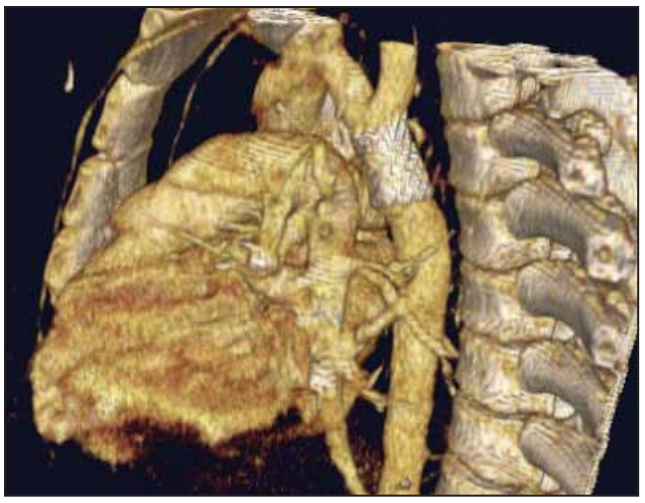
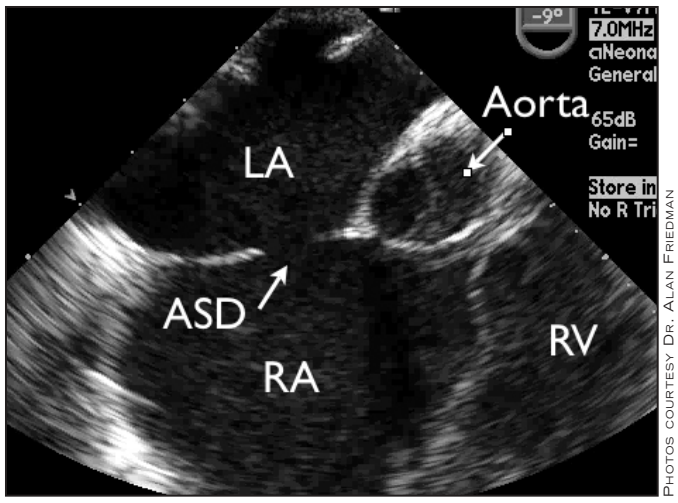


A CT scan with three-dimensional reconstruction shows a stent placed in this patient to aortic coarctation. With three-dimensional echocardiography, physicians can obtain real-time images of the atrial septum, mitral valve, and aortic valve structure.



Photos courtesy Dr. Alan Friedman

A transesophageal echocardiogram shows a secundum atrial septal defect (ASD) in a toddler. This technology provides excellent anatomic definition because lungs, bone, and muscle do not interfere with the imaging (LA, left atrium; RA, right atrium; RV, right ventricle).

