

A pilot study of the use of perfusion scintigraphy in the assessment of lower limb perfusion after stem cell therapy in patients with diabetic foot disease

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**Background and Aims:** The use of imaging of microvascular pathology in the lower limbs of diabetic patients is questionable. The evaluation of neovascularization by contrast angiography is poorly assessable. Scintigraphy as a dynamic method of limb perfusion evaluation could be a promising technique to objectify the effect of stem cell therapy indicated for patients with no option for standard revascularization. The aim of our study was to gain first experience and assess perfusion scintigraphy of calf muscles in comparison with transcutaneous oxygen tension (TcPO<sub>2</sub>) in diabetic patients after stem cell therapy of critical limb ischemia. **Methods:** Perfusion scintigraphy with 99mTc-MIBI was performed before and 2 months after the autologous stem cell therapy of 6 patients with critical limb ischemia (mean age 58 ± 9.9 years, mean diabetes duration 23.2 ± 7.3 years) and it was compared to TcPO<sub>2</sub> measurement used as a standard method of non-invasive evaluation of skin microcirculation. After application of 4 MBq/kg of 99mTc-MIBI a whole-body scan and SPECT/CT were performed and a rest count (RC) of a calf muscle was measured. Next bolus of 8 MBq/kg of 99mTc-MIBI was applied after a stress test (60times flexion and extension in ankle joint). Perfusion reserve (PR) was defined as a: (count in exercising calf - count in rest calf) / count in rest calf x 100 (%). **Results:** TcPO<sub>2</sub> values increased significantly from 6.5 ± 5.4 mm Hg to 36.5 ± 15.9 mm Hg after 2 months after stem cell therapy (p = 0,03). RC of a calf muscle of the study foot was unchanged, whereas PR increased from 325.7 ± 40.6 % to 374.75 ± 41.6 % (NS); 3 patients were improved, 2 patients with no change and 1 patient slightly impaired. No significant correlation between TcPO<sub>2</sub> increase and perfusion scintigraphic parameters after stem cell therapy was found (r = 0.136). **Conclusion:** Our study had a limitation in the small number of patients. Controversy between TcPO<sub>2</sub> and PR results could be caused due to technical (higher variability of scintigraphy) or metabolic (many processes influencing mitochondrial uptake of 99mTc-MIBI) reasons. PR was more related to TcPO<sub>2</sub> changes than RC that results in better improvement of functional reserve than rest perfusion. More studies are required to evaluate reproducibility and conclusiveness of scintigraphic perfusion assessment. *This study was supported by grant MZO 00023001.*