Introduction

Primary pericardial mesothelioma (PPM) is an uncommon variety of primary malignant cardio-pericardial tumor and is a highly lethal and an extremely rare cardiac tumor (1). Its incidence was 0.0022% among 500,000 cases in a large necropsy study (2). It has poor prognosis and a progressive clinical course. Common clinical features are constrictive pericarditis, cardiac tamponade, and cardiac failure. Prognosis is poor with survival after diagnosis ranging from 6 weeks to 15 months (3). The diagnosis of PPM is extremely difficult because its clinical presentation is nonspecific. Here we report the F-18 fluorodeoxyglucose positron emission Tomography (F-18 FDG PET)/computed tomography (CT) images of a patient with PPM.

Case Report

A 54-year-old man presented to our hospital with a 4-month history of intermittent shortness of breath. Transthoracic echocardiography revealed a mild pericardial effusion and minimal pericardial thickening. CT image of the thorax showed fluid collections within the pericardial sleeves (up to 14 mm) and the bilateral pleural spaces (Fig. 1). He had no apparent history of occupational exposure to asbestos. Although CT scan of the chest and echocardiography were performed, a definitive diagnosis could not be obtained. Whole body F-18 FDG PET/CT scan was performed (1 h after the administration of 465 MBq F-18 FDG, with the subject fasted for 6 h beforehand). FDG-PET/CT images showed a diffuse intense F-18 FDG uptake (SUVmax, 7.5) in the thickened pericardium (Fig. 2, Video 1). There were fluid collections within the bilateral pleural spaces and massive fluid in the abdominal and pelvic peritoneal spaces and systemic edema. No abnormal focus of FDG uptake was seen elsewhere in the body, suggesting a possible site of primary. Thus, a primary tumor of the pericardium, possibly malignant PPM was suspected. In addition, there were no additional hypermetabolic lesions suggesting lymphatic or distant metastatic disease. Primary pericardial malignancy as the cause of constrictive pericarditis was highly suspected from F-18 FDG PET/CT results. The patient’s condition deteriorated, and surgical pericardiectomy under cardiopulmonary bypass (CPB) was performed to relieve the symptoms and confirm the definitive diagnosis. The debulking surgery was performed to remove the thickened pericardium. Pathological examination revealed epithelial type PPM (Fig. 3). He underwent palliative treatment and died 2 months postoperatively.

Discussion

PPMs are extremely rare and have an overall poor prognosis. The onset of symptoms is usually insidious. The majority of physical findings are nonspecific. The diagnosis is extremely difficult because its clinical presentation is nonspecific. The clinical presentation is that of constrictive pericarditis or pericardial effusion with or without tamponade and heart failure caused by myocardial infiltration. It can often be misdiagnosed as other causes of constrictive pericarditis prior to undergoing pericardial tissue biopsy. The cause of this rare tumor is unknown. Ex-
Exposure to asbestos is correlated with the onset of pleural and peritoneal mesothelioma; a link to asbestos has not been shown. Echocardiography is the most commonly used initial investigative tool. CT and magnetic resonance imaging are useful in showing the extent of involvement of contiguous structures and the degree of constriction. The treatment options for this rare tumor are surgery, radiotherapy, and chemotherapy. Operative intervention in pericardial mesothelioma is primarily for effusion control, cytoreduction before multimodal therapy, or to deliver and monitor innovative intrapericardial therapies (4, 5).

F-18 FDG, an analogue of glucose, provides valuable functional information based on increased glucose uptake and glycolysis of cancer cells and depicts metabolic abnormalities. FDG PET/CT with its ability for whole body fusion imaging is used for detection of primary tumors and distant metastases in most of the cancers, including primary cardiac tumors (6–9). In our case, pericardial malignancy was highly suspected from the imaging results. Absence of abnormal uptake suggests primary malignancy at a distant site in F-18 FDG PET/CT and reinforces the possibility of PPM in these cases. Exact diagnosis of PPM could be established by histopathology. Pleural and peritoneal effusions were the only signs of pericardial constriction.

**Conclusion**

Primary pericardial malignant mesothelioma is an extremely rare neoplasm. To determine the exact etiology of constrictive pericardial disease, clinical suspicion, imaging modalities, and histopathological examination are needed. F-18 FDG PET scan is useful to evaluate the pericardial metabolic activity in assessing the etiology of constrictive pericardial disease.

**Video 1.** Whole body F-18 FDG MIP PET images of the patient. A diffuse intense F-18 FDG uptake of heart is seen (video image). Co-registered PET/CT images of thorax showed increased FDG activity of thickened pericardium, Figure 2.

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