Validation and potential usefulness of the updated PROMISE minimal risk tool in patients with suspected coronary artery disease undergoing coronary CT angiography

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Funding Acknowledgements: None.

Introduction: The steady decline in test positivity among patients with suspected coronary artery disease (CAD) has raised interest in developing strategies to identify patients who may not require testing. The updated PROMISE minimal-risk tool (PMRT) was developed specifically for this purpose, but never tested in our population. The aim of this study was to assess the diagnostic performance of this new tool, and to compare it with the guideline-recommended pre-test probability (PTP) and with the risk factor-weighted clinical likelihood (RF-CL) model in a Portuguese cohort of symptomatic patients undergoing coronary computed tomography angiography (CCTA).

Methods: We conducted a two-centre cross-sectional study of symptomatic patients undergoing CCTA for suspected CAD. Key exclusion criteria were age <30 years, known CAD, suspected acute coronary syndrome or symptoms other than chest pain or dyspnoea. A simplified version of the updated PMRT (without HDL-C), the guideline PTP, and RF-CL score were calculated for each patient. Obstructive CAD was defined as any luminal stenosis ≥ 50% on CCTA. ‘Low risk’ was defined as absence of obstructive CAD and coronary artery calcium (CAC) score < 100 (both conditions present, where CCTA results are unlikely to change patient management). The cut-off value of the PMRT with 95% positive predictive value for identifying patients with ‘Low risk’ was identified in ROC curve analysis.

Results: A total of 2162 patients (mean age 60±11 years, 59% female) were included. Overall, 14.9% (N=323) of patients had obstructive CAD, and 73.5% (N=1589) fulfilled the criteria for ‘Low risk’. Patients with ‘Low risk’ were more frequently female, had higher prevalence of non-anginal chest pain and had fewer cardiovascular risk factors.

For obstructive CAD, the discriminative power of the updated PMRT was similar to the one provided by the guideline PTP and RF-CL models (Figure 1A). However, for identifying patients with ‘Low risk’, the updated PMRT showed greater discriminative power than the guideline PTP and RF-CL models (Figure 1B).

The PMRT cut-off value with 95% positive predictive value for detecting patients at "Low risk" was identified as >46%. A total of 458 patients (21.2%) had a PMRT >46%.

Conclusion: In this cohort of symptomatic patients undergoing CCTA, the updated PMRT showed similar discriminative power for obstructive CAD, but greater discriminative power to identify "Low risk" than the guideline-recommended PTP and the RF-CL models. The criterion that identified "Low Risk" with 95% positive predictive value was present in roughly one fifth of patients undergoing CCTA, who would derive less benefit from testing.