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PO-080 - (22717) - THE IMPACT OF HIGH ALTITUDE HYPOXIA ON BRAIN AND LIVER: HISTOMORPHOLOGICAL INSIGHTS INTO HEPATIC-NEUROVASCULAR INTERACTIONS

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Acute hypobaric hypoxia, a hallmark of high-altitude exposure, disrupts systemic homeostasis and induces metabolic and inflammatory responses that affect both the brain and liver. As a central metabolic organ, the liver plays a critical role in adapting to altitude-induced hypoxia by modulating metabolic and immune reactions. However, the pathological mechanisms underlying hypoxia-induced liver injury remain unexplored. This study investigates the interplay between brain and liver dysfunction under acute hypobaric hypoxic conditions, emphasizing the histomorphological changes in these organs that may offer valuable insights into the brain-liver axis as a key mediator of high-altitude pathophysiology.
To simulate acute hypobaric hypoxia, male albino rats (n=24) were subjected to a decompression chamber environment at an altitude of 7.620 meters for 24 hours. The histological analysis was used to reveal the damages in both liver and brain tissues via H&E staining, silver impregnation, IHC and micronucleus test.
The study findings depicted various histomorphological changes in both brain and liver including edematous and neurovascular alterations in the brain parenchyma, dilatations of the brain vessels, elevated number of cytokines (TNF-a), pyknosis and vacuolization of the neurons. Histological examination showed fibrotic changes in the liver, vacuolization of hepatocytes, and fatty dystrophy with hemorrhagic foci. The micronucleus test demonstrated an increased number of nuclear abnormalities and binucleation in hepatocytes.

The study considers that the brain-liver axis may be pivotal in mediating inflammatory responses and metabolic dysregulation during hypoxic stress. However, further research into this inter-organ crosstalk may provide new perspectives on high-altitude pathophysiology and potential therapeutic interventions.

Palavras-chave : high-altitude hypoxia, brain-liver interactions, histomorphology