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Estimation of two-dimensional intraventricular velocity and pressure maps by digital processing conventional color-Doppler sequences DAMIEN GARCIA, Hospital Gregorio Maranon, Madrid, Spain (HGM), JUAN C. DEL ALAMO, UC San Diego, DAVID TANNE, IRPHE, Marseille, France, CRISTINA CORTINA, RAQUEL YOTTI, FRANCISCO FERNANDEZ-AVILES, JAVIER BERMEJO, HGM — Clinical echocardiographic quantification of blood flow in the left ventricle is limited because Doppler methods only provide one velocity component. We developed a new technique to obtain two-dimensional flow maps from conventional transthoracic echocardiographic acquisitions. Velocity and pressure maps were calculated from color-Doppler velocity (apical long-axis view) by solving the continuity and Euler equations under the assumptions of zero transverse fluxes of mass and momentum. This technique is fast, clinically-compliant and does not require any specific training. Particle image velocimetry experiments performed in an atrioventricular duplicator showed that the circulation and size of the diastolic vortex was quantified accurately. Micromanometer measurements in pigs showed that apex-base pressure differences extracted from two-dimensional maps qualitatively agreed with micromanometer data. Initial clinical measurements in healthy volunteers showed a large prograde vortex. Additional retrograde vortices appeared in patients with dilated cardiomyopathy and left ventricular hypertrophy.

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