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Diagnostic Accuracy and Relevance of Early MRI Vessel Signs Are Highly Overrated

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With interest I read the recent article by Assouline et al. [1] reporting the high sensitivity and specificity of the vascular susceptibility artifact (VSA), a signal loss on susceptibility-weighted images caused by an intravascular thrombus and indicating vessel occlusion at the site of VSA or close by. Also the FLAIR hyperintense (FLAIR HVS) vessel sign and CT hyperdense vessel sign (HMCAS) were investigated, all in a total of 29 patients with baseline MRI within the first 6 h. The reported sensitivity was 88, 100 and 60% for VSA, FLAIR HVS and HMCAS, specificity was 100, 10 and 50%, respectively [1]. The authors propose at the end of their article that 'further investigations are needed to determine the usefulness of VSA detection in the diagnostic work-up (thrombotic origin and/or recent occurrence) and treatment of ischemic stroke in the first hours'.

The diagnostic accuracy of early MR vessel signs is far higher than in a recent publication by our group [2]. We analyzed 56 patients (nearly twice the number) of patients with stroke MRI at baseline within 3 h after symptom onset, and 2 and 24 h after thrombolytic therapy (all patients). Besides the diagnostic accuracy we assessed prognostic value (recanalization, outcome, hemorrhage) and response pattern to intravenous recombinant tissue plasminogen activator based on thrombus composition. A subgroup (n = 31) of patients also had acute CT scanning before thrombolysis. In an independent and blinded fashion, analysis revealed a poor sensitivity for HMCAS (40%) and VSA (34%) and a moderate sensitivity for FLAIR HVS (65.9%) compared to a combined standard of magnetic resonance angiography and perfusion-weighted MRI. Specificity was moderate for both MRI vessel signs (75%). Sensitivity and specificity mildly increased at 2 and 24 h after thrombolysis, for VSA probably due to thrombus aging and increasing deoxygenation. While vessel signs when present indicated a higher NIHSS score, neither stroke etiology nor concomitant antiplatelet regimen was associated with presence or absence of either sign. Furthermore, early MRI signs, which have been proposed to reflect thrombus composition, did not predict the response to thrombolytic therapy or outcome. Overall, the FLAIR HVS may be moderately helpful, the VSA is probably neither for

diagnostic nor prognostic means. We suggest that the results by Assouline et al. [1] indicate a falsely high diagnostic accuracy due to an unblinded and retrospective analysis of the data with knowledge of the vascular status. Furthermore, we agree that FLAIR HVS is more sensitive (and specific) than the VSA. This is due to the fact that it detects slow flow as well as frank occlusion and can be seen also in the distal internal carotid artery where the VSA is negative due to bone artifacts.

References

- 1 Assouline E, Benziane K, Reizine D, Guichard JP, Pico F, Merland JJ, Bousser MG, Chabriet H: Intra-arterial thrombus visualized on T₂* gradient echo imaging in acute ischemic stroke. *Cerebrovasc Dis* 2005;20:6–11.
- 2 Schellinger PD, Chalela JA, Kang DW, Latour LL, Warach S: Diagnostic and prognostic value of early MR imaging vessel signs in hyperacute stroke patients imaged <3 hours and treated with recombinant tissue plasminogen activator. *AJNR Am J Neuroradiol* 2005;26:618–624.

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Reply to the Letter by Schellinger: Diagnostic Accuracy and Relevance of Early MRI Vessel Signs Are Highly Overrated

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We read with interest the comments by Schellinger [1] concerning our paper entitled 'Intra-arterial thrombus visualized on T₂* gradient echo imaging in acute ischemic stroke' [2]. His main concern is that diagnostic accuracy and relevance of early MRI vessel signs were probably overrated in our study. Schellinger et al. [3] have recently found a lower frequency of the vascular sus-

ceptibility artifact (VSA) in a larger series of 56 patients investigated within 3 h of symptoms. Actually, we cannot exclude an over- but neither an underestimation of the frequency of VSA due to the retrospective analysis of our MRI data. Also, we would like to emphasize that all acute stroke patients who had an MRI between April 2002 and June 2003 in our center were included in the study. Although the number of patients in our series was lower, we think that these two studies are not actually comparable for 3 reasons: (1) delay of 3 h for symptom onset in one study versus 6 h in the other, (2) inclusion of only patients eligible for thrombolysis in the study of Schellinger et al. [3] and of all categories of patients in our series, (3) different MRI sequences in the two studies.

References

- 1 Schellinger PD: Diagnostic accuracy and relevance of early MRI vessel signs are highly overrated. *Cerebrovasc Dis* 2006;21:215.
- 2 Assouline E, Benziane K, Reizine D, Guichard JP, Pico F, Merland JJ, Boussier MG, Chabriat H: Intra-arterial thrombus visualized on T₂* gradient echo imaging in acute ischemic stroke. *Cerebrovasc Dis* 2005;20:6–11.
- 3 Schellinger PD, Chalela JA, Kang DW, Latour LL, Warach S: Diagnostic and prognostic value of early MR imaging vessel signs in hyperacute stroke patients imaged <3 hours and treated with recombinant tissue plasminogen activator. *Am J Neuroradiol* 2005;26:618–624.

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