Persistent post percutaneous coronary intervention angina investigated with invasive physiological testing

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A 56-year-old gentleman presented with recurrent exertional angina post percutaneous coronary intervention (PCI). In 2013 a drug-eluting stent was implanted in the obtuse marginal in the context of an non ST elevation myocardial infarction. He was investigated 3 and 24 months after PCI due to persistent angina. Exercise testing was positive and a pre-existing moderate left anterior descending stenosis was assessed with intracoronary physiology on both occasions, showing fractional flow reserve (FFR) 0.83 (Panels A and B) and FFR 0.88, coronary flow reserve (CFR) 4.4 and index of microcirculatory reserve (IMR) 12, respectively (Panel C). Medical therapy was optimized but, 26 months post PCI, while hospitalized with a respiratory infection, he developed chest pain with marked diffuse ST depression and T-wave inversion, there was discussion as to whether PCI should be performed despite normal physiological data. During coronary angiography, which remained unchanged, he was exercised for 3 min. Both symptoms and ischaemic ECG changes were elicited, with angiography showing severe, generalized vasospasm in the left coronary artery. (Panels D and E) Symptoms, ECG, and angiographic changes resolved with intracoronary nitroglycerin (Panels F and G).

In this case, adenosine-induced vasodilation demonstrated normal resistance (IMR) and vasodilation (CFR) of the microcirculation, but at the expense of overriding endothelium-dependent mechanisms of coronary dysfunction. Paradoxical vessel vasoconstriction became evident during exercise in the epicardial vessels, and most likely also extended to the arterioles. The information provided by FFR was valid in suggesting that PCI would not resolve the underlying cause of ischaemia in this patient. Beta-blockers were discontinued, and calcium-channel blockers and nitrates were added to his treatment with significant improvement.

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