Morphine treatment slows recovery after a contusion injury in rats and does not reduce the negative consequences of aversive stimulation

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Aversive stimulation 1–4 days after a contusion injury inhibits recovery. We hypothesized that this effect was related to the pain-eliciting nature of the aversive stimulation, and therefore treatment with an analgesic (morphine) should have a protective effect. Rats received a moderate (12.5mm drop) contusion injury using the NYU Impactor. The next day, subjects received 0, 10, or 20 mg/kg morphine (i.p.). Thirty minutes later, half the subjects in each drug condition were given 6 minutes of intermittent tailshock (1.5 mA, 80 ms, interval), and recovery was monitored over the next 6 weeks. Morphine treatment caused an immediate dip in recovery (p < .05) that lasted over 48 hrs. A high dose of morphine in combination with shock treatment led to a high rate of mortality (53%, p < .05), death occurring at a mean of 3.4 days post-treatment. None of the morphine–unshocked or saline–shocked rats died during recovery. Rats given the highest dose of morphine exhibited enhanced motor reactivity to tactile stimulation (mechanical allodynia) at the end of the recovery period. Shock treatment impaired locomotor recovery (p < .001), delayed recovery of bladder function (p < .05), and led to poor weight gain (p < .05). These adverse effects of shock treatment were not attenuated by morphine treatment. The results suggest that treatment with a high dose of morphine can, in combination with stress, lead to high mortality in injured patients and does not prevent the adverse effect of uncontrollable stimulation.

Support Contributed By: MH60157 and NS41548


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