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## **Pulmonary Tumor Embolism in A Case of Hepatocellular Carcinoma**

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**To the editor:** Pulmonary tumor embolism as a presenting feature of hepatocellular carcinoma is rare. In most of the reported cases, it occurred from large proximal emboli by the extension of HCC to the inferior vena cava and right atrium or from multiple sub-segmental peripheral vascular emboli. We report an unusual case of HCC with pulmonary tumor embolism, which obstructed the main pulmonary artery despite the fact that main tumor did not extend to large veins. Furthermore, the patient had a symptomatic improvement after the interventional treatments.

A 27-year-old male who received treatment for HCC was admitted to our hospital due to upper gastrointestinal bleeding in April 2005. A computed tomography (CT) scan on admission revealed multiple intrahepatic HCC, but invasion to the major hepatic vein, inferior vena cava (IVC) or right atrium was not detected (Fig. 1A). After treatment for gastrointestinal bleeding, he was forced to rest in bed for a long period due to anemia and severity of the underlying disease. Two weeks after admission, he suddenly complained of chest pain and dyspnea. An emergency CT scan and pulmonary angiography revealed emboli in his left main pulmonary artery (Fig. 1B, C). Aspiration technique using a catheter was performed to remove the emboli and many red-to-white tissues admixed with the aspirated blood clot were found (Fig. 2A). After this procedure, the blood flow of the left pulmonary artery increased (Fig. 1D) and the patient showed symptomatic improvements within one day. Subsequent histopathological examination revealed that these tissues were components of moderate to poorly differentiated HCC (Fig. 2B).

Winterbauer *et al.* [1] reported that significant pulmonary tumor embolism occurred in 6 of 79 (7.6%) patients with HCC. Willett *et al.* [2] revealed a summary of autopsy findings in 5 cases of HCC with pulmonary tumor embolism. They reported that there were two types of pulmonary tumor embolism: large proximal emboli type and multiple microvascular emboli type. In the large proximal emboli type, HCC had obviously invaded the major hepatic vein or IVC and extended to the right atrium. On the other hand, microvascular embolization can occur even if there is no any extension of tumor into major veins. However, our case was different from those two types. The main pulmonary artery was occluded by large tumor emboli with no evidence of tumor extension into major

veins.

According to a recent review on the relationship between cancer and thromboembolism, malignant cells can activate blood coagulation by producing procoagulant activities or by releasing proinflammatory and proangiogenic cytokines or by interacting directly with host vascular and blood cells [3]. The pulmonary tumor embolism in our case is therefore thought to have been caused by a large amount of tumor cells and hypercoagulability related to prolonged bed rest. Aspiration with a catheter resulted in reduction of the sizes of the emboli, and patient showed a symptomatic improvement. It was possible that mechanically fractionized emboli might lodge in pulmonary peripheral vessels, but it seemed to be more life-threatening to leave the emboli. Therefore, we believe that this kind of interventional treatment is needed for patients with pulmonary embolism associated with hypercoagulability like our case.

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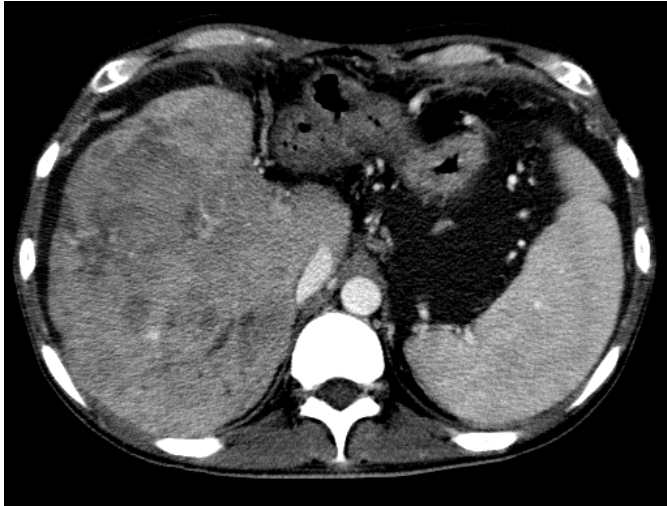
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## • FIGURE LEGENDS

**FIG. 1** (A) Venous phase of an abdominal CT scan showing intrahepatic multiple HCC located under the right lobe of the liver. (B) Chest CT scan showing embolism of the left main pulmonary artery. (C) Angiography of the left pulmonary artery showing low vascular flow before treatment (D) Chest CT scan showing improvement of the left pulmonary embolism after interventional treatment.

**FIG. 2** (A) Tissues aspirated with clot of blood. (B) Histology of these tissue showing moderately to poorly differentiated HCC.

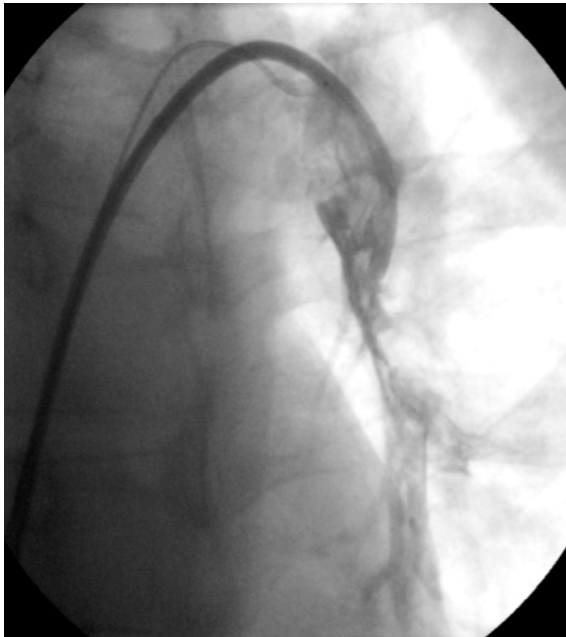
**A**



**B**



**C**



**D**



**A**



**B**

