

Ozone Therapy and Hyperbaric Oxygen Treatment in Lung Injury in Septic Rats

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Abstract :

Various therapeutic protocols were used for the management of sepsis including hyperbaric oxygen (HBO) therapy. It has been shown that ozone therapy (OT) reduced inflammation in several entities and exhibits some similarity with HBO in regard to mechanisms of action. We designed a study to evaluate the efficacy of OT in an experimental rat model of sepsis to compare with HBO. Male Wistar rats were divided into sham, sepsis+cefepime, sepsis+cefepime+HBO, and sepsis+cefepime+OT groups. Sepsis was induced by an intraperitoneal injection of *Escherichia coli*; HBO was administered twice daily; OT was set as intraperitoneal injections once a day. The treatments were continued for 5 days after the induction of sepsis. At the end of experiment, the lung tissues and blood samples were harvested for biochemical and histological analysis. Myeloperoxidase activities and oxidative stress parameters, and serum proinflammatory cytokine levels, IL-1? and TNF-?, were found to be ameliorated by the adjuvant use of HBO and OT in the lung tissue when compared with the antibiotherapy only group. Histologic evaluation of the lung tissue samples confirmed the biochemical outcome. Our data presented that both HBO and OT reduced inflammation and injury in the septic rats' lungs; a greater benefit was obtained for OT. The current study demonstrated that the administration of OT as well as HBO as adjuvant therapy may support antibiotherapy in protecting the lung against septic injury. HBO and OT reduced tissue oxidative stress, regulated the systemic inflammatory response, and abated cellular infiltration to the lung demonstrated by findings of MPO activity and histopathologic examination. These findings indicated that OT tended to be more effective than HBO, in particular regarding serum IL-1?, lung GSH-Px and histologic outcome.

Key Word :

Sepsis, *Escherichia coli*, HBO, Ozone, Oxidant stress, Antioxidant

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