Headache in acute ischaemic stroke: a lesion mapping study.

Abstract:

Headache is a common symptom in acute ischaemic stroke, but the underlying mechanisms are incompletely understood. The aim of this lesion mapping study was to identify brain regions, which are related to the development of headache in acute ischaemic stroke. Patients with acute ischaemic stroke (n = 100) were assessed by brain MRI at 3 T including diffusion weighted imaging. We included 50 patients with stroke and headache as well as 50 patients with stroke but no headache symptoms. Infarcts were manually outlined and images were transformed into standard stereotaxic space using non-linear warping. Voxel-wise overlap and subtraction analyses of lesions as well as non-parametric statistics were conducted. The same analyses were carried out by flipping of left-sided lesions, so that all strokes were transformed to the same hemisphere. Between the headache group as well as the non-headache there was no difference in infarct volumes, in the distribution of affected vascular beds or in the clinical severity of strokes. The headache phenotype was tension-type like in most cases. Subtraction analysis revealed that in headache sufferers infarctions were more often distributed in two well-known areas of the central pain matrix: the insula and the somatosensory cortex. This result was confirmed in the flipped analysis and by non-parametric statistical testing.
(whole brain corrected P-value< 0.01). To the best of our knowledge, this is the first lesion mapping study investigating potential lesional patterns associated with headache in acute ischaemic stroke. Insular strokes turned out to be strongly associated with headache. As the insular cortex is a well-established region in pain processing, our results suggest that, at least in a subgroup of patients, acute stroke-related headache might be centrally driven.