

Cerebrovascular disease and stroke

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HIGH SHEER STRESS, CALCULATED BY STRAIN AND STRAIN RATE IMAGING, IS ASSOCIATED WITH ACUTE CEREBRAL INFARCTION

Jun Wang *Qilu Hospital of Shandong University, Shandong, China*

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Aims The purpose of this study was to evaluate the reliability of strain and strain rate imaging for detecting carotid plaques elastic characteristics, and the correlation between plaque fibrous cap strain and acute cerebral infarction (ACI).

Methods Seventy-two patients with carotid plaques were enrolled into this cross-sectional study. All patients underwent MRI and were divided into two groups according to the history of ACI: patients with ACI (n=39) and patients without ACI (n=33). High-resolution ultrasound scanner was performed to exam carotid artery intima-media thickness (IMT), blood flow parameters and plaques. Positive and negative peak of strain and shear stress on different regions of plaque longitudinal view was measured by strain and strain rate imaging. Binary logistic regression was used to assess the association between ACI and plaque biomechanics index, morphology data or carotid artery parameters.

Results Positive and negative peak of strain among regions of interest in patients with ACI were significant different ($p < 0.05$ and $p < 0.01$, respectively). Compared with control group, negative peak of shear stress (SS2) in the half part far away the heart (FA) and middle far away the heart (FM) were significantly higher ($p < 0.05$ respectively) in ACIs.

Conclusions Plaque biomechanics in the longitudinal view could be calculated by strain and strain rate imaging, which may provide a more useful quantitative assessment of plaque biomechanics. Therefore, the reliability and clinical importance of these quantitative parameters will be specified by further investigations.