

Echocardiographic Evaluation of Arterial Stiffness

Kye Hun Kim, MD, PhD
Chonnam National University Hospital, Korea

Arterial stiffness is now an established risk factor for cardiovascular diseases or events. Several methods, both invasive and noninvasive, have been applied to the assessment of arterial stiffness. Measurement of pulse wave velocity (PWV) or pulse wave analysis has been widely studied and used as standard methods to evaluate arterial stiffness.

With the technical advance of echocardiography, noninvasive measurements of subclinical or overt changes associated with arteriosclerosis or atherosclerosis became a promising challenge. Both transthoracic and transesophageal echocardiography are useful methods for the evaluation of arterial stiffness. Several parameters such as aortic diameter change, aortic strain, elastic modulus, and aortic stiffness index β can be measured and used to evaluate arterial stiffness by 2-D echocardiography with M-mode. Echocardiography also can be used for the measurement of PWV by obtaining the arterial waves simultaneously at the common carotid and femoral arteries with two transducers. Recent studies have suggested that aortic or carotid arterial strain analysis using tissue Doppler image or 2D speckle tracking method can be a new alternative method in the evaluation of arterial stiffness. Furthermore,

some investigators suggested the usefulness of 3-D echocardiography in the evaluation of the arterial stiffness.

The useful echocardiographic techniques to evaluate arterial stiffness will be reviewed and discussed in this review.