It thus appears that rapid infusion of physiological saline caused a pronounced fall in arterial pressure in 9 out of 12 dogs, followed by their death, i.e., collapse ensued from acute overloading of the organism with physiological saline.

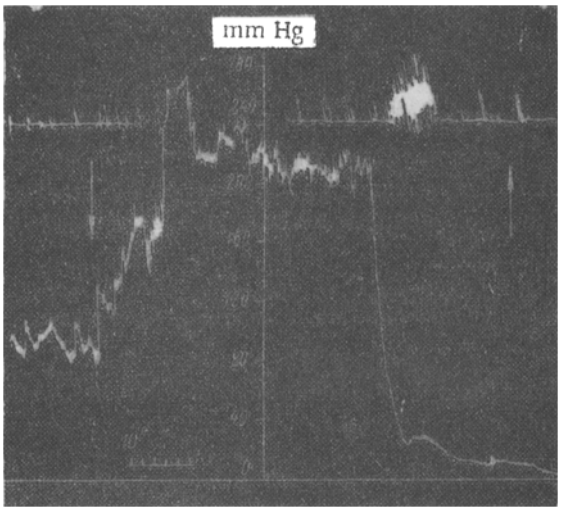

Fig. 3. Reaction to rapid infusion of physiological saline (650 ml infused; weight of dog 6 kg). ↓ beginning of infusion; ↑ end of infusion. Explanation of curves as in Figure 2.

The most common cause of death from acute overloading with physiological saline was pulmonary edema. Arrest of the heart took place at relatively high arterial pressures (80 mm Hg). After opening the iliac artery pressure fell gradually and smoothly to zero. This is evidence of the disturbance in normal hemodynamics caused by overloading with physiological saline.

Histological examination of the organs of the animals of this group, performed in collaboration with the Chair of Pathological Anatomy, revealed certain characteristic changes in the tissues' structure, apart from the generalized edematous condition. The argyrophilic substance of the lung tissues was disintegrated, and the pulmonary blood vessels contained protein floccules, suggesting that the plasma proteins had undergone profound alterations.

Our experiments show that significant changes take place in the organism following rapid infusion of large amounts of physiological saline.

Stimulation of the vasomotor center associated with slow infusion of physiological saline aggravates the outcome of subsequent blood-letting.

LITERATURE CITED

[1] T. E. Kudritskaya, Problems of Reactivity and Shock,* Medgiz, 1952.

[2] G. L. Lyuban, Sov. Zdravookhranenie Kirgizy, No. 1, (1954).

[3] I. P. Petrov, Role of the Nervous System in Oxygen Hunger,* Medgiz, 1952.

RATE OF ELIMINATION OF CONGO RED FROM THE BLOOD STREAM OF DECEREBRATE DOGS

S. A. Chesnokova

From the Chair of Physiology, II Moscow Medical Institute (Director: Prof. E. A. Asratyan, Corresponding Member Acad. Sci. USSR)

(Received October 15, 1955. Presented by S. A. Sarkisov, Member Acad. Med. Sci. USSR)

Ablation of the cerebral hemispheres of dogs causes alterations in the vegetative and somatic functions of the organism, such as the nature of gastric secretion, the activity of the salivary glands, etc. There are also changes in the response of the organism to certain factors: they become more responsive to introduction of hormones [1], and they give a more intense leukocytic reaction to parenterally introduced proteins [2].

There can be no doubt that the reticuloendothelial system (RES) takes part in these reactions.

The present paper is devoted to a study of RES function in dogs before and after decerebration.

* In Russian.

Among others, the Congo red test is applied for assessing the functional state of the RES. According to the majority of workers, the Congo red test gives a measure of the absorptive capacity of the reticuloendothelial cells.

EXPERIMENTAL METHODS

We adopted the techniques of M. P. Nikolaev, modifying the method in accordance with our conditions.

The dogs were given intravenous injections of 2% Congo red solution, at a dosage level of 0.25 mg per kg body weight. The first blood sample was taken 4 minute later from a vein of the contralateral limb, and a second sample was taken after 30 minutes. The blood was centrifuged, and the serum separated. The first sample was more intensely colored than the second. The first sample was diluted with water until its color matched that of the second. The ratio of the amount of water added to the amount of serum in the first test is taken as the Congo red index.

The greater the rate of elimination of Congo red from the blood stream (by absorption into cells of the RES), the more does the first sample have to be diluted to match the second.

The magnitude of the Congo red index is therefore in direct proportion to the rate of elimination of the dye from the blood stream.

