Impact of a decreasing pre-test probability on the performance of diagnostic tests for coronary artery disease

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Background.
The optimal use of cardiovascular diagnostics depends on the assumed pre-test probability (PTP) of significant coronary artery disease (CAD) and the diagnostic performance profile of the considered technique. There is indication that the prevalence of CAD in symptomatic patients has changed over the last decades and a contemporary overview of PTPs is lacking. Therefore, we sought provide a pooled estimation of contemporary PTPs of significant CAD across clinical patient categories, evaluate the utility of application of diagnostic techniques according to such estimates, and propose An optimized comprehensive diagnostic technique selection tool for suspected CAD.

Methods. Estimates of significant CAD prevalence across sex, age and type of chest complaints categories from three large-scale studies were pooled (n=15,815). These updated PTPs and diagnostic performance profiles of exercise ECG, ICA, CCTA, PET, stress CMR, and SPECT were integrated to define the PTP ranges in which ruling-out CAD (using FFR as reference standard) is possible with a post-test probability of <10% and <5%. These were integrated in a color-coded tabular diagnostic technique selection tool.

Results.
Pooled CAD prevalence was 14.9% (range=1-52), clearly lower than that used in current clinical guidelines. Ruling-out capabilities of noninvasive imaging were good overall. The greatest ruling-out capacity (i.e. post-test-probability <5%) was documented by CCTA, PET and stress CMR (PTP thresholds for a post-test probability <10 and <5%: PTP <45 and <28%, respectively). The comprehensive tool is show in the Figure.

Conclusion.
The contemporary PTP of significant CAD across symptomatic patient categories is substantially lower than currently assumed. With a low prevalence of the disease, diagnostic testing can rarely rule-in CAD and the focus should shift to ruling-out functionally obstructive CAD. A comprehensive tool may aid in technique selection when significant CAD is suspected in symptomatic patients.
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Abstract:
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Conclusion. The contemporary PTP of significant CAD across symptomatic patient categories is substantially lower than currently assumed. With a low prevalence of the disease, diagnostic testing can rarely rule-in CAD and the focus should shift to ruling-out functionally obstructive CAD. A comprehensive tool may aid in technique selection when significant CAD is suspected in symptomatic patients.