J. Pharm. Pharmacol., 1965, **17**, 316–317 Received December 2, 1964

Action of the neurohypophysial hormones on the vascular system of the male monkey and the rooster

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Oxytocin caused a fall in the blood pressure of the normal, oestrogen- and progesterone-treated male monkeys. Vasopressin always caused a rise of blood pressure in similarly treated monkeys and oestrogen and progesterone treatment did not enhance the pressor response. Oxytocin also caused a fall in the blood pressure of the normal, oestrogen- and progesterone-treated rooster.

IN 1959, Lloyd demonstrated that the hypotensive effect of oxytocin on the rat was converted to a hypertensive effect by treating the animal with oestrogen. The pressor effect of vasopressin was exaggerated in these animals. We were interested to see whether this phenomenon would occur in the primate and in the rooster, in which animal the oxytocin-induced fall in the blood pressure is the parameter used for its assay and standardisation (Coon 1939).

Experimental

Eleven male rhesus monkeys weighing 1·4 to 3 kg were anaesthetised with pentobarbitone sodium (40 mg/kg) and the carotid blood pressure recorded. Injections of oxytocin, 1·0 unit, and vasopressin, 0·5 unit, were made through the femoral vein. Oestradiol dipropionate, 100 μg/kg, was injected subcutaneously daily for 3 days before the experiment in four monkeys. Progesterone, 1 mg/kg, was injected subcutaneously daily for 3 days before the experiment in four monkeys. Progesterone, 1 mg/kg, was injected subcutaneously daily for 3 days before the experiment in another four monkeys. Three monkeys served as controls, Ten roosters weighing 1·3 to 2·8 kg were anaesthetised with pentobarbitone sodium (35 mg/kg) and the carotid blood pressure recorded. Injections of oxytocin, 0·5 unit, were made through the subclavian vein. Four roosters served as controls while four were injected daily with oestradiol dipropionate, 100 μg/kg, subcutaneously for 3 days before the experiment. Two birds were injected subcutaneously daily for 3 days with progesterone, 1 mg/kg, before the experiment.

Results

Table 1 shows the fall in the blood pressure when 1·0 unit of oxytocin was injected intravenously into normal, oestrogen- and progesterone-treated monkeys. It also indicates the rise in the blood pressure caused by the intravenous administration of 0·5 unit vasopressin in these animals. Fig. 1 shows the results in a typical series of experiments in the monkeys where oxytocin caused a fall in the blood pressure of normal, oestrogen- and progesterone treated-animals. In the rooster, oxytocin at a dose 0·5 unit caused a fall in the blood pressure in all birds (Table 2).

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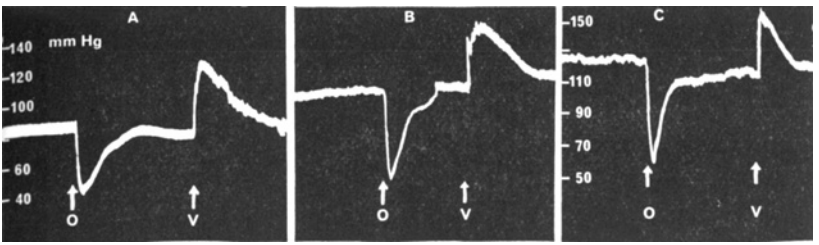

FIG. 1. Action of 1 unit of oxytocin (O) and 0·5 unit of vasopressin (V) on the blood pressure of A, normal monkey; B, monkey pretreated with oestradiol dipropionate, 100 μg/kg/day for 3 days; C, monkey pretreated with progesterone, 1 mg/kg/day for 3 days.

TABLE 1. THE EFFECT OF OXYTOCIN AND VASOPRESSIN ON THE BLOOD PRESSURE OF THE MONKEY

	Fall in B.P. due to 1 unit of oxytocin (mm Hg)	Rise in B.P. due to 0·5 unit of vasopressin (mm Hg)
Normal animals	20, 40, 70	34, 44, 38
Oestradiol dipropionate treated animals (100 μg/kg/day for 3 days) ..	53, 22, 54, 52	26, 40, 34
Progesterone treated animals (1 mg/kg/day for 3 days)	68, 63, 56, 54	24, 40, 32, 28

TABLE 2. THE EFFECT OF OXYTOCIN ON THE BLOOD PRESSURE OF THE ROOSTER

	Fall in B.P. due to 0·5 unit of oxytocin (mm Hg)
Normal Animals	64, 92, 42, 60
Oestradiol dipropionate treated animals (100 μg/kg/day for 3 days) ..	58, 50, 60, 50
Progesterone treated animals (1 mg/kg/day for 3 days)	68, 56

Discussion

Our results indicate that oxytocin caused a fall in the blood pressure of the normal monkey and the same result was obtained when these animals were pre-treated for 3 days with 100 μg/kg of oestrogen or 1 mg/kg of progesterone. In no experiment did we observe a hypertensive effect of oxytocin. Roosters treated with oestrogen or progesterone behaved similarly. Lloyd & Pickford (1962) have demonstrated that oestrogen treatment in dogs did not reverse the blood pressure responses to oxytocin but that in some vascular beds the vasodilator effect was converted to a constrictor effect. The same phenomenon may occur in monkeys and roosters. The fall in the blood pressure, however, was clearly seen in all the monkeys and roosters with prior oestrogen or progesterone treatment and in the doses used these ovarian hormones did not alter the overall hypotensive effect of oxytocin.

References

Coon, J. M. (1939). *Arch. int. Pharmacodyn*, **62**, 79–99.
Lloyd, S. (1959). *J. Physiol.*, **148**, 625–632.
Lloyd, S. & Pickford, M. (1962). *Ibid.*, **163**, 362–371.