References: **1.** Rubens C, Ewert R, Halank M, et al. Big endothelin-1 and endothelin-1 plasma levels are correlated with the severity of primary pulmonary hypertension. *Chest.* 2001;120:1562-1569. **2.** Lüscher TF, Yang Z, Tschudi M, et al. Interaction between endothelin-1 and endothelium-derived relaxing factor in human arteries and veins. *Circ Res.* 1990;66:1088-1094. **3.** Yanagisawa M, Kurihara H, Kimura S, et al. A novel potent vasoconstrictor peptide produced by vascular endothelial cells. *Nature.* 1988;332:411-415. **4.** Murakoshi N, Miyauchi T, Kakinuma Y, et al. Vascular endothelin-B receptor system in vivo plays a favorable inhibitory role in vascular remodeling after injury revealed by endothelin-B receptor–knockout mice. *Circulation.* 2002;106:1991-1998. **5.** Peacock AJ, Rubin LJ, eds. *Pulmonary Circulation: Diseases and Their Treatment.* 2nd ed. London: Arnold; 2004. **6.** Fukuroda T, Fujikawa T, Ozaki S, Ishikawa K, Yano M, Nishikibe M. Clearance of circulating endothelin-1 by ET_B receptors in rats. *Biochem Biophys Res Commun.* 1994;199:1461-1465. **7.** Verhaar MC, Strachan FE, Newby DE, et al. Endothelin-A receptor antagonist–mediated vasodilatation is attenuated by inhibition of nitric oxide synthesis and by endothelin-B receptor blockade. *Circulation.* 1998;97:752-756. **8.** Halcox JPJ, Nour KRA, Zalos G, Quyyumi AA. Coronary vasodilation and improvement in endothelial dysfunction with endothelin ET_A receptor blockade. *Circ Res.* 2001;89:969-976. **9.** Giaid A, Yanagisawa M, Langleben D, et al. Expression of endothelin-1 in the lungs of patients with pulmonary hypertension. *N Engl J Med.* 1993;328:1732-1739. **10.** Hankins SR, Horn EM. Current management of patients with pulmonary hypertension and right ventricular insufficiency. *Curr Cardiol Rep.* 2000;2:244-251. **11.** Spieker LE, Noll G, Ruschitzka FT, Lüscher TF. Endothelin receptor antagonists in congestive heart failure: a new therapeutic principle for the future? *J Am Coll Cardiol.* 2001;37:1493-1505. **12.** Jeffery TK, Wanstall JC. Pulmonary vascular remodeling: a target for therapeutic intervention in pulmonary hypertension. *Pharmacol Ther.* 2001;92:1-20. **13.** Lüscher TF, Barton M. Endothelins and endothelin receptor antagonists: therapeutic considerations for a novel class of cardiovascular drugs. *Circulation.* 2000;102:2434-2440. **14.** Chen SJ, Chen YF, Opgenorth TJ, et al. The orally active nonpeptide endothelin A-receptor antagonist A-127722 prevents and reverses hypoxia-induced pulmonary hypertension and pulmonary vascular remodeling in Sprague-Dawley rats. *J Cardiovasc Pharmacol.* 1997;29:713-725. **15.** Ihara M, Noguchi K, Saeki T, et al. Biological profiles of highly potent novel endothelin antagonists selective for the ET_A receptor. *Life Sci.* 1992;50:247-255. **16.** Williamson DJ, Wallman LL, Jones R, et al. Hemodynamic effects of bosentan, an endothelin receptor antagonist, in patients with pulmonary hypertension. *Circulation.* 2000;102:411-418. **17.** Clozel M, Breu V, Gray GA, et al. Pharmacological characterization of bosentan, a new potent orally active nonpeptide endothelin receptor antagonist. *J Pharmacol Exp Ther.* 1994;270:228-235.

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measurement of right and left ventricular function. Unlike echocardiography, its results are not subject to variable interobserver interpretation. He recommended PET scanning for assessing myocardial metabolism, perfusion, and viability.

Dr. Friedman said ultrafast CT scanning produces very-high-resolution images that can provide excellent information on blood flow and cardiac function. It also can assess areas of stenosis, particularly in the distal pulmonary artery, that are missed by echocardiography.

Although not yet portable, MRI and MR angiography also offer excellent resolution, according to Dr. Friedman, but without the high doses of radiation with CT scanning. Three-dimensional images are already available for surgical planning, he said, and MR cardiac catheterization laboratories are being developed. ■

Doppler Able to Determine the Nature of HCM

Doppler myocardial imaging to assess systolic activation delay can help determine whether a condition is hypertrophic cardiomyopathy or merely the result of athletic training—and help predict serious adverse cardiac events, Italian researchers reported.

Dr. Antonello D'Andrea of the Second University of Naples (Italy) and colleagues followed 70 patients with hypertrophic cardiomyopathy (HCM) and 85 age- and sex-matched competitive athletes with enlarged left ventricles and interventricular septa thicker than 12 mm (Br. J. Sports Med. 2006;40:244-50).

During the 4-year follow-up, the study's primary end point was cardiovascular mortality. Eight HCM patients died during follow-up; none of the athletes had a cardiovascular event. The participants were aged 29 years on average and were matched for blood pressure. Eighty percent of them were male. All had standard pulsed Doppler echocardiography and pulsed Doppler myocardial imaging in six myocardial segments. HCM patients showed a "significant global Doppler interventricular delay," the authors said. One-fifth of the HCM patients had a relative who had died from an HCM-related cardiac event.

—John R. Bell