Spinal Anti nociceptive Effect of Neostigmine in Donkeys

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Abstract:

Abstract: Recent research on the pharmacology of nociception has shown the involvement of cholinergic transmission and its safe use at the spinal level to be among the numerous candidates for spinal pain modulation. Intrathecal (IT) injection of neostigmine represents a cholinergic mechanism of spinal analgesia. It inhibits the breakdown of the endogenous neurotransmitter, acetylcholine that has been shown to cause analgesia. This study was carried out in well-defined animal model (donkeys) over a range of doses to provide information on the analgesic effect as well as the adverse reactions of neostigmine 0.25% by the spinal route. Neostigmine methyl sulfate 0.25% was used in different doses to induce lumbosacral intrathecal (IT) analgesia in 32 non-medicated clinically healthy donkeys of both sexes. The animals were classified randomly into 2 groups, a main or neostigmine group (Group I, of 20 donkeys) and a control group (Group II, of 12 donkeys). Each group was further subdivided into 4 equal subgroups. IT injections of 1 ml (2.5 μg) and 2 ml (5 μg) neostigmine in subgroups Ia & Ib respectively did not alter sensory perception in these donkeys. IT injections of 3 ml (7.5 μg) and 4 ml (10 μg) resulted in analgesia that was started after 12.60 ± 5.85 min and 10.70 ± 3.04 min from the end of injections and lasted for 33.4 ± 2.40 min and 52 ± 8.63 min. in subgroups Ic & Id respectively. The control group was injected by normal saline intrathecally. Analgesia involved the triangular flank regions, hind quarters, buttocks, tail, perineum, vulva or scrotum, lateral aspect of the thigh and area over the last 3rd - 7th ribs in different animals. Recumbancy occurred in 3 donkeys in subgroup Id (4 ml). Prolapse of penis was observed in 2 and 3 donkeys in subgroup Ic and Id respectively. There were symptoms of frequent diarrhea, lacrimation, increased salivation, nasal discharge as well as tremors in different animals. There was significant increase in body temperature in all animals. Pulse rate showed significant increase in all subgroups except for subgroup Id, as it exerted significant decrease in pulse rate. IT neostigmine produced significant increase in respiratory rate in all subgroups Ia, Ib, Ic and Id. The changes of these parameters (body temperature, pulse rate, respiratory rate) were of no clinical importance. IT neostigmine 0.25% in doses of 7.5 μg and 10 μg gives good analgesia that could be satisfactory for surgical operations caudal to the last rib in donkeys. Keywords: Neostigmine, Intrathecal, Analgesia, Donkey.

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