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Single Test AI-Based Coronary Evaluation

With the help of artificial intelligence (AI) technology, experts at the Prairie Heart Institute of HSHS St. John's Hospital have developed a robust coronary CT angiography (CTA) programme for improved patient care. This AI-based coronary evaluation system enables clinicians to comprehensively treat patients with just one test.

At Prairie, myocardial perfusion imaging (MPI) has been the primary tool for screening patients suspected of having coronary artery disease. However, there are patients who despite clinical symptoms that indicate coronary artery disease and evidence of ischaemia based on their MPI stress test, have angiographically normal coronary arteries. This leads to a significant number of patients receiving unnecessary cardiac catheterisations.

"Although our numbers are lower than national averages, we still see anywhere from 20-30% of patients who receive a cardiac cath with normal coronary arteries or non-obstructive coronary disease," said Kristin Doster, executive vice president of cardiovascular services, HSHS central Illinois division, Prairie Heart Institute. "As a group, we felt we could do better than one in three patients, so we began to explore other opportunities."

This prompted the institute to collaborate with HeartFlow, a digital health company providing AI-powered solutions for diagnosis and treating heart disease. HeartFlow's FFRct technology has led to significant improvements in the assessment of coronary artery disease using CT angiography.

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CT angiography is useful for noninvasive imaging of the coronary arteries as it provides good information about stenosis, according to Doster, but it still isnít ideal as a standalone modality. This method "provides high sensitivity results, but not the specificity we needed to impact what we were trying to accomplish," Doster pointed out. "That's when we made the decision to introduce the HeartFlow FFRct technology to our toolkit."

FFRct essentially provides both an anatomical and functional assessment of the coronary arteries. Its computational fluid dynamics modelling, when applied to a CT coronary angiography dataset, delivers lesion-specific functional information of a coronary stenosis. The CTA-FFRct approach offers greater specificity and positive predictive value for detecting haemodynamically significant coronary artery disease compared with anatomic imaging alone, Doster explained.

The CTA-FFRct programme has helped the institute reduce unnecessary catheterisations. Importantly, coronary CT with FFRct can be performed with a much lower radiation dose than a typical nuclear stress test.

"Operationalising CTA-FFRct within the Prairie Heart Institute has helped to support our goals of offering patients a comprehensive evaluation of coronary anatomy and functional evaluation of stenosis in a single test," Doster added.

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