Images in cardiovascular medicine

Sixteen-row multislice computed tomography of tuberculous pericardial abscess

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Introduction

In view of the myriad of possible symptoms at the time of presentation and if based solely on the medical history in the absence of a typical clinical presentation, the diagnosis of constrictive pericarditis may be difficult. These symptoms may develop slowly over a number of years such that patients may not be aware of all their symptoms until questioned. Dyspnea is the most common presenting symptom, observed in almost all patients. The most common etiologies are idiopathic (generally due to unrecognized viral pericarditis) and infectious[1]. Tuberculosis is the leading cause of constrictive pericarditis in non-industrialized countries but represents only a minority of causes in industrialized countries. Bacterial infections are increasing causes of various forms of pericarditis[1]. The typical finding at imaging is pericardial thickening and the differential diagnosis is with restrictive cardiomyopathy[1]. In some cases the chronic tuberculous inflammatory process can progress towards a pseudotumoral configuration[2-4].

The characterization of cardiac and pericardial masses can be performed in the first instance by means of transthoracic and transesophageal echotomography. Even though the motion during the heart cycle, the location, and the ultrasound characteristics can be helpful in the diagnosis, the tissue texture and perfusion are not optimally demonstrated with these techniques. Therefore, magnetic resonance imaging has been used to diagnose and characterize this disease[5,6]. To date, it has been held that computed tomography (CT) is only occasionally useful for the characterization of tuberculous pericarditis[3]. The recent introduction of multislice spiral CT scanners has extended the field of application of CT into cardiac imaging. In particular, the last generation 16-row scanners may be very helpful in routine cardiac evaluation[7].

Case report

A 34-year-old female, with known systemic tuberculosis and under tuberculostatic treatment, was referred to our Institution after the detection at transthoracic ultrasound of a cardiac mass (Fig. 1A) located within the right ventricle. The patient's history included mild right heart dysfunction with jugular tenderness in the upright position and hepatomegaly extending to two fingers below the right costal margin.

The patient underwent 16-row contrast enhanced multislice CT (Sensation 16, Siemens Medical Solutions, Forchheim, Germany) with retrospective electrocardiographic gating in order to freeze the heart motion in the end-diastolic phase (Figs. 1B and 2). The main scan parameters were: number of detector rows 16, individual detector collimation 1.5 mm, gantry rotation time 420 ms, kV 120, mA/s 400, effective slice thickness 2 mm, and increment of reconstruction 1 mm (50% overlap). Three-dimensional volume rendering of the data set confirmed the location of the mass (Fig. 1B) within the right ventricle.

The heart of the patient was studied in two phases: an arterial phase (Fig. 2A and 2B) and a delayed phase (Fig. 2C and 2D) respectively performed 25 and 60 s after intra-

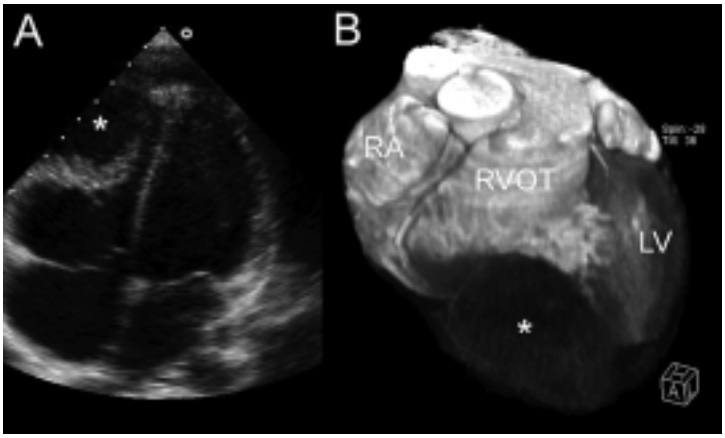

Figure 1. *Transthoracic ultrasound and three-dimensional volume rendering. The characteristics of the pericardial pseudomass* (asterisks) *are compatible with those of an abscess. The wall is thick and hyperechoic while the center appears homogeneous and hypoechoic* (A)*. Three-dimensional volume rendering* (B) *shows the compression on the right ventricle. LV = left ventricle; RA = right atrium; RVOT = right ventricular outflow tract.*

