A METHOD OF STIMULATION OF THE PRESSURE RECEPTORS OF THE CAROTID SINUS REGION WHILE PRESERVING THE NATURAL BLOOD SUPPLY

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In present-day physiology several methods are available for investigating the depressor reflexes from the pressure receptors of the carotid sinus region. The most widespread method is that of E. A. Moiseev, which is based on total isolation of the carotid sinus region followed by perfusion of the sinus with a nutrient fluid. Stimulation of the pressure receptors is effected by increasing the pressure of the fluid passing through the sinus. The main defect of this method is the artificial nutrition of the receptor zone, which creates abnormal conditions of pressure and chemical composition of the fluid medium acting on the receptor apparatus; this, especially in pathological conditions, may affect the performance of the reflex.

In 1953, I. R. Petrov and A. A. Zor'kin [2] suggested a method of stimulation of the pressure receptors by means of an obturator. The introduction of an obturator into the region of the carotid sinus disturbs the normal blood supply of the receptor zone (only retrograde flow of the blood is possible, and the pressure in this region falls sharply). In addition it is quite difficult to place the obturator accurately in relation to the receptors.

We propose a method of investigation of the pressure receptors while preserving the natural blood supply, by means of a cannula and tap which is inserted into the common carotid artery.

The cannula and tap (Fig. 1) consists of a brass three-way tube with a three-way tap.

The experiment is conducted as follows: in a rabbit, previously having been given injections of heparin, under local anesthesia of the skin, the three-way tap and cannula in inserted into the common carotid artery below its division into internal and external. All the branches above the division, with the exception of one branch of the external carotid artery, are ligated (Fig. 2).

The natural blood supply is preserved when the tap is in position I. The tap is turned into position II in order that a small quantity of blood (1-1.5 ml) should reach the initial part of the system for injecting fluid, which is filled with warm physiological saline from a Dewar flask before the experiment. The admission of the sample of blood is controlled by means of the glass tube, and a clamp is applied to the unligated branch of the external carotid artery. Temporary isolation of the carotid sinus region is thus created.

The tap is next turned to position III. By means of the syringe 2 the required pressure is created in the isolated part of the carotid artery. The pressure is recorded by means of the mercury manometer 3.

After a single stimulation the blood supply is restored by turning the tap to position I. All the manipulations last for about a minute.

This method enables the state of the pressure receptors of the carotid sinus region to be studied while preserving the natural blood supply, and it does not require complicated apparatus.

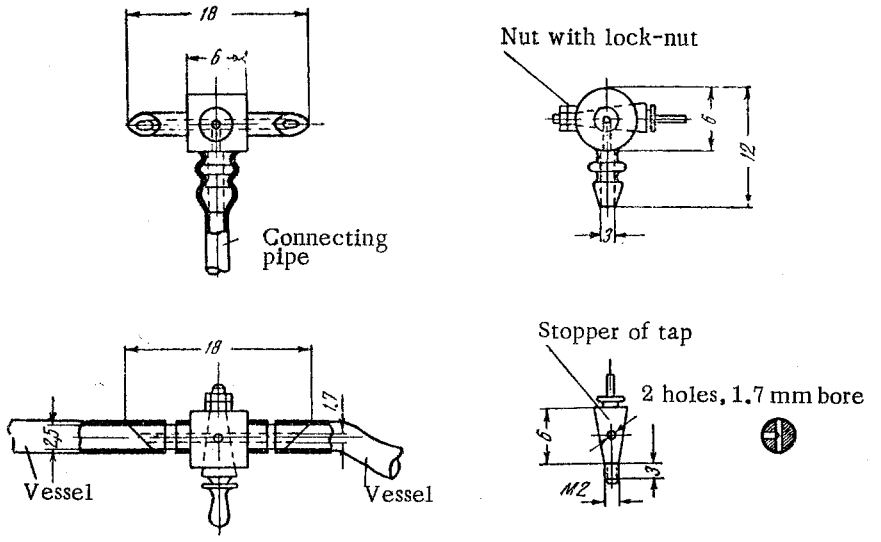

Fig. 1. Three-way tap and cannula and its scheme.

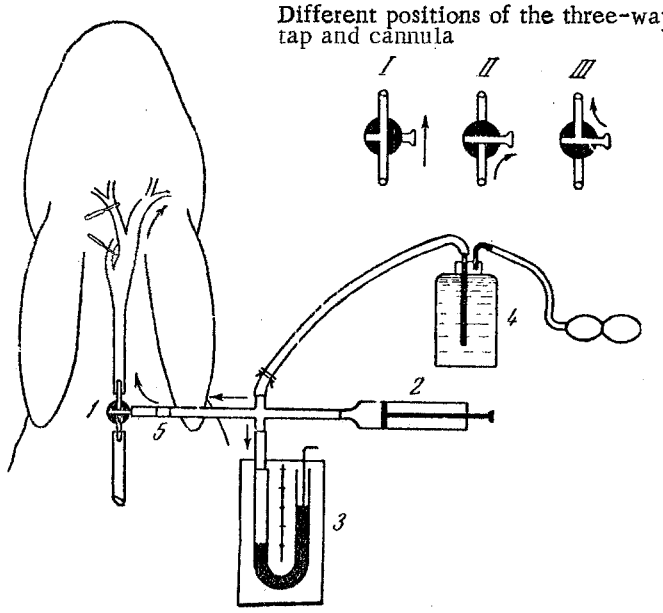

Fig. 2. Scheme of setting up the experiment with natural blood supply to the carotid sinus. 1) Three-way tap and cannula; 2) syringe; 3) mercury manometer; 4) Dewar flask; 5) glass tube; I, II, III) different positions of the three-way tap and cannula; clamp.

SUMMARY

The method presented in this paper makes it possible to investigate the baroceptors of the sinocarotid zone in conditions of natural circulation. For this purpose a 3-way tap and cannula is employed which is connected to the common carotid artery. This method does not require complicated equipment, and has many advantages over the formerly existing ones.

LITERATURE CITED

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[2] I. G. Petrov and A. A. Zor'kin, Collection of Inventive and Rational Suggestions of the S. M. Kirov Military Medical Academy, pp. 62-64, Leningrad, 1953 [In Russian].