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Multimodal imaging of pericardial synovial sarcoma and two years postoperative follow-up by ^{18}F-FDG PET/CT

Entao Liu, MD,[a] Haojian Dong, MD,[b] Chao Liu, MD,[c] Zhouyang Lian, MD,[d] Zerui Chen, MD,[e] Siyun Wang, MD, PhD,[a,] and Shuxia Wang, MD, PhD[a,f]

[a] WeiLun PET Center, Department of Nuclear Medicine, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, Guangdong, China
[b] Department of Cardiology, Vascular Center, Guangdong Cardiovascular Institute, Guangdong Provincial Key Laboratory of Coronary Heart Disease Prevention, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, Guangdong, China
[c] Department of Pathology and Laboratory Medicine, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, Guangdong, China
[d] Department of Radiology, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, Guangdong, China
[e] Department of Cardiovascular Surgery, Guangdong Provincial Cardiovascular Institute, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, Guangdong, China
[f] WeiLun PET Center, Department of Nuclear Medicine, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, Guangdong, China

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INTRODUCTION

Synovial sarcoma is a rare mesenchymal malignancy commonly occurring in the extremities and has been reported at other sites such as the lung, pleura, and kidney.[1] Primary origin in the pericardium is extremely rare. By the end of August 2016, Vega et al. identified only 38 cases of pericardial synovial sarcoma in the literature.[2]In this article, we have presented a young adult with primary pericardial synovial sarcoma who had preoperative multimodality imaging, underwent complete tumor resection, and was followed up by ^{18}F-FDG PET/CT for 2 years.

Reprint requests: Shuxia Wang, MD, PhD, WeiLun PET Center, Department of Nuclear Medicine, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Room 517, 5/F, Weilun Building of Guangdong Provincial People's Hospital, 106 Zhongshan Er Road, Guangzhou 510080, Guangdong, China; *shuxia_wangGGH@outlook.com*

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CASE SUMMARY

A 30-year-old man presented with increased chest tightness and shortness of breath for 2 months. Chest radiography showed enlargement of cardiac silhouette and left pleural effusions (Figure 1A). Bedside echocardiography showed a mass in the pericardium (Figure 1B). Chest CT and Cardiac MRI scan demonstrated a solitary mass with heterogeneous enhancement (Figure 2). Malignant cardiac tumor was suspected, and ^{18}F-FDG PET/CT was performed which showed the mass adjacent to the heart, with increased uptake of ^{18}F-FDG (Figure 3). Subsequently, the patient underwent surgical resection and the final histological diagnosis was primary pericardial synovial sarcoma, biphasic type (Figure 4). ^{18}F-FDG PET/CT postoperative follow-up was performed at 12 and 24 months and revealed pericardial metastasis (Figure 5).

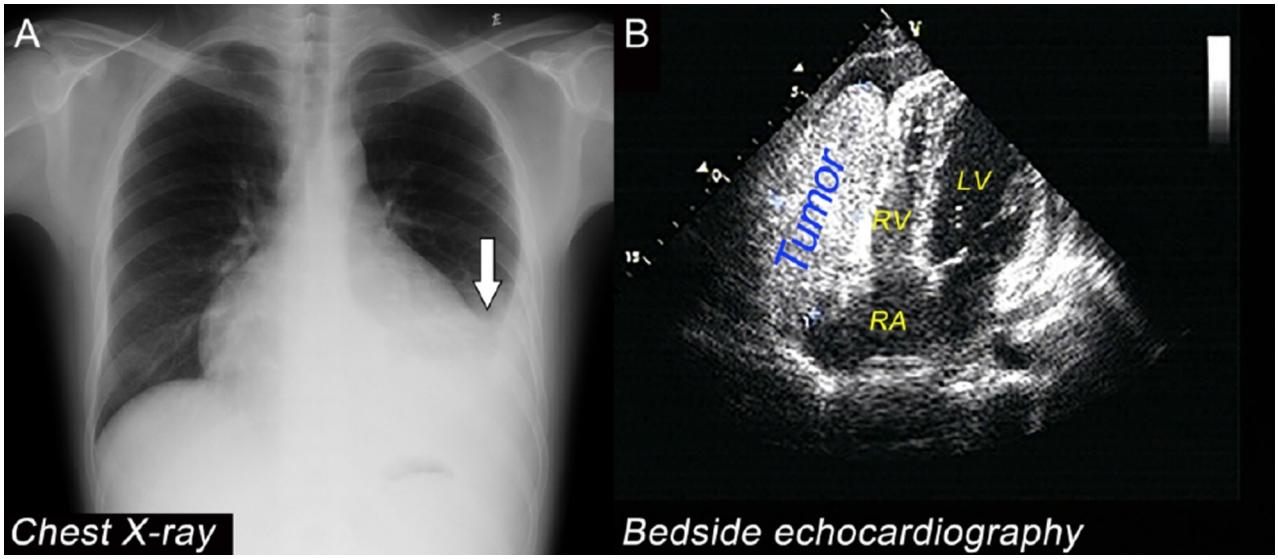

Figure. 1. Chest X-ray (**A**) and bedside echocardiography (**B**). Chest X-ray (PA view) showing left pleural effusions (white arrow) and marked enlargement of the cardiac silhouette, which is the so-called ''water bottle sign.'' Bedside echocardiography showing a mass in the pericardium, which was adjacent to the anterolateral wall of the right ventricle with an unclear boundary on the four-chamber view.

