Abstract: P4712

Hyperbaric oxygen therapy enhanced circulating levels of endothelial progenitor cells and angiogenesis biomarkers, blood flow in ischemic area in patients with peripheral arterial occlusive disease

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Background: Arterial atherosclerotic occlusive syndrome remains the leading cause of mortality and morbidity worldwide. Peripheral arterial occlusive disease (PAOD) is a manifestation of atherosclerosis in the lower extremities. In our previous preclinical study, hyperbaric oxygen (HBO) therapy improved ischemic PAOD mainly through an increase of vascular wall permeability and recruiting endothelial progenitor cells (EPCs) to enhance the angiogenesis and blood flow in the ischemic area.

Purpose: This study tested the hypothesis that hyperbaric oxygen (HBO) therapy enhanced the circulating levels of endothelial progenitor cells (EPCs), soluble angiogenesis factors and blood flow in ischemic area in patients with peripheral arterial occlusive disease (PAOD).

Methods: 57 consecutive patients with PAOD undergoing the HBO therapy (3 atm for 2h/each time) were prospectively enrolled into the present study. The venous blood sampling was drawn for assessing the circulating levels of EPCs and soluble angiogenesis factors prior to and during five times of HBO therapy. Additionally, skin perfusion pressure (SPP), an indicator of blood flow at ischemic area, was measured by moorVMS-PRES.

Results: The results demonstrated that the circulating levels of EPCs (CD34+/CD133+/CD45dim, CD31+/CD133+/CD45dim, CD34+) and soluble angiogenesis factors (VEGF/SDF-1a/HGF/FGF) were significantly increased in post-HBO therapy than in pre-HBO therapy (all p<0.01). Additionally, Matrigel assay exhibited that the angiogenesis was significantly increased in post-HBO therapy than prior to the therapy (p<0.001). Furthermore, the SPP was significantly increased in ischemic area (i.e., plantar foot and mean SPP of the ischemic foot) in post-HBO therapy than in pre-HBO therapy (all p<0.01). Importantly, the HBO therapy did not show any complication and all the patients were uneventfully discharged without amputation.

Conclusions: HBO therapy augmented circulating levels of EPCs and angiogenesis factors as well as improved the blood flow in the ischemic area.