

中文題目：正子攝影在偵測右心房腫瘤較顯影增強電腦斷層的優勢

英文題目：**Positron Emission Tomography Demonstration of Right Ventricle Tumor Overlooked on Contrast-Enhanced CT**

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Case 1

A 71-year-old woman has history of cervical cancer (squamous cell carcinoma, poorly differentiated type, FIGO stage IIA) operated. For para-aortic lymph node metastases, she received concurrent chemoradiotherapy last year. She did not report any heart failure or arrhythmia symptoms. For persistently elevated serum squamous cell carcinoma antigen (SCC) (7.03 ng/ml) and no significant disease progression revealed by contrast-enhanced computed tomography (CT) (Figure 1 A), positron emission tomography (PET) (Figure 1B) was arranged for further evaluation. The blood glucose on examination was 99 mg/dl. PET accidentally demonstrated a hypermetabolic lesion in the right heart (2.5 cm, SUV: 5.8) and metastasis was suspected. Beside, hypermetabolic lesions were also found in the liver, multiple lymph nodes and bones. Trans-thoracic echocardiogram (TTE) failed to exhibit obvious lesion in the heart chamber (Figure 1D). Cardiac magnetic resonance imaging (CMR) confirmed a nodule, about 2.2cm, with isointensity to myocardium of the RV wall (Figure 1C). We reviewed the previous CT image and a soft tissue nodular lesion in the right ventricle might be misinterpreted as incomplete contrast mixing. We performed trans-venous myocardial biopsy but only resulted in inflammatory cell infiltration without evidence of malignancy. The patient received another course of chemotherapy but die of sepsis 2 months later.

Case 2

A 51-year-old woman has history of cervical cancer (squamous cell carcinoma, poorly differentiated type, FIGO stage IIA) who received operation and radiotherapy one year ago. For progressively elevated serum SCC (3.87 ng/ml), CT was arranged and resulted in suspicious tumors recurrence over residual vaginal stump with right pelvic wall invasion (Figure 2A). She came for PET to survey if recurrence or metastasis over the whole body. The blood glucose was 119 mg/dl on examination.

Hypermetabolic lesion was observed in the residual vaginal stump extending to the right pelvic wall, compatible to tumor recurrence. However, a hypermetabolic lesion was marked in the apex of heart, referring to possible cardiac metastasis (Figure 2B). TTE could not demonstrate obvious lesions but focal apical inferoseptal and inferior myocardial wall thickness was mentioned (Figure 2D). Cardiac MRI resulted in a homogeneous enhanced nodular lesion in the sized of 2.7x1.9x3 cm, involving endocardium and myocardium of right ventricular septum (Figure 2C). Trans-venous endomyocardial biopsy revealed only minimal inflammatory infiltrate in the interstitium but no evidence of malignancy. She was under another cycle of chemotherapy and symptom free till now.

Discussion

Cardiac tumours are rare entities in clinical cardiology, more common in metastasis than primary etiologies, and generally associated with poor prognosis. Tumors that are most likely to involve the heart include lung and breast cancer, melanoma, and lymphoma. Cervical cancer with heart metastasis has been reported but relatively rare. Hypothesis of four metastasis pathways has been raised: retrograde lymphatic extension, hematogenous spread, direct contiguous extension, or transvenous extension. Patient with heart metastasis may present heart failure, chest pain or arrhythmia but mainly go unrecognized until autopsy or accidental radiographic findings. Cardiac metastasis often refers to poor prognosis and indicates systemic chemotherapy. Therefore, image evaluation plays an important role in early detection.

Contrast-enhanced CT is quick and widely available but a comprehensive CMR provides more information of tumor morphology, tissue composition, and vascularity, which has been, evaluate as a confident risk-stratification and clinical-management tool in patients with suspected cardiac tumors. As to another aspect, PET scan assesses the level of metabolic activity and perfusion in various organ systems of the whole body. Nowadays, PET-CT is generally applied in investigation for malignancy and restaging to evaluate the therapeutic response.

