Contrast Echocardiography without Contrast Agent for Display of Intraventricular Mass

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INTRODUCTION
Diagnosing and distinguishing different types of cardiac masses can be challenging by echocardiography. Microbubble contrast agents are useful to confirm diagnosis and characterize tumors, which are crucial for therapeutic management. This is the first report that using just the low–mechanical index contrast imaging technique without injection of a contrast agent may be helpful in assessing a cardiac mass.

CASE PRESENTATION
A 62-year-old woman was referred for transthoracic echocardiography having presented with fatigue and weakness for several weeks prior. The scan revealed a 15 × 20 mm, highly mobile, homogeneous, echogenic mass attached to the mid septal wall of the left ventricle (Figure 1, Video 1). Left ventricular global systolic function was normal, and no regional wall motion abnormality was seen. No signs of left ventricular noncompaction were observed on noncontrast echocardiography. Transesophageal echocardiography confirmed tumor size and attachment. It also demonstrated that the mass was not a papillary muscle. To further assess the mass, cardiac magnetic resonance imaging was arranged, but the findings were nondiagnostic because of motion artifact from the rapidly moving mass. Contrast echocardiography was therefore planned to further assess the nature of the mass.

Before contrast agent administration, very low power (mechanical index 0.07) imaging was performed with transmitted energy similar to what is used for contrast echocardiography, but no contrast was injected in order to cancel signals from myocardial tissue. Interestingly, the unusual bright signal from the mass was displayed on a dark image background (Figure 2, Video 2). One milliliter of diluted Definity (Lantheus Medical Imaging, North Billerica, MA) was then injected intravenously. When the left ventricular cavity and myocardium became opacified, the mass demonstrated similar echogenicity as the myocardium (Figure 3, Video 3), which would be in agreement with the diagnosis of a tumor. The findings on contrast echocardiography were therefore suggestive of a vascularized tumor with fibrotic tissue within.

The tumor was subsequently surgically resected, with a final diagnosis of a papillary fibroelastoma (Figures 4 and 5).

DISCUSSION
Papillary fibroelastomas in the left ventricle are uncommon, benign cardiac tumors. Pathologically, these tumors grossly resemble a “sea anemone” because they are composed of multiple frond-like projections. Histologically these tumors are derived from the endocardium. The macroscopic appearance of these tumors shows that they have a dense core of connective tissue surrounded by elastic fibers, smooth muscle cells, and loose connective tissue covered by endothelium with a lack of vascular structure. The findings in our case demonstrate that the fibroelastic tissue in a tumor provides bright signal in contrast-specific imaging technique without contrast administration. This finding is in agreement with a previous study by Gaibazzi et al. in which the contrast-specific imaging technique was able to identify myocardial scar or fibrotic tissue in patients with coronary artery disease. Although a papillary fibroelastoma is an avascular tumor, it can appear vascularized after contrast injection because a contrast agent can disperse between the finger-like structures, resulting in an incorrect assumption of a vascularized tumor. Physicians should be aware of this finding when assessing a cardiac tumor’s vascularity using contrast echocardiography.

CONCLUSIONS
Contrast echocardiography has potential value in helping diagnose a papillary fibroelastoma in the left ventricle. The contrast-specific imaging technique can detect fibrotic tissue in a papillary fibroelastoma, in a fashion similar to the concept of contrast echocardiography assessing scar tissue without requiring the administration of contrast agents.

SUPPLEMENTARY DATA
Supplementary data related to this article can be found at https://doi.org/10.1016/j.case.2018.01.004.
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