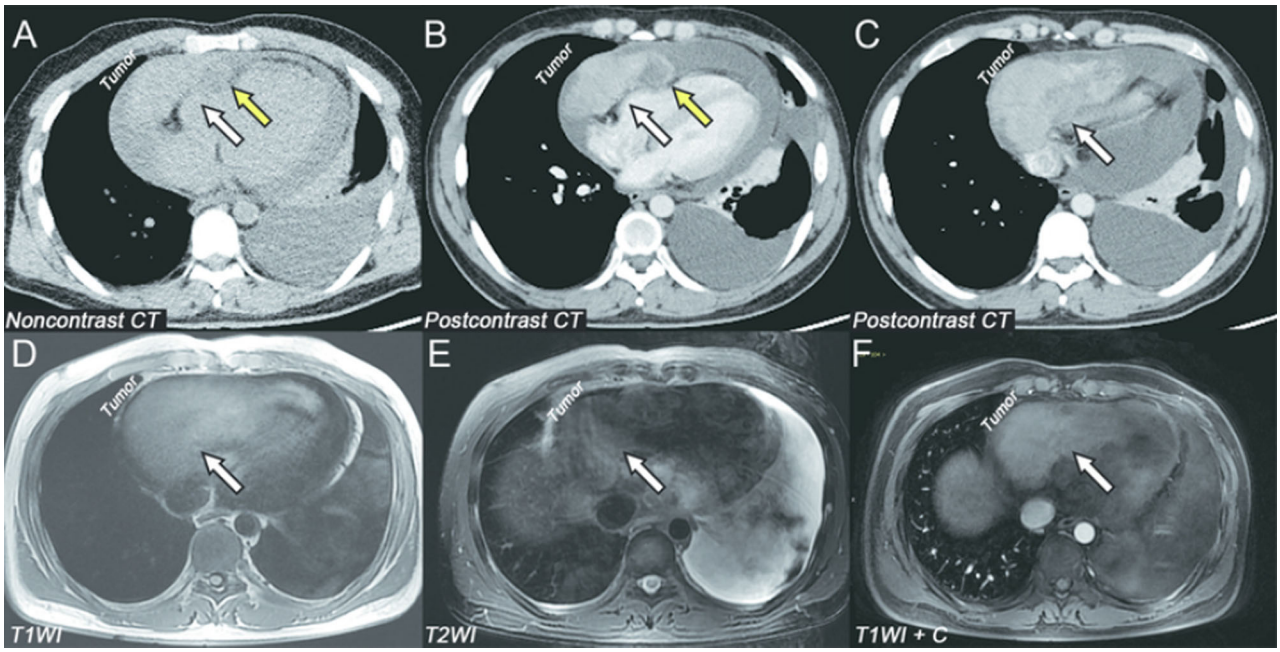

Figure. 2. Chest computed tomography (**A**–**C**) and cardiac magnetic resonance imaging (**D**–**F**) in transverse views. Non-enhanced CT **A** showing a solid tumor (white arrow) with peripheral low attenuation region (yellow arrow) in the pericardium, pericardial, and left pleural effusions. Contrast-enhanced CT (**B**, **C**) showing the tumor was adjacent to the anterolateral wall of the right ventricle with unclear boundary, with homogeneous enhancement in the solid component, and no enhancement in the peripheral low attenuation region. Non-enhanced cardiac magnetic resonance imaging (**D**, **E**) showing the large poorly defined tumor was isointense to myocardium on T1WI (FIRM sequences) and hyperintense on T2WI with Fat Suppression (FS). The late gadolinium enhancement image showing the tumor with heterogeneous enhancement.

