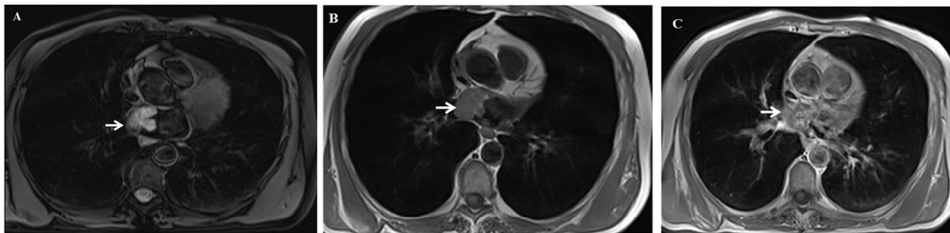


Fig. 2 – MRI in axial sequences showing the tumor in the right upper pulmonary vein (arrow). Fat-suppressed T2W demonstrated high-intensity mass (A) that appears with the same intensity to the muscles on T1W (B) and have heterogeneous enhancement on contrast T1W (C). MRI, magnetic resonance imaging.

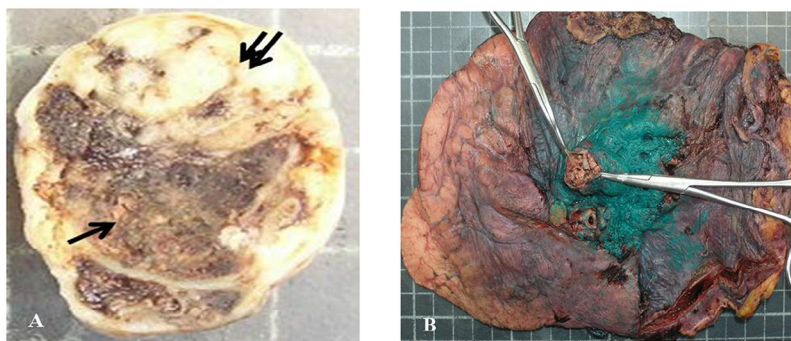


Fig. 3 – Macroscopic study. Regular blood material (arrow) and white appearance of the mass (double arrow) in A. Dilated pulmonary vein containing the tumor (between clamps) in B.

patients with cardiac metastasis are asymptomatic. According to Vignaux [1], cardiac function is altered only in 30% of cases because of pericardial effusion. In some rare cases the patient is received with dyspnea and cough.

Sonographic evaluation may reveal the intracavitary mass with echoic appearance and pericardial effusion. On CT imaging, cardiac metastasis is an intracavitary-enhanced mass with rarely some calcifications. The primary tumors may be also revealed. The characteristic MRI of heart metastasis include T1 hypointense (hyperintense in melanoma because of melanin properties), T2 hyperintense, and contrast enhancement with variable degrees [1,5,8]. In our case the tumor was isointense to muscles.

There is generally a dismal prognosis in cardiac metastasis because of cardiopulmonary collapse, heart failure, or sudden death in 25% [1,2,10].

Conclusion

We have reported a case of metastatic HCC extending into the left atrium via the pulmonary vein. Metastatic tumors exhibiting this type of spread are extremely rare. We believe that experience will increase rare case reports about this entity.

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