
**Color Doppler Features of Left Ventricular Pseudoaneurysm**

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A patient had left ventricular pseudoaneurysm after mitral valve replacement surgery. The diagnosis was made by color flow Doppler demonstration of systolic flow between the left ventricular chamber and an echo-free space posterior to the heart which was initially interpreted as localized pleural effusion. Color Doppler features of this entity have not been previously described. Color flow cardiac Doppler enhances echocardiographic and pulsed Doppler diagnosis of left ventricular pseudoaneurysms. (Chest 1989; 95:231-32)

False aneurysms or pseudoaneurysms of the left ventricle occur following rupture of the myocardium after infarction,1 cardiac trauma or surgery,2 infective endocarditis,3 and syphilis.4 Prompt recognition can allow for surgical repair of this potentially fatal condition.5 M-mode, two-dimensional echocardiography and pulsed Doppler ultrasound are of value in diagnosing pseudoaneurysms of the left ventricle.2,4 We present color Doppler features of a submitial left ventricular pseudoaneurysm which heretofore were unreported.

**CASE REPORT**

A 31-year-old white woman with a history of intravenous drug abuse was admitted in June 1984 with *Staphylococcus aureus* endocarditis. She had severe mitral valvular insufficiency and underwent mitral valve replacement surgery with a bioprosthetic valve.

She presented again in November 1986 with recurrent staphylococcal endocarditis and embolic stroke and underwent bioprosthetic mitral valve replacement. At surgery, the prosthetic valve was covered with a pannus, and a separation was noted between the left atrium and left ventricle along the posterior aspect of the valve ring. This was closed with buttressed sutures and a xenograft valve was implanted.

In February 1987, she presented with sudden onset of left pleuritic chest pain. Physical examination revealed temperature of 37°C, pulse rate of 100 beats per minute, and BP of 110/70 mm Hg. A grade 2/6 holosystolic murmur was heard at the lower left sternal border and apex. Echocardiogram revealed normal appearing bioprothetic mitral valve and an echo-free space posteriorly (Fig 1). This was interpreted as possible loculated postoperative pleural fluid. Pulsed Doppler ultrasound revealed no mitral bioprosthetic valve regurgitation. Color flow Doppler imaging performed the next day revealed high velocity systolic flow into the echo-free space (Fig 2). This established that this space was communicating with the left ventricle. Cardiac catheterization and left ventriculography reaffirmed a normal functioning bioprosthetic mitral valve and the pseudoaneurysm of the left ventricle. She underwent repair of the pseudoaneurysm and replacement of the mitral valve with another bioprosthetic valve. The postoperative course was uneventful. Color flow Doppler and echocardiogram, however, continue to demonstrate a small residual submitial left ventricular pseudoaneurysm.

**DISCUSSION**

True aneurysms of the left ventricle are more common than pseudoaneurysms. On pathologic examination, true aneurysms have a fibrous connective tissue wall interspersed with myocardial elements. The walls of pseudoaneurysms consist of fibrous tissue and pericardium, not myocardium, and therefore, carry a high risk for rupture.5 Clinically, pseudoaneurysm and true aneurysm can be complicated by congestive heart failure, ventricular tachyarrhythmia, sys...

![Figure 1](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21587/ on 06/24/2017)
temic embolization, and infective endocarditis. The incidence of pseudoaneurysm of the left ventricle following mitral valve surgery varies from 0.5 to 1 percent. Although infective endocarditis by itself can lead to submural pseudoaneurysm, in our patient, this probably resulted from extensive resection of the left atrium and mitral annulus during her first valve surgery.

Demonstration of an echo-free space posteriorly or posterolaterally by echocardiography is seen in submural pseudoaneurysms.* The presence of a narrow orifice differentiates a pseudo from a true left ventricular aneurysm. These findings are helpful in confirming the presence of pseudoaneurysm, but they are not specific. Pseudoaneurysm was not suspected clinically in our patient, and the initial echo interpretation was of a loculated pleural effusion. Color flow Doppler clearly demonstrated flow into the echo-free space and resulted in the correct diagnosis. Pulsed Doppler ultrasound may also have aided in the diagnosis, but the echo-free space of presumed pleural effusion was not interrogated by the pulsed Doppler probe.

In conclusion, color flow Doppler enhances the echocardiographic and pulsed Doppler diagnosis of left ventricular pseudoaneurysms.

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Pulmonary Artery Thrombus Detection by Magnetic Resonance Imaging*

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We report a patient in whom cardiac magnetic resonance imaging detected a clinically unsuspected pulmonary artery thromboembolus. Follow-up MRI after surgical removal of the thromboembolus showed normal pulmonary arteries. This case illustrates the potential utility of MRI in the detection and follow-up of central pulmonary artery thromboembolism. (Chest 1989; 95:232-34)

We report a patient in whom magnetic resonance imaging detected the presence of a clinically unsuspected right pulmonary artery thromboembolus.

CASE REPORT

A 30-year-old man was hospitalized with painful swelling of the left leg and toes. Physical examination revealed a cold, pulseless foot and a grade 3/6 systolic ejection murmur at the left sternal border.

Two-dimensional echocardiography showed right atrial and ventricular enlargement with a normal left ventricle, intact atrial and ventricular septa, and no valvular vegetations. An aortobifemoral arteriogram revealed a blunt occlusion of the left superficial femoral artery consistent with an embolus. The patient underwent endarterectomy, embolectomy and angioplasty. A postoperative chest radiograph showed a nodular density in the right lower lobe which subsequently cavitied.

The patient was referred for magnetic resonance imaging to further evaluate the possibility of an atrial septal defect.

Cardiac gated MRI was performed using a Siemens Magnetom with a 1.0 Tesla superconducting magnet. Ten mm thick coronal and 5 mm thick axial images were obtained using a dual spin echo multislice technique with TEs of 25 and 56 ms and a TR of 520 ms. The transaxial images revealed a well-defined region of high signal intensity filling most of the main and virtually all of the proximal right pulmonary artery (Fig 1). The intensity of this abnormal intravascular signal decreased by 45 percent from the first to the second echo and did not vary as a function of the phase of the cardiac cycle. The extent and shape of the apparent mass remained constant from the first to the second echo and throughout the cardiac cycle. No intravascular signal was observed in other regions of the pulmonary artery. Coronal images also revealed the presence of this abnormal signal (Fig 2), although its location and extent were better delineated on the transaxial images.

Both the interatrial and interventricular septa appeared intact and no intracardiac mass was observed. Additionally, MRI showed a pulmonary parenchymal process in the right lower lobe which appeared as a ring of high signal intensity surrounding a region of lower signal intensity.

We interpreted the MRI study as showing the presence of a large, probably thromboembolic mass within the main and right pulmonary arteries and a cavitating right lower lobe pulmonary infarct.

Cardiac catheterization immediately following the MRI revealed mild pulmonary hypertension with a pulmonary artery pressure of 45/25 mm Hg (mean 30 mm Hg). Pulmonary angiography confirmed complete occlusion of the right pulmonary artery by a thromboembolus projecting into the main pulmonary artery. No intracardiac

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