ESC European Society of Cardiology

European Heart Journal (2021) **42**, 4401
doi:10.1093/eurheartj/ehab332

Coronary artery stenosis prediction does not mean coronary artery stenosis obstruction

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Online publish-ahead-of-print 20 June 2021

This commentary refers to 'Validation of the European Society of Cardiology pre-test probability model for obstructive coronary artery disease', by S. Winther *et al.*, https://doi.org/10.1093/eurheartj/ehaa755 and the discussion piece 'Selecting the right cohorts and endpoints for the validation of pre-test probability models for obstructive coronary artery disease', by S. Winther *et al.*, https://doi.org/10.1093/eurheartj/ehab336.

We read with interest the recent study by Winther *et al.*[1] showing better accuracy for the recent 2019 ESC pre-test probability assessment of obstructive coronary artery disease than previous algorithms, in a Danish population-based survey using computerized tomography (CT) coronary angiogram.

Obstructive coronary artery disease (CAD) detection is an old surrogate for CAD-related myocardial ischaemia when stenosis is >50% of coronary artery diameter. It is now universally accepted that coronary stenosis is only weakly related to myocardial ischaemia, with accuracy as low as 64% compared to gold-standard Fractional Flow Reserve.[2] Moreover, it is also well accepted that FFR can be measured below the 0.8 ischaemic threshold with coronary lesions of <50% stenosis (positive mismatch) and alternatively above 0.8 (i.e. non-ischaemic lesions) in anatomically significant (>50%) stenosis (negative mismatch).

The rate of positive mismatch has been reported to be as high as 19%,[3] and negative mismatch is observed in around one-third of >50% stenoses.[4,5] This means that roughly half of CAD patients may or may not have effort myocardial ischaemia when some degree of atherosclerosis is observed, whatever the diagnostic method.

CAD diagnosis and evaluation is a major public health objective, and we have some methodological and pathophysiological concerns that may relativize the clinical scope of Winther's study.

(1) In Winther's study, only patients with >50% stenosis on CT were referred to invasive coronary angiography (ICA), and so three-quarters of the study population were considered free of obstructive CAD, without distinguishing between patients with normal CT without CAD and patients with non-stenotic (<50%) CAD. A significant part of the latter group would have positive mismatch, and we consequently hypothesize a loss of sensitivity in the algorithm

(2) More than half of the 19% subgroup undergoing ICA was finally classified as having non-significant CAD. Unfortunately, although FFR may have been used, the rate of use is not given, and one can suspect that some degree of mismatch (positive or negative) was undetected, leading to a potential loss of accuracy.

(3) Finally, without systematic use of ICA, whatever the results of the coronary CT angiogram, it is methodologically questionable to calculate sensitivity and specificity.

It is thus probably time for the cardiologic community to discard once and for all the outdated concept of 'significant' or 'obstructive' stenosis on CT or ICA for the diagnosis of significant CAD. We call for a European-wide survey testing the 2019 ESC pre-test probability of CAD against FFR with a strong methodology.

Conflict of interest: none declared.

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