13) Vectorcardiographical Studies on Spontaneous and Experimental "Myocardial Infarction" in Rats. Yukio Yamori, Michiya Ohtaka, Masahiro Kihara, Yasuo Nara, Ryoichi Horie, and Akira Ooshima. Japan Stroke Prevention Center, Department of Pathology, Shimane Medical University, Izumo 693.

INTRODUCTION Since we established vectorcardiography for small animals (Yamori et al.: Jap Circul J 40:1315, 1976), various electro- or vector- cardiographic features in SHR have been revealed. Characteristic vectorcardiogram (VCG) in adult SHR was left superior deviation of major QRS portion with ST-T changes, which corresponded to the pathological findings such as the increased weights of the heart and left ventricle, left ventricular wall thickening and also high blood pressure.

In old SHR particularly SHRSP, VCG often represented the deformity and deviation of QRS loop with prolonged QRS duration, which might be reflected by the organic changes of myocardium such as infarction-like myocardial fibrosis (Yamori et al.: Jap Heart J 19:609, 1978).

In this study, we further tried to analyse vectorcardiographically and pathologically the pathogenesis of such myocardial lesions in SHRSP, comparing with surgically induced myocardial infarction in WK.

MATERIALS AND METHODS

Experiment 1 Each 5 of male SHRSP and WK were vectorcardiographically followed up from 70 days to over 1 year of age.

Experiment 2 The ligation of the coronary arteries to induce myocardial infarction and the sham operation were performed in 3 adult male WK respectively. In all these rats VCG was followed up, and after they died, the heart was histopathologically examined.

RESULTS

Experiment 1 At the age of about 1 year, the obvious prolongation of QRS duration in all cases and the deformity of QRS vector in a few cases were observed only in SHRSP but not in WK.

Experiment 2 All of 5 WK operated on for the coronary arterial ligation indicated the characteristic findings of VCG such as the deformity and deviation of QRS vector with ST-T changes, that is, the abnormal Q wave with ST elevation in the scalar ECG. These vectorcardiographic findings, which were similar to those of acute myocardial infarction in humans, corresponded well to the organic lesions of massive myocardial necrosis and fibrosis which were confirmed histopathologically.

SUMMARY WITH DISCUSSION

(1) In Experiment 2, the deformity or irregularity of QRS vector in VCG was ascertained to correspond to myocardial necrosis and fibrosis.

(2) In Experiment 1, myocardial lesions of SHRSP could be detected vectorcardiographically about 1 year of age. And, such myocardial lesions as diffuse fibrosis developed progressively but rather gradually, compared with "sudden onset" of the artificial myocardial infarction as demonstrated in Experiment 2.

Thus, vectorcardiographical or pathological study on the heart of SHRSP and its comparison with the surgically induced myocardial infarction in WK demonstrated that the heart of old SHRSP could be used as the model of myocardial infarction.

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