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The advance in T2/T1-weighted cardiac magnetic resonance coronary plaque imaging

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Background

We've reported that non invasive imaging with cardiac magnetic resonance imaging (CMR) can visualize and characterize various coronary plaques.

Purpose

We compared the coronary plaque imaging on CMR and other invasive modalities; optical coherence tomography (OCT) and intravascular ultrasound (IVUS) in patients with angina pectoris.

Methods

Plaque imaging with 1.5-T CMR, OCT and IVUS were performed at corresponding sites in patients undergoing catheterization. CMR arterial wall imaging was divided into four categories according to the signal intensity ratio of vessel/lumen (low to diffuse high). OCT plaque characteristics for lipid content, fibrous cap thickness, and macrophage density were derived using previously validated criteria. Thin-cap fibroatheroma (TCFA) was defined as lipid-rich plaque with fibrous cap. Remodeling index (RI) was calculated as the ratio of the lesion to the reference external elastic membrane area with IVUS.

Results

Totally31 lesions from 9 patients(mean age 72 +- 8 year-old) were imaged and 29.5% of them were low intensity and 39.5% were moderate to diffuse high intensity. 44% of angiographic stenotic lesion revealed higher intensity wall and 2 non stenotic lesions showed higher intensity. Lipid rich plaque was more commonly detected in higher intensity lesion compare to lower intensity lesions (90% vs 10% $P < 0.01$). Positive remodeling was more commonly associated with lipid-rich plaque (90 vs 0%, $P < 0.01$). The presence of TCFA was detected in higher intensity lesions.

Conclusion

Coronary plaques with positive remodeling exhibited characteristic features of vulnerable plaque. CMR can detect vulnerable patients without any contrast and harmful exposure.