

group containing eight rabbits. Targeted and non-targeted contrast ultrasound imaging of the left carotid arteries were performed at baseline and at 4, 8 and 12 weeks respectively. The imaging was digitally recorded and evaluated with Contrast quantitative analysis software. Left carotid specimens were harvested for HE staining and real time qPCR respectively. Pathological changes of atherosclerosis were evaluated by HE slice. Levels of VCAM-1 expression were quantified by real time qPCR and compared with the peak signal intensity (SI_{peak}) of the VCAM-1-targeted ultrasound contrast agent.

Results A significantly lower SI_{peak} was detected in the carotid wall of rabbits from the '4-w' group as compared with rabbits from the '8-w and 12-w' group (18.2 ± 4.6 vs 36.2 ± 3.8 vs 46.5 ± 4.2 dB, respectively; $p < 0.001$). Such differences were not detected with the non-targeted contrast agent Sonovue. Retention of VCAM-1-targeted microbubbles in carotid wall was significantly higher than retention of non-targeted microbubbles. In addition, the SI_{peak} of carotid wall enhancement detected with ultrasound after injection of VCAM-1 targeted contrast agent strongly correlated with actual VCAM-1 measured in corresponding carotid segments using real time qPCR ($r = 0.85$). In contrast, retention of the non-targeted contrast agent was not correlated with the level of VCAM-1 expression ($r = 0.13$).

Conclusions VCAM-1 targeted contrast-enhanced ultrasonography can detect and quantification of VCAM-1 expression in an experimental early atherosclerotic model. It allowed an early detection of atherosclerosis and showed a significant gradual progression of atherosclerosis over time, supporting its utility as a clinical imaging tool for in vivo detection of early atherosclerosis.

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MONITORING THE PROGRESSION OF ATHEROSCLEROSIS IN RABBITS MODEL WITH TARGETED ULTRASOUND DETECTION OF VASCULAR CELL ADHESION MOLECULE-1

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Objectives The aim of our study was to investigate the use of targeted contrast-enhanced high-frequency ultrasonography for molecular imaging of vascular cell adhesion molecule-1 (VCAM-1) expression on carotid artery in a rabbit atherosclerotic model

Methods Microbubbles targeting to VCAM-1 were prepared via electrostatic attraction way. Atherosclerotic lesions were induced by high cholesterol diet in 24 male New Zealand white rabbits. According to hyper-cholesterolaemic diet feeding time, they were randomly assigned to three groups, namely 4-w, 8-w and 12-w group, each