PHARMACOLOGY

THE EFFECT OF RESERPINE ON THE VEGETATIVE REFLEXES

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Numerous investigations have shown that reflexes from the interoceptors are of fundamental importance in the regulation of the activity of the cardiovascular system. It is also well known that reflex influences from certain receptor fields may take part in the development of different pathological processes, including hypertensive diseases.

In studying drugs used in the treatment of hypertension it is, therefore, important to take into consideration their influence on the interoceptive reflexes.

Hypotensive drugs which have recently become widely used are various preparations obtained from the root of rauwolfia (reserpine, rescinnamine, alseroxylon, rauwiloid and also total rauwolfia alkaloids). Reserpine is particularly widely used in the treatment of hypertension and of several other pathological conditions.

Investigations carried out previously on the effect of total alkaloids of Rauwolfia serpentina on the vegetative reflexes [2] showed that this preparation depresses the reflexes from the mechanoreceptors in various receptor fields (the mechanoreceptors of the carotid sinus, the large intestine and the urinary bladder, the chemoreceptors of the pericardium) and also from the central ends of the divided vagus and tibial nerves.

The total alkaloid preparations of rauwolfia is known to contain alkaloids with different, and sometimes directly opposite, types of action. In this connection it was interesting to determine whether the changes which we observed in the interoceptive reflexes were associated with the effect of one of the principal alkaloids contained in rauwolfia – reserpine.

The majority of information in the literature concerns the effect of reserpine on the reflexes from the mechanoreceptors of the carotid sinus and from the central ends of the vagus nerve trunk, divided in the neck, and the sciatic nerve [4, 7, 8].

This research is not of a systematic character and does not permit a full enough idea to be gained of the influence of reserpine on vegetative reflexes, the reflex pathways of which are connected at different levels of the central nervous system. In addition there is an almost complete absence of information on the effect of reserpine on reflexes arising in response to stimulation of chemoreceptors.

The aim of the present work was to study the influence of reserpine on the reflex reactions of the circulation of the blood and respiration arising from the mechanoreceptors of the carotid sinus, the large intestine and the urinary bladder; the central ends of the divided vagus, brachial and tibial nerves, and also from the chemoreceptors of the pericardium and the small intestine.
EXPERIMENTAL METHOD

Experiments were carried out on anesthetized and decerebrate cats. Reflexes affecting the arterial blood pressure and respiration from the mechanoreceptors of the urinary bladder and large intestine were elicited by distension of the organs, reflexes from the mechanoreceptors of the carotid sinus by clamping the common carotid artery. In order to stimulate the vagus, brachial and tibial nerves, rectangular impulses were used from an electronic stimulator (frequency 30-50 cps, duration of impulse 2-2.5 millisecond, voltage 0.5-6 v).

In order to elicit reflexes from the chemoreceptors of the pericardium and small intestine we used the method of perfusion of these organs, with their nerve connections with the body maintained. To stimulate the chemoreceptors we used acetylcholine in a concentration of $1 \times 10^{-5}$, $1 \times 10^{-4}$ and in a volume of 0.3-0.5 ml.

The reflexes obtained from the chemoreceptors of the small intestine were pressor in character; the reflexes from the chemoreceptors of the pericardium were either pressor or depressor in different experiments.

The arterial pressure was recorded in the carotid artery by means of a mercury manometer and the respiration by a Marey's capsule. via a tracheal cannula.

In the experiments we used pure reserpine obtained from the All-Union Research Chemopharmaceutical Institute, and also reserpine marketed in tablet form by the firm "SANABO". In view of the very low solubility of reserpine in water, we used the latter in the form of a 0.1% solution in glacial acetic acid.

In order to exclude the possibility of any influence of acetic acid on the reflexes, control experiments were carried out, which showed that acetic acid, when administered in the concentration used for dissolving the preparation, had no essential effect either on the level of the arterial pressure or on the reflexes.

Fig. 1. The effect of reserpine on reflexes from the mechanoreceptors of the carotid sinus, the chemoreceptors of the pericardium and the central ends of the divided vagus and tibial nerves. Legend (from above down): arterial pressure; marker of injection of the drug and stimulation marker; time marker (5 seconds). A: 1) Reflex from the carotid sinus; 2) reflex from the vagus nerve; 3) reflex from the tibial nerve. a) Before injection, and injection of 0.25 mg/kg of reserpine; b) 30 minutes after injection of reserpine; c) 60 minutes after; d) 120 minutes after. B: 1) Reflex from the carotid sinus; 2) reflex from the tibial nerve; 3) reflex from the chemoreceptors of the pericardium. a) Before injection; b) in response to injection of 0.25 mg/kg; c) 60 minutes after injection of reserpine.