

# 18<sup>th</sup> Annual Cardiologists Conference

June 19-21, 2017 Paris, France



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### **Diastolic stress echocardiography: How and when to perform it**

There is growing evidence that the diastolic stress test can provide important diagnostic findings helpful in the management of patients presenting with dyspnea of an unclear etiology. Many patients present with exertional dyspnea and exercise intolerance, but have normal left ventricular filling pressures at rest. In these patients, it is important to evaluate filling pressure with exercise. Exercise can be performed using a supine bicycle or treadmill protocol. Alternatively dobutamine can be used, though its vasodilator as well as inotrope effect determine a very different hemodynamic response compared to that of exercise. We need to record mitral inflow by pulsed Doppler echocardiography at the level of the mitral tips, mitral annular velocities by spectral Doppler echocardiography, and tricuspid regurgitation jet by continuous-wave Doppler at baseline and after the termination of exercise. Diastolic function parameters can be obtained soon after the assessment of regional wall motion abnormalities, especially when an exercise echocardiogram is performed for the evaluation of dyspnea. In patients with diastolic heart failure, left atrial pressure is increased, leading to an increase in mitral E velocity, whereas annular e' velocity remains reduced given the limited preload effect on e'. Moreover, an increase in the pulmonary artery systolic pressure can be detected by the increase in peak velocity of the tricuspid regurgitation jet. On the other hand, in the absence of cardiac disease, e' increases to a similar extent to the increase in mitral E velocity, and the normal E/e' ratio essentially is unchanged with exercise. The concept of the diastolic stress test was introduced more than 10 years ago. Subsequently, exercise E/e' ratio was validated against invasive measurements. Importantly, exercise septal E/e' ratio was an important determinant of exercise capacity, and its decline with age was noted in a large series of patients referred for exercise echocardiography. Furthermore, a recent study showed the incremental prognostic value of exercise E/e' ratio over clinical variables and exercise wall motion score index. In conclusion, diastolic stress test has an interesting role in patients with heart failure and preserved ejection fraction that present symptoms during activity, normal ejection fraction and inconclusive diastolic function at rest.

### **Biography**

Fabiola B Sozzi works as a Staff Cardiologist at University Hospital Policlinico of Milan, Italy. 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 has expertise in Echocardiography at Thoraxcenter of Rotterdam (NL), where she defended her PhD thesis on Stress Cardiac Imaging under the supervision of Professor J Roelandt. She is a 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 an Author of 70 papers published in peer-reviewed international journals and Reviewer of several medical international journals.

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