FEMORAL MECHANISM FOR REGULATION OF BLOOD PRESSURE IN DOGS

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(Received October 16, 1957.)

It has long been known that electrical or mechanical stimulation of the carotid sinus provokes a combined reflex of cardiac Inhibition and fall of blood pressure (Hering and Heymans). Similar effects have been observed as a result of stimulation of the aortic arch or the depressor nerve (Ludwig & Cyan). Afferent fibres originating from the pulmonary artery (Schweitzer) and the pulmonary vein (Daly *et al*,) have similar but weaker functions.

All these sites in the Arterial system are sensitive to electrical stimulation and this lead to the curiosity of searching out if other sites in the Arterial pathway are also sensitive to electrical stimulation. Earlier Experiments carried out on various arterial branchings in dogs reveal for certain that different sites are not equally sensitive to electrical stimulation (Mathur and Tandon). This work has been carried out to demonstrate the effect of electrical stimulation on Femoral branchings, which in earlier Experiments have shown great sensitivity to such stimuli.

METHODS

Stray dogs have been used for the Experimental work. All operative interferences have been carried out under chloralose anaesthesia (0·08 gm./ Kgm of body weight). The blood pressure has been recorded by introducing a cannula into the common carotid artery and connecting it to a Mercury manometer. The records were taken on a slow moving Kymograph.

The profunda branch of the left femoral artery is exposed in the upper part of the thigh about 3″ below the inguinal line. The site of origin of the profunda Branch is stimulated electrically using the pendulum or the neefs hammer.

OBSERVATIONS

In one group of observations the frequency of Electrical stimulation has been varied between 60 and 150/mt., while in the other group of observations the rate of stimulation has been above 180 per minute.

TABLE No. I

Dog Nos.	Body weight (Kilo-grams)	Room Tem-perature (Centigrade)	Initial mean arterial B.P. in mm	Rate of Stimulation per minute	Duration of Stimula-tion in Sec.	Resul-tant B.P.
1	8·25	34	170	150	60	140
2	9·5	37	135	150	30	110
3	9·5	30	130	150	30	118
4	10·25	33	138	150	30	116
5	11·5	32	160	135	60	135
6	13·0	31	60	120	60	60
7	8·25	31	120	120	20	120
8	12·0	32	130	120	30	95
9	11·5	30	155	100	60	135
10	9·75	31	125	100	60	116
11	9·25	32	160	90	30	160
12	11·5	30	155	60	60	155

TABLE No. II

1	12·25	30·5	110	180	120	70
2	9·5	31	120	180	90	70
3	7·25	32	124	180	60	124
4	12·0	30	165	180	60	125
5	12·5	31	160	180	60	120
6	11·5	30	155	180	60	135
7	7·75	30	75	180	60	70
8	12·5	30	155	180	60	145
9	9·0	31	150	180	30	130
10	14·25	34	120	180	30	100
11	8·5	31·6	140	180	30	140
12	9·5	34	130	180	30	110
13	9·5	33	135	180	30	105
14	14·0	30	130	180	30	106
15	10·75	31	116	180	30	102
16	12·0	32	150	180	30	150
17	9·25	32	160	180	30	145
18	10·75	30	135	180	30	105
19	10·75	30	140	180	30	125
20	10·0	29	110	180	15	86
21	8·25	31	120	180	15	96
22	9·5	31	140	180	15	120
23	12·75	32	145	180	10	120
24	13·25	31	160	180	10	120

DISCUSSION

A critical study of 36 observations tabulated in table I & II reveals that electrical stimulation of the site of origin of Profunda femoris in dogs resulted in a definite fall of Blood Pressure in 30 cases.

The extent of fall of Blood Pressure was dependent upon three factors:

1. *Initial Blood Pressure*: This is expected as well, as the machinery for the fall of Blood Pressure should only operate when the Blood Pressure is high (Mathur).

2. *Frequency of electrical stimulation*: The fall of Blood Pressure is in proportion to the frequency of stimulation. This is because of the fact that the rise in the rate of electrical stimulation proportionately so effects the sensory nerve endings in that region that larger number of inhibitory impulses are generated to produce such effects.

3. *The intensity of induced shocks*: Reduction of the strength of current resulted in the abolition of this depressor response which was otherwise apparent when the intensity of electrical stimulation was increased.

The duration of stimulation apparently has no relation to the fall of Blood Pressure which showed a tendency to return to normal if the stimulation was continued for long (90 to 120 Sec.). In all general peripheral nerve stimulations, as is well known, the sympathetic nervous system gets stimulated and the amount of adrenaline in circulation increases. The rise of Blood Pressure during the maintenance of prolonged electrical stimulation may be accounted for by sympathetic discharge (Mathur). Similar effects have been observed earlier on the heart, after vagal stimulation (Starling).

As is well known the legs play an important role in locomotion and so they may have their own mechanism for the regulation of Blood Pressure.

SUMMARY

The site of origin of Profunda Femoris in dogs is sensitive to electrical stimulation and results in a generalised fall of Blood Pressure. This fall is dependent upon the initial Blood Pressure, the rate and the intensity of electrical stimulation.

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