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Case Report

상행대정맥 종양혈전을 동반한 재발성 간세포암 환자의 F-18 FDG PET/CT소견

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Detection of Superior Vena Cava Tumor Thrombus by F-18 FDG PET/CT in Recurrent Hepatocellular Carcinoma

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We report the case of a 64-year-old man with superior vena cava (SVC) syndrome due to tumor thrombus from recurrent hepatocellular carcinoma (HCC). He presented with new onset of facial swelling for 10 days. HCC was detected ten years ago. He has undergone repeated transcatheter arterial embolization (TAE) and chemotherapy. Chest computed tomography (CT) demonstrated tumor thrombus in the SVC extending to right atrium. He underwent whole body F-18 fluorodeoxyglucose(FDG) positron emission tomography/computed tomography (PET/CT) scanning for assessing the effect of TAE in HCC. F-18 FDG PET/CT showed increased uptake in the residual liver mass indicating viable tumor. There was another intense F-18 FDG accumulation in SVC extending to right atrium to suggest tumor thrombus. This case illustrates that F-18 FDG PET/CT is useful to identification of distant metastases as well as assessment of response to therapy in long-term survival HCC patients. (Nucl Med Mol Imaging 2006;40(5):271-274)

Key Words: superior vena cava syndrome, hepatocellular carcinoma, F-18 FDG PET/CT

Introduction

The sensitivity of F-18 FDG PET for the detection of primary liver tumor, hepatocellular carcinoma (HCC), was relatively low since F-18 FDG uptake is variable in HCC.[1)] However, F-18 FDG PET may have a valuable role in assessing the success rate of catheter embolization therapy.[2)] In addition, PET has the potential to detect unexpected metastatic sites in patients with HCC who accumulate F-18 FDG.[3)] Extrahepatic metastases of HCC were observed in long-term survival patients due to early detection of small HCC and the improvement in treatment of modalities.[4)]

We present a case of recurrent HCC with SVC syndrome due to tumour thrombus. F-18 FDG PET/CT demonstrated marked F-18 FDG uptake in tumor thrombus in SVC. This case illustrates the role of F-18 FDG PET for the detection of unexpected extrahepatic metastasis in long-term survival patients with recurrent HCC.

Case report

A 64-year-old male, received medial segmentectomy for HCC in his liver in 1997, presented with new onset of facial swelling for 10 days. The patient had previously undergone repeated TAE of recurrent HCC in S4 of the liver.

Physical examination revealed distended vein of neck

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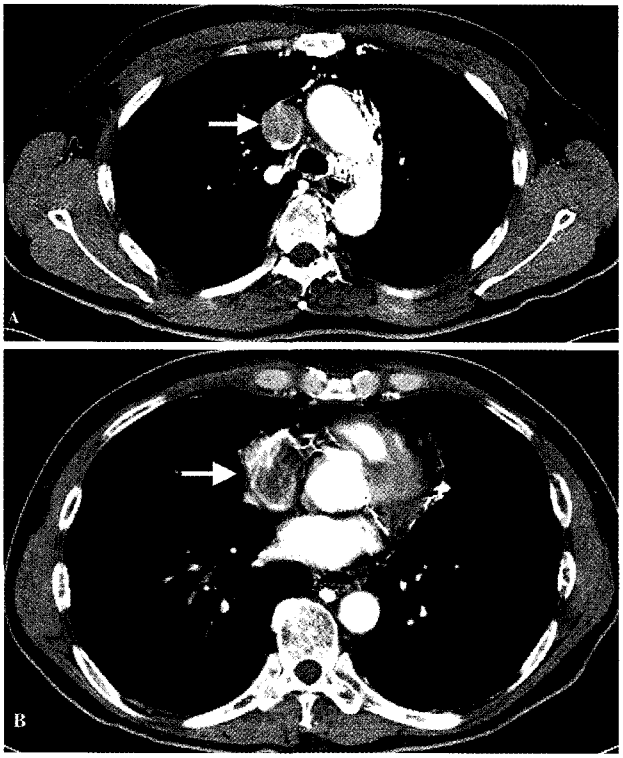

Fig. 1. (A) Axial image of CT scan in arterial phase demonstrated tumor thrombus (arrow) expanding the superior venous cava. (B) In right atrium, there was also tumor thrombus (arrow) which near totally obliterating chamber.

and anterior chest. He was not cyanotic. Blood-gas analysis showed PaO_2 of 76 mmHg (normal, 80-100 mmHg) and $PaCO_2$ of 33 mmHg (normal, 35-45 mmHg). Lung mass or widening of mediastinum was not seen in chest X-ray. Chest CT was ordered under suspicion of SVC syndrome. CT demonstrated widened SVC with thrombus extended to right atrium (Fig. 1A, B). SVC syndrome by tumor thrombus was impressed.

