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IN THIS ISSUE OF EUROINTERVENTION

Valve-in-valve TAVI, sizing with abnormal aortic cusps, a new system for continuous intracoronary adenosine infusion during FFR, a minifocus on emerging physiology indices (OFR, QFR and "vessel FFR"), a mega-registry of complex PCIs and more…

Davide Capodanno, *Editor-in-Chief*

In these months in which we have necessarily talked more about virology than cardiology, there is a trial that seems to be immune from criticism and prejudice: ISCHEMIA. I rarely remember a landmark study so long awaited that it was not even divisive, but this is the case, apparently. Even the Twitter court, which certainly does not skimp lashing judgements, has not found many critical arguments. Yet there are plenty of outstanding questions, especially when it comes to translating the trial results into the management algorithm of patients with chronic coronary syndromes, whom we see every day in practice. For example, do we have to do a coronary CT scan in all patients with non-severe symptoms, and define the coronary anatomy to exclude the presence of left main disease before starting with the conservative approach? Does it make sense to continue prescribing a lot of ischaemia tests if the consequences don't result in actions other than optimal medical therapy titrated on elimination of symptoms at first? What must be the trigger for revascularisation – anatomy, physiology, or, more simply, the presence of symptoms despite the maximum sustainable medical therapy? And when an elderly or diabetic patient has no typical symptoms, can we believe it and deny an early invasive strategy based on that? What role should we consider for intracoronary physiology, in light of the above? An ISCHEMIA-like patient can easily

become a FAME 2-like patient with the use of a thin intracoronary probe. Is that right? Is it appropriate? Is it useful? And again, are there differences between the outcomes of patients treated with PCI and those treated with CABG, in comparison with the conservative strategy, as was evident in the case of diabetic patients included in BARI 2D? In short, I would say that we have put aside the fear that the trial could be "a giant with clay feet", but this does not mean that we must give up asking ourselves questions that aim at improving and personalising the individual management of our patients. In this sense, each new study can represent a piece of the mosaic. In this issue of EuroIntervention, hosting a minifocus on intracoronary physiology, we hope that readers can find a variety of food for thought.

Our minifocus begins with an article by **Ahmed Elghamaz, Keith G. Oldroyd and colleagues** on the HYPEREMIC trial. This randomised, single-blinded study evaluated the safety and accuracy of continuous intracoronary adenosine infusion using a new, dedicated over-the-wire infusion microcatheter (HYPEREM™IC) for measuring fractional flow reserve (FFR). The trial involved forty-one patients, with the authors concluding that "continuous IC adenosine was non-inferior to standard IV adenosine for FFR assessment". In addition, this procedure was well tolerated and allowed for faster maximal hyperaemia with less chest pain using "approximately 1.5% of the dose of a standard IV adenosine". **Gabor G. Toth and Bernard De Bruyne** provide an editorial considering this article and the topic of steady-state hyperaemia.

Our minifocus continues – accompanied by an editorial by **Gianluca Campo and Simone Biscaglia** – in which **Jiayue Huang, Shengxian Tu and colleagues** examine the diagnostic performance of OCT-based optical flow ratio (OFR) compared to angiography-based quantitative flow ratio (QFR). Using wire-based FFR as the standard of reference, all patients with OCT and FFR assessment prior to revascularisation were analysed with OFR or QFR, computed in a blinded fashion. The authors concluded that OFR showed significantly better correlation and agreement with FFR than QFR, in their words "much better than conventional morphological parameters in determining physiological significance of coronary stenosis", and that the effectiveness of OFR was "not influenced by the presence of previously implanted stents".

A new software to calculate vessel FFR (vFFR) is the subject of the FAST study in an article by **Kaneshka Masdjedi, Joost Daemen and colleagues**. This examines a 3D quantitative coronary angiography (3D-QCA)-based software to calculate vFFR without the use of either a pressure wire or vasodilator agent. Clinical validation was performed in patients presenting with stable angina or NSTEMI and demonstrated that 3D-QCA-based vFFR had a good linear correlation with FFR as well as accuracy in identifying lesions. The authors concluded that 3D-QCA-based vFFR has a high diagnostic accuracy "to detect FFR $\leq$0.80 along with a low inter-observer variability".

