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Searching into the invisible: hunting for present and future ischaemia with fractional flow reserve pullback and wall shear stress

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Vision is the art of seeing what is invisible to others - Jonathan Swift

We report the case of a 71 years old gentleman, with slowly worsening angina and known not significant coronary disease. At coronarography, left anterior descending (LAD) artery appeared with an intermediate patchy atherosclerotic disease: we performed an automated hyperaemic pullback FFR analysis, along with post procedural evaluation of wall shear stress (WSS) base on a personalized computational hemodynamic approach, to better define the underlying functional impact and possible regions candidate to PCI.

We used the Volcano R 100 system to perform automated pullback, set at a speed of 1 mm/sec; hyperaemic state was achieved with intravenous adenosine. FFR drop along the vessel demonstrated a focal proximal disease, not functionally significant (FFR 0.92), along with a diffuse non-significant disease. Therefore, stenting was not performed.

In order to better predict the potential evolution of these plaques, the coronary tree was reconstructed and WSS analysis performed, which showed an increased stress at the bifurcation between LAD and the first diagonal, in the body of the first septal branch and in the distal LAD.

In this case FFR pullback and WSS allowed us firstly to define whether or not there was any focal disease, to clarify the ischemic burden along the whole vessel, and finally to predict the future evolution of the disease. We are looking forward to establish what kind of relationship might be presumed by merging pullback FFR data and WSS to predict future ischemic events.

