

The influences of superoxide and aging to reperfusion arrhythmias in Spontaneous Hypertensive Rats (SHRs).
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<Purpose> It is well known that some fatal arrhythmias are appeared high frequently in acute phase of acute myocardial infarction in old patients with hypertension and that the mortality is higher than that in young patients. We have already reported the effects of some drugs to the reperfusion arrhythmias in SHR. In this study, the mechanism of reperfusion arrhythmias with old SHRs and the effect of superoxide dismutase (SOD) to old SHRs were investigated.

<Method> Normal rats (WKYs) of 16 weeks, SHRs of 16 weeks in progress of hypertension and old SHRs of 30 weeks were used. The coronary arteries of rats under an anesthetic by ether with artificial respiration were ligated by the Selye's method. They were monitored by limb lead ECGs. Five minutes later the ligation, coronary arteries were untied and reperfused. Each rats were investigated SOD of 35 million units/Kg from their tail vein. The average durations of ventricular tachycardia (VT) and ventricular fibrillation (VF) of the reperfusion arrhythmias were compared in each groups. For purpose of supposing the metabolic factors, ATP in tissues before and after reperfusion were measured by a method to absorb NADH light.

<Results> 1) The average durations of VT and VF in SHR of 16 weeks with no drug were longer than that of WKY of 16 weeks with no drug, respectively. 2) In SHR and WKY of 16 weeks with SOD, the average durations of VT and VF were increased and the appearance times of them were delayed. 3) The appearance rates of VF and mortality in old SHRs of 30 weeks were more frequency than they in SHRs of 16 weeks. Increase of VF were more clear than that VT in old SHRs. 4) VT were controlled by SOD in SHRs of 16 weeks and VF in SHRs of 30 weeks. As all old SHRs with VF died, the average durations of live VF could not be compared. The mortality was 45% in SHR of 30 weeks with SOD as compared to 72% in SHR without SOD. 5) Tissue ATP of 5 minutes later the ligation was more increased than that before the ligation. Transiently, that of 3 minutes later the reperfusion was more decreased than that before the ligation, and that of 20 minutes later the reperfusion reincreased.

<Conclusion> VT and VF in SHRs appeared more frequency than that in WKY. In old SHRs, appearance rate of VF was more than that of VT. SOD controlled VT in SHRs of 16 weeks and VF in SHRs of 30 weeks. Tissue ATP increased after the ligation of coronary artery and transiently decreased after the reperfusion. It was suspected that oxygen radical had a share in a cause of reperfusion arrhythmias.