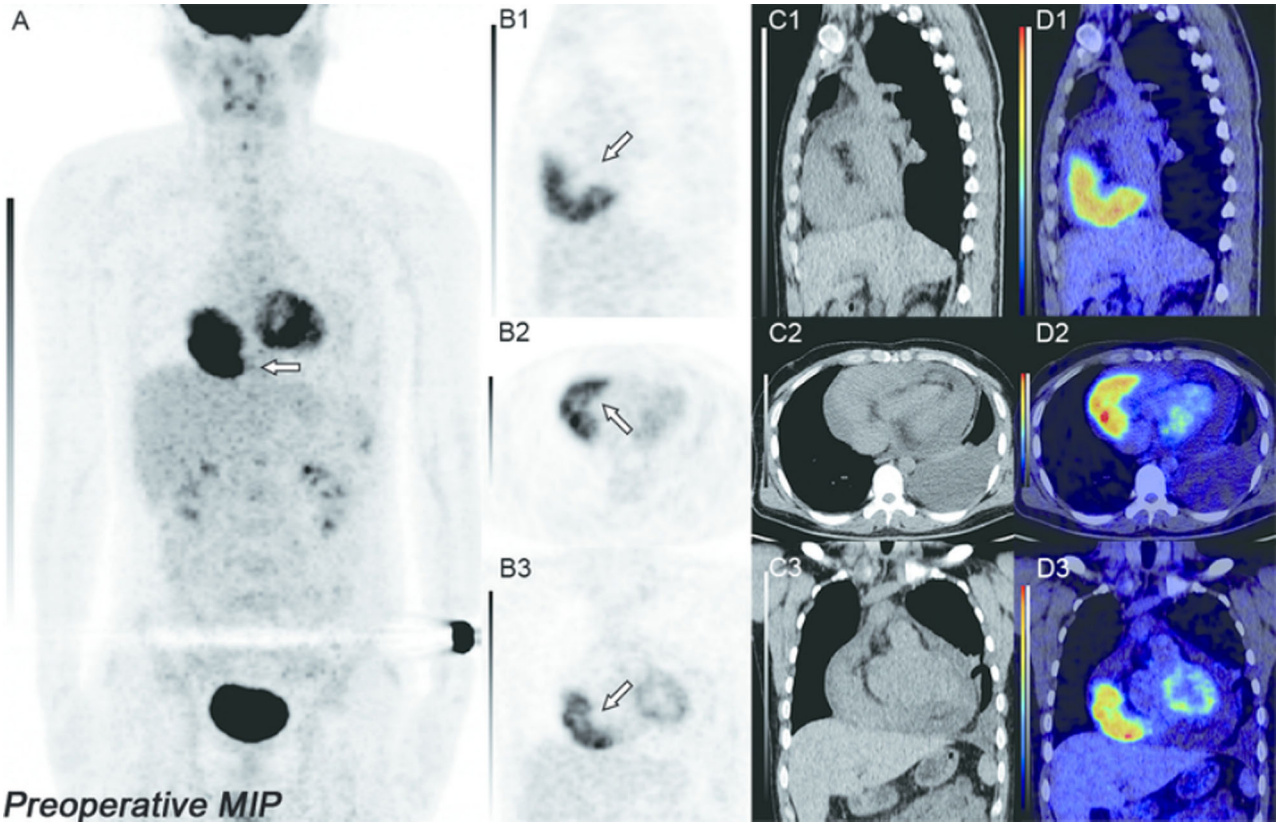

Figure. 3. Preoperative 18F-FDG positron emission tomography combined with computed tomography imaging. **A** Maximum-intensity-projection (MIP) image showing the tumor adjacent to the heart, which showed higher uptake of 18F-FDG (white arrow, SUVmax 6.6) higher than the myocardium. **B**, **C**, and **D** Sagittal (1), transverse (2), and coronal (3) views of selected PET, CT, and fused PET/CT images showing a boomerang shaped tumor attached to the outer edge of the right ventricle.

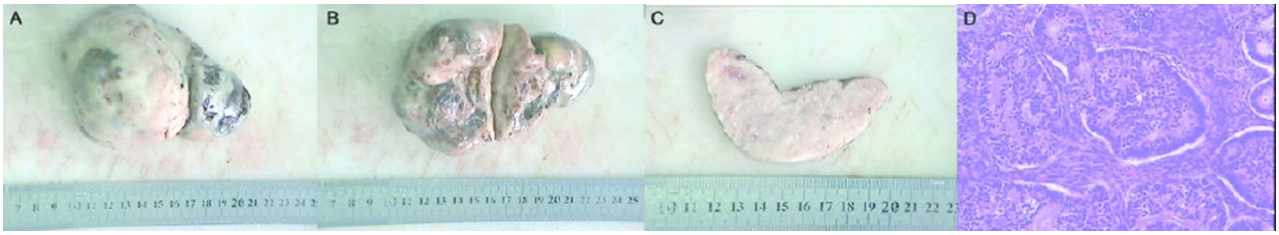

Figure. 4. Gross specimens and the photomicrograph. **A** and **B** gross specimens showing a yellowish white, smooth-surfaced solid tumor measured 11.0 × 4.0 × 9.0 cm, with partial necrosis and hemorrhage, and encapsulated with a fibrous capsule. **C** the cut surface was pinkish white, fish flesh-like color and granular. **D** the photomicrograph showing both spindle and epithelial cell. The former components were uniform and relatively small, with a round to oval nuclei and scarce cytoplasm, and the latter, characterized by well-differentiated glandular structures (hematoxylin and eosin stain, magnification, × 400).