Bhavik N. Modi, Divaka Perera and colleagues look at the optimisation of physiology-guided revascularisation in serial coronary disease comparing conventional pressure-based indices, a reference Doppler-based resistance index (hyperaemic stenosis resistance [hSR]) and a recently described mathematical correction model to predict the contribution of individual stenoses in serial disease. While larger trials are needed, this could be a novel solution to use with routine hyperaemic pressure wire measurements to show a similar reduction in error compared to conventional resting and hyperaemic indices.

A final article in our minifocus on coronary physiology is a substudy of the DANAMI-3-PRIMULTI trial by **Muhammad Sabbah, Thomas Engstrøm and colleagues**. In order to

validate the use of FFR-guided PCI in patients with left ventricular hypertrophy (LVH), the authors looked at 279 patients with STEMI who had had cardiac magnetic resonance imaging for the assessment of left ventricular mass index. The authors concluded that FFR-guided PCI of non-culprit lesions in patients with STEMI is safe and that LVH showed "no interaction with the effect of diameter stenosis on FFR" nor did it "modify the risk of clinical outcome related to treatment randomisation".

In the section on coronary interventions, we also host an article that characterises the contemporary nature of complex PCIs. **Mohamed Mohamed, Mamas A. Mamas and colleagues** present one-year outcomes from the e-Ultimaster multicentre registry. Procedures were stratified by complexity as well as by the number and type of complex features. The reader is provided with an overview "of the relationship between number and types of lesion complexity and one-year outcomes after complex PCI". Of the 35,839 patients undergoing PCIs in the registry, 9,793 patients were determined to be complex PCI cases. This group was older with more comorbidities and a greater risk of cardiac death and complications at one year when compared to the non-complex PCI patients. Differences between lesions were seen to affect prognosis with complications increasing with the "number of complex features". The authors concluded that "all individual complex features were associated with an increased hazard of composite complications (except CTO) and definite/probable stent thrombosis". The article is accompanied by an editorial by **Joanna J. Wykrzykowska and Laura S.M. Kerkmeijer**.

Let's now move to the section on valvular disease and heart failure. With the increased use of surgical bioprostheses for aortic valve repair over the last decade, we have seen a subsequent rise in the need to replace these valves when they fail. In this issue, a large meta-analysis of different valve-in-valve transthoracic aortic valve replacement (ViV-TAVR) studies is presented by **Ahmed N. Mahmoud, Danny Dvir and colleagues** which examines evidence of procedural success as well as adverse outcomes in patients with failed bioprosthetic aortic valves. Encompassing 24 studies with 5,553 patients, the authors show that, when ViV-TAVR was performed by experienced operators, it was associated with high success rates, low rates of death and other serious adverse events at 30 days, and with an all-cause mortality of 12% for the first year and 29% at 3 years. This article is accompanied by an editorial by **Julinda Mehilli and Cristina Giannini**.

Finally, an article by **Tilak K.R. Pasala, Carlos E. Ruiz and colleagues** looks at abnormal aortic cusps (AAC) having unequal lengths and size. AAC can significantly influence the relationship of the hinge point-based annular plane (HPAP) used during TAVI, further complicating valve deployment. This can lead to paravalvular leaks and valve embolisation. The authors conclude that these risks and complications could be avoided in cases of AAC by using the centreline-based aortic annular plane (CAP) approach instead of HPAP. CAP also helps us to understand THV behaviour better.

There's more, a lot more, in this issue – flashlights and commentary – and, as always, our archives and community online. We hope we've given you the material you're looking for – information, ideas and clinical insights to challenge, help in daily practice and inspire an interaction with us that has been so sorely missed in these months where we've been limited in how we travel.

Here, in Europe, with this issue we enter autumn, and wish you an excellent season wherever you are. We are looking forward to hearing from you and we'll be back in October with the next issue of our Journal.