

## **CEREBROVASCULAR RESERVE CAPACITY IS MORE SENSITIVE MARKER OF INTERNAL CAROTID ARTERY OCCLUSION THAN CEREBRAL LACTATE LEVEL**

**B. Urbanová<sup>1</sup>, A. Tomek<sup>1</sup>, J. Hort<sup>1</sup>, S. Ostry<sup>2</sup>, J. Vrana<sup>3</sup>, A. Skoch<sup>4</sup>, J. Laco<sup>1</sup>, M. Mohapl<sup>2</sup>, D. Netuka<sup>2</sup>, R. Mikulik<sup>5</sup>, D. Horinek<sup>2</sup>, V. Benes<sup>2</sup>**

<sup>1</sup>*Department of Neurology, Charles University in Prague, 2nd Medical School, and University Hospital Motol, Prague, Czech Republic*

<sup>2</sup>*Department of Neurosurgery, Charles University in Prague, 1st Medical School, and Central Military Hospital, Prague, Czech Republic*

<sup>3</sup>*Department of Radiodiagnostics, Central Military Hospital, Prague, Czech Republic*

<sup>4</sup>*Department of Radiodiagnostics and Interventional Radiology, Institute for Clinical and Experimental Medicine, Prague, Czech Republic*

[barbora.urbanova@gmail.com](mailto:barbora.urbanova@gmail.com)

**Objective:** To better understand the pathophysiological mechanisms triggered by internal carotid artery (ICA) occlusion, the interhemispheric differences in cerebrovascular reserve (CVR) capacity (marker of hypoperfusion) and cerebral lactate level (marker of microembolism) were investigated.

**Methods:** Patients with symptomatic or asymptomatic unilateral ICA occlusion and less than 70% stenosis on the contralateral side were studied. The CVR capacity to hypercapnia in the middle cerebral artery was assessed by transcranial Doppler ultrasound calculating the breath-holding index (BHI). The cerebral lactate level was measured by MR spectroscopy in a voxel of interest in the centrum semiovale. The BHI and lactate levels were compared in the affected and the non-affected side using paired t-test.

**Results:** 20 right-handed subjects (15 males, 5 females, age  $63 \pm 10$ ) were included, 6 patients had asymptomatic and 14 patients symptomatic occlusion (5 patients after TIA, 9 patients after a minor stroke, modified Rankin Scale 1). The cerebral lactate level was investigated in 14 patients (10 males, 4 females, age  $63 \pm 7$ , 3 asymptomatic, 4 TIA, 7 minor stroke). The BHI on the affected side was  $0,50 \pm 0,49$  and  $0,79 \pm 0,57$  on the non-affected side ( $p < 0,014$ ). The cerebral lactate level on the affected side was  $1,190 \pm 0,387$  and  $0,887 \pm 0,412$  on the non-affected side ( $p = 0,09$ ).

**Conclusion:** Our study showed ICA occlusion caused hemodynamic compromise. Given the limited statistical power, MR spectroscopy suggested microembolism may also play role. We hypothesize hemodynamic compromise and microembolism can be mutually interconnected because hemodynamic compromise can facilitate formation of microemboli and microembolism then worsens hemodynamic.

*Supported by IGAS10331-3 and NT11328.*