

Hyperbaric O₂

In patients with open fracture, hyperbaric O₂ may not benefit patient outcomes.

Quality of Evidence: Low

Strength of Recommendation: Limited ★★☆☆

Evidence from two or more “Low” quality studies with consistent findings or evidence from a single “Moderate” quality study recommending for or against the intervention. Also, higher strength evidence can be downgraded to limited due to major concerns addressed in the EtD Framework

Rationale

One moderate quality study (Bouachour 1996) regarding hyperbaric treatment investigated the presence of wound healing following crushing injuries. In crush injuries to the extremities, ischemia can occur on the macro (arterial disruption) or micro (microcirculatory insufficiency) level. The concept behind hyperbaric oxygen therapy is to increase the amount of dissolved oxygen in the plasma, enhancing local tissue oxygen delivery to attempt to preserve tissue viability and improve the wound-healing process.

In the Bouachour (1996) study, subjects (n=36) were randomly assigned to treatment with either hyperbaric oxygen (HBO, session of 100% O₂ at 2.5atm for 90 minutes twice daily over 6 days) versus a placebo chamber (atmospheric conditions) in patients who had a crush injury that required an irrigation and debridement and then tension-free wound closure. Transcutaneous oxygen levels were measured during the trial. Complete healing was obtained in 17 patients in the HBO group versus 10 patients in the placebo group (p<0.01). There was a significantly smaller number of patients requiring skin grafts/flaps, vascular procedures or amputations in the HBO group relative to the control group (p<0.05). In the subgroup of patients who were older than 40 and had a Gustilo type III soft-tissue injury, wound healing was obtained in 87.5% of patients in the HBO group versus 30% in the placebo group.

Benefits & Harms

The potential benefits of enhancing the wound-healing process are profound. Hyperbaric treatment is contraindicated in some patients with certain neurologic, pulmonary, or otorhinolaryngologic diseases.

Outcome Importance

In the small subset of patients who are fortunate to receive care in a facility with a hyperbaric chamber, it may benefit some patients with a crush injury to an extremity.

Cost Effectiveness/Resource Utilization

In the Bouachour (1996) study, the length of hospital stay was similar in the two study arms: 22.4 in the HBO group and 22.9 in the placebo group. Although the cost of hyperbaric treatment may be great (the chamber itself, and the expense necessary to fund a qualified medical officer as well as, staffing with skilled technicians) the total investment may be less (amortized over time) than the potential cost of management of the sequela of the potential complications associated with crush injuries. However, formal cost/benefit analysis has not been completed.

Acceptability

Clinical studies indicating the use of hyperbaric treatment in the surgical management of open traumatic fractures or crush injuries are limited.

View background material via the SSI Trauma CPG [eAppendix 1](#)

View data summaries via the SSI Trauma CPG [eAppendix 2](#)