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A Unique Case of Pulmonary Valve Direct Involvement in Multiple Cardiac Localization of Hydatid Cysts

Francesco Mangini, MD[1,2], Eluisa Muscogiuri, MD[1], Elvira Bruno, MD[2], Grazia Casavecchia, MD[3], Roberto Del Villano, MD[1], Antonio Medico, MD[1], Robert W.W. Biederman, MD, FACC, FAHA[4], and Rinaldo Giaccari, MD[2]

[1]Cardiac Magnetic Resonance Unit, "Di Summa, Perrino" Hospital, Brindisi, Italy
[2]ICU/Cardiology Unit, "Camberlingo" Hospital, Francavilla Fontana, Italy
[3]Cardiothoracic Department, Policlinico Riuniti Foggia, Italy
[4]Division of Cardiology, Centre for Cardiac MRI. Allegheny General Hospital, Allegheny Health Network, Pittsburgh, PA, USA

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Address for Correspondence:
Francesco Mangini, MD
Cardiac Magnetic Resonance Unit, "Di Summa, Perrino" Hospital, Via Napoli 8, Brindisi 72100, Italy.
Email: fuz1978@libero.it

ORCID iDs
Francesco Mangini
https://orcid.org/0000-0003-3767-7595
Robert W.W. Biederman
https://orcid.org/0000-0001-6363-9571

Conflict of Interest
The authors have no financial conflicts of interest.

Echinococcosis is a parasitosis caused by microorganisms of the genus *Echinococcus*, of which at least 6 species have been identified, including *Echinococcus granulosus*, *Echinococcus multilocularis*, and *Echinococcus vogeli*.[1] Cardiac involvement is a rare but potentially fatal condition.[2-5]

A 68-year-old man was admitted to the emergency room for chest pain. He presented normal vital signs and high values of D-dimer. First, he was evaluated with a computed tomography which revealed a mass attached to the pulmonary valve (PV), initially labeled as a thrombus (**Figure 1**). The transthoracic echocardiography and then transesophageal echocardiography confirmed the presence of the mass, showing findings that instead suggested the cystic nature of it (**Figure 2**). A cardiac magnetic resonance imaging was performed. Again, a mass attached to the ventricular side of the PV was confirmed. Also, the cystic nature of the mass was confirmed (**Figure 3**). Furthermore, in the steady state free precession sequences, the cyst appeared to contain another small cyst structure, a daughter cyst, representing a pathognomonic feature of the hydatid cysts (**Figure 4**). The other 2 cysts were detected intramyocardially at the ventricular septum and the left ventricular inferior wall. Later on, the patient confirmed that an echinococcal infection had occurred 20 years earlier.

Cardiac involvement of hydatid disease is a rare but potentially fatal condition. This case demonstrates pathognomonic findings of *Echinococcus* cysts and represents a rare case of multiple cardiac localization of hydatids and, as far as we know, the first documented case of direct PV involvement.

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Author Contributions

Conceptualization: Mangini F, Medico A, Biederman RW, Giaccari R; Data curation: Mangini F, Biederman RW, Giaccari R; Formal analysis: Mangini F; Investigation: Bruno E; Methodology: Casavecchia G; Resources: Giaccari R; Supervision: Bruno E, Biederman RW; Validation: Del Villano R, Biederman RW; Visualization: Muscogiuri E, Del Villano R, Biederman RW; Writing - original draft: Mangini F; Writing - review & editing: Mangini F.

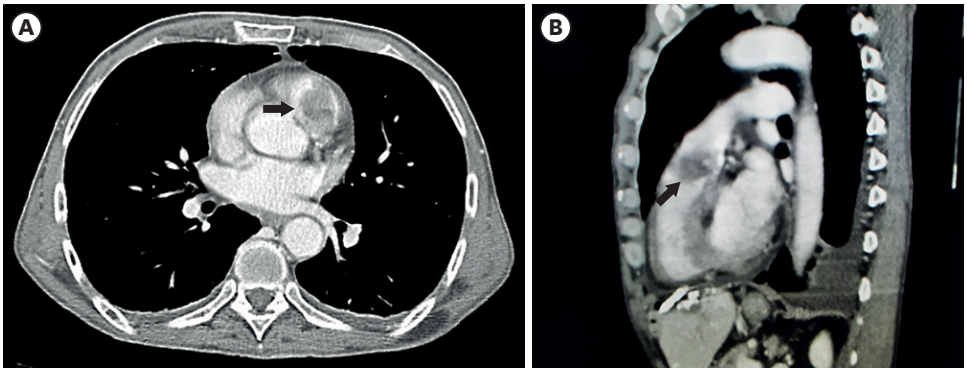

Figure 1. Chest CT angiography. The axial scans revealed a mass, likely at the level of the pulmonary valve (A); the sagittal scans confirmed the presence of the mass and better showed that it was attached to the ventricular side of the pulmonary valve (B). The finding was labeled as a thrombus.
CT: computed tomography.

