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Effect of cuneiformis nucleus inactivation by lidocaine microinjection on the analgesic response of morphine in rats

Sepehri, G.^a, Shafeiee, M.N.^b^a Dept. of Physiology and Pharmacology, Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran^b Dept. of Physiology, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

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The present study was performed to evaluate the analgesic effect of morphine microinjection into the cuneiformis nucleus (CnF) and the effect of inactivation of this area by lidocaine on pain modulation. Rats were anaesthetized by thiopental (45-60 mg/kg/i.p.) and placed in a stereotaxic instrument, and then a guide cannula was implanted just one mm above the CnF. Following surgery and recovery period, various doses of morphine (10, 20 and 40 µg/0.5 µl saline) and lidocaine 5% (0.5 µl) were microinjected into the CnF. Antinociceptive response was measured by tail flick latency (TFL) and maximal possible effect (% MPE) for 25 min at 5-min intervals, before and after any injection in control and experimental groups. The results of this study showed that morphine microinjection into the CnF increased TFL in a dose-dependent manner. TFL was also increased significantly after lidocaine microinjection. However, co-microinjection of morphine and lidocaine increased TFL which was less than morphine microinjection alone. The intravenous morphine injection with lidocaine microinjection increased TFL significantly, as compared to morphine microinjection. These effects were reversed by naloxone administration. In summary, the results of this study showed that morphine microinjection into the CnF caused a significant analgesic response which indicates that CnF may be involved in pain modulation.

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Author keywords

Cuneiformis nucleus (CnF); Lidocaine; Morphine; Pain modulation; Tail flick latency (TFL)

Indexed Keywords

EMTREE drug terms: lidocaine; morphine; naloxone; thiopental

EMTREE medical terms: analgesia; analgesic activity; animal experiment; animal model; animal tissue; antinociception; article; brain region; cannula; controlled study; cuneiformis nucleus; dose response; drug effect; evaluation; male; microinjection; neuromodulation; nonhuman; rat; stereotaxic surgery; tail flick test

Species Index: Animalia

Chemicals and CAS Registry Numbers: lidocaine, 137-58-6, 24847-67-4, 56934-02-2, 73-78-9; morphine, 52-26-6, 57-27-2; naloxone, 357-08-4, 465-65-6; thiopental, 71-73-8, 76-75-5

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