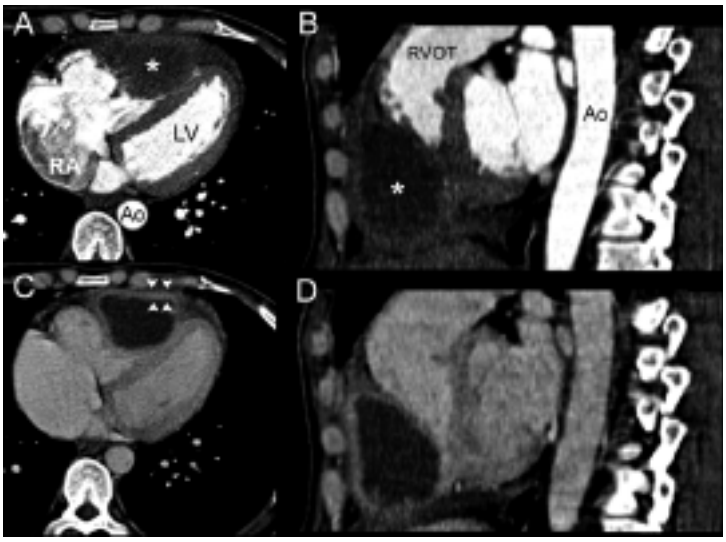

Figure 2. *Biphasic cross-sectional imaging of the 16-row multislice computed tomography data sets. The biphasic 16-row multislice computed tomography acquisition shows the arterial* (A *and* B) *and late* (C *and* D) *myocardial perfusion of the pseudomass* (asterisks)*. Axial images at the level of the ventricles* (A *and* C) *show the pattern of enhancement of the pseudomass. In the arterial phase* (A)*, the bright enhancement of the blood inside the ventricles is not accompanied by a concomitant differential enhancement of the mass. In particular, compared to transthoracic ultrasound (Fig. 1A), it is almost impossible to detect a capsule* (A)*. In the delayed phase, the wall is enhanced while the core remains dark* (C)*. Note the evident thickening of the wall of the abscess* (arrowheads)*. Sagittal reconstructions of the arterial and delayed phases* (B *and* D) *show the same findings in a different plane. Ao = aorta; LV = left ventricle; RA = right atrium; RVOT = right ventricular outflow tract.*

venous contrast medium administration. The mass showed the typical appearance of an abscess with a poorly enhancing arterial phase and a capsular enhancement in the delayed phase (Fig. 2C). The central part of the mass showed no significant enhancement (necrotic tissue). No calcifications were detected.

The patient was submitted to pericardiotomy and partial epicardiotomy. The surgical specimen confirmed the diagnosis of a tuberculous abscess. At 6 months of follow-up the patient's cardiac performance was satisfactory and there was no evidence of relapse.

References

1. Spodick DH. Pericardial disease. (letter) JAMA 1997; 278: 704.
2. Agarwala BN, Ruschhaupt DG, Sand ME. Pseudotumor of the pericardium. Pediatr Cardiol 1997; 18: 429-31.
3. Johnson MA, Hirji MK, Hennig RC, Williams D. Pericardial abscess: diagnosis using two-dimensional echocardiography and CT. Radiology 1986; 159: 419-21.
4. D'Silva SA, Nalladaru ZM, Dalvi BV, Kale PA, Tendolkar AG. MRI as guide to surgical approach in tuberculous pericardial abscess. Case report. Scand J Thorac Cardiovasc Surg 1992; 26: 229-31.
5. Masui T, Finck S, Higgins CB. Constrictive pericarditis and restrictive cardiomyopathy: evaluation with MR imaging. Radiology 1992; 182: 369-73.
6. Hayashi H, Kawamata H, Machida M, Kumazaki T. Tuberculous pericarditis: MRI features with contrast enhancement. Br J Radiol 1998; 71: 680-2.
7. Nieman K, Cademartiri F, Lemos PA, Raaijmakers R, Pattynama PM, de Feyter PJ. Reliable noninvasive coronary angiography with fast submillimeter multislice spiral computed tomography. Circulation 2002; 106: 2051-4.

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