

# THE VASCULAR BAROCEPTORS IN EXPERIMENTAL MYOCARDIAL INFARCTION

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The comparatively rapid and complete restoration of reflex influences from the extracardial nerves on the heart in the course of myocardial infarction suggested that irreversible changes in the nervous apparatus of the principal reflexogenic zones of the cardiovascular system do not take place in this disease [2].

The object of the present investigation was to study the structure of the nervous apparatus of the depressor zone of the arch of the aorta, the carotid sinus, and the regions near the orifices of the pulmonary veins and venae cavae in the course of development of experimental myocardial infarction.

## EXPERIMENTAL METHOD

Experiments were conducted on 16 dogs. Under general endotracheal anesthesia the 4th left rib was resected, the thorax was opened, and 3-5 ligatures were applied to the anterior descending branch of the left coronary artery and to its ramifications. As a result of this operation all the dogs developed necrotic changes in the myocardium of the anterior wall of the left ventricle, accompanied by changes in the cardiac rhythm in the form of extrasystoles and paroxysms of ventricular tachysystole and by changes in the ECG waves indicating the development of extensive foci of necroses in the myocardium.

The experimental dogs were sacrificed at different times during the postoperative period—from 1 day to 6 months. Material for investigation was taken immediately after the thorax of the anesthetized animals had been opened and the contracting heart excised.

The material taken for neuromorphological investigation included the depressor zone of the arch of the aorta, the carotid sinus, and the mouths of the pulmonary veins and the venae cavae. The Bielschowsky-Gros and Campos impregnation methods were used. Some preparations were stained for myelin by the Benda-Spielmeyer method, and by Sudan red and Scharlach R for neutral lipids.

## EXPERIMENTAL RESULTS

Irrespective of the duration and of any special features (whether clinical or pathological) of the development of the myocardial infarct, the morphological picture of the vascular baroreceptors was the same in all dogs. No changes were seen in the structure of the baroreceptors of the arch of the aorta, the carotid sinus, and the region of the mouths of the pulmonary veins and the venae cavae in experimental myocardial infarction. The conducting, preterminal, and terminal divisions of these sensory nerve structures fully preserved their normal structural organization within the normal limits of morphological variation when the coronary circulation was disturbed [3].

The state of the vascular baroreceptors at the various stages of experimental myocardial infarction can be seen clearly in the photomicrographs (see Figure 1). The irregularity of the outlines of the nerve fibers, the pools of axoplasm, the notched outlines of the axons, the foci of demyelination, the hypertrophy and hemogenization of the terminal loops, reticula, and end-plates—these were the principal morphological phenomena invariably found in the baroreceptors of the vascular reflexogenic zones of all the experimental dogs investigated. Comparison of these observations with the pictures of the corresponding receptors described previously [3] in healthy control animals revealed no significant differences between them. It

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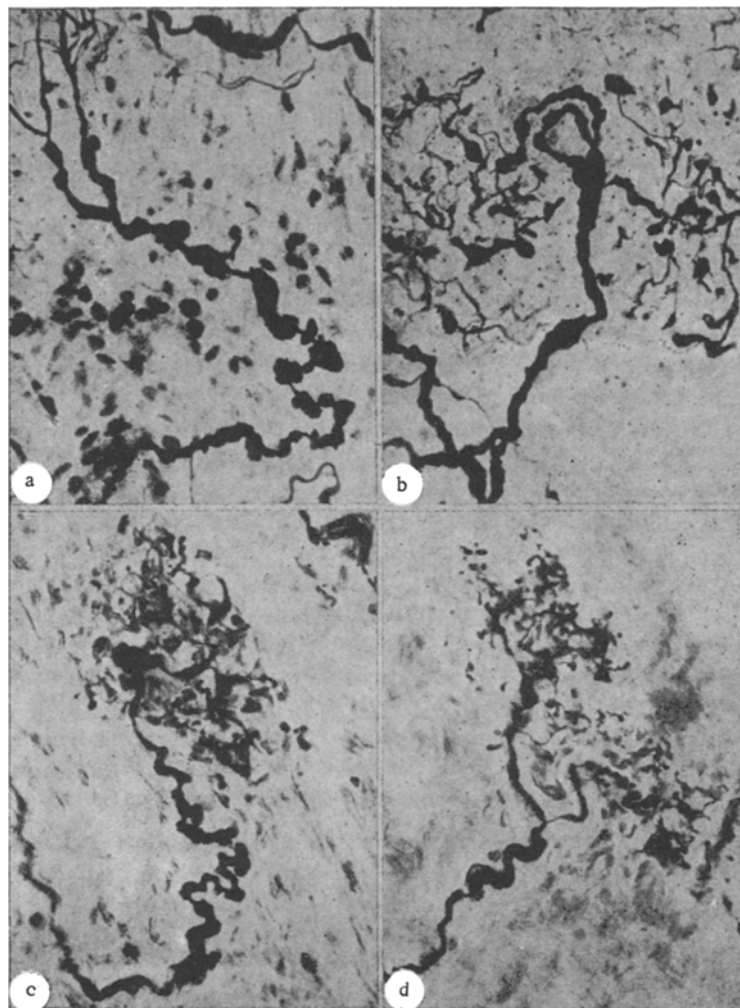


Fig. 1. Preterminal and terminal structures of the baroreceptors from the depressor zone of the arch of the aorta (a), the carotid sinus (b), and the mouths of the pulmonary veins (c) and the venae cavae (d) of dogs. Experimental myocardial infarction (14 days after the operation). Photomicrograph. Impregnation by Campos's method. 400 $\times$ .

may at least be concluded that in preparations impregnated by the Bielschowsky-Gros and Campos methods no changes can be demonstrated in the structure of the vascular baroreceptors of the experimental dogs by comparison with normal animals.

No changes could likewise be detected in the structure of the vascular baroreceptors in preparations stained for myelin. The phenomenon of uneven myelination characteristic of baroreceptor fibers of large and medium caliber was clearly visible in these preparations. However, no degenerative phenomena could be detected in the myelin sheath and no conversion of myelin into neutral lipids had occurred.

The results of these neuromorphological investigations are in agreement with those of pathophysiological studies [1, 2] demonstrating the functional integrity of the vascular baroreceptors in the conditions of experimental myocardial infarction.

#### LITERATURE CITED

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