Massive pericarditis constrictiva calcarea with compression of the right ventricle and consecutive pulmonary embolism

Thomas Butz*, Hakan Yeni, Marc Van Bracht, Martin Christ, Gunnar Plehn, Sebastian Machnick, Axel Meissner, and Hans-Joachim Trappe

Department of Cardiology and Angiology, Marienhospital Herne, Ruhr-University Bochum, Hölkeskampring 40, D-44625 Herne, Germany

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A 40-year-old man was admitted to our department with complaints of progressive dyspnoea (NYHA III), fatigue, and tachyarrhythmia because of atrial fibrillation. Chest radiography (Figure 1) and a computer tomography (CT; Figure 2) showed a massive pericarditis constrictiva calcarea

Figure 1 Chest radiography showing the double-layered pericardial calcification.

Figure 2 CT demonstrating the double-layered calcification encapsulating an extensive pericardial effusion and calcification with an inner and outer layer (arrow). RA, right atrium; RV, right ventricle; LA, left atrium; LV, left ventricle.

A 40-year-old man was admitted with a massive pericarditis constrictiva calcarea. Transthoracic and transoesophageal echocardiography demonstrated a double-layered pericardial calcification with interspacial effusion, a massive compression of the right ventricle, and a thrombus formation in the ventricle. In addition, severe pulmonary embolism due to this right ventricular thrombus formation was diagnosed by CT. This case demonstrates the importance of a multimodal imaging approach (echocardiography, TDI, MRI, CT) in the diagnosis of constrictive pericarditis and pericardial masses. In respect to the severe pericardial calcification with the massive interspacial mass, and the compression of the right ventricle with thrombus formation and consecutive pulmonary embolism, this case appears to be a very rare and uncommon clinical finding.

KEYWORDS
Constrictive pericarditis; Tissue doppler imaging; Magnetic resonance imaging; Pulmonary embolism

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with a double-layered pericardial calcification, a huge inter-
spacial mass (82 Hounsfield-Units), and consecutive com-
pression of the right ventricle.

Transthoracic and transoesophageal echocardiography
confirmed the double-layered pericardial calcification with
interspacial effusion, and showed a massive compression
of the right ventricle by the pericardial mass (Figure 3A;
Supplementary data, Cine 1).

Tissue Doppler imaging (TDI) analysis showed
\( E_0 \) velocities
of \( \geq 8 \text{ cm/s} \) at the septal and lateral mitral annulus and an
increased respiratory variation of the transmitral flow
(\( >40\% \)). Moreover, a thrombus formation in the right

Figure 3  (A and B) Transoesophageal echocardiography demonstrating the double-layered pericardial calcification with interspacial effusion (arrow), a massive compression of the right ventricle by the pericardial mass, and a right ventricular thrombus formation due to this com-
pression. (A) Four-chamber view: RA, right atrium; RV, right ventricle; LA, left atrium; LV, left ventricle; asterisk: thrombus formation in
the right atrial appendix and the right ventricle. (B) Short-axis view, 30°.

Figure 4  Magnetic resonance imaging (MRI) with perfusion study and late enhancement demonstrating the intrapericardial mass (arrow) and
the compression of the right ventricle. (A) Four-chamber view, true-fisp, Siemens Sonata 1.5 Tesla. (B) Short-axis view, true-fisp, Siemens
Sonata 1.5 Tesla; RA, right atrium; RV, right ventricle; LA, left atrium; LV, left ventricle; PLE, pleural effusion.

Figure 5  Cineangiography demonstrated the massive pericardial mass. (A) RAO, 30°; AO, aorta; LV, left ventricle; arrow, inner and outer
layer of the pericardial calcification (CP) and the ‘heart-like’ compression of the right ventricle. (B) LAO, 60°; RVOT/PA, right ventricular
outflow tract and pulmonary artery; RV, right ventricle, inner and outer layer of the pericardial calcification.
atrial appendix and in the right ventricle due to the compression was detected (Figure 3B; Supplementary data, Cine 2) by transoesophageal echocardiography. In addition, severe pulmonary embolism due to this right ventricular thrombus formation, and a large pleural effusion was diagnosed by CT.

Magnetic resonance imaging (MRI) with a perfusion study and late enhancement confirmed right ventricular thrombus formation and ruled out an intracardial or intrapericardial tumour formation (Figure 4A and B; Supplementary data, Cines 3 and 4).

Angiography ruled out a coronary heart disease and demonstrated the massive pericardial mass with compression of the right ventricle (Figure 5A and B). Hemodynamic measurements showed elevated filling pressures, end-diastolic pressure equalization in all chambers, and a dip-plateau phenomenon. An oral anticoagulation therapy was started and the thrombus formation decreased in the next few weeks.

The patient underwent surgical therapy (pericardectomy) with uneventful recovery. This case demonstrates the importance of a multimodal imaging approach (Echocardiography, TDI, MRI and CT) in the diagnosis of constrictive pericarditis and pericardial masses. TDI analysis of the septal and lateral mitral annulus motion should be part of the diagnostic work-up in pericardial disease in consideration of recent studies and the guidelines on the diagnosis and management of pericardial diseases of the European Society of Cardiology.1–6

CT and MRI provide important additional information about thickening and calcification of the pericardium, intrapericardial masses, suspected thrombus formations, and intracardial or pericardial tumors.7–10

In respect to the severe pericardial calcification with the massive interspatial mass, and the compression of the right ventricle with thrombus formation and consecutive pulmonary embolism, this case appears to be a very rare and uncommon clinical finding.

Supplementary data

Supplementary data are available at European Journal of Echocardiography online.

References