We determined the Congo red index in 10 normal dogs and in 7 dogs after ablation of the cerebral hemispheres.

More than 60 experiments were performed.

EXPERIMENTAL RESULTS

We found considerable differences in the rate of elimination of the dye between the two groups of animals. There was very little difference between the colorations of the two samples taken from decerebrate dogs. Unoperated dogs gave much greater differences.

Figure 1 presents the values for the Congo red index for 5 normal and 5 operated dogs. In the former group the index varies from 0.4 to 0.8 (mean 0.6,)whereas it is rarely greater than 0.3 in the latter group, the mean value being 0.2.

We modified the method, as follows, in order to get a fuller understanding of the differences in rate of elimination of Congo red in the two groups.

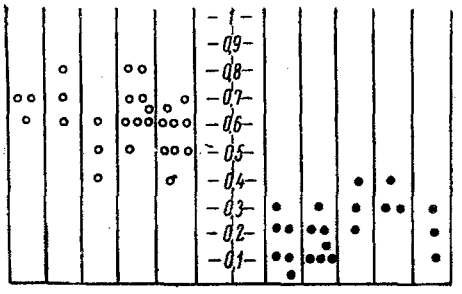

Fig. 1. Value of the Congo red index for unoperated dogs (left) and decerebrate dogs (right).

For each experiment we prepared a standard solution of Congo red in serum obtained from the given animal before injection of the dye. The coloration of the standard solution was identical with that of the first sample of serum taken 4 minutes after intravenous injection of the dye. The concentration of Congo red in the standard solution was known, and was taken as the initial concentration in the blood (100%).

Blood samples were then taken at half-hourly intervals during the next 3-4 hours, and the dye content of the serums was determined colorimetrically against the initial value.

The results of the experiments are shown in Figure 2, in which the values for operated and normal dogs are contrasted.

As is evident from the results obtained, elimination of the dye from the blood stream of operated dogs proceeded much more slowly than from normal ones, which is evidence of the lowered activity of the RES cells. Thus, for example, the dye content of the blood of a normal dog had fallen to 28% of the initial value $1^1/_2$ hours after its introduction, as compared with only 66% in a decerebrate dog.

Our experiments show that ablation of the cerebral hemispheres of dogs leads to a fall in the value of the Congo red index, and to a lowering of the rate of elimination of the dye from the blood stream.

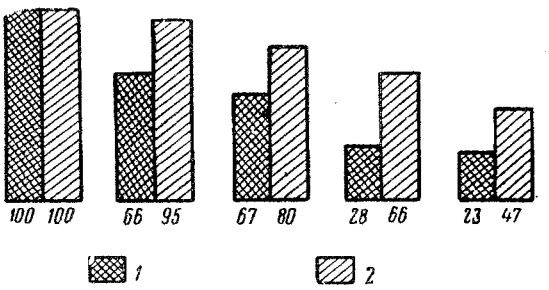

Fig. 2. Alterations in the Congo red content of the blood of normal and decerebrate dogs over 30 minutes after injection of the dye. The concentration of the dye in blood taken 4 minutes after injection was taken as 100%. 1) Unoperated dogs; 2) operated dogs.

This finding points to the existence of a direct or indirect influence of the cerebral cortex on the activity of the RES.

LITERATURE CITED

[1] I. K. Zhmakin, Effect of Ablation of the Cerebral Hemispheres of Dogs on their Gaseous Metabolism,* Thesis, Moscow, 1954.

[2] S. A. Chesnokova, Byull. Eksptl. Biol. i Med., 39, No. 5, 17-19 (1955).

REFLEX CHANGES IN THE INTRACARDIAL NERVOUS FORMATIONS ENCOUNTERED IN FOCAL EXPERIMENTAL MYOCARDITIS

V. S. Livshits and L. N. Lebedeva

From the Comparative Pathology Laboratory (Director: S. I. Franshtein), Institute of General and Experimental Pathology (Director: Academician A. D. Speransky), and the Pathological Morphology Laboratory (Director: Prof. A. A. Solovev, Corresponding Member Acad. Med. Sci. USSR), Institute of Normal and Pathological Physiology (Director: V. N. Chernigovsky, Member Acad. Med. Sci. USSR).

(Received September 12, 1955. Presented by V. N. Chernigovsky, Member Acad. Med. Sci. USSR)

As we have shown in an earlier communication [4], focal myocarditis, produced in dogs and rabbits by application of heat to the apical myocardium, is associated with alteration in the response of the heart to electrical stimulation of the vagus nerves, whereas the response to stimulation of the sympathetics is unaffected.

* In Russian.