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Machine learning may enhance utility of FFR-CT

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A machine-learning algorithm shows potential for facilitating the use of fractional flow reserve (FFR) calculations on coronary CT angiography (CCTA) studies, according to research being presented in this scientific session.

While FFR-CT is a reliable method for detecting lesion-specific ischemia, the derivation of FFR-CT is still a time-consuming process, according to presenter Dr. Christian Tesche from the Medical University of South Carolina in Charleston.

"Newer [FFR-CT] algorithms using machine learning may reduce the need for human input and improve the speed and clinical utility of [FFR-CT]," Tesche said.

The researchers sought to investigate the effect of coronary artery calcium (CAC) on the diagnostic performance of machine learning-based FFR-CT calculations for CCTA exams. They retrospectively assessed patients from the Machine Learning-Based CT Angiography Derived FFR: A Multi-Center Registry (MACHINE). These patients had undergone coronary CT angiography with calcium scoring followed by invasive FFR.

Using invasive FFR as the reference standard, the researchers found that Frontier -- a prototype deep-learning FFR-CT algorithm (Siemens Healthineers) -- demonstrated superior diagnostic performance over CCTA alone in detecting lesion-specific ischemia in calcified coronary arteries on both a per-lesion and per-patient level. The researchers also found no difference in the performance of FFR-CT between patients with low to intermediate Agatston scores (a measure of CAC) and those with high Agatston scores.

Evidence is rapidly accumulating in support of noninvasive FFR-CT calculation for guiding the management of patients with suspected coronary artery disease, Tesche noted.

"In this investigation, we demonstrated that [FFR-CT] has superior diagnostic performance over CCTA in a population of patients with a wide range of Agatston scores," he told *AuntMinnie.com*. "Further studies are needed to gauge the impact of machine learning-based CCTA-derived FFR determination. However, we believe that this approach may facilitate the integration of such algorithms into clinical decision-making trees for coronary artery disease management."

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