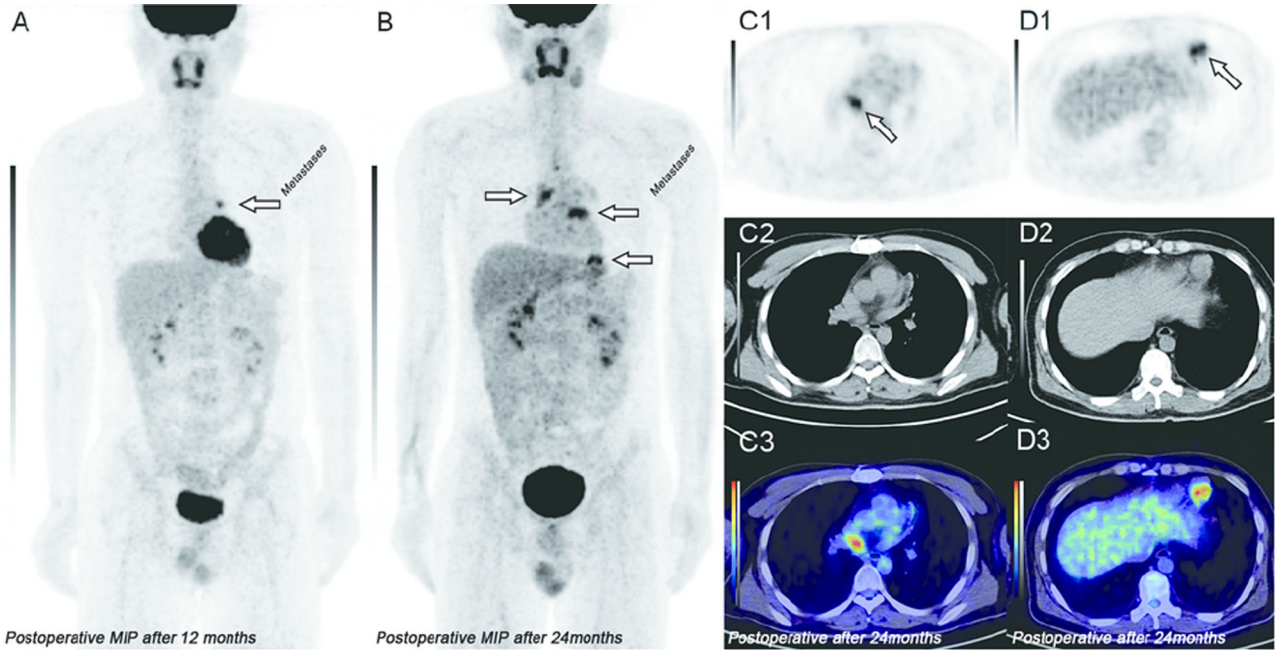

Figure. 5. Postoperative follow-up 18F-FDG positron emission tomography combined with computed tomography imaging. **A** MIP image at 12 months after surgical resection showing a metastatic nodule adjacent to the root of the pulmonary trunk (white arrow, SUVmax 3.6). **B** MIP image at 24 months after surgical resection showing multiple metastases in the mediastinum and pericardial cavity (white arrow, SUVmax 4.3). **C** and **D** Transverse view of the selected PET (1), CT (2), and fused PET/CT (3) images showing that the metastatic foci were located in the mediastinum and pericardium, respectively.

TEACHING POINTS

Pericardial synovial sarcoma is a high-grade malignancy, prone to local invasion in the adjacent organs and distant metastasis.

Although surgical resection is widely accepted as the primary treatment option, a complete surgical resection of the tumor is difficult to perform due to the characteristic tumor invasion. Moreover, there is also no standard chemotherapy protocol to select.[3]

Thus, early detection and diagnosis with multimodality imaging is crucial to treat this tumor.

FEATURE RESULT

There were 30 responses of which 5 (17%) were correct or close to correct answers. Other responses included: mediastinal tumor, lung tumor, sarcoidosis, thymoma, myxoma, heart transplant, and amyloidosis.

By draw, the winner is:

Muhammad Ayub, MD, from Punjab Institute of Cardiology, Lahore, Punjab, Pakistan.

The winning response was: Malignant pericardial tumor with pericardial effusion.

Compliance with Ethical Standard

Disclosure

No conflict of interest and no disclosures.

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