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PROMISE Trial: Safety of CTA vs. Functional Testing

According to researchers, both coronary computed tomography angiography (CTA) and functional stress testing are safe for the evaluation of stable chest pain, with minor complications in less than one percent of patients.

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The researchers compared test safety – test complications, incidental findings, and effective radiation dose – between CTA and functional testing as-tested in PROMISE (PROspective Multicentre Imaging Study for Evaluation of Chest Pain). In the subgroup whose physicians intended nuclear stress over other functional tests if randomised to the functional arm, the researchers compared radiation dose of CTA versus nuclear stress and identified characteristics associated with dose.

The PROMISE trial found that, in stable outpatients with suspected coronary artery disease (CAD), anatomic CTA and functional testing strategies resulted in a similar rate of cardiovascular events. "Given this state of equipoise, test safety should help guide test choice," the researchers said.

Of the 10,003 patients enrolled in PROMISE, 404 had no testing and 29 had ICA as a first test. Of the remaining 9,570 patients, 4,733 had CT and 4,837 had functional testing. Of the 4,733 who had CT, 4,633 completed CTA while 100 had only a noncontrast calcium score CT. There were no major test complications (cardiac arrest, severe bronchospasm, anaphylaxis, renal failure requiring dialysis, or death) in either arm. Minor test complications were similarly rare for CTA (0.8%, 37/4,633) and functional testing (0.6%, 27/4,837).

Additionally, CTA identified more incidental findings (11.6% [539/4,633] vs. 0.7% [34/4,837]), most commonly pulmonary nodules (9.4%, 437/4,633). CTA had similar 90-day cumulative radiation dose to functional testing. However, in the subgroup whose physicians intended nuclear stress (CTA 3,147; nuclear 3,203), CTA had lower median index test (8.8 vs. 12.6 mSv) and 90-day cumulative (11.6 vs. 13.1 mSv) dose, independent of patient characteristics. The lowest nuclear doses employed 1-day Tc-99 m protocols (12.2 mSv). The lowest CTA doses were at sites performing ≥500 CTAs/year (6.9 mSv) and with advanced CT scanners (5.5 mSv).

"Our findings confirm previous reports that incidental findings are substantially more frequent on CTA as compared to functional testing. Findings with the potential to cause chest pain such as coronary anomalies, pneumonia, pulmonary embolism, and aortic dissection were found in 2% of patients having CTA," the study authors write. "Put in context, only 12% of PROMISE patients had obstructive CAD on CTA. Nevertheless most incidental findings were truly incidental and would not be expected to cause chest pain, most commonly lung nodules seen in 9%."

The authors also say that CTA's lower radiation dose than nuclear stress testing, independent of patient characteristics, makes it an attractive alternative test for the evaluation of stable chest pain. "Radiation dose varies substantially with equipment, site experience, and imaging protocol, indicating opportunities to further reduce dose," they add.

Source: Journal of Cardiovascular Computed Tomography
Image Credit: Jon Callas

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