The Predictive Role of Carotid Intima-media Thickness: What is the Clinical Relevance?

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Carotid intima-media thickness (CIMT) has long been known as a surrogate marker for cerebrovascular and cardiovascular events.[1-3] Although the data is still controversial in several meta-analysis, increased CIMT has been proven to be correlated with future event of stroke or acute coronary syndrome.[1,4] Diabetes is an important risk factor for endothelial dysfunction and atherosclerosis.[1] It has been estalished that diabetes is an independent risk factor for macro- and microvascular complications.[5] Thus, diabetes, increased CIMT and macrovascular complications are a continuum chain.

In this issue, Acta Medica Indonesiana – The Indonesian Journal of Internal Medicine is introducing a study conducted by Indra Wijaya et al.[6] with a title of "Scoring system development and additional value of albuminuria to estimate carotid intima-media thickness (CIMT) in type-2 diabetes mellitus patients". In their study, Wijaya et al.[6] have exposed the role of CIMT as a surrogate marker for endothelial dysfunction, which may occur in systemic circulation, both in small and large blood vessels. The early paragraphs of the study show the evidences of macrovascular endothelial dysfunction by citing results of several studies such as the Cardiovascular Health Study (CHS), Atherosclerosis Risk in Communities Study (ARIC), the Insulin Resistance Atherosclerotic Study (IRAS), and Carotid Atherosclerosis Progression Study (CAPS); while the microvascular endothelial dysfunction is shown by citing the Prevention of Renal and Vascular End Stage Disease (PREVEND) Study. Their study also has proposed the additional value of albuminuria in estimating CIMT. Albuminuria itself is a surrogate marker for nephropathy, which is one of microvascular complications of diabetes. In other words, Wijaya tell us both conditions are happen vice versa.

Albuminuria is an important risk factor and can be a good predictor for renal impairment and cardiovascular events.[7] CIMT also has a role as a strong predictor for cardio- and cerebrovascular events. There have been only few studies on the correlation between albuminuria and CIMT. In addition to the Wijaya et al.[6] study, a study conducted by Jadhav UM and Kadam NN[8] in Western Indian population also has showed a strong correlation between microalbuminuria and increased CIMT as well as coronary artery disease in diabetic patients. However, the measurement of CIMT by carotid ultrasound has several limitations as has been mentioned in Wijaya's manuscript; therefore, a modest and simple approach such as a scoring system to estimate thickening of CIMT is essential.

The results of the Wijaya's study have shown that there is only a 2.3% increase on diagnostic value of CIMT compared to previous model using three variables (duration of diabetes, hypertension, dyslipidemia). Moreover, albuminuria could also increase the cost of treatment, which has not been included in the final model. The scoring system, which is developed using those three variables, can be used as a screening tool for

early diagnosis and to determine whether the patients should undergo carotid ultrasound test. The study provides new evidences on the correlation between microalbuminuria and carotid intima-media thickness or between micro- and macrovascular complication.

Carotid intima-media thickness is a useful tool for detecting the severity of subclinical vascular disease and atherosclerosis. It can predict future cardiovascular and cerebrovascular events. It is a safe and non-invasive procedure for promoting primary and secondary prevention of cardiovascular disease. The carotid ultrasound is a rising star for detecting CIMT since there are some limitations of traditional risk factors in the Framingham Study risk stratification to predict cardiovascular events.[9] CIMT also provides precise information about the burden of atherosclerosis when electrocardiogram has not yet found any abnormality. Some studies have also found that information obtained from CIMT imaging using ultrasound is similar with pathological findings under the microscope.[9]

Nowadays, not all diabetes and endocrinology associations recommend carotid ultrasound as a routine screening tool for subclinical atherosclerosis in diabetes patients, including the Indonesian Society for Endocrinologists (Perkumpulan Endokrinologi Indonesia – PERKENI). Nevertheless, several studies have concluded the benefit of screening for asymptomatic type 2 diabetes patients with severe coronary artery disease, which may have equivalent benefits to revascularization. Clinicians have to consider that carotid ultrasound is an operator-dependent approach and we must carefully perform patient screening for those who are indicated to have carotid ultrasound test. A screening tool as proposed by Wijaya et al.[6] can be one of screening tests for clinical purpose.

Along with Indra Wijaya's article, in this issue, we are also publishing several studies written by distinguished physicians and researchers, such as Cosphiadi Irawan who has jotted down several biomarker expressions of breast cancer bone metastasis (CXCR4, IL11-RA, TFF1, and MLF1P) and Fauzi Yusuf who has presented his study about new markers and microbiota composition for colorectal cancer patients. A large study about survival of acute respiratory distress syndrome by Zulkifli Amin will give us new evidences and perspective on critical respiratory care service in a tertiary hospital in Indonesia. In this issue, we are also focusing on many other studies, reviews, and case reports written by general internists and consultant internists in Indonesia in addition to a study from Bangkok, which was carried out by Phuping Akavipat. The Bangkok researchers have studied on the parameters affecting the length of stay at the intensive care unit among neurosurgical patients in their center. Finally, please enjoy reading our journal. Let the evidences be the part of our reference to perform the best clinical care for our patients.

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