

# Diagnostic Value of Retinal Fluorescence Angiography in Juvenile Diabetes

By

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A group of 61 diabetic children has been subjected to fluorescence-angiographic examination after the disease has lasted 0-5, 5-10 or 10-15 years. It was found that symptoms of angiopathy can be recognized at the earliest stage of the disease, between the 10th and the 14th year of life already. While the number of ophthalmoscopically diagnosed cases of retinopathy was proportional to the duration of diabetes, microaneurysms in ophthalmoscopically negative but fluorescence-angiographically positive cases were revealed in approximately equal numbers in the different groups. It is suggested that the signs of retinal angiopathy detected by angiography are independent of the diabetic disturbance of metabolism.

Retinopathy in diabetic children is a rare condition during the first 5 years of the disease; vascular complications usually appear after puberty. Still, recent literature contains data to show that it is possible to diagnose a retinopathy simultaneously with the detection of diabetes, i.e., prior to puberty [1, 2, 3]. These reports have induced us to perform retinal fluorescence angiography in all cases of juvenile diabetes. Although a microaneurysm detected by angiography is not histologically identical with retinopathy, it is nevertheless universally regarded as the first symptom of retinopathy.

## MATERIAL AND METHOD

The material of this study comprised 61 (28 male and 33 female) children in

whom diabetes had become manifest before the 14th year of age. At the detection of the disease, 58 of the patients were sexually immature and 3 mature. Ophthalmoscopic examinations of the eyegrounds were repeatedly negative in all cases. Twenty-five children (from a total of 201) in whom retinopathic symptoms had been detected served as controls. Fluorescence angiography was performed with a Zeiss-Opton fundus camera after intravenous administration of 5 or 10% sodium fluorescein in a dose corresponding to body weight.

## RESULTS

Thirty-three patients were sexually immature at the time of angiography; of these 13 displayed signs of retinopathy. In the sexually mature group the corresponding figures were 28 and 18.

TABLE I  
Retinopathy according to the duration of diabetes

	Number of cases examined by					
	Angiography			Ophthalmoscopy		
Number of years since detection of diabetes	0—5	5—10	10—15	0—5	5—10	10—15
Number of cases	20	20	21	61	66	74
Microaneurysm recognizable	8	20	21	1	8	16

Cases examined by angiography: distribution according to age

Age (years)	8—10	10—12	12—14	14—16	16—18	above 18
Number of cases	3	6	16	10	15	11
Appearance of microaneurysm	0	3	10	2	7	9

Treatment of diabetes in the cases examined by angiography

	Good	Adequate	Inadequate
Number of cases	30	23	8
Appearance of microaneurysm	15	12	4

## DISCUSSION

The appearance of retinopathy, as revealed by ophthalmoscopy, is correlated with the duration of diabetes, whereas the angiographic results showed no such relationship. A microaneurysm diagnosed by angiography in an early phase, though presumably no irreversible phenomenon, is in any case a characteristic microangiopathic feature. The proportion of therapeutically well-managed cases in the group of patients whose microaneurysm had been revealed by angiography was as expected. DITZEL et

al. [4] studied the conjunctival vessels of diabetic children biomicroscopically and found lesions already in the earliest phase of the disease; the lesions were reversible but tending to turn irreversible with the progression of the disease. SIPERSTEIN et al. [5] showed that a thickening of the basement membrane is an early premonitory symptom of diabetes. Electron-microscopic examinations of diabetic and prediabetic patients convinced these authors that the thickening of the basement membrane was independent of the diabetic disturbances of metabolism. Accordingly,

they regard the diabetic condition as characterized by special vascular alterations which may be diagnosed before or simultaneously with the disturbance of glucose metabolism. In our opinion, SIPERSTEIN et al. [5] are justified in speaking of a diabetic syndrome. A comparison of our own observations with those of other authors has led to the conclusion that diabetic angiopathy cannot be

prevented by the therapy of diabetes, however correct this may be, whereas the progression of retinopathy may be correlated with metabolic factors.

It is in any case significant that fluorescence angiography allows to detect the retinopathy at an early stage of diabetes so that its possible progression can be followed together with the other manifestations of the disease.

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