There is growing recognition that lifestyle-related diseases, including dyslipidemia, type 2 diabetes, hypertension, visceral obesity, are alarmingly large public health concerns, because they are now the major causes of atherosclerotic cardiovascular diseases (ASCVDs) and premature death worldwide. Early detection of atherosclerotic lesions is arguably important not only in symptomatic but also high-risk patients. Toward this end, an accurate, simple, and non-invasive method for screening vascular lesions or functions is required urgently. In the evaluation of ASCVDs, the meaning of “non-invasive” examination is sometimes ambiguous and depends on the situation. Cardiac catheterization has generally been considered as an invasive examination, and then how about computed tomographic coronary angiography (CTCA) and single photon emission computed tomography (SPECT) are? The frequency of major complications, containing fatal ones, is much lower in CTCA and SPECT than that in cardiac catheterization. However, in both CTCA and SPECT, patients receive a certain amount of radiation exposure; moreover, loading of the contrast medium is essential in CTCA. Therefore, it is ambiguous whether CTCA and SPECT can really be considered non-invasive in this sense and whether it is acceptable to perform CTCA and SPECT repeatedly in low-risk patients for screening or follow-up. Research in the field of CTCA and SPECT is still ongoing to overcome the challenge of reducing radiation exposure and the amount of the contrast medium.

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reliable diagnostic tool for patients with suspected ASCVDs or those at high risk of ASCVDs.

Lee et al. reported, as published in the current issue of J Atheroscler Thromb, that baPWV, in combination with SPECT, was useful in the risk evaluation of patients newly suspected of CAD. They retrospectively analyzed 350 patients who were suspected of CAD and evaluated with baPWV and SPECT. Following the patients after these examinations for 441 days (median), cardiovascular events were confirmed in 21 patients. In multivariable Cox regression analysis, baPWV and abnormal myocardial perfusion detected with SPECT were both independent predictors of cardiovascular events. In addition, high baPWV had an incremental prognostic value to traditional risk factors of atherosclerosis and abnormal myocardial perfusion in predicting cardiovascular events.

Management of ASCVDs should be considered in terms of factors such as patient risks, primary or second prevention, and ethnic difference. A Japanese study showed that aspirin administration as the primary prevention for ASCVDs did not reduce cardiovascular events, probably due to the low ASCVD event rates in the Japanese population. This study also suggested the importance of identifying and screening high-risk patients, possibly by combination of reliable non-invasive and invasive vascular examinations. On the other hand, statins are the most effective drug for reducing the risks of ASCVDs; however, there remains a residual risk of over 30%. To deal with these unsolved problems, it would be useful to pursue the significance of combined vascular examinations.

Results of non-invasive vascular examinations have been so far applied only for risk evaluation at each time point but not for the prediction of patient prognosis. Acute coronary syndrome does not necessarily occur from severe organic stenosis of coronary arteries, and it is critical to detect the so-called vulnerable plaque. Although SPECT or baPWV, by itself, is not perfect to predict the future onset of acute coronary syndrome, the study by Lee et al. indicates that these non-invasive methods might be a useful tool, if combined, to estimate the progression of CAD. Patients at high risk of ASCVDs are the most adequate candidates for combined non-invasive examinations. Non-invasive examinations can be regularly repeated during the follow-up period, and we could use invasive examinations only if the patient reaches the warning zone.

A number of studies have tried to clarify what combination of invasive and non-invasive methods is best to reflect the risk of ASCVDs; however, no conclusive results have been obtained. In the past decades, the goal for clinical medicine has moved from the preventive to the “preemptive” direction, in which we aim to predict and manage each disease before onset. From the viewpoint of “preemptive” medicine, it is therefore important to perform more clinical trials and accumulate data as reported by Lee et al.

Conflicts of Interest
None.

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