Cardiac hemangiomas are rare vascular tumors that account for 2% to 5% of benign cardiac masses. They are constituted by endothelial cells lining vascular channels, and they can be histologically classified into capillary, cavernous, or arteriovenous hemangiomas. They may affect the endocardium, myocardium, and epicardium of the ventricles, atria, or arteriovenous hemangiomas. They may be complicated by asymptomatic pericardial effusion or pericardial hemangiomas is difficult to predict, and its course may be complicated by asymptomatic pericardial effusion or by recurrent pericardial tamponade.\(^1\)\(^,\)\(^2\) Here, we describe 3 patients with a very rare clinical condition, pericardial hemangioma presenting with pericardial effusion and diagnosed by cardiac magnetic resonance (CMR).

The first patient was a 75-year-old man with a history of hypertension who was complaining of worsening dyspnea. Echocardiography showed an incidental pericardial effusion and a hyperechogenic mass located in the atrioventricular groove. CMR (Figure 1 and Movies I and II in the online-only Data Supplement) confirmed the presence of a mobile, polilobated mass adherent to the atrioventricular groove, which grew like an extracardiac mass in the pericardial space, surrounded by moderate pericardial effusion without tamponade. T1-weighted fast-spin-echo images showed a hypointense border surrounding a hypointense core, whereas T2-weighted short-time inversion-recovery images disclosed a hypointense border surrounding a hypointense core, and gadolinium-first-pass and late-enhancement imaging showed a central, hypointense core. All these characteristics seemed typical of pericardial hemangioma of the atrioventricular groove consisting of a vascular core surrounded by pericardial fat. Coronary angiography confirmed the diagnosis, showing the presence of a vascular tangle perfused by the left circumflex artery.

The second patient was a 73-year-old asymptomatic woman with a history of chronic renal failure who was admitted because of a new-onset pleuro-pericardial effusion. Echocardiography confirmed the severe pericardial effusion, initially referred to her chronic renal failure, with partial atrial collapse. She underwent a CMR scan to better characterize the effusion (Figure 2 and Movie III in the online-only Data Supplement). Cine images showed the presence of 2 pedunculated, partially mobile masses within the large pericardial effusion located in the right and left atrioventricular groove, close to the right and circumflex coronary arteries. As in the previous case, the masses appeared heterogeneously hypo-isointense on T1-weighted fast-spin-echo images and hyperintense in T2-weighted images. Even though the patient was not given any gadolinium contrast agent because of the severe renal failure, all these findings suggested the diagnosis of double pericardial hemangioma of the atrioventricular groove.

The third patient was an 86-year-old woman hospitalized for dyspnea, peripheral edema, and palpitations. Echocardiography identified a moderate pericardial effusion without signs of tamponade and an incidental hyperechogenic mass located inside the pericardial space. She underwent a CMR scan, which showed a noninfiltrating, partially mobile mass adherent to the pericardium of the right atrioventricular groove (Figure 3 and Movie IV in the online-only Data Supplement). The mass presented precontrast and postcontrast signal characteristics similar to those of the previous cases, making the clinicians conclude that the neof ormation could be consider a pericardial hemangioma. All 3 patients were finally referred to a cardiosurgery evaluation.

Pericardial hemangiomas of the atrioventricular groove are rare causes of pericardial effusion. Although the mechanisms underlying the pericardial effusion are unclear, pericardial inflammation from mechanical friction of the tumor or from cytokine release may represent plausible causes; in malignant lesions, even spontaneous rupture of epicardial tumor vessels or local spreading of tumor cells into the pericardium may cause pericardial irritation and effusion\(^3\). Hemangiomas may remain dormant and clinically silent for years, even if they rarely shrink spontaneously. All 3 patients presented relatively well-shaped and homogeneous masses with no apparent local invasiveness or distant metastasis; moreover, the pericardial effusion did not present any signal characteristics of hemorrhagic content. Nevertheless, some heterogeneity in precontrast and postcontrast signal intensity may be found even in primarily benign lesions\(^4\) and may result from the irregular blood vessel size and flow inside the tumor. On the
other hand, malignant hemangiomas (ie, hemangiosarcomas) typically present as single or multiple irregular nodules that infiltrate the myocardium and pericardium and cause distant metastases (often in the lung). On CMR, hemangiosarcomas display a mosaic pattern consisting of nodular areas of increased signal intensity interspersed with areas of intermediate signal intensity on T1- and T2-weighted images as a result of intratumoral hemorrhagic, thrombotic, and necrotic areas. The pericardium is characterized by hematic effusion, irregular metastatic nodules, or even irregular obliteration from the invasive neoplastic mass.

