Undersea & Hyperbaric Medical Society

2014 ANNUAL SCIENTIFIC MEETING

Program & Abstracts

A 4

ORAL PRESENTATION TIME: 1036 - 1048
POSTER PRESENTATION TIME: 1130 - 1200
RESIDENT COMPETITION: NO

THE EFFECTS OF HYPERBARIC OXYGEN APPLIED FOR ONE AND FIVE DAYS ON BLOOD BRAIN BARRIER PERMEABILITY IN RATS

Tatar S, Arican N, Orhan N, Yılmaz CU, Ahishali B, Kaya M, Toklu AS
akin@toklu.net

Introduction: The studies about the effect of hyperbaric oxygen (HBO) on blood-brain barrier (BBB) permeability are limited. In this experimental study, the effects of HBO applied for one and five days, on blood-brain barrier (BBB) permeability and oxidant-antioxidant systems were investigated in rats.

Materials and Methods: Healthy young female Wistar albino rats were divided into three groups as, control, HBO administered for 1 day (HBO-1) and HBO adminestered for 5 days (HBO-5) groups. Hyperbaric oxygen sessions were set as; compression in 15 min, 100% oxygen for 60 min at 2,5 ATA and decompression in 15 min. Three HBO sessions were applied to HBO-1 group with 6 hours intervals in 24 hours. Twelve HBO sessions were applied to the HBO-5 group as; 3 sessions a day in first two days and twice a day during the last three days. The rats were catheterized about 2 hours after the last hyperbaric sessions to inject horseradish peroxidase (HRP), to make the fixation for immunohistochemical evaluation, to take tissue samples for measurement of the oxidant-antioxidant level and decapitation. BBB permeability was examined electron microscopically by using HRP tracers.

Results: When examined by electron microscopy, it was observed that HRP couldn't pass through BBB in control group, but it was passed in HBO-1 and HBO-5 groups. Immunohistochemically, no significant difference was detected between groups. GSH levels in cerebral cortex and hippocampal tissues in HBO-1 and HBO-5 were measured significantly lower comparing to control group. SOD activities in both experimental groups were higher than control group. MDA levels in cerebral cortex and hippocampal tissues were lower in both HBO-5 and HBO-1 groups.

Conclusion: HBO administered to healthy rats for 1 and 5 days caused an increase in BBB permeability to HRP, decrease in MDA and GSH level in brain tissue and slight increase in SOD activity.