11) Chorioretinal Changes in Diabetic Stroke-Prone Spontaneously Hypertensive Rats induced Streptozotocin Sigeki Takahashi
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With the aging of society in recent years, the number of cases in which hypertension or arteriosclerosis is complicated with diabetes is increasing. It is also known that retinopathy occurs in diabetes. It is important to consider the stage of diabetes at which retinopathy occurs and the pathogenetic site where it occurs.

At the XXII Annual Scientific Meeting of the Society for the spontaneously Hypertensive Rat, the authors reported on changes observed in the retina and choroid for a period of three months after the injection of alloxan or streptozotocin (STZ) in spontaneously hypertensive rats (SHRSP). In the present paper, interesting changes that were observed in the SHRSP retina six months after the injection of STZ are described.

Experimental methods: 2-month-old SHRSP weighting almost 150 g were used, were 5 SHRSP assigned to each group. To induce diabetes, 65 mg/kg of STZ was dissolved in 0.3 ml of citrate buffer (pH 4.5) and injected into the caudal vein. Untreated SHRSP were used as controls. Horseradish peroxidase (HRP) was injected in some animals as a tracer six months after STZ injection. Fifteen minutes after injection, fixation was performed by the method of Graham & Karnovsky, followed by dehydration with ethanol series, and embedding in epoxy resin. Ultrathin sections were then prepared, double stained with uranyl acetate and lead citrate, and observed by electron microscope.

Experimental results: The SHRSP injected with STZ showed strongly positive reaction for urine sugar and ketone bodies as well as a blood sugar level of 300 to 340 mg/dl two days after injection, which persisted for 6 months. During the same period, the control rats had a blood sugar level of 76 to 81 mg/dl. Five months after STZ injection, ecchymosis or splinter hemorrhage appeared on the ocular fundus of one of the five rats. The retinal nerve fiber layer at the hemorrhagic site showed marked axonal degeneration. Observation of the retinal blood vessels revealed a large number of HRP reaction products in vacuoles in the endothelial cell layer of arterioles and in the muscle layer. In venules and capillary blood vessels as well, HRP reaction products were also observed outside the blood vessels.

Conclusion: Hemorrhage of the ocular fundus, which probably corresponds to human diabetic retinopathy, was observed in one of the five SHRSP injected with STZ six months after injection. The fact that hyperpermeability of retinal blood vessels was demonstrated histopathologically suggests the association of not only capillary blood vessels but all retinal blood vessels in the development of retinopathy.