MRI research highlights high-risk atherosclerotic plaque hidden in the vessel wall

EurekAlert

Researchers from Boston University School of Medicine (BUSM) have shown that use of magnetic resonance imaging (MRI) in an animal model can non-invasively identify dangerous plaques. The findings, which appear in the May issue of *Circulation Cardiovascular Imaging*, offer possible applications in the diagnosis and treatment of patients with atherosclerosis.

Rupture of vulnerable atherosclerotic plaque, which often occurs without prior symptoms, is responsible for a substantial number of deaths and disabilities worldwide. The untimely death of television journalist Tim Russert was caused by the sudden rupture of a vulnerable plaque in a critical location in a coronary artery. Identification of atherosclerotic plaques with a high risk for disruption and thrombosis would allow preventive therapy to be initiated before thrombi begin to clog arteries and cause stroke or heart attack.

The BUSM researchers examined diagnostic protocols in an animal (rabbit) model of human disease with procedures that never could have been applied to humans. Plaque disruption was stimulated at a precise time to allow MRI imaging before and after the rupture. According to researchers, plaques that were hidden within the vessel wall and pushing the vessel wall outward instead of occluding the lumen had a very high chance of forming a thrombus; plaques that caused vessel narrowing were almost always stable, which could explain why the most dangerous plaques generally escape detection by x-ray angiography. The study finds accurate, non-invasive MRI can identify these stable and unstable plaques. It also reports that enhanced gadolinium uptake, which is associated with histological findings of inflammation, tissue necrosis and the proliferation of blood vessels in tissue not normally containing them, can predict dangerous plaque.

"The MRI exams reported are promising for application to human disease because they are noninvasive, use a clinically approved contrast agent and are performed using a clinical MRI scanner," said lead author James A. Hamilton, PhD, a professor of biophysics and physiology at BUSM. "The findings suggest that MRI may be used as a noninvasive modality for localization of plaques that are prone to disruption." Clinical studies of carotid plaques with the reported exams from the rabbit model are now under way in Hamilton's lab.

SOURCE [1]

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