

Infused Mesenchymal Stem Cells Ameliorate Organs Morphology in Cerebral Malaria Infection

Authors : Reva Sharan Thakur, Mrinalini Tiwari, Jyoti das

Abstract : Cerebral malaria-associated over expression of pro-inflammatory cytokines and chemokines ultimately results in the up-regulation of adhesion molecules in the brain endothelium leading to sequestration of mature parasitized RBCs in the brain. The high-parasitic load subsequently results in increased mortality or development of neurological symptoms within a week of infection. Studies in the human and experimental cerebral malaria have implicated the breakdown of the integrity of blood-brain barrier during the lethal course of infection, cerebral dysfunction, and fatal organ pathologies that result in multi-organ failure. In the present study, using Plasmodium berghei Anka as a mouse model and in vitro conditions, we have investigated the effect of MSCs to attenuate cerebral malaria pathogenesis by diminishing the effect of inflammation altered organ morphology, reduced parasitemia, and increased survival of the mice. MSCs are also validated for their role in preventing BBB dysfunction and reducing malarial toxins. It was observed that administration of MSCs significantly reduced parasitemia and increased survival in Pb A infected mice. It was further demonstrated that MSCs play a significant role in reversing neurological complexities associated with cerebral malaria. Infusion of MSCs in infected mice decreased hemozoin deposition; oedema, and haemorrhagic lesions in vascular organs. MSCs administration also preserved the integrity of the blood-brain barrier and reduced neural inflammation. Taken together, our results demonstrate the potential of MSCs as an emerging anti-malarial candidate.

Keywords : cerebral malaria, mesenchymal stem cells, erythropoiesis, cell death

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