Radical surgical resection of the tumor is the treatment of choice whenever possible, with acceptable operatory risks and favorable long-term outcome for benign hemangiomas. CMR is of utmost clinical utility to assess cardiac morphology and to characterize cardiac masses and pericardial effusions. In particular, it provides crucial information on the size, borders, vascular supply, and benign or malignant nature of the lesions, helping the clinician to plan the most appropriate treatment.

**Disclosures**

None.

**References**


![Figure 1](image1.png)

**Figure 1.** A, Steady-state free-precession long-axis 4-chamber view showing a mass (arrow) with a hyperintense vascular core arising from the visceral pericardium and surrounded by moderate pericardial effusion. B, T1-weighted fast-spin-echo images showing a mass (arrow) with a hyperintense fatty border surrounding a hypointense vascular core. C, T2-weighted short-time inversion-recovery long-axis 4-chamber view showing the same mass (arrow) with a hypo-isointense border surrounding a hyperintense core. D, First-pass long-axis 4-chamber view showing the mass (arrow) with a hyperintense central core after gadolinium injection. E, Late-gadolinium-enhancement images showing signal hyperintensity of the mass (arrow). F, Coronary angiography confirming the presence of a vascular tangle perfused by the left circumflex artery.

![Figure 2](image2.png)

**Figure 2.** A, Steady-state free-precession long-axis 4-chamber view showing 2 mobile masses (arrows) within the pericardial effusion located in the atrioventricular groove. B, T1-weighted fast-spin-echo images displaying the 2 lesions (arrows) with a heterogeneously hypo-isointense signal. C, T2-weighted fast-spin-echo inversion-recovery images showing the 2 masses (arrow) with a hyperintense signal.
Figure 3. A, Steady-state free-precession short-axis view images showing a mobile mass (arrow) adhering to the pericardium of the right atrioventricular groove within the moderate pericardial effusion. B, T1-weighted fast-spin-echo images displaying a isointense mass (arrow) in the right atrioventricular groove. C, T2-weighted fast-spin-echo inversion-recovery images presenting a hyperintense mass (arrow). D, At late-gadolinium-enhancement imaging, the mass (arrow) presented heterogeneous contrast uptake.
Rare Presentation of Asymptomatic Pericardial Effusion: Hemangioma of the Atrioventricular Groove in Cardiac Magnetic Resonance Imaging
Sara Salerni, Andrea Barison, Pier Giorgio Masci and Giovanni Donato Aquaro

Circulation. 2014;130:e15-e17
doi: 10.1161/CIRCULATIONAHA.113.007804
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/130/3/e15

An erratum has been published regarding this article. Please see the attached page for:
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In the article by Salerni et al, “Rare Presentation of Asymptomatic Pericardial Effusion: Hemangioma of the Atrioventricular Groove in Cardiac Magnetic Resonance Imaging,” which published in the July 15, 2014 issue of the journal (Circulation. 2014;130:e15-e17), corrections were needed.

1. In the author byline, the author listed as “Barison Andrea” should be listed as “Andrea Barison.”

2. In the affiliations footnote, “From the Institute of Cardiology, “G.D’Annunzio” University, Chieti-Pescara, Italy (S.S.); and Fondazione “G.Monasterio” CNR-Regione Toscana, Pisa, Italy (B.A., P.G.M., G.D.A.)” should say “From the Institute of Cardiology, “G.D’Annunzio” University, Chieti-Pescara, Italy (S.S.); and Fondazione “G.Monasterio” CNR-Regione Toscana, Pisa, Italy (A.B., P.G.M., G.D.A.).”

The authors regret the errors. The corrections have been made to the online version of the article.