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LOWERING THE THRESHOLD OF CARDIAC PACING BY SATURATING THE ELECTRODE WITH GLUCOCORTICOIDS

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KEY WORDS: cardiac pacing; pacing threshold; electrode; glucocorticoids.

The response of the heart to implantation of an electrode is for the pacing threshold to rise, and this is especially marked on the 7th-14th day after the operation, so that sometimes the electrical pacemaker cannot impose its rhythm on the heart. To suppress this response an electrode containing porous material in the form of a separate component, filled with dexamethasone, has been used [1]. This agent, escaping gradually through the pores of the electrode, acts on neighboring tissue without any general effect on the body as a whole.

We have suggested and tested a simpler method: saturating the porous electrode with dexamethasone immediately before use.

We made the porous electrodes under laboratory conditions from chromium carbide or titanium carbide. The geometric area of the outer surface of the electrode was 8-12 mm^2. Before implantation the electrodes were kept for 20-30 min in a sterile solution of dexamethasone sodium phosphate. The electrode was then introduced into the right ventricle of a dog under general thiopental anesthesia (four cases). The pacing threshold was then measured for 30 days. The results were compared with those of investigation of porous electrodes (13 cases).

During pacing with the test electrode the threshold on the day of implantation was higher than in the control (Table 1) but the peak threshold value did not reach 1.5 V. On

TABLE 1. Changes in Threshold (in V) of Cardiac Pacing in Early Period after Implantation of Electrode (duration of stimulating pulse 0.5 msec)

Time (days)	Type of electrode	
	saturated with dexamethasone	control
0	1,0±0,1	0,41±0,05
3	0,6±0,07	0,66±0,06
7	1,0±0,15	1,62±0,17
15	1,15±0,12	1,41±0,16
30	0,6±0,1	1,14±0,12

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the 20th-30th day the threshold of cardiac pacing stabilized at a sufficiently low level, on average 0.6 V. Such a low pacing threshold was observed in only one case when electrodes of the control group were used. Saturation of a porous electrode with glucocorticoids immediately before implantation thus significantly lowers the pacing threshold.

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INVESTIGATION OF THE MULTICOMPONENT DETOXICATION SYSTEM IN THE ALBINO RAT LIVER

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KEY WORDS: microsomal monooxygenases; cytochrome P-450; cytochrome b_5; factor analysis.

In a series of investigations Sarkisov has developed the view that any pathological process is based on injury to intracellular membrane structures [8, 9]. Membrane structures, however, are supramolecular complexes of enzymes and information macromolecules functioning as integrated systems [6]. During the formation of responses to external stimuli the number of actively "working" structural units in these systems varies within the limits of the available reserve, but under certain conditions their number increases because of intensification of synthesis of new molecules [7]. The formation of responses of integrated biochemical systems to an external stimulus is thus coupled with corresponding changes in their components.

One typical example illustrating this view is functioning of the multicomponent system for detoxication of xenobiotics, which includes the polyenzymic complex of the endoplasmic reticulum of cells which is functionally connected with phospholipids of microsomal membranes. This balanced biochemical system ensures homeostasis provided that the increase in the intensity of toxic action or its duration does not cause failure of this protective mechanism [10].

The problem of assessing the reliability of the complex integrative system, taking account of the wide range of possible changes in its components, accordingly arises, and to study it was the aim of the present investigation. It was considered that the study of the pattern of function of a multicomponent system would enable the closest analysis to be made of the most informative parameters, the structure of correlations between them, and its modification under the influence of external factors. One approach to the solution of this problem may be by the use of factor analysis.

EXPERIMENTAL METHOD

Experiments were carried out on noninbred male albino rats weighing 300 ± 30 g. Before the beginning of the experiments the animals were kept on a standard diet. Activity of the microsomal monooxygenase system, forming a component of the polyenzymic complex of the smooth endoplastic reticulum of the hepatocytes, was investigated. Phenobarbital, injected intraperitoneally in a dose of 80 mg/kg daily for 3 days, was used as inducer of microsomal monooxygenases. The compound SKF-525A (β-diethylaminoethyl-diphenylpropyl acetate), injected intraperitoneally in a single dose of 80 mg/kg, was used as the inhibitor. The animals were decapitated 24 h after injections of the inducer and 18 h after injection of the inhibitor, after which microsomes were isolated from the perfused liver tissue. Cytochromes P-450 and b_5 were determined by the method in [2]. Total NADPH- and NADH-dependent monooxygenase activity was measured by the method in [13]. The concentration of SH-groups in microsomal proteins was determined by the method in [12]. Protein was estimated spectrophotometrically

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