

Abstract

Introduction

Since 2016, we know that the neuron responds to chronic hypoperfusion by reducing its performance. Cerebral revascularization using extra-intracranial bypass in internal carotid occlusion has also been shown to improve this reduction in function. In the case of asymptomatic internal carotid stenosis (ACS), hypoperfusion of the brain may occur due to insufficient collateralization. It is not clear whether this condition can lead to changes in cognitive performance. Likewise, the impact of hemodynamic changes on cognition in patients with ACS after carotid endarterectomy (CEA) remains unclear. The aim of this study was to evaluate the results of CEA for ACS at one year by assessing the changes in anterior, middle, and posterior cerebral artery blood flow in tandem with changes in cognitive efficiency.

Methodology

As part of the prospective study, the flow volume in cerebral arteries using quantitative magnetic resonance angiography was measured in a group of 14 males and 5 females before and at one year after CEA for ACS. Cognitive efficiency was assessed by Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). The values of flow volume were processed using simple ratio (SR) and were used for analyses with changes in cognitive skills after CEA.

Results

One year after CEA for ACS, a significant improvement in cognitive performance was observed in an index of short-term memory and visuospatial perception. At the same time, a deterioration of the speech index was noted. When analyzing the relationship between flow and cognition, there was a correlation between middle cerebral artery (MCA) flow and improvement in visuospatial perception. A change in flow in the posterior cerebral artery (PCA) was associated with an improvement in the short-term memory index, and a change in flow in the anterior cerebral artery (ACA) was associated with a deterioration in speech.

Conclusion

In a small group of ACS patients, one year after CEA, improvements in cognitive functions in visuospatial perception and short-term memory were observed. A partial improvement in visuospatial perception was associated with a change in flow in the MCA and an improvement in short-term memory with a change in flow in the PCA. Flow changes in the ACA, on the other hand, were associated with deterioration in speech function. One year after CEA, there were no changes in the RBANS neurocognitive battery total score. The methodological limitations of this small study do not allow for greater generalization. It would be appropriate to evaluate hemodynamic changes after CEA in patients with ACS in a large study.