6715

Effect of Ergotamine Tartrate on Blood Flow and Blood Pressure in the Femoral Artery of the Dog*

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In reviewing the literature[1, 2] on the pharmacodynamic activity and importance of ergot, it was found that its constituents, so far as the activity is concerned, may be divided into 2 groups: (1) specific alkaloids: ergotamine and ergotoxine, and (2) nonspecific amines: histamine and possibly tryramine. The specific alkaloids, to which I shall limit attention, are reported to produce a slow but persistent rise in blood pressure, diminishing with repeated dosage due to vasomotor paralysis until a condition is reached in which there is no rise, or else there is a fall which cannot be raised by epinephrine. Ergotoxine and ergotamine are pharmacodynamically identical. The researches of Brown,[3] and Barker[4] and their colleagues suggested the possibility that quantitative data on the actual changes in blood flow to the periphery brought about by this drug might be of some general interest. So far as I know, no such data are available.

The blood flow was measured by the thermo-stromuhr method developed by Rein.[5] The method permits quantitative observations under normal physiologic conditions in the intact animal. The femoral blood pressure was measured and recorded in the usual manner. All operative procedures were carried out under local anesthesia. The blood flow was measured in one femoral artery, and the blood pressure in the other femoral artery.

The dogs had been trained to lie quietly throughout all observations. After the normal blood flow and blood pressure were established, either 1.0 or 0.5 mg. of ergotamine tartrate (gynergen) was injected intravenously. The results of several experiments are given in the table. In 4 of the 6 experiments the blood flow was

* Work done under the direction of Dr. Hiram E. Essex at the Institute of Experimental Medicine, The Mayo Clinic.

[1] Thompson, M. R., *J. Am. Pharm.*, 1929, **18**, 1106; 1930, **19**, 11, 104, 221, 436, 705, 844.

[2] Barger, G., Ergot and Ergotism, 1931, pp. 151-160. Gurney and Jackson, London.

[3] Brown, G. E., quoted by Barker.

[4] Barker, N. W., *Med. Clin. N. Amer.*, in press.

[5] Rein, H., *Z. f. Biol.*, 1928, **87**, 394.

reduced to 25.5% of its normal value, on the average. The remaining 2 reductions were only 57 and 35%. There was a definite rise in the blood pressure, varying from 10 to 46 mm. Hg.

TABLE I.
Changes Caused by Ergotamine Tartrate.

Dog	Wt. kg.	Dose mg.	Blood Pressure mm. Hg.		Blood Flow, cc. per min.	
			Before Injection	After Injection	Before Injection	After Injection
1	19.8	1.0	114	124	170	43
2	8.5	1.0			97	55
3	14.2	0.5	120	146	295*	70
4	16.8	0.5	120	166	160	56
5	14.4	0.5	114	150	86	23
6	21.5	0.5	120	160	81	21

* This large blood flow is due to experimentally induced hyperthyroidism.

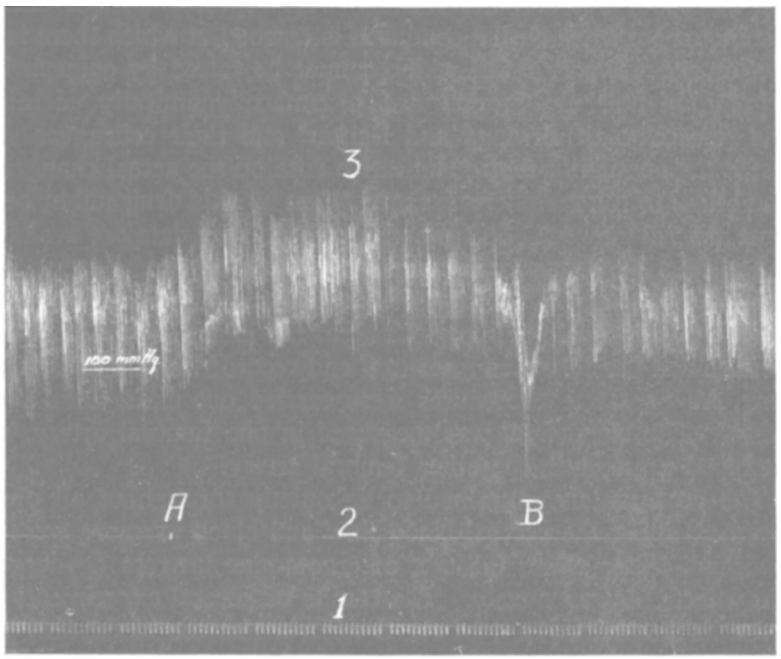

FIG. 1.

Emetic action of ergotamine tartrate as indicated by the blood pressure. *A* indicates injection (i.v.) of the drug. *B* indicates the first emesis occurring about 5 minutes after injection 1 = time in intervals of 5 seconds; 2 = 0 mm. of mercury; 3 = blood pressure.

The intravenous injection of ergotamine tartrate provoked prompt emesis in every instance, usually 5 minutes after the injection and several times thereafter. The emetic action of this drug has been

reported previously.[6] Figure 1 shows the occurrence of this emesis about 5 minutes after the injection. This 5-minute interval between injection and emesis occurs with striking regularity in different dogs when the same dosage is used.

[6] Koppanyi, T., and Evans, E. I., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 1181.