

NEONATAL PULMONARY RESEARCH

Preconditioning of Mesenchymal Stem Cells by Sevoflurane to improve their therapeutic potential

Background

Transplantation of Bone marrow Mesenchymal Stem Cells (MSCs) into ischemic tissue shows benefits in preventing reperfusion injury and is therefore of interest for patients with myocardial infarction or other ischemic events. Apoptosis of MSCs in ischemic tissue limits the potential in vivo. Existing data showed promising effects of Sevoflurane, an inhaled anesthetic, on proliferation and mobilization of progenitor cells in ischemia. Sun and coworkers tested the effects of Sevoflurane priming on Bone marrow MSCs in a cell culture model of ischemia.

Summary of results

After 2h of Sevoflurane preconditioning, MSCs showed less apoptosis, increased mitochondrial membrane potential and enhanced migration compared to non-preconditioned MSCs in ischemia. Differences to control group (no ischemia) remained significant with or without preconditioning. The authors could show that HIF-1 α , HIF-2 α and VEGF expression was increased after Sevoflurane priming and might be the underlying mechanism.

Strength

Sun and coworkers used established models of ischemia and were able to show potential benefits of Sevoflurane priming on cellular level and can explain underlying mechanisms.

Limitations

The study presented here is cell culture-based. If the promising results of Sevoflurane priming are of potential clinical importance has to be proofed in animal model.

Practical conclusion

The effectiveness of Mesenchymal Stem Cells could be improved by preconditioning. Optimal drugs and protocols have to be developed.

Sun X et al. Preconditioning of Mesenchymal Stem Cells by Sevoflurane to Improve Their Therapeutic Potential. Plos One 2014; DOI: 10.1371/journal.pone.0090667

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