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EFFECT OF NEOSTIGMINE BROMIDE ON INTRAVAL SODIUM ANAESTHESIA IN DOGS

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Barbiturates are commonly used in veterinary practice, especially in small animals, as general anaesthetic. Many drugs like ataractics and cholinergic drugs influence barbiturate anaesthesia (Dobkin, 1960; Pavlica and Nemecek, 1970; Khaunina, 1967). In the present study Neostigmine bromide was used along with Interaval sodium (Thiopentone sodium) to assess its influence on duration of anaesthesia.

Materials and Methods

Six healthy adult mongrel dogs weighing 8-10 kg body weight were used in each set of experiment. A 2.5% solution of Interaval sodium Neostigmine bromide 0.1% solution 0.02 mg/kg intramuscularly were used.

In the control group Intraval sodium alone was given. After securing the animals properly half of the computed dose was administered rapidly through the cephalic vein of the right fore-limb in order to ensure that the dog passed quickly through the narcotic excitement stage. The remainder of the dose was administered assessing the effect. Onset of deep anaesthesia was assessed by the abolition of pedal reflex at the right hind limb. The period between the time of abolition of pedal reflex and the reappearance of pedal reflex at the right hind limb was taken as the duration of anaesthesia. Disappearance and reappearance of corneal reflex was taken as the duration of sleep. Dose of the drug required, duration of anaesthesia and sleeping time were recorded in all animals.

In the experimental groups Neostigmine bromide was given at three time intervals.

i) Thirty minutes prior to administration Intraval sodium.
ii) Five minutes prior to Intraval sodium administration.
iii) Five minutes after the onset of Intraval sodium anaesthesia.

Results

In the control group where only Intraval sodium was given, in deep anaesthesia, the corneal reflex was absent, the pupil was constricted and did not respond to light. Respirations were slow, shallow but regular and the pulse was accelerated and forceful. When the anaesthesia passed off, the corneal reflex and pedal reflex reappeared. The animal gradually recovered from sleep. From this period the recovery was rapid though limb co-ordination especially that of the hind limbs were delayed. Urination, defecation and salivation were not observed during the period. There was no post-anaesthetic vomiting. Duration of surgical anaesthesia was 10-11 minutes and the duration of sleep 45-52 minutes. The dose of Intraval sodium administered was 24-25.4 mg/kg body weight. The temperature was reduced by 1.8 to 2.3°C within a period of 90 minutes from the administration of the anaesthetic. Pulse rate increased by 40-52/minute immediately after the administration of the drug. Later the pulse rate decreased gradually. The rate of respiration was reduced by 12-20/minute immediately after the onset of anaesthesia, but was restored slowly to become normal.

In the first set of experimental animals Neostigmine bromide was given 30 minutes prior to Intraval sodium anaesthesia. Dogs lied down within a period of 10–15 minutes time. During induction of anaesthesia there was no excitement. But during recovery stage the dogs showed vigorous and forceful movements of the head, neck and limbs. The period of anaesthesia was 13–15 minutes and the duration of sleep was 26–32 minutes, The dose of Intraval sodium ranged from 23.6 to 24 8 mg/kg body weight; Pulse rate was reduced after the administration of neostigmine bromide. Temperature was gradually reduced from the time of administration of anaesthetic. Gradually both pulse and respiration returned to normal.

In the second set of experiment, the dogs received neostigmine bromide 5 minutes prior to administration of Intraval sodium. The period of anaesthesia was 12-14 minutes which was a significant increase at 1% level, The period of sleep was 27-35 minutes. Temperature got reduced from the time of administration of neostigmine bromide by 2.6 to 3°C. Pulse rate increased by 42-56 per minute from the onset of anaesthesia and gradually became normal. Respiratory rate was decreased by 12-20 per minute just after the onset of anaesthesia and later gradually became normal. The dogs showed excitement during recovery.

In the third set of experiment neostigmine bromide was administered 5 minutes after the onset of anaesthesia. The period of anaesthesia

Table I

Average dose of Intraval sodium, duration of anaesthesia and sleeping time in controls and three experimental groups

	Dose of Intraval sodium in mg/kg	Duration of Anaesthesia in minutes	Duration of sleep in minutes
Control	24.43	10.66	48
Experimental Group I	24.47	13.5	29
Experimental Group II	24.43	13.17	30.67
Experimental Group III	24.35	13	27.17

Analysis of variance

Source	df	MSS	MSS	MSS
Between groups	3	0.006	9.946	556.92
Error	20	0.04	0.55	6.809
	P <0.01		P <0.05	

was 12-14 minutes and the period of sleep varied from 24-32 minutes. Increase in the period of anaesthesia was significant at 1% level. Pulse rate increased by 42-56/minute just after the administration of the anaesthetic, but gradually became normal.

Discussion

Neostigmine bromide 0.02 mg/kg potentiated the Interaval sodium anaesthesia by 26.36%. Greig and Mayberry (1951) reported that pretreatment of mice with neostigmine reduced the delay in onset of anaesthesia induced by Intraval sodium and the reduction in the onset of anaesthesia was shown to be due to an increased rate of penetration of barbiturates into brain. When a lower dose of Intraval sodium 10 mg/kg was used anaesthesia did not occur in the control animals but brief anaesthesia developed in experimental animals pre-medicated with neostigmine. Rosic and Milosevic (1976) suggested that inhibition of cholinesterase by neostigmine shortens the induction time and increased the period of anaesthesia. The reduction of heart rate with neostigmine observed within 3-5 minutes after intramuscular administration of neostigmine is in general agreement with the finding of Gravenstein and Purkins (1966).

Administration of neostigmine bromide prior to administration of Intraval sodium or during Intraval sodium anaesthesia prolonged the duration of anaesthesia. Neostigmine bromide did not prolong the period of sleep. There was salivation, discharge from the nose and defecation.

Summary

Neostigmine bromide 0.02 mg/kg intramuscularly was given to dogs 30 minutes prior to Intraval sodium, 5 minutes prior to Intraval sodium and 5 minutes after the onset of Intraval sodium anaesthesia. In all the cases the period of anaesthesia was increased. But there was salivation, discharge from the nose and defecation.

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