Case report

Massive pericardial effusion: A rare and easily missed finding in myocardial perfusion scintigraphy

ABSTRACT

A 72-year-old gentleman underwent myocardial perfusion scintigraphy (MPS) for sinus tachycardia of unknown cause. Baseline electrocardiography (ECG) showed sinus tachycardia and electrical alternans. Thallium-201 stress-redistribution MPS was performed with dipyridamole stress. On the raw projection images, a photopenic "halo" was noted surrounding the heart. Reconstructed slices showed small left ventricle with no obvious perfusion defect. Review of single-photon emission computed tomography/computed tomography images showed suspected large pericardial effusion. The patient was admitted and Echocardiography showed significant circumferential pericardial effusion with early tamponade effect. Subsequent bedside pericardiocentesis aspirated 800 ml blood-stained fluid and the cytology yielded metastatic adenocarcinoma with features suggestive of pulmonary primary. Pericardial effusion is a rare finding in MPS. Finding of a "halo" around the heart should raise suspicion on the presence of pericardial effusion and confirmatory investigation such as ECG may be warranted.

Keywords: Halo, myocardial perfusion scintigraphy, pericardial effusion, tamponade, thallium-201

INTRODUCTION

Myocardial perfusion scintigraphy (MPS) has been commonly performed for investigation of ischemic heart disease. A massive pericardial perfusion can produce tamponade effect and nonspecific symptoms that mimic ischemic heart disease. It may lead to circulatory failure and is an emergency situation. We report a case of incidental detection of massive pericardial effusion in thallium-201 MPS with characteristic scintigraphic, electrocardiographic, and blood pressure (BP) findings.

CASE REPORT

A 72-year-old gentleman presented to the Medical Specialist Clinic for palpitation in December 2011. He had a history of hypertension and dyslipidemia. He had no other cardiac symptoms except easy palpitation upon stress or exertion. Echocardiography performed in March 2012 showed ~0.6 cm loculated pericardial effusion without tamponade effect and satisfactory left ventricular function. He was then referred to our unit for MPS for sinus tachycardia of unknown cause in June 2012. Baseline heart rate and BP were 122 beats/min and 104/85 mmHg, respectively. Baseline electrocardiography (ECG) showed sinus tachycardia and alternating amplitude of QRS complexes, which suggested electrical alternans [Figure 1].

The patient underwent dipyridamole stress and subsequently 2 mCi of thallium-201 thallous chloride was injected intravenously. Single-photon emission computed tomography (SPECT) with attenuation correction by low-dose computed tomography (CT) was performed with a dual-head gamma-camera at 15 min and 4 h post tracer injection.

Kwan Kit Wu, Boom Ting Kung, Ting Kun Au Yong

Nuclear Medicine Unit, Queen Elizabeth Hospital, Kowloon, Hong Kong, China

Address for correspondence: Dr. Kwan Kit Wu, Nuclear Medicine Unit, Queen Elizabeth Hospital, Kowloon, Hong Kong, China.
E-mail: kksamwu@gmail.com

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On the raw projection images, a photopenic "halo" was noted surrounding the heart [Figure 2]. Reconstructed slices showed small left ventricle with no obvious perfusion defect [Figure 3]. Review of SPECT/CT images showed isodense area surrounding the heart with no thallium-201 uptake (~3.5 cm thick), suspicious of large pericardial effusion.

The patient was admitted for suspected massive pericardial effusion. Chest X-ray showed globular enlargement of the cardiac shadow giving a water bottle configuration [Figure 4]. Echocardiography showed significant circumferential pericardial effusion (up to 3.3 cm thick) with early tamponade effect. Subsequent bedside pericardiocentesis aspirated 800 ml blood-stained fluid, and the cytology yielded metastatic adenocarcinoma with features suggestive of pulmonary primary.

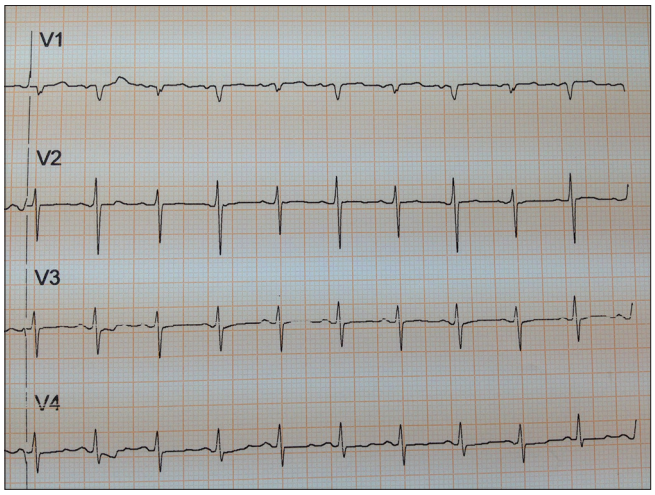

Figure 1: Electrocardiography showing alternating amplitude of QRS complexes, best visualized at V2, which suggests electrical alternans

