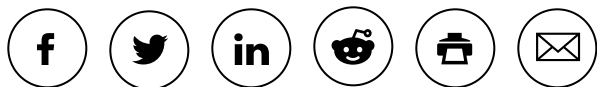


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Supervised AI-enabled Vectorcardiography Superior to Conventional Modalities for Myocardial Ischemia Detection

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Supervised artificial intelligence-enabled vectorcardiography was found to be a valid screening tool for the detection of coronary ischemia at rest, overcoming the limitations of conventional noninvasive diagnostic modalities, according to a study published in the *Journal of Electrocardiology*.

Noninvasive methods for the detection of stable coronary artery disease (CAD) at rest are typically limited by cost, low sensitivity, or dependence on personnel expertise and availability. The investigators aimed to leverage the power of machine learning to develop a reliable time- and cost-efficient screening tool for coronary ischemia.

The international group of researchers developed a “supervised artificial intelligence algorithm combined with a five-lead vectorcardiography...approach (ie, Cardisography, CSG) for the diagnosis of CAD,” the authors wrote. Vectorcardiography allowed for interpretation of the heart’s excitation process as a 3-dimensional signal. The signal’s physical parameters were then analyzed using a machine learning algorithm that included neuronal networks to deliver a diagnosis. The study’s primary outcome was CSG Diagnosis System accuracy, which was validated using cross-validation and compared with angiographic findings currently considered as the gold standard. The presence of CAD was defined as the involvement of 1 to 3 vessels.

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Of 595 patients included in this multicenter study, 369 (62%) had 1-, 2-, or 3-vessel disease on coronary angiography. CSG identified CAD at rest with $90.2\% \pm 4.2\%$ and $97.2\% \pm 3.1\%$ sensitivities and $74.4\% \pm 9.8\%$ and $76.1\% \pm 8.5\%$ specificities in women and men, respectively. Overall accuracy was $82.5\% \pm 6.4\%$ in women and $90.7\% \pm 3.3\%$ in men.

Limitations of this study include its retrospective nature, the relatively small number of analyzed cases, and the fact that the interpretation of neuronal network outputs and their implications on clinical decision-making remain to be developed.

If confirmed in clinical studies, the authors project that their method could serve as an efficient “first line non-invasive diagnostic modality for the detection of CAD in primary clinical settings, emergency departments, or remote areas,” which could have important implications for the screening of CAD.

Reference

Braun T, Spiliopoulos S, Veltman C, Hergesell V, Passow A, Tenderich G, Borggreffe M, Koerner MM. Detection of myocardial ischemia due to clinically asymptomatic coronary artery stenosis at rest using supervised artificial intelligence-enabled vectorcardiography – A five-fold cross validation of accuracy. *J Electrocardiol.* 2020;59:100-105.

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