Medical Studies / Resources

Diabetes

Kalani M, Jorneskog G, Naderi N, Lind F, Brismar K. "Hyperbaric oxygen (HBO) therapy in treatment of diabetic foot ulcers. Long-term follow-up." Diabetes Complications 2002 Mar-Apr;16(2): pp 153-8.

Abstract: The cause of diabetic foot ulcers is multifactorial, e.g., neuropathy and angiopathy, leading to functional disturbances in the macrocirculation and skin microcirculation. Adequate tissue oxygen tension is an essential factor in infection control and wound healing. Hyperbaric oxygen (HBO) therapy, daily sessions at increased pressure in a hyperbaric chamber, has beneficial actions on wound healing including antimicrobial action, prevention of edema and stimulation of fibroblasts. The, aim of the present study was to investigate the long-term effect of HBO in treatment of diabetic foot ulcers.

Thirty-eight diabetic patients (30 males) with chronic foot ulcers were investigated in a prospective study. The mean age was 60+/-13 years and the mean diabetes duration 27+/-14 years. Seventeen patients underwent 40-60 sessions of HBO therapy, while 21 patients were treated conventionally. The follow-up time was 3 years. Seventy-six percent of the patients treated with HBO (Group A) had healed with intact skin at a follow-up time of 3 years. The corresponding value for patients treated conventionally (Group B) was 48%. Seven patients (33%) in Group B compared to two patients (12%) in Group A went to amputation. Adjunctive HBO therapy can be valuable for treating selected cases of hypoxic diabetic foot ulcers. It seems to accelerate the rate of healing, reduce the need for amputation, and increase the number of wounds that are completely healed on long-term follow-up. Additional studies are needed to further define the role of HBO, as part of a multidisciplinary program, to preserve a functional extremity, and reduce the short- and long-term costs of amputation and disability.

Senior C." Treatment of diabetic foot ulcers with hyperbaric oxygen." Wound Care 2000 Apr;9(4): pp 193-7.

Abstract: The delivery of oxygen to the wound site is crucial in healing diabetic foot ulcers, and impairment of this process in people with diabetes leads to delayed wound repair. Hyperbaric oxygen therapy works by elevating the plasma oxygen level. Fibroblasts synthesise and modify collagen, and both these activities require relatively high partial pressures of oxygen. Hyperbaric oxygen can promote healing by stimulating fibroblast activity and collagen formation. Increasing oxygen tensions also **has a** direct and toxic effect on anaerobes, therefore hyperbaric oxygen therapy has a special role in treating diabetic foot infections. Studies on hyperbaric oxygen therapy in general show it to be a beneficial adjunctive therapy for diabetic foot ulcers. However much of the work is anecdotal and more controlled trials are required.

Fife, Caroline E.; Buyukcakir, Cem; Otto, Gordon H.; Sheffield, Paul J.; Warriner, Robert A.; Love, Tommy L.; Mader, Jon. "The predictive value of transcutaneous oxygen tension measurement in diabetic lower extremity ulcers treated with hyperbaric oxygen therapy: a retrospective analysis of 1144 patients." Wound Repair & Regeneration. July 2002, Vol. 10 Issue 4, p 198-207.

Abstract: The objective of this retrospective analysis was to determine the reliability of transcutaneous oxygen tension measurement (TcPO[sub 2]) in predicting outcomes of diabetics who underwent hyperbaric oxygen therapy for lower extremity wounds. Six hyperbaric facilities provided TcPO[sub 2] **data** under several possible conditions: breathing air, breathing oxygen at sea level, and breathing oxygen in the chamber. Overall, 75.6% of the patients improved after hyperbaric oxygen therapy. Baseline sea-level air TcPO[sub 2] identified the degree of tissue hypoxia but had little statistical relationship with outcome prediction because some patients healed after hyperbaric oxygen therapy despite very low prehyperbaric TcPO[sub 2] values. Breathing oxygen at sea level was unreliable for predicting failure, but 68% reliable for predicting success after hyperbaric oxygen therapy. TcPO[sub 2] measured in chamber provides the best single discriminator between success and failure of hyperbaric oxygen therapy using a cutoff score of 200 mmHg. The reliability of in-chamber TcPO[sub 2] as an

isolated measure was 74% with a positive predictive value of 58%. Better results can be obtained by combining information about sea-level air and in-chamber oxygen. A sea-level air TcPO[sub 2] < 15 mmHg combined with an in-chamber TcPO[sub 2] < 400 mmHg predicts failure of hyperbaric oxygen therapy with a reliability of 75.8% and a positive predictive value of 73.3%.