Functional image, like PET-CT, leads higher sensitivity to cancer surveillance than traditional CT. Such as in our cases, a soft tissue nodular lesion in the right ventricle might be misinterpreted as incomplete contrast mixing. PET/CT has advantages in feasibility in patients with renal impairment and stratification if necessary to further survey, like endomyocardial biopsy and CMR. Though pathology

results of endomyocardial biopsy cannot give definite diagnosis, our cases provide experiences that PET/CT may more sensitively detect a cardiac metastasis which was missed by contrast-enhanced CT.

Clinical implications

The combination of CMR and PET/CT provides a powerful tool for non-invasive morphological assessment and tissue characterization of cardiac tumor, especially when correlated with clinical history and appropriate biochemistry evaluations.

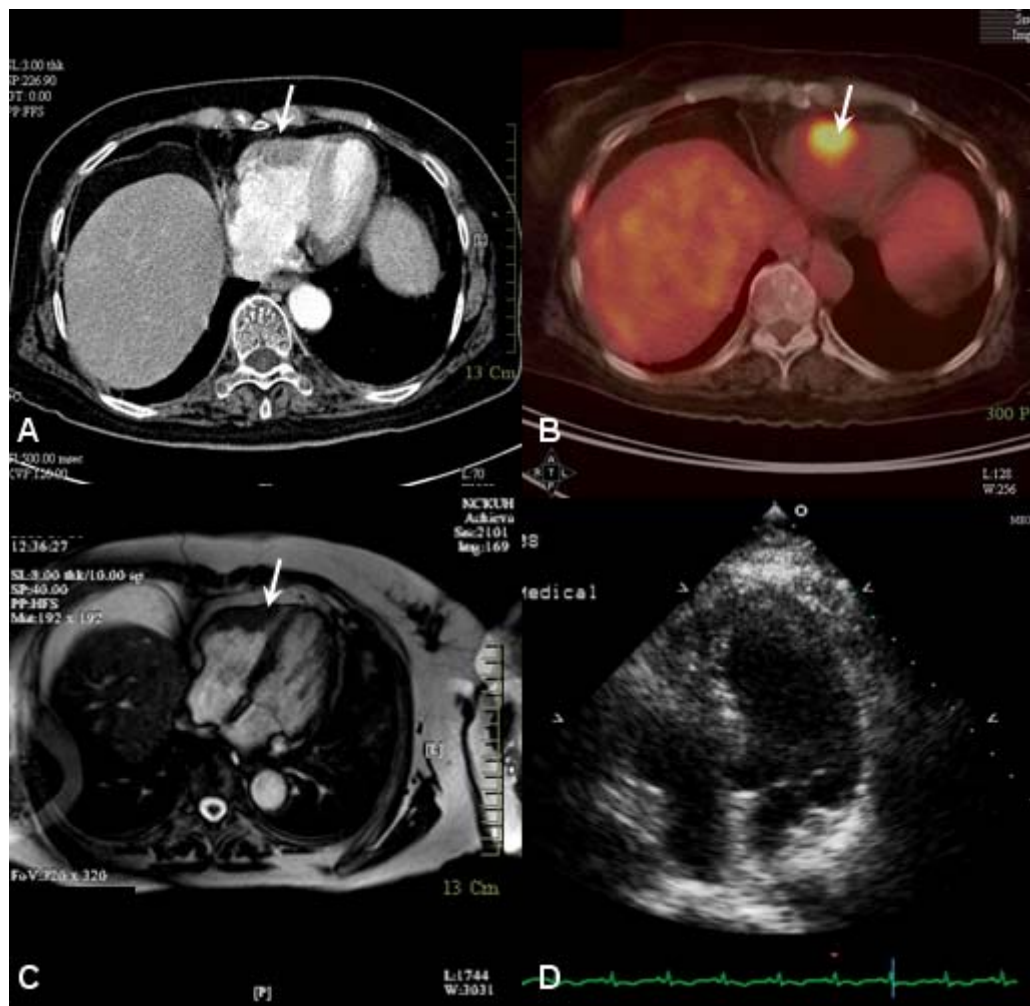


Figure 1. A: A soft tissue nodular lesion in RV free wall by chest CT (arrow) but ignored initially, B: A hypermetabolic lesion in RV by PET/CT (arrow), C: A nodule with isointensity to myocardium of the RV wall (arrow), D: TTE failed to exhibit obvious lesion in the heart chamber

