Flair MRI in acute stroke
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Section: Neuroradiology
Imaging Technique: MR
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Case Type: Clinical Cases
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Patient: 61 years, male

Clinical History:

The patient presented with stroke, right-sided hemiplegia and aphasia.

Imaging Findings:

The patient presented with stroke, right sided hemiplegia and aphasia. An MRI examination was performed 5 hours after stroke. Diffusion-weighted and fast-fluid-attenuated inversion recovery (FLAIR) sequences were added to the standard imaging protocol. In the left middle cerebral artery, fast-FLAIR images showed intraarterial signal, hyperintense to cerebral parenchyma. And also the cortical gray matter in the left insular region is brighter than on the right side. Diffusion-weighted images (DWI) showed hyperintense lesion in the left insular cortex; however there was no change in the hemispheric territory. Fast-FLAIR image obtained 8 days after onset of stroke confirmed the final infarction to be in the territory of the left middle cerebral artery. The area of final infarct was larger than the hyperintense signal distribution on DWI but it was smaller than the area of the distribution of hyperintense intraarterial signal.

Discussion:

FLAIR, which is based on the fast spin-echo sequence, is available in most of the commercial clinical MR systems and is used to improve the visibility of small lesions close to CSF. Recently, FLAIR has been reported to show occluded arteries by high signal within, in patients with hyperacute ischemic stroke. The bright intraluminal signal seen in FLAIR images in patients with acute stroke is sometimes described as “Hyperintense vessel sign”. Intraarterial hyperintense signal on FLAIR images may relate not only to lack of flow void but also to T1-shortening of thrombus, embolus, and clotted or stationary blood. It should be kept in mind that intraarterial hyperintense signal implies not only total obstruction in the artery, but may also be due to slow flow. Another sign on FLAIR images in patients with acute stroke is the so-called “Hyperintense swollen cortical gyri sign”. The cortical gray matter in the hyperintense signal distribution territory is brighter than other cortical gray matter. This sign is seen in Figure 1. Intraarterial signal on FLAIR images is an early sign of occlusion of major arteries. It is very likely to be seen immediately after occlusion. Combination of FLAIR images and DWI can be helpful for the detection of the area at risk of infarction (ischemic penumbra). FLAIR plays an important role for deciding whether perfusion study is necessary in the setting of hyperacute stroke. When the distribution area of intraarterial signal is larger than that of a lesion measured on diffusion-weighted images, hemodynamic evaluation by dynamic contrast-enhanced perfusion imaging should be performed to assess ischemic penumbra. Early detection of arterial occlusion is necessary for effective thrombolytic therapy and improvement of clinical outcome.
Differential Diagnosis List: Flair MRI in acute stroke

Final Diagnosis: Flair MRI in acute stroke

References:


Description: FLAIR image performed 5 hours after stroke shows intra-arterial signal, which is hyperintense to cerebral parenchyma, in the left middle cerebral artery and also "Hyperintense swollen cortical gyri sign" is seen on the left insular region. Origin:
Description: Diffusion-weighted image performed 5 hours after stroke shows a hyperintense lesion in the left insular cortex; however there is no change in the hemispheric territory. Origin:
**Figure 3**

*Description:* FLAIR image, obtained after 8 days, shows the final infarction in the territory of the left middle cerebral artery. The area of final infarct is larger than the DWI hyperintense signal distribution but is smaller than the distribution area of the hyperintense intraarterial signal. *Origin:*