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Hyperbaric Oxygen May Improve Healing of Diabetic Foot Ulcers

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Aug. 7, 2003 — Systemic hyperbaric oxygenation (HBO) therapy given for two weeks significantly improved the rate of healing of nonischemic chronic diabetic foot ulcers, according to the results of a prospective randomized controlled trial published in the August issue of *Diabetes Care*. The authors suggest that further investigation is warranted.

"HBO has previously been proposed as an adjunctive treatment for the diabetic foot because it improves in vitro the complex processes underlying healing," write Laurence Kessler, MD, PhD, from University Hospital in Strasbourg, France, and colleagues. "The difficulty in controlling the different parameters (metabolic, vascular, infectious, and foot off-loading) involved in the evolution of the diabetic foot and the lack of prospective randomized studies on the effect of HBO on this pathophysiological condition make it difficult to recognize HBO as an incontrovertible treatment."

Of 28 diabetic patients with chronic Wagner grades I-III foot ulcers without clinical symptoms of arteriopathy, 87% had type 2 diabetes. Average age was 60.2 ± 9.7 years, and average diabetes duration was 18.2 ± 6.6 years. All patients had signs of neuropathy, and their ulcers had failed to improve during three months of full standard treatment. Subjects were randomized to receive HBO, twice daily, five days weekly for two weeks, or to a control group.

During HBO, the transcutaneous oxygen pressure ($TcPo_2$) measured around the ulcer increased significantly from 21.9 ± 12.1 to 454.2 ± 128.1 mm Hg ($P < .001$). At day 15, ulcer size had decreased significantly in the HBO group (41.8 ± 25.5 vs. 21.7 ± 16.9% in the control group; $P = .037$).

However, at day 30, there was no significant difference between groups (48.1 ± 30.3 vs. 41.7 ± 27.3%). Four weeks later, two patients in the HBO group and none in the control group had complete healing. HBO was well tolerated in all but one patient, who developed transient barotraumatic otitis.

"This prospective randomized study provides evidence that HBO doubles the mean healing rate of nonischemic chronic foot ulcers in selected diabetic patients. In addition, it suggests the possibility of shortening hospitalization time in these patients," the authors write. "Whether longer periods of HBO sessions would result in better healing remains to be established."

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Reviewed by Gary D. Vogin, MD