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Effects of Some Basal Anesthetics on Vasomotor Reflexes.

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In a study of the relative efficiency of basal anesthetics it was frequently noticed that in animals under varying doses of barbiturates (amytal, allonal and dial) the blood pressure showed a depressor response upon stimulation of the central end of the divided sciatic nerve. As such reversal of normal reflexes has been noted with other drugs such as chloroform, it seemed worth while to investigate the effect produced on vasomotor responses by these barbiturates and those produced by some other basal anesthetics or hypnotics.

Cats were used, and satisfactory experiments were conducted with the different basal anesthetics in the following numbers (amytal 4, dial 6, and allonal 5). Under the influence of novocain, a tracheal cannula was inserted in order to administer ethylene 90% oxygen 10% for anesthesia to complete the preparation, that is to cut the sciatic and insert a carotid cannula to record the blood pressure.

The central end of the sciatic was stimulated with a Dubois Raymond coil connected with 3 dry cell batteries in parallel to give a voltage of 6. As the response of different cats to the same strength of stimulus varies so greatly no average figures for the stimulation used can be given. The minimal strength required to produce a vasomotor response after 20% of the M.L.D. of these drugs was stimulation with the secondary coil at 20 cm. in some cats, while in others no response would be obtained until the secondary coil was at positions intermediate between this and 11 cm.

The barbiturates were given intraperitoneally. The usual procedure was to give 20% of M.L.D.* while the cats were still under the ethylene, and after a fixed interval (10 minutes was sufficient for the full effect to be produced) the ethylene was discontinued and 5 minutes allowed for its effect to be lost. Then the sciatic was stimulated with gradually increasing strengths of the current, beginning in each period with a stimulus which produced no vasomotor response. Subsequently, additional doses of 10% of the M.L.D. were administered and the same procedure repeated until from 60 to 70% of the M.L.D. had been given. In the majority

* M.L.D. for amytal and dial 100 mg. per kilo, for allonal 90 mg.

of instances, the first vasomotor response noted in cats under the influence of larger doses of the barbiturates (30% or more of M.L.D.) was a fall in blood pressure, at times of only about 10 mm. of mercury, while at others the fall amounted to as much as 20 mm. With the largest doses (from 60 to 70% of M.L.D.) the strongest stimulation which could be applied frequently produced no vasomotor response. However, with these large doses, the cats were deeply anesthetized, and the blood pressure was already low as compared with the preliminary blood pressure, the average for the preliminary blood pressure being 152 mm., while the average under the above mentioned dosages of the barbiturates was 100 mm.

The most common vasomotor responses under doses from 30 to 60% of the M.L.D. with weak currents was a fall in blood pressure, and the same fall was also often the result of stronger stimulation. However, it was a common experience that, in these experiments, on increasing the strength of the stimulus by moving the secondary coil one or more centimeters the depressor response was changed to a pressor one. At times the fall in blood pressure appeared to be due to vagal inhibition of the heart. Consequently, a number of experiments were carried out with vagotomized cats. In these animals, the vasomotor responses to sciatic stimulation were similar to those of the cats with the vagi intact except that the fall in blood pressure in many cases was much less. In no instance was the fall as much as 20 mm. of mercury.

With corresponding percentages of the M.L.D. of chloral, avertin and paraldehyde† (the first 2 given rectally, the last intraperitoneally) comparative observations were made using the same procedure as with the barbiturates.

In animals under these drugs, with the vagi intact the usual responses with currents that would produce any effect, was an increase in the blood pressure. Sometimes, however, a fall was noted, which appeared to be due to vagal inhibition of the heart. In vagotomized cats under the influence of these drugs, sciatic stimulation invariably caused a rise in blood pressure, except that with the largest doses (above 60% of M.L.D.) the strongest stimulation possible with the coil used was often followed by neither vasomotor nor other reflexes.

This difference in the effect of these different basal anesthetics on the vasomotor mechanism would appear to be of significance. Freeman and Rosenbleuth¹ report that dial has no unusual effects on the

† M.L.D. chloral 350 mg. per kilo, for avertin 400 mg., for paraldehyde 2.5 cc.

¹ Freeman and Rosenbleuth, *Am. J. Physiol.*, 1931, **98**, 454.

vasomotor reflexes. A repetition of their observations with currents of the strength and with the dosages used by them has failed to confirm this statement, in that we have found variable vasomotor responses, either pressor or depressor to sciatic stimulation.

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Attempts to Produce Hyperplasia in Thyroid by Destruction of Part of the Adrenals and by Infection.

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Several methods may produce retrogression in the hyperplastic thyroid, *viz.*, resection of the thyroid, administration of iodine, x-ray, but it is more difficult to produce the hyperplasia characteristic of exophthalmic goiter at will.

The purpose of these experiments was to note the microscopic changes occurring in the thyroid after injury to and destruction of part of the adrenals or in the organism suffering from an infection. In these experiments dogs were used. Dogs in this locality apparently very rarely have goiter. The thyroid of a 6 to 10 kg. dog is usually about 2.2 x 1.2 cm. in size.

To have a section of thyroid to compare the result by, from each of the dogs a piece of thyroid about 2 x 2 mm. was removed at a preliminary operation. Sections removed from the same dog at subsequent operations or at necropsy were compared with this first section. Sections removed subsequently from control dogs in whom no other procedure but this preliminary operation was done did not show any hyperplasia, as has been proven to occur when larger pieces of the thyroid gland are removed.

Two dogs were fed 3 grains of thyroid extract a day for 46 and 47 days, respectively. These dogs became extremely restless, nervous, excitable, and had even a stare but no exophthalmos. Sections removed from the thyroids of these dogs after feeding the animals thyroid extract for 46 and 47 days showed retrogressive changes in the thyroid; smaller epithelial cells with more colloid in the vesicles. This response to thyroid extract has been described before.¹

¹ Mosser, W. B., *Am. J. Surg.*, 1929, 7, 338.