

EFFECTS OF HYPERBARIC OXYGEN THERAPY ON THROMBOCYTOPENIA AND PLATELET AGGREGATION DURING AN EXPERIMENTAL MODEL OF MULTIPLE ORGAN FAILURE SYNDROME

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Multiple-organ failure syndrome (MOFS) is one of the most challenging clinical problems in intensive care [1]. Our previous experimental studies provided the first evidence that, during MOFS, hyperbaric oxygen therapy (HBO) attenuates: (i) the fall of mean arterial pressure; (ii) systemic toxicity; (iii) mortality; (iv) the mixed acid base disorder; (v) the coagulation disorders; (vi) release of involved mediators (tumor necrosis factor-alpha, nitric oxide) [2]. Recently, it has been reported that thrombocytopenia and alteration of platelet aggregation could have a pivotal role in sepsis-induced MOFS [3]. Aim of this study is to evaluate the effects of HBO therapy on the number and function of platelets during an experimental model of MOFS. Forty male rats were randomly divided into four groups of ten rats each. One group was injected with saline solution (0.9% NaCl i.p.), and served as control group. The second group received zymosan (500 mg/kg i.p.). The third group received zymosan (500 mg/kg i.p.) and HBO (2 absolute atmospheres; ATA) four and eleven hours after zymosan-induced shock. The fourth group underwent HBO treatment four and eleven hours after saline solution administration. Eighteen hours after study onset, animals were sacrificed and blood samples were drawn from the abdominal aorta in order to study the number and the aggregation of platelets. The administration of zymosan was responsible of a significant thrombocytopenia. HBO treatment significantly reduced the zymosan-induced thrombocytopenia, while did not affect the number of platelets in sham-treated animals. In addition, the *ex vivo* platelet aggregation in response to ADP (10 µM), was significantly increased in blood from zymosan-treated rats. However, *in vivo* HBO significantly reduced platelet hyper-responsiveness in zymosan-treated rats. It also significantly reduced the aggregation ability of platelets from sham-treated rats. The results of this study demonstrate that HBO is able to reduce the thrombocytopenia and the hyper-aggregation of platelets in zymosan-induced MOFS. Taken together, these findings support the view that HBO could be an effective and supportive treatment of MOFS.

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3. Bone RC (1991) The pathogenesis of sepsis. Ann Inter Med 115: 457 – 469