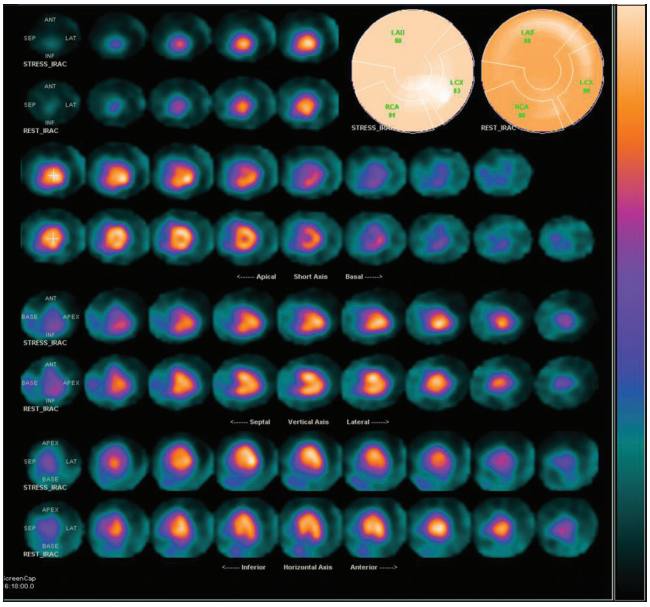

Figure 3: Reconstructed slices of myocardial perfusion single-photon emission computed tomography showing small left ventricle with no obvious perfusion defect

DISCUSSION

Pericardial effusion is characterized by abnormal fluid collection in pericardial space. The more common etiologies of moderate-to-large pericardial effusions are malignancy, infection, and idiopathic.[1] Sinus tachycardia commonly occurs in patients with cardiac tamponade as a physiologic response to maintain cardiac output. One typical cause of electrical alternans in ECG is large pericardial effusion causing periodic wobbling of the heart in the pericardium.

MPS is commonly performed for the investigation of suspected coronary artery disease. Pericardial effusion is a rare finding in MPS and had been reported in several case

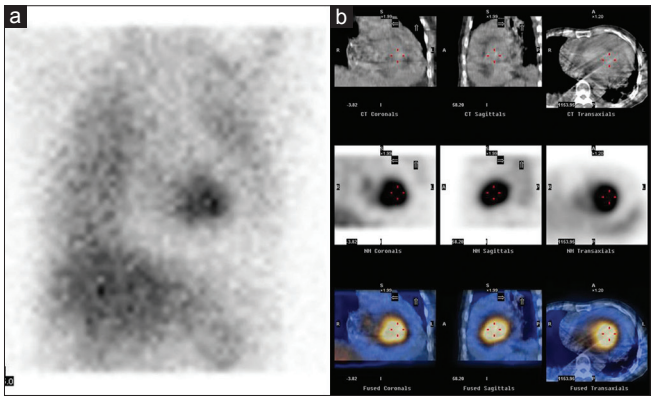

Figure 2: (a) Raw projection image of thallium-201 myocardial perfusion scintigraphy showing a "halo" around the heart and mildly increased pulmonary uptake. (b) Single-photon emission computed tomography/computed tomography images showing suspected large circumferential pericardial effusion with no thallium-201 uptake

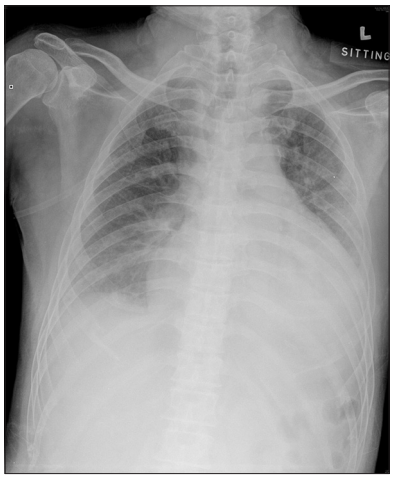

Figure 4: Chest X-ray on admission showing globular enlargement of the cardiac shadow giving a water bottle configuration

reports with typical finding of a photopenic "halo" around the heart in raw projection images.[2-5] Echocardiography remains the primary diagnostic tool for the study of pericardial diseases, which enables semiquantitative assessment of the pericardial effusion size and its hemodynamic effects.[1]

Finding of a "halo" around the heart should raise suspicion on the presence of pericardial effusion, and confirmatory investigation such as ECG may be warranted. Our case also emphasizes the importance of careful review of raw projection images in MPS. The "halo" around the heart may be easily overlooked in reconstructed cropped slices display.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Adler Y, Charron P, Imazio M, Badano L, Barón-Esquivias G, Bogaert J, *et al.* 2015 ESC Guidelines for the diagnosis and management of pericardial diseases: The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC) Endorsed by: The European Association for Cardio-Thoracic Surgery (EACTS). Eur Heart J 2015;36:2921-64.
2. Spieth ME, Schmitz SL, Tak T. Incidental massive pericardial effusion diagnosed by myocardial perfusion imaging. Clin Med Res 2003;1:141-4.
3. Malik D, Sood A, Parmar M, Bahl A, Sood A. Unexpected detection of pericardial effusion on myocardial perfusion scintigraphy. Indian J Nucl Med 2016;31:317-8.
4. Nestico PF, Hakki AH, Iskandrian AS, Morganroth J. Thallium-201 imaging in pericardial effusion. Clin Nucl Med 1986;11:213.
5. Austin BA, Kwon DH, Jaber WA. Pericardial effusion on Tc-99m SPECT perfusion study. J Nucl Cardiol 2008;15:e35-6.