On the Horizon: Imaging of Vulnerable Plaques

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CHICAGO — Intriguing invasive methods of identifying vulnerable coronary plaques include vaso vasorum imaging, intraarterial MRI, and several variants of optical coherence tomography, according to speakers at the annual meeting of the Society for Cardiovascular Angiography and Interventions.

Vaso vasorum imaging. The vaso vasorum—the microcapillaries that form in the adventitia adjacent to atherosclerotic plaque in response to vascular injury—become more dense as inflammation due to macrophage activity increases. And this inflammation is a key factor in plaque rupture, said Dr. Stephane Carlier of Columbia University, New York.

He and his coworkers have developed an intravascular ultrasound–based technique that uses gas-filled microbubbles for contrast enhancement to assess vaso vasorum density and identify areas of intraplaque leakage or hemorrhage.

Intraarterial MRI. Conventional MRI using a big external magnet is not well suited for evaluating the composition of atheromatous plaques. Adequate resolution is difficult because the coronary arteries are small, are situated deep in the thorax, and move with respiration and systolic motion of the heart.

Intraarterial MRI is a novel imaging method that sidesteps these obstacles. There is no external magnet. Magnet and coil are incorporated within the probe, which also contains radiofrequency transmission and receiver units.

Efforts are also underway to streamline the delivery catheter from No. 8 to No. 6 French, added Dr. Wilensky, who heads the scientific advisory board for TopSpin Medical, the Israeli company developing intraarterial MRI.

Optical coherence tomography. This extremely high-resolution broadband light-based imaging method provides tremendous structural detail.

With optical coherence tomography, ‘you could image a whole coronary artery in 5 or 6 seconds and get incredibly high-resolution images.’