

## SHORT COMMUNICATION

**The effect of hyperbaric oxygen therapy in treatment of leg ulcers**

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The “diabetic foot” – diabetic ulcer (DU) is characterized by sensory, motor and autonomic neuropathy as well as both macro- and microvascular disorders, which ultimately can result in ulceration, gangrene and amputation. Chronic venous insufficiency leads to venous ulcers (VU) due to valvular malfunction with blood pooling, hypertension within the venous system and swelling. The common cause of both types of non-healing ulcers resides in ischemia. In addition to further effects within the site of ischemia, the systemic hyperbaric oxygen (HBO) has been suggested to relieve the pain and improve the healing by reducing the swelling, enhancing the bacterial killing, supporting the new capillary formation, inducing the endothelial fibrinolytic activation and reducing the leukocytes adherence. The favourable effect of HBO therapy in APC resistant patients with post-thrombotic ulcers has recently been reported (Batora, Haemostasis, 2000, Suppl 1: 30). However, the evidence-based efficacy of HBO therapy as an adjunct treatment of hypoxic wounds is still missing.

We report the efficacy of HBO therapy in 14 and 13 patients with diabetic and venous ulcers, respectively. Fourteen DU and 12 VU patients treated with conventional therapy served as the control groups. All patients were tested for thrombophilia mark-

ers: homocystein level, FVLeiden1691G/A, FII20210G/A and MTHFR677C/T. An average of 29 and 26 HBO treatments were administered in patients with DU and VU, respectively (72-minute inhalation of 100% oxygen, hyperbaric pressure 0.18–0.20 MPa). After 6 weeks of therapy the size of ulcer area was observed to be reduced significantly (expressed as percentage of initial size) in both HBO groups when compared with the conventional therapy groups: reduction of diabetic ulcers by  $62.8 \pm 29.8\%$  vs  $17.7 \pm 9.9\%$ ;  $p < 0.001$ , and venous ulcers by  $60.8 \pm 42.7\%$  vs  $29.3 \pm 6.5\%$ ;  $p < 0.05$ , respectively. Only one patient in each of both, the diabetic HBO and CVI conventional-therapy groups had heterozygous thrombophilic mutation of FV Leiden and FII20210G/A. The MTHFR C677T mutation was revealed in 22/50 (44 %) patients (3 homozygous and 19 heterozygous). However, only 5/22 (23 %) patients with MTHFR mutation (1 homozygous and 4 heterozygous) had a mild-to-moderate hyper-homocysteinemia (mean level of 26.8; range 17.6–46.8  $\mu\text{mol/l}$ ).

Our results demonstrate the hyperbaric oxygen to be a valuable therapy adjunct to the conventional management of chronic non-healing ulcers in both, diabetes mellitus and chronic venous insufficiency.\*

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