

24th Annual

Cardiologists Conference

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Diastology: Pathophysiology of relaxation and filling pressure

Doppler echocardiography can characterize left ventricular diastolic function through a combination of measurements, which show evidence of slowed ventricular relaxation, increased left ventricular stiffness or abnormal left ventricular filling. Doppler echocardiography can also provide an estimate of left ventricular filling pressures, one component of diastolic function that reflects pulmonary capillary wedge pressure. These parameters have been shown to correlate with exercise capacity. A normal diastolic function response to exercise is characterized by normal and similar resting and exercise E/e' measurements. Elevated left ventricular filling pressure is a cardinal feature of heart failure with preserved ejection fraction (HFpEF). The ratio of transmitral E to mitral annular e' velocities (E/e') at Doppler echocardiography has been proposed as a non-invasive measure of left ventricular filling pressure and endorsed by professional guidelines as a surrogate parameter of invasive left ventricular filling pressure in the diagnostic work-up of HFpEF. The diagnosis of HFpEF is straightforward when patients are acutely decompensated. To make matters more complex, many patients with HFpEF display normal left ventricular filling pressures at rest, with abnormalities that develop during stresses like exercise. Invasive hemodynamic exercise testing has emerged as the gold standard to diagnose or exclude HFpEF in patients with exertional dyspnea of unclear etiology, but cost, risk, and the requirement for specialized training and equipment may limit its broad application in practice and in clinical trials. Therefore, Doppler echocardiography plays a central role in the non-invasive evaluation and grading of diastolic dysfunction. The American College of Cardiology Foundation/American Heart Association Guidelines define HFpEF as clinical signs and symptoms of HF, preserved ejection fraction, and no other obvious explanation for symptoms. This scheme works well for patients with a high likelihood of disease on the basis of clinical indicators of congestion. To address the patients without overt congestion, more recent guideline statements from the European Society of Cardiology (ESC) and American Society of Echocardiography/European Association of Cardiovascular Imaging (ASE/EACVI) require objective evidence of high left ventricular filling pressures.

Recent Publications

1. Hiroyuki O, Hiirou I, Miyo T, et al. (2000) Impact of Doppler derived left ventricular diastolic performance on exercise capacity in normal individuals. *Am Heart J* 139(4):716-722.
2. Borlaug B A and Paulus W J (2011) Heart failure with preserved ejection fraction: pathophysiology, diagnosis, and treatment. *Eur Heart J* 32:670-679.
3. Ponikowski P, Voors A A, Anker S D, Bueno H, Cleland J G, Coats A J, Falk V, González-Juanatey J R, Harjola V P, Jankowska E A, Jessup M, Linde C, Nihoyannopoulos P, Parissis J T, Pieske B, Riley J P, Rosano G M, Ruilope L M, Ruschitzka F, Rutten F H and van der Meer P (2016) ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: the task force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur Heart J* 37:2129-2200.
4. Nagueh S F, Appleton C P, Gillebert T C, Marino P N, Oh J K, Smiseth O A, Waggoner A D, Flachskampf F A, Pellikka P A and Evangelisa A (2009) Recommendations for the evaluation of left ventricular diastolic function by echocardiography. *Eur J Echocardiogr.* 10:165-193.

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Biography

Fabiola B Sozzi works as a Staff Cardiologist at University Hospital Policlinico of Milan, Italy, with high-specialization nomination. She has high skills in multimodality imaging of heart disease using echocardiography integrated with cardiac magnetic resonance imaging, cardiac computed tomography and nuclear. She also works in the acute clinical setting treating acute cardiac syndromes. She gained a high expertise in echocardiography at Thoraxcenter of Rotterdam (NL), where she defended PhD thesis on "Stress cardiac imaging" under the supervision of Professor J Roelandt. She is Visiting Professor at University of Milan where she leads several research projects and teaches at Faculty of Medicine and School of Specialization of Cardiology. She is author of 70 papers published in indexed peer-reviewed international journals and reviewer of several medical international journals.

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