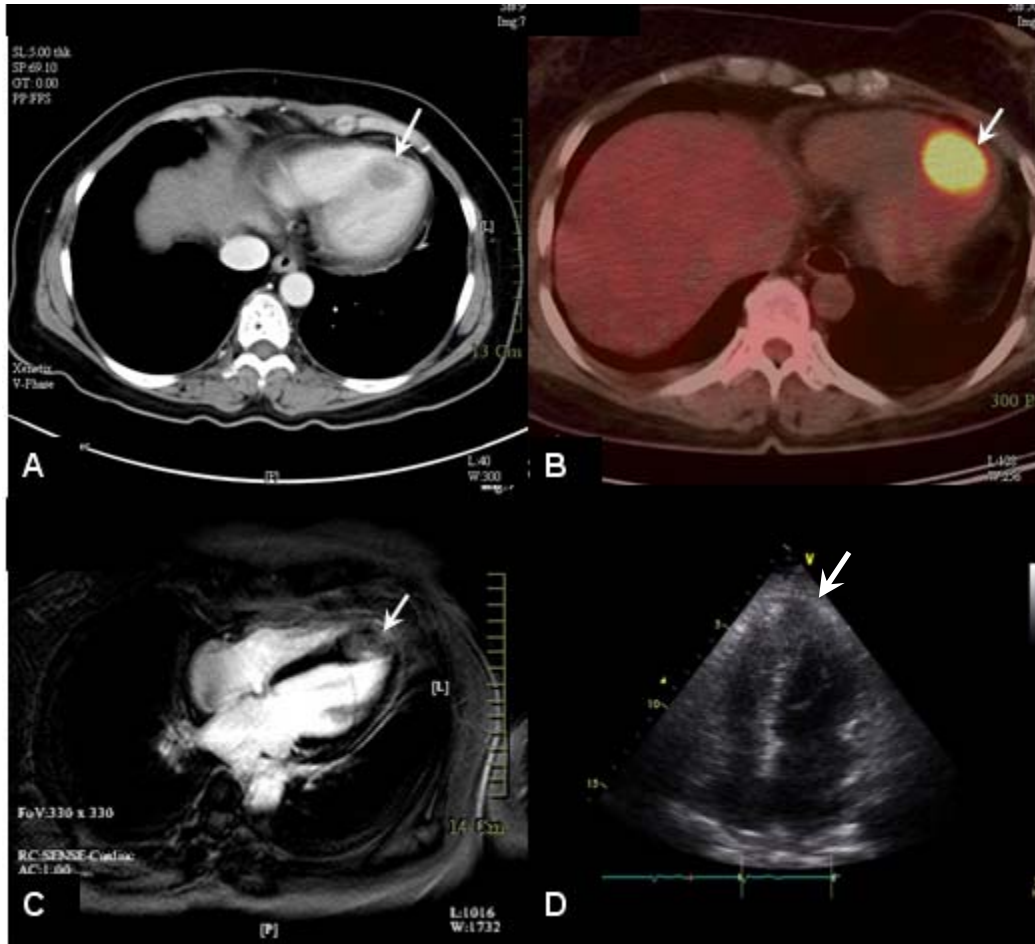


Figure 2. A: A soft tissue nodular lesion in RV septum by chest CT (arrow) but ignored initially, B: A hypermetabolic lesion in RV septum by PET/CT (arrow), C: A nodule with isointensity to myocardium of the RV septum (arrow), D: TTE showed focal apical inferoseptal and inferior myocardial wall thickness (arrow)