Magnetic Resonance Imaging in Acute Stroke

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Although intravenous administration of tissue plasminogen activator is the only proven treatment after acute ischemic stroke, there is always a concern of hemorrhagic risk after thrombolysis. Therefore, selection of patients with potential benefits overcoming potential harms of thrombolysis is of great importance. Despite the practical issues in using magnetic resonance imaging (MRI) for acute stroke treatment, multimodal MRI can provide useful information for accurate diagnosis of stroke, evaluation of the risks and benefits of thrombolysis, and prediction of outcomes. For example, the high sensitivity and specificity of diffusion-weighted images (DWIs) can help distinguish acute ischemic stroke from stroke-mimics. Additionally, lesion mismatches between perfusion-weighted images (PWIs) and DWIs are thought to represent potential tissue salvageable by reperfusion therapy. However, the optimal threshold to discriminate between benign oligemic areas and the penumbra is still debatable. Signal changes on fluid-attenuated inversion recovery image (FLAIR) within DWI lesions may be a surrogate marker for ischemic lesion age and might indicate risks of hemorrhage after thrombolysis. Moreover, clot signs on gradient echo images may reflect the nature of clots, while their location, length and morphology data may provide predictive information of recanalization by reperfusion therapy. Previous clinical trials, which relied on perfusion-diffusion mismatch for patient selection, failed to show benefits of MRI-based thrombolysis. Therefore, understanding the clinical implication of various useful MRI findings and comprehensively incorporating those variables into therapeutic decision- making may be a more reasonable approach for expanding the indication of acute stroke thrombolysis.

Key Words: Acute stroke; MRI

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