

## [O24] MR SPECTROSCOPY IN THE ASSESSMENT OF EFFECT OF REVASCULARIZATION IN DIABETIC PATIENTS WITH CRITICAL LIMB ISCHEMIA

Andrea Nemcova<sup>1</sup>, Alexandra Jirkovská<sup>1</sup>, Michal Dubský<sup>1</sup>, Robert Bem<sup>1</sup>, Vladimira Fejfarova<sup>1</sup>, Veronika Woskova<sup>1</sup>, Petr Sedivy<sup>1</sup>

<sup>1</sup>Diabetes Centre, Institute for Clinical and Experimental Medicine, Prague, Czech Republic

**Aim:** The standard method for assessment of effect of revascularization in patients with diabetic foot and critical limb ischemia (CLI) is transcutaneous oxygen pressure (TcPO<sub>2</sub>). Magnetic resonance spectroscopy (MRS) reflects the changes of oxidative muscle metabolism. The aim of our study was to evaluate the contribution of MRS of calf muscle in the assessment of microcirculation and effect of revascularization in diabetic patients with CLI and to compare it with healthy controls.

**Methods:** Seventeen diabetic patients with CLI treated either by autologous cell therapy (ACT; 8 patients, mean age 62.6 ± 8.9 years) or percutaneous transluminal angioplasty (PTA; 9 patients, mean age 66.7 ± 5.4 years) in our foot clinic during 2013-2016 and 19 healthy controls (mean age 57.6 ± 9.9 years) were included into the study. TcPO<sub>2</sub> measurement was used as a standard method of non-invasive evaluation of limb ischemia. MRS examinations were performed using the whole-body 3T MR system 1 day before and 3 months after the procedure. Subjects were examined in a supine position with the coil fixed under the musculus gastrocnemius. MRS parameters were obtained at rest and during the exercise period divided into 3 parts: a two-minute rest period, a six-minute exercise period and a six-minute recovery period. The exercise was performed by the plantar flexion once per repetition time (2s) with a weight load of 7.3 kg. Rest MRS parameters of oxidative muscle metabolism such as phosphocreatine (PCr), inorganic phosphate (Pi), phosphodiester (PDE), β-adenosine triphosphate (βATP), and intramyocellular pH were compared between patients and healthy controls. Recovery constant PCr (τPCr) and mitochondrial capacity (Q<sub>max</sub>) were calculated from dynamic MRS. The standard T-test and ANOVA were used for statistical analysis.

**Results:** Patients with CLI had significantly lower PCr/Pi ( $p < 0.01$ ) and significantly higher Pi and pH (both  $p < 0.01$ ) in comparison with healthy controls. We observed a significant improvement in TcPO<sub>2</sub> after both ACT (from 19.6 ± 10.4 to 32.1 ± 13.1 mmHg,  $p < 0.05$ ) and PTA (from 31.1 ± 16 to 44.4 ± 14.4 mmHg,  $p < 0.05$ ). However, the rest MRS parameters did not change significantly after either ACT or PTA. There was no correlation between any of the rest MRS parameters and TcPO<sub>2</sub> values. In individual cases we observed improvement of dynamic MRS parameters but only a few patients were capable of exercise (2 out of 3 in ACT group, 3 out of 5 in PTA group).

**Conclusion:** Results of our study show impaired oxidative metabolism of calf muscles in patients with CLI in comparison with healthy controls. According to our results, the rest MRS parameters of calf muscle do not seem to reflect the changes after revascularization in rest, on the other hand, an improvement in dynamic MRS parameters in individual cases was observed; this finding should be verified in a large number of patients.

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