Correspondence

Letter by Smilowitz Regarding Article, "Three-Vessel Assessment of Coronary Microvascular Dysfunction in Patients With Clinical Suspicion of Ischemia: Prospective Observational Study With the Index of Microcirculatory Resistance"

To the Editor:

Coronary microvascular disease (CMD) is an important mechanism of ischemia and an emerging predictor of adverse cardiovascular outcomes, but the optimal approach to invasive measurement remains uncertain. In the multicenter study titled Three-Vessel Assessment of Coronary Microvascular Dysfunction in Patients With Clinical Suspicion of Ischemia: Prospective Observational Study With the Index of Microcirculatory Resistance, Kobayashi et al[1] report a similar prevalence of CMD in each of the major epicardial coronary arteries, with 1-vessel, 2-vessel, and 3-vessel CMD in 23.7%, 14.0%, and 3.2% of patients, respectively. These data suggest that abnormalities of coronary microvascular resistance may be regional and thus raise questions about the validity of conventional assessments of CMD based on the index of microcirculatory resistance (IMR) measured in a single coronary territory.[2,3] The left anterior descending coronary artery is typically selected for IMR measurement to ensure that the distal temperature probe is >6 cm from the injection site, which minimizes variability in thermodilution measurements of coronary flow. Unfortunately, in the present study, only 68% of patients with any CMD had evidence of CMD in the myocardium subtended by the left anterior descending. In other words, 32% of patients with CMD are missed when single-vessel IMR measurement in the left anterior descending is performed. This may lead to underascertainment bias in studies using single-vessel IMR to detect CMD.

Complicating matters, Kobayashi et al[1] include patients presenting with non–ST-segment–elevation acute coronary syndromes in their study (24.7% of the cohort), in whom acute plaque rupture with thromboembolism may lead to regional microvascular obstruction and heterogeneous abnormalities of microvascular resistance. The authors do not report the sensitivity of single-vessel IMR measurement in the left anterior descending to identify any CMD in patients with stable ischemic heart disease. These unpublished data are important to guide interpretation of the existing CMD literature and may have significant implications for future studies reporting invasive measures of microvascular function in stable patients.

Disclosures

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References

1. Kobayashi Y, Lee JM, Fearon WF, Lee JH, Nishi T, Choi D-H, Zimmermann FM, Jung J-H, Lee H-J, Doh J-H, Nam C-W, Shin E-S, Koo B-K. Three-vessel assessment of coronary microvascular dysfunction in patients with clinical suspicion of ischemia: prospective observational study with the index of microcirculatory resistance. *Circ Cardiovasc Interv*. 2017;10:e005445. doi: 10.1161/CIRCINTERVENTIONS.117.005445.
2. Fearon WF, Balsam LB, Farouque HM, Caffarelli AD, Robbins RC, Fitzgerald PJ, Yock PG, Yeung AC. Novel index for invasively assessing the coronary microcirculation. *Circulation*. 2003;107:3129–3132. doi: 10.1161/01.CIR.0000080700.98607.D1.
3. Lee BK, Lim HS, Fearon WF, Yong AS, Yamada R, Tanaka S, Lee DP, Yeung AC, Tremmel JA. Invasive evaluation of patients with angina in the absence of obstructive coronary artery disease. *Circulation*. 2015;131:1054–1060. doi: 10.1161/CIRCULATIONAHA.114.012636.

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