Abdomen CT was performed and revealed partially lipiodol uptaken mass in S4 of liver, suspicious for residual viable tumor (Fig. 2). There was no portal vein or hepatic vein invasion. To evaluate the viability of residual liver mass, F-18 FDG PET/CT was performed on a Siemens/Biograph Duo PET/CT scanner 60 minutes after intravenous injection of 15 mCi (555 MBq) of F-18 FDG in right lower leg. F-18 FDG PET /CT showed increased uptake in S 4 of the liver indicating viable tumor (Fig. 3).

There was another intense F-18 FDG accumulation in SVC extending to right atrium to suggest F-18 FDG uptake in tumor thrombus (Fig. 4A-C).

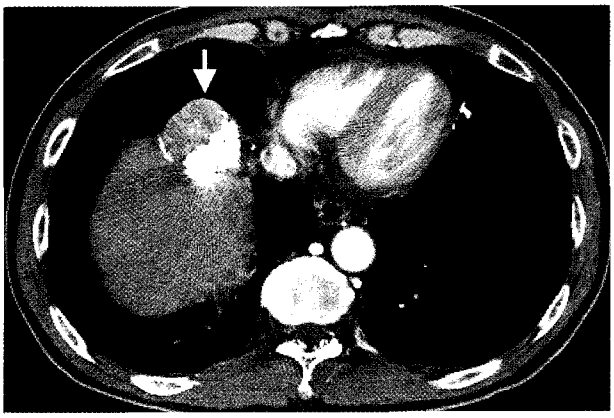

Fig. 2. Axial image of abdomen CT scan showed partially lipiodol uptaken mass on dome of liver (arrow), suspicious for residual viable tumor.

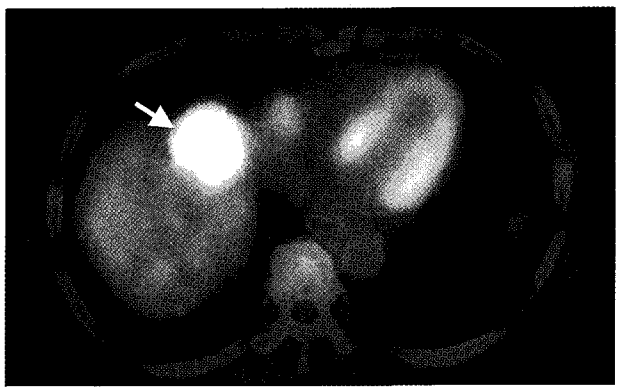

Fig. 3. Axial image of F-18 FDG PET/CT showed intense FDG uptake in dome of liver (max SUV=5.30) (arrow), corresponding to residual viable tumor.

Discussion

In HCC patients with long-term survival, distant metastases were observed frequently. The most frequent cause of distant spread of HCC is the propensity of this tumor to invade the hepatic venous system.[4] This characteristic is responsible for malignant emboli being swept from the hepatic veins or the inferior vena cava via the right side of the heart to the pulmonary circulation. In this case with SVC tumor thrombosis, HCC was detected ten years ago, and he received repeated TAE. The remaining viable tumor cells in the partial tumor necrosis caused by TAE are less firmly attached, and this may facilitate extrahepatic metastases.[5]

We described a patient with intense uptake of F-18 FDG in SVC tumor thrombus. The mechanism of F-18

