Ischaemic heart disease in Turkish migrants with type 2 diabetes mellitus in the Netherlands: wait for the next generation?

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ABSTRACT

Objective: To study the prevalence of ischaemic heart disease in Turkish and Surinam-Asian migrants with type 2 diabetes mellitus in the Netherlands as compared with Europeans.

Methods: In a consecutive case-control study, 59 Turkish and 62 Surinam-Asian patients were compared with 185 Europeans referred to a diabetes clinic for treatment of type 2 diabetes in the period 1992 to 1998. Main outcome measures were ischaemic heart disease and its associated risk factors.

Results: The prevalence of ischaemic heart disease was lower (9%) in the Turks (p<0.02), but higher (29%) in the Surinam-Asians compared with the Europeans (23%). The Turks (52±10 years) and Surinam-Asians (46±12 years) were younger than the Europeans (64±11 years, p<0.001). Body mass index was 32±5 (p<0.001) in the Turks, 27±5 in the Surinam-Asians (p<0.05) and 29±5 in the Europeans. Turkish patients smoked less (23%, p<0.05) and used less alcohol (4%, p<0.05) than the Europeans. Proteinuria was found in 24% of the Turks (p<0.05), 37% of the Surinam-Asians (NS) and 46% of the Europeans.

In univariate analysis ischaemic heart disease was related to Turkish origin, OR 0.34 (0.14-0.83) p<0.02, to Surinam-Asian origin, OR 1.84 (1.00-3.38) p=0.05, and smoking, OR 1.78 (1.18-2.68) p<0.01. Other variables were not related to ischaemic heart disease.

Multivariate analysis in a model with ethnicity and smoking showed significant relations between ischaemic heart disease and Turkish ethnicity, OR 0.19 (0.06-0.65)

p=0.007, Surinam-Asian origin, OR 2.77 (1.45-5.28) p=0.002, and smoking, OR 1.79 (1.20-2.66) p= 0.004.

Conclusion: Type 2 diabetes mellitus in different ethnic groups results in a significant difference in incidence of ischaemic heart disease. The most remarkable finding is a low incidence of ischaemic heart disease in the Turkish patients with type 2 diabetes, independent of smoking. The high prevalence of ischaemic heart disease in young migrant Asians with diabetes is confirmed.

INTRODUCTION

The prevalence of type 2 diabetes mellitus differs in ethnic groups.[1] Furthermore, type 2 diabetes is more prevalent in migrants than in non-migrants, as exemplified by the high prevalence in second-generation Japanese-Americans and in Asians in the United Kingdom.[2,3] Moreover, diabetic complications – notably coronary heart disease – are more frequent in migrant populations with type 2 diabetes.[2,4] Thus, the ethnic susceptibility suggests genetic factors for type 2 diabetes and macrovascular complications, whereas the data from migrant populations suggest environmental factors.

The Netherlands has a large migrant population originating from Turkey and Surinam. As in the South Asians in the UK, type 2 diabetes in the Surinam-Asians in the Netherlands is characterised by severe complications at a relatively young age.[5] One of the contributing factors could be body mass index (BMI). There is a relation between

the prevalence of type 2 diabetes and BMI[6] as exemplified by the increased BMI concordant with greater insulin resistance in Asians living in London (UK) compared with their siblings in India.[7] On the contrary, the prevalence of type 2 diabetes, which is probably high, and its complications in Turkish migrants has not been studied. In Turkey itself it is largely unknown.[8] Remarkably, Turkish migrant diabetic patients, who are nearly always overweight, rarely present with cardiac complications, contrary to the Surinam-Asians with type 2 diabetes.

We therefore conducted a case-control study of cardiac complications in Turkish and Surinam-Asian patients at presentation to our clinic as compared with Europeans.

PATIENTS AND METHODS

Cases were Turkish or Surinam-Asian patients and controls were European patients referred for treatment of type 2 diabetes to the medical clinics of Rijnmond Zuid Medical Centre, