

The Effect of Hyperbaric Oxygen Therapy on a Burn Wound Model in Human Volunteers.

Articles

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Abstract:

A previous nonblinded study has suggested beneficial effects from hyperbaric oxygen treatment of superficial partial-thickness radiation burns in human volunteers. This protocol was designed to either confirm or challenge these previous findings in a randomized, blinded format.

Twelve healthy, nonsmoking volunteers (7 males, 5 females) participated. All were screened for contraindications to hyperbaric oxygen therapy (acute sinusitis, otitis media, pneumonia, pregnancy, active cancer, pneumothorax) and given a single test hyperbaric exposure.

A standardized wound model was employed for the painless creation of a volar forearm lesion on volunteers by applying a suction device to form a blister, excising its epidermal roof, and irradiating the exposed dermis with ultraviolet light. Subjects were randomized into either a hyperbaric oxygen group (100% oxygen at 2.4 ATA, n=6) or the sea-level air-breathing equivalent control group (8.75% oxygen at 2.4 ATA, n=6). Both groups then underwent standard hyperbaric therapy. The subjects, the hyperbaric oxygen chamber operators, and the monitoring clinicians were all blinded to the oxygen concentration administered. Each subject received two dives per day over a 3-day period. The wounds were studied noninvasively prior to treatment and once per day over 6 days for size, hyperemia, and exudation, with epithelialization as the endpoint. The averages for each measurement of the hyperbaric oxygen group versus the control group were computed by means of a one-tail t test; p was considered significant at less than 0.05.

Daily wound size, hyperemia, and exudation measurements were significantly different on day 2. The hyperbaric oxygen group showed a 42 percent reduction in wound hyperemia, a 35 percent reduction in the size of the lesion, and a 22 percent reduction in wound exudation (p values of 0.05, 0.03, and 0.04, respectively). No significant difference was noted for epithelialization.

Observed differences in wound size, hyperemia, and exudation were attributable to hyperbaric oxygen therapy. This study further supports earlier conclusions that hyperbaric oxygen therapy is beneficial in a superficial dermal wound.

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