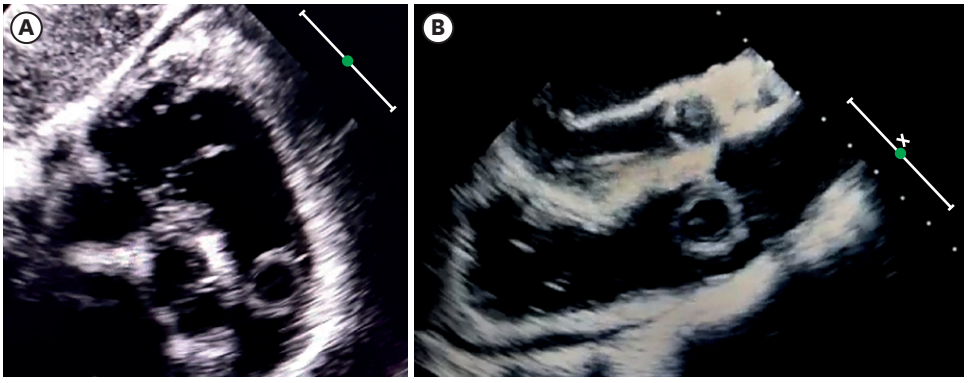

Figure 2. Echocardiographic evaluation. The transthoracic echocardiography confirmed the presence of the mass, attached to the ventricular side of the PV, resulting in mild valve obstruction. The mass showed an anechoic content surrounded by a hyperechoic structure, suggesting the cystic nature of the mass (A); those findings were confirmed by transesophageal echocardiography (B).
PV: pulmonary valve.

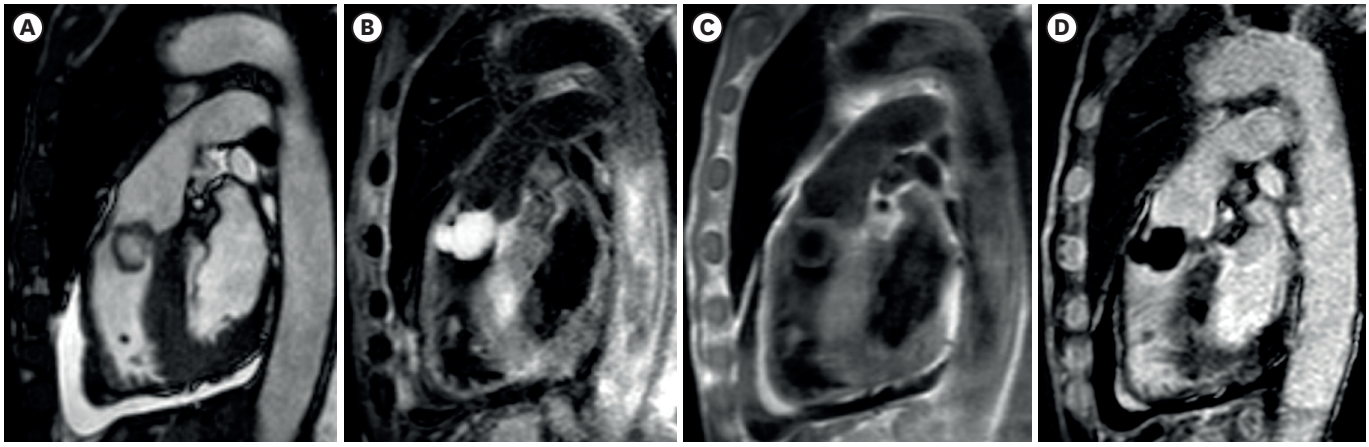

Figure 3. Cardiac magnetic resonance imaging. The mass on the pulmonary valve appeared hollow with hyperintense content in the SSFp sequences (A) and markedly hyperintense (bright) in the triple inversion recovery/T2 sequences (B), hypointense in the double inversion recovery/T1 sequences (C) and markedly hypointense (dark) in the late gadolinium enhancement sequences (D), thus confirming the cystic nature of the mass; besides, in SSFp sequences, the cyst appeared to contain another small cyst structure (daughter cyst).
SSFp: steady state free precession.

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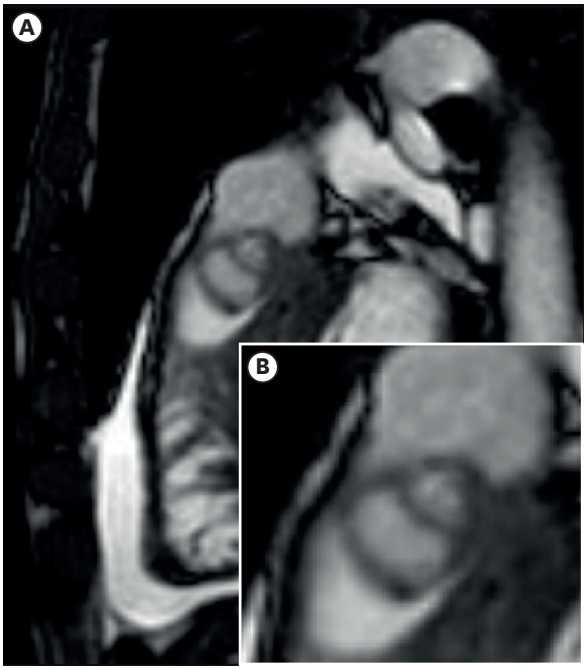

Figure 4. Cardiac magnetic resonance imaging. Steady state free precession sequences. A hollow formation is evident internally in planes focused on the right ventricular outflow tract and pulmonary artery emergence (A). Furthermore, the cyst appeared to contain another small cyst structure, a daughter cyst (B, magnified image).

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