[Intervention 2]

Abstract

Lecture: Angiogram-derived FFR and IMR

Presenter: Hernán Mejía-Rentería

Intracoronary physiology has demonstrated its clinical value to guide coronary revascularization and to assess non-obstructive causes of myocardial ischemia. Fractional flow reserve (FFR) and the more recent developed non-hyperemic pressure-ratios like instantaneous wave-free ratio (iFR) are recommended with the highest level of evidence by the European guidelines to guide coronary revascularization in patients with intermediate stable coronary stenoses. Furthermore, in patients with non-obstructive coronary stenosis and clinically suspected myocardial ischemia, it is also recommended to perform a wire-based assessment of the coronary microcirculation, since an appropriate treatment of coronary microcirculatory dysfunction may improve patients' quality of life and prognosis. However, given the requirement of dedicated coronary physiology wires, hyperemic drugs, additional procedure time and patient disconfort, the real adoption of these recommendations in the catheterization laboratory remains low.

Recently, it has been developed several angiogram-based techniques aimed to assess the functional relevance of coronary stenosis without the need of physiology wires nor hyperemic drugs. Based on three-dimensional reconstruction of the coronary vessels and computational fluid dynamics or advanced mathematical algorithms, novel techniques like quantitative flow ratio (QFR) allows to estimate FFR. Besides its well demonstrated high accuracy to predict FFR, QFR has shown to be superior to angiography in terms of 1-year clinical outcomes when used to guide PCI.

In case of the coronary microcirculatory compartment, angiogram-based techniques have also shown its value to assess the coronary microcirculatory resistance (i.e., index of microcirculatory resistance, IMR). Several mathematical formulas, applied to angiogram-based techniques, have recently shown the feasibility and accuracy of these methods to estimate IMR without the need of physiology wires. Although the evidence is still scarce, angiogram derived IMR appears to be a promising method that may help in improving the adoption of coronary microcirculatory assessment.

[Cross Specialty 8: Neurology & Cardiology]

Abstract

Lecture: Coronary and cerebral microvascular disease; same pathophysiology?

Presenter: Hernán Mejía-Rentería

Coronary microcirculatory dysfunction is an important cause of myocardial ischemia that influences the quality of life and outcomes of patients with ischemic heart disease. The multifactorial etiology of this condition, that might result from a spectrum of biological and cardiovascular risk factors, could indicate a systemic process extending to the microcirculation of other vital organs, such as the brain. Microcirculatory dysfunction of the brain, known as cerebral small vessel disease, is increasingly being recognized as a cause of cognitive decline and neurodegenerative disorders. Despite microvascular dysfunction of the heart and the brain may share pathophysiological mechanisms including endothelial dysfunction, thrombosis, vascular remodelling and capillary rarefaction, the evidence about the potential link between both target organs at the level of the microcirculation is still scarce. A recent prospective and blinded study, the cerebral-coronary connection (C3), found that coronary microcirculatory dysfunction is frequent in patients with coronary artery disease, and correlates with cerebral small vessel disease, abnormal cerebral flow haemodynamics, and significant cognitive impairment. The findings of this study support the hypothesis that microvascular dysfunction in the heart and the brain are part of a single pathological process affecting the microcirculation of patients with coronary artery disease.