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## Spasm Provocation Tests can Predict Intractable Vasospastic Angina

Running title: Improving i-VSA prediction

Hiroshima, Japan – Researchers from JR Hiroshima Hospital, Japan, have recently identified two factors that can be used to predict the occurrence of a form of vasospastic angina (VSA) that is resistant to conventional drug treatments, offering new hope for patients.

VSA is characterized by episodes of angina at rest that are caused by coronary artery spasms, which reduce blood flow to the heart and prevent it from receiving sufficient oxygen. In most patients, these attacks can be relieved or suppressed by taking coronary vasodilators, such as calcium channel blockers or nitrates. However, one form of VSA—intractable VSA (i-VSA)—is resistant to such drugs.

VSA is often diagnosed using a spasm provocation test (SPT), which involves administration of a pharmacological or non-pharmacological treatment during a coronary angiography and determining the degree of coronary artery narrowing. However, as pointed out by the principal investigator Dr. Hiroki Teragawa, “Although several studies are investigating the clinical characteristics of patients with i-VSA, it remains difficult to predict the presence of i-VSA.”

Therefore, Dr. Teragawa and colleagues set out to investigate the relationship between a range of clinical parameters and i-VSA by studying the characteristics of 155 patients with VSA at their hospital between 2011 and 2015. In addition to collecting a detailed history of these patients and measuring a range of blood chemistry parameters, they also performed SPTs by infusing incremental doses of acetylcholine (ACh) into the coronary arteries and then measured the resultant changes in the coronary artery diameter.

Follow-up interviews 1 year after discharge showed that 25% of the patients had i-VSA based on the number of coronary vasodilators they had used and angina attacks they had suffered. In terms of general risk factors, this group of patients had a lower body mass index, a significantly lower frequency of lipid disorder, and a lower estimated age of VSA onset than the treatable VSA (t-VSA) group, as has been found in previous studies, while there was no significant difference in any other risk factors between the two groups, such as smoking status and blood chemical or echocardiographic parameters.

What was of particular interest to the researchers, however, was the finding that the i-VSA group also had a higher frequency of positive SPTs induced by a low dose of ACh (L-ACh) in the right (<30 µg) and/or left (<50 µg) coronary arteries and a higher rate of total occlusion (TOC) than the t-VSA group—a finding that could help explain why i-VSA occurs: “These two factors may imply the presence of easiness in the vasoconstriction of the epicardial coronary artery, leading to the higher activity of coronary spasm,” says Dr. Teragawa.

So what does this mean in the clinical setting? In the case of doctors, including primary care doctors, the ability to predict i-VSA will allow them to prescribe another vasodilator. Furthermore, as Dr. Teragawa argues, “The proposition that two or more coronary vasodilators will be needed to control the chest symptoms is important information for patients as well as doctors, as they can then understand their disease activity, leading to a high compliance of taking coronary vasodilators.”

To build on these findings, the importance of multivessel spasms will be investigated in the future, as the scientists also recognized this as a factor for i-VSA but excluded it from the analysis due to difficulties associated with its assessment in a large number of patients. However, it is clear that SPT may be important not only for diagnosing VSA but also for providing prognostic information for VSA patients.

The article “Importance of the Spasm Provocation Test in Diagnosing and Clarifying the Activity of Vasospastic Angina” was published in *Interventional Cardiology Journal* at DOI: 10.21767/2471-8157.100058.

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