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High prevalence of chronic kidney disease in Finnish patients with type 2 diabetes treated in primary care

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ABSTRACT

Objective: To examine the prevalence of chronic kidney disease (CKD) and related cardiovascular morbidity in a cross-sectional population in patients with type 2 diabetes (T2D) treated in a primary care setting in Finland.

Research design and methods: Data were collected and recorded from 42 primary care centres, which recruited 629 patients diagnosed with type 2 diabetes (T2D) to this non-interventional study. Data including patient characteristics, kidney function and albuminuria, blood pressure, HbA1c, lipid and lipoprotein levels, and diabetes duration as well as current medication was collected in each patient.

Results: In the final study population of 625 patients, the mean age was 67 years (range 29–92 years), BMI 32.8 kg/m^2 (95% CI 32–33), blood pressure 142/80 mmHg (140–143/80–81) and HbA1c 7.1% (7.0–7.2) (53.8 mmol/mol, 53–55) and the median duration of diabetes was 9.2 years ranging from newly diagnosed to 43 years. History of dyslipidemia had in 73.3% of patients, 27.8% had cardiovascular disease and 82.7% had hypertension. The primary endpoint, prevalence of CKD of any grade (1–5) or albuminuria, was 68.6%. Regarding

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declined renal function, 16.2% of patients had an estimated glomerular filtration rate (eGFR) <60 ml/min/1.72 m^2, classifying as CKD 3–5. Only one patient was within CKD5. Regarding renal damage, albuminuria was present in 24.3% of patients, with microalbuminuria in 17.1% and macroalbuminuria in 7.2%, respectively. Combining the patients with CKD 3–5 and/or the presence of albuminuria, 34.7% seemed to suffer from significant CKD. The proportion of patients with albuminuria increased with a decrease in glomerular filtration rate. Historically, diabetic nephropathy had been diagnosed in 24.3% of the patients.

Conclusions: Nearly 70% of patients with T2D treated in primary care in Finland have some sign of CKD and nearly half of all T2D patients have a significant CKD. However, only half of the latter had it diagnosed and documented in their patient charts, thus highlighting the importance of performing routine screening of nephropathy by measuring both albuminuria and eGFR in patients with T2D. Prevention of this complication with active therapy for risk factors, such as hypertension and dyslipidemia is warranted.

1. Introduction

Type 2 diabetes (T2D) is an increasing epidemic worldwide [1]. In Finland the number of diagnosed and treated patients with T2D in 2010 was about 250 000 [2]. However, it is estimated that the total number of patients with diabetes is at least 500 000 or around 10% of the population [3,4]. The number of patients with T2D has doubled every 12 years in Finland, and there are no signs that the rate of increase would be slowing down [2].

Even though the number of diabetic patients in Finland has increased, the risk of myocardial infarction and stroke within the diabetic population has decreased [2], probably due to improved treatment of cardiovascular risk factors. This has resulted in an increase in survival, with more patients living longer and thus facing the risk of developing end-stage renal disease (ESRD). In clinical practice, it is important to identify (1) risk factors for nephropathy, such as poor glucose control and hypertension as well as (2) the markers of developing nephropathy, i.e. microalbuminuria and decreased glomerular filtration rate (GFR), in order to prevent progression to ESRD, which as such is a strong and independent cardiovascular risk factor [5].

According to the Finnish Registry for Kidney Diseases [4], the number of T2D patient-years in dialysis has increased by 59% in 10 years (1998–2008). ESRD is, however, only the tip of the iceberg, not encompassing all other less severe renal disorders, i.e. mild and moderate kidney disease. According to NHANES IV (Fourth National Health and Nutrition Examination Survey) the prevalence of CKD in type 2 diabetic patients in the US was 39.7% [6]. The prevalence of nephropathy in type 1 diabetic patients has been investigated in the FinnDiane study [7], but to the best of our knowledge, no reliable data exist on the prevalence of mild and moderate kidney disease in T2D patients in Finland.

This observational, cross-sectional study was undertaken to define the prevalence of CKD among T2D patients treated in primary care in Finland. In addition, we collected data of the prevalence of well-known risk factors for nephropathy, such as hypertension and obesity, as well as of cardiovascular co-morbidity, metabolic profile and current antihyperglycemic treatment in patients with and without CKD.

2. Patients and methods

2.1. Study centres and population

Throughout the country 155 primary care sites were randomly invited to participate. Out of those 42 (27%) agreed to join. Each site was invited to enrol 10–12 consecutive patients with type 2 diabetes, 18 years or older coming for a regular diabetes visit occurring between March 2011 and August 2012. There was no specific criterion for the known duration of diabetes. Patients with other forms of diabetes mellitus, or those participating in another clinical study were excluded. The median number of patients recruited by a physician was 15 (range 1–60). In four patients the T2D diagnosis was not reliable. Thus, the final study population consists of 625 T2D patients.

The study protocol was approved by the ethics review committee of the district hospital of Southern Finland. It was conducted in accordance with the guidelines of the declaration of Helsinki. All participants gave a written informed consent.

2.2. Measurements and definitions

The following information was collected from each patient during the visit: age, gender, height, body weight, blood pressure, known diabetes duration, current antihyperglycemic therapy, history of ischaemic heart disease or stroke, smoking status, antihypertensive and lipid lowering treatment. The patients were also asked if they had ever had laser treatment for retinopathy. The most recent available laboratory values within the last 12 months for serum creatinine, HbA1c, total-LDL and HDL cholesterol, triglycerides and blood haemoglobin were collected from patient records. Blood pressure and BMI were measured during the study visit.

CKD prevalence was determined based on the presence of albuminuria and decreased estimated glomerular filtration rate (eGFR). According to the study protocol and the Finnish guidelines at that time, the eGFR was calculated using the Modification of Diet in Renal Disease (MDRD) and Cockcroft–Gault (CG) equations [8]. The final eGFR was estimated and derived by MDRD ($eGFR_{MDRD}$). If $eGFR_{MDRD}$ was 60 ml/min/1.73 m^2 or higher, the eGFR was estimated using CG