

IS DYNAMIC LEFT VENTRICULAR DYSSYNCHRONY A NOVEL SURROGATE MARKER IN THE PATIENT WITH HYPERTENSION?

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REFER TO THE PAGE 174-180

Recently, dynamic left ventricular dyssynchrony (LVD) using exercise echocardiography (ExE) become a promising method in many cardiovascular disease, because it can unveil the pathophysiology, can predict the prognosis and also would be a possible surrogate marker in the treatment monitoring.^{1,2)} Especially in the field of cardiac resynchronization therapy, it would be a useful tool for patient selection, the prediction of response and optimization method during exercise.³⁾ Although dynamic LVD can be measured by simply manipulating loading condition using sublingual nitroglycerine and leg-raising maneuver,^{4,5)} ExE can be provide more additional information about myocardial ischemia, diastolic function, pulmonary hypertension and exercise capacity.

The presence of left ventricular hypertrophy (LVH) and concentric remodeling is related to the prognosis of hypertensive patients. However, there were few report about the relationship of LVH and dynamic LVD. Seo et al.⁶⁾ reported that systolic LVD during exercise is significantly associated with the degree of LVH in hypertensive patients. Although dyssynchrony was impaired in both LVH and non-LVH group at resting, exercise could differentiate these. Systolic and diastolic dyssynchrony were exaggerated more in LVH group compared to non-LVH one. And, as we expected, the presence of LVH could limit the exercise duration even adjusting for age, sex and diastolic dysfunction. It means ExE can provide a valuable suggestion between the pathophysiology of hypertensive LVH and exertional dyspnea. As authors described in discussion, hypertension impairs left ventricular function not only by influencing myocardial function, but also by impairing left ventricular synchronicity.

Other interesting finding in this article is about the gender

difference in LVD. Although they do not perform a subgroup analysis, transmitral E/mitral annular E' ratio at 50 watts of exercise was much more elevated in women compared to men, and the standard deviation (SD) of 12 segments the time from Q wave to myocardial early diastolic velocity (TPe) at peak exercise as well as modified SD of TPe (calculated considering heart rate) at peak exercise was very prolonged. It explains short exercise duration because women may be vulnerable to increase left atrial pressure and diastolic dyssynchrony at exercise. It may suggest the difference pathophysiologic mechanism on the progression of hypertensive heart disease in female compared to male. It need a further future investigation about that.

In conclusion, dynamic LVD through ExE is probably one of the important topics in the hypertensive heart disease, because it will provide prognostic information and could be a surrogate marker for treatment monitoring.

REFERENCES

1. Cheung YF, Yu W, Li SN, Lam WW, Ho YC, Wong SJ, Chan GC, Ha SY. *Dynamic dyssynchrony and impaired contractile reserve of the left ventricle in beta-thalassaemia major: an exercise echocardiographic study.* *PLoS One* 2012;7:e45265.
2. D'Andrea A, Mele D, Nistri S, Riegler L, Galderisi M, Agricola E, Losi MA, Ballo P, Mondillo S, Badano LP; On behalf of the Working Group Nucleus on Echocardiography of the Italian Society of Cardiology. *The prognostic impact of dynamic ventricular dyssynchrony in patients with idiopathic dilated cardiomyopathy and narrow QRS.* *Eur Heart J Cardiovasc Imaging* 2012. {Epub ahead of print}
3. Lancellotti P, Moonen M. *Left ventricular dyssynchrony: a dynamic condition.* *Heart Fail Rev* 2012;17:747-53.
4. Kim MS, Kim HK, Chang SA, Kim SY, Cho GY, Kim YJ, Sohn DW, Oh BH, Park YB. *Impact of preload alteration on left ventricular mechanical dyssynchrony using tissue velocity imaging echocardiography.* *Echocardiography* 2011;28:196-202.
5. Park HE, Chang SA, Kim HK, Shin DH, Kim JH, Seo MK, Kim YJ, Cho GY, Sohn DW, Oh BH, Park YB. *Impact of loading condition on the 2D speckle tracking-derived left ventricular dyssynchrony index in*

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nonischemic dilated cardiomyopathy. Circ Cardiovasc Imaging 2010; 3:272-81.

6. Seo HS, Cho YH, Choi JH, Suh J, Lee NH, Lim OK. *The Associa-*

tion of left ventricular hypertrophy with intraventricular dyssynchrony at rest and during exercise in hypertensive patients. J Cardiovasc Ultrasound 2012;20:174-80.