HIGH PREVALENCE OF NONPROLIFERATIVE RETINOPATHY IN NORMOALBUMINURIC PATIENTS WITH TYPE 1 DIABETES

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INTRODUCTION

Retinopathy and nephropathy are most important microvascular complications in patients with diabetes. It is assumed that retinopathy and nephropathy occurs at the same time and that the severity of retinopathy parallels the presence and severity on nephropathy in diabetes mellitus and it has also been suggested that relationship between renal abnormalities and retinopathy are more frequent in patients with type 1 diabetes (T1DM) than type 2 diabetes. However, retinopathy might be present already in normoalbuminuric state in T1DM and up to 27% of T1DM with advanced retinopathy may be normoalbuminuric and even with normal glomerular structural measures determined with renal biopsy. The aim of this study was to evaluate the prevalence of nonproliferative retinopathy (NPR) in normoalbuminuric T1DM.

SUBJECTS AND METHODS

A total of 223 normoalbuminuric T1DM with normal or mildly decreased (estimated GFR > 60 ml min^{-1}1.73m^2) renal function were included in this study (age 42 7 years, 120M/113F, BMI 25 4 kg/m^2, HbA1c 7.0 1.4%, duration of diabetes 17 9 years, serum creatinine 70 12 umol/L, estimated GFR 106 15 mlmin^{-1}1.73m^2, urinary albumin excretion rate (UAE) 9.8 (1.3-29.0 mg/24h). UAE was measured from at least two 24-h urine samples. Estimated GFR was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula. Microalbumin was measured spectrophotometrically by turbidimetric immuno-inhibition. NPR was diagnosed by binocular indirect slit lamp fundoscopy and fundus photography.

RESULTS

Baseline clinical and metabolic characteristics of patients with NPR and those without retinopathy are presented in Table 1. The majority of patients (70%) had no retinopathy while 67 (30%) had NPR. Patients with NPR compared to patients without retinopathy were older (49 8 vs 39 6 years, p<0.001), had longer duration of diabetes (24 9 vs 14 8 years, p<0.001), higher BMI (25 4 vs 24 5 kg/m^2, p=0.004), higher systolic blood pressure (130 (95-160) vs 120 (80-180) mmHg, p=0.03), higher resting heart rate (74 (44-111) vs 70 (51-98) beats/min, p=0.001), higher UAE (10.3 (1.3-29) vs 7.8 (2.3-25.5) mg/24h, p=0.006) and lower estimated GFR (101 17 vs 108 13 ml min^{-1} 1.73m^2, p=0.001).

Table 1: Clinical and metabolic characteristics of patients without and with nonproliferative retinopathy (NPR)

	without NPR (n=156)	with NPR (n=67)	P
Age (years)	39 (20-65)	49 (24-67)	<0.001
Sex (m/f)	83/73	34/33	0.7
Duration of diabetes (years)	14±8	24±9	<0.001
Body mass index (kg/m^2)	24 (18-38)	25 (19-35)	0.04
HbA1c (%)	6.9±1.4	7.2±1.5	0.2
(mmol/mol)	52±4	55±4	
SBP (mmHg)	120 (80-180)	130 (95-160)	0.03
DBP (mmHg)	80 (60-110)	80 (50-110)	0.5
Heart rate (beats/min)	70 (51-98)	74 (44-111)	0.001
LDL cholesterol (mmol/L)	2.8±0.7	3.0±0.9	0.2
HDL cholesterol (mmol/L)	1.7±0.4	1.7±0.4	0.9
Triglycerides (mmol/L)	0.98±0.6	1.13±0.7	0.07
Serum creatinine (μmol/L)	70±11	71±13	0.4
eGFR (ml min^{-1} 1.73m^{-2})	108±13	101±17	0.001
UAE (mg/24h)	7.8 (2.3-25.5)	10.3 (1.3-29)	0.006
Smoking (yes/no, %)	55/101	26/41	0.6

Abbreviations: SBP, systolic blood pressure; DBP, diastolic blood pressure; eGFR, estimated glomerular filtration rate; UAE, urinary albumin excretion rate.

CONCLUSION

It is assumed that retinopathy and nephropathy, as most important microvascular complications in diabetes, occurs at the same time. The results of our study suggest high prevalence of NPR in normoalbuminuric T1DM. This points to the need for close monitoring of normoalbuminuric T1DM aimed at early detecting, preventing or limiting the progression of retinopathy.