

Static magnetic field attenuates mortality rate of mice by increasing the production of IL-1 receptor antagonist

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Abstract

Purposes: Disseminated intravascular coagulation (DIC) is a complex systemic thrombohemorrhagic disorder involving intravascular coagulation and hemorrhage. The aim of this study is to test whether static magnetic field (SMF) is effective in attenuating lipopolysaccharide (LPS)-induced DIC. Materials and methods: In vivo experiments were performed in this study using male BALB/cByJ mice. An intraperitoneal injection of 50 mg/kg LPS was shown to lead to approximately 50% mortality and this dose was used in subsequent experiments. To test the effects of SMF on the survival rate of LPS-induced animals, the mice were exposed to 0.25-T SMF for 2 h before LPS injection. In addition, the effect of a 2-h SMF treatment on the production of anti-inflammatory cytokines was evaluated. Results: In the first set of experiments, we found that the survival rate was higher in the SMF-exposed group than in the sham-exposed group. The circulating platelet (PLT) counts in the SMF-exposed mice were significantly higher than in the unexposed animals. However, no significant changes in inflammatory cytokine, including tumour necrosis factor-alpha (TNF-alpha), interleukin-1alpha (IL-1alpha), interleukin-6 (IL-6) and monocyte chemoattractant protein 1 (MCP-1), in plasma were found after SMF treatment. The results from the second experiment showed that the plasma levels of interleukin-1 receptor antagonist (IL-1ra) were higher in the SMF-exposed group than in the sham group. Conclusions: Exposure to an SMF increases the plasma levels of IL-1ra. This effect may inhibit the reduction in PLT in plasma, resulting in prevention in LPS induced DIC.