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The Effects of Nmda Antagonists On Morphine Induced Hyperthermia in Rats

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Objectives: NMDA receptor antagonists, are known for their anesthetic, analgesic and anti-shivering properties. This study is aimed at evaluating the effects of ketamine and magnesium sulphate on body temperature in rats, and to determine the type of interaction between them.

Methods: The body temperature was measured by insertion of a thermometer probe 5 cm into the colon of unrestrained male Wistar rats (200-250 g).

Results: Magnesium sulphate (5 and 60 mg/kg, sc) showed influence neither on baseline, nor on morphine-evoked hyperthermic response. Subanesthetic doses of ketamine (5-30 mg/kg, ip) given alone, produced significant dose-dependent reduction in both baseline colonic temperature and morphine-induced hyperthermia. Analysis of the log dose–response curves for the effects of ketamine and ketamine-magnesium sulphate combination on the baseline body temperature revealed synergistic interaction, and about 5.3 fold reduction in dosage of ketamine when the drugs were applied in fixed ratio (1:1) combinations. In addition, fixed low dose of magnesium sulphate (5 mg/kg, sc) enhanced the temperature lowering effect of ketamine (1.25-10 mg/kg, ip) on baseline body temperature and morphine-induced hyperthermia by factors of about 2.5 and 5.3, respectively.

Conclusion: This study is first to demonstrate the synergistic interaction between magnesium sulphate and ketamine in lowering morphine induced hyperthermia. It is possible that the synergy between ketamine and magnesium may have clinical relevance.