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MEETING ABSTRACT

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The effect of magnesium sulfate in carrageenan-induced inflammatory pain in rats

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Background: Magnesium is the fourth most abundant essential ion in the human body and plays a fundamental role in many cellular functions, such as storage, metabolism and energy utilization. Additionally, magnesium acts as a blocker of voltage-dependent *N*-methyl-D-aspartate (NMDA) receptor ion channels. It has been demonstrated to enhance the effects of opioids and general and local anaesthetics. Magnesium has analgesic efficacy against neuropathic pain, but reports on its effects on inflammatory pain are controversial. This study aimed at evaluating the systemic and local effects of magnesium sulfate on the inflammatory somatic pain after systemic and local administration in rats.

Methods: Hyperalgesia was induced in male Wistar rats by injection of 0.5% carrageenan (0.1 ml) into the paw. $MgSO_4$ was given s.c. either 5 min before the injection of carrageenan or co-injected with carrageenan. Hind paw withdrawal threshold to mechanical stimuli was measured six hours after intraplantar injection of carrageenan using the von Frey anesthesiometer test.

Results: Pretreatment with systemic $MgSO_4$ resulted in a dose-independent increase in the mechanical paw withdrawal threshold after carrageenan injection. Subcutaneous $MgSO_4$ at doses of 0.5, 5, 15 and 30 mg/kg, reduced the hyperalgesia by 44.4 ± 8.8%, 68 ± 8.4%, 24.6 ± 6.9% and 45.3 ± 6.7%, respectively. The effect lasted up to 3 h. $MgSO_4$ at doses of 0.05, 0.1 and 0.5 mg/paw, co-injected with carrageenan had no influence on hyperalgesia. A dose of 0.1 mg/paw injected into the contralateral (non-inflamed) paw also had no effect on carrageenan induced hyperalgesia.

Discussion: The present study shows that magnesium sulfate is effective against pain associated with inflammation after systemic, but not after local peripheral administration. The absence of any effect of $MgSO_4$ following local, peripheral administration, and the presence of an effect after systemic administration, might suggest that this effect is mediated by a central mechanisms. Low doses of systemic $MgSO_4$ may thus be useful in the treatment of somatic inflammatory pain.

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