Nodular Glomerulosclerosis without Glucose Intolerance: Long-Term Follow-Up

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Fig. 1. Masson's trichrome staining showing diffuse hyaline nodules and marked glomerular basement membrane thickening. $\times 400$.

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Hemoglobin A_{1c} was 4.8% (normal $< 5.4\%$). A retinal fluorescein angiography did not demonstrate diabetic retinopathy. An intravenous urography was normal. By light microscopy examination, 13 glomeruli were counted with all of them showing a diffuse increase in mesangial matrix. In addition, 2 glomeruli presented mesangial hyaline nodular lesions (fig. 1). There were multiple areas of tubular atrophy and interstitial fibrosis. Thickening and hyalinization of small arterial wall vessels was also observed. Immunofluorescence microscopy showed IgM mesangial deposits with irregular distribution. Congo red staining for amyloid was negative. Immunofluorescence staining with κ and λ light chains was also negative. Electron micros-

Dear Sir,

Renal involvement is an important complication of diabetes mellitus and in general, the manifestations of diabetic nephropathy are preceded by clinical symptoms of glucose intolerance from between 7 and 20 years. Although the nodular glomerulosclerosis lesion has been considered pathognomonic of diabetic nephropathy, some reports have focused attention on cases with histological features of nodular glomerulosclerosis in the absence of overt diabetes [1-5]. In addition, those previously reported studies comprise patients with mild alterations in oral glucose tolerance test [1, 5] and others in which no abnormality in glucose handling could be demonstrated [1-5]. We present the long-term outcome of a patient with renal lesions consistent with diabetic glomerulosclerosis and normal glucose tolerance.

A 70-year-old man was found to have isolated proteinuria in 1978, when he was 56, on a routine urinalysis. He has no family history of diabetes. At that time, blood pressure was 140/90 mm Hg, serum creatinine 0.7 mg/dl and proteinuria 20 mg/kg/day. Glucosuria was absent and urinary sediment showed 2 erythrocytes per high power field and hyaline casts. An oral glucose tolerance test showed the following values: 0 min, 120 mg/dl; 30 min, 181 mg/dl; 60 min, 201 mg/dl; 90 min, 180 mg/dl, and 120 min, 134 mg/dl. Total protein was 6.7 g/dl and albumin 4.3. Serum IgM, IgA and IgG, Bence-Jones proteinuria, serum and urine

immuno-electrophoresis, antinuclear antibodies, C3, C4, CH₅₀ and virus B markers yielded negative results or were within the normal limits.

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copy study revealed thickening of the glomerular basement membrane (550 nm) without lamination. Electron-dense deposits were not observed in any location and amyloid fibrils were also absent. Several fasting blood glucose determinations over time ranged from 85 to 103 mg/dl. A second oral glucose tolerance test was within the normal values. Mild hypertension presented 9 years after the onset of the disease, when he was 65, and treatment with enalapril 10 mg/day was started. Proteinuria values through the outcome ranged from 30 to 60 mg/kg/day with normal serum albumin and total protein. Nowadays, after 14 years' follow-up, serum creatinine is 1.3 mg/dl and creatinine clearance 80 ml/min.

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Having excluded light chain disease and amyloidosis, our patient falls into the rare category of previously reported patients exhibiting renal lesions consistent with diabetic glomerulosclerosis in the absence of glucose intolerance. In fact, we looked for signs of diabetes only after the renal biopsy revealed the nodular lesion. However, the precise classification of this patient has not been completely clarified. Some studies have considered the nodular lesion specific of diabetic nephropathy even in the absence of demonstrable abnormalities in glucose handling, and in consequence these patients have been tentatively diagnosed as having diabetic nephropathy without diabetes mellitus [2-4]. Alternatively, it has also been proposed that not yet known disorders may induce diffuse glomerulosclerosis in the nondiabetic patient [1]. Although little is known about the natural history of this condition, the favorable outcome of our patient who did not develop either nephrotic syndrome or renal insufficiency, favors a nondiabetic causal factor.

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