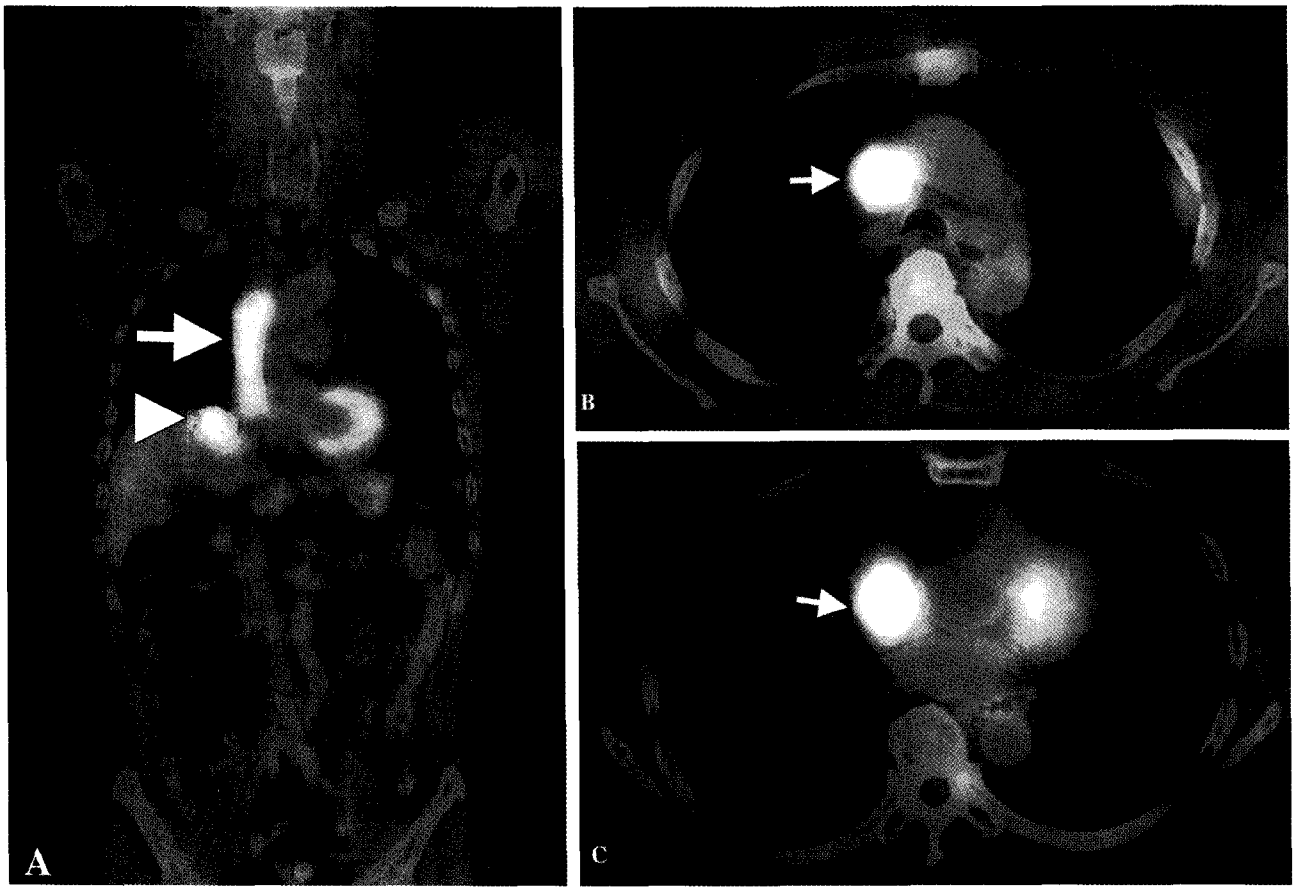

Fig. 4. (A) The coronal image of F-18 FDG PET/CT showed increased FDG uptake in tumor thrombus (arrow) involving from SVC extending to right atrium. And, there was increased metabolic activity in residual viable tumor in dome of liver (arrowhead). (B) The axial image of F-18 FDG PET/CT showed intense FDG uptake in the SVC (max SUV= 5.72) (arrow). (C) The axial image of F-18 FDG PET/CT showed intense FDG uptake in the right atrium (max SUV=6.98) (arrow)

FDG uptake in tumor thrombus is due to its hypervascularity and high metabolic neoplastic activity.[6] Differential diagnoses of thrombus accumulating radiotracer on PET are inflammatory or septic venous thrombi,[6] and malignant vascular tumor.[7,8] The increased risk for deep vein thrombosis in some cancer patients is thought to be related to an impaired fibrinolytic system with increased levels of proinflammatory cytokines, the presence of central venous line, and antineoplastic chemotherapy.[9] In this case with recurrent HCC, tumor thrombus was suggested because there was no infectious clinical symptomatology of fever and chills, and central venous line.

F-18 FDG PET/CT was performed for assessing the success rate of catheter embolization therapy in this recurrent HCC case. F-18 FDG PET/CT assessed the effect of TAE by F-18 FDG uptake in residual HCC. In addition, F-18 FDG PET/CT detected unexpected metastasis in SVC tumor thrombus. In this case, F-18 FDG PET with CT correlation provided useful identification and characterization of size and extension of the SVC tumor thrombus. We suggest that F-18 FDG PET/CT is useful to identification of distant metastases as well as assessment of response to therapy in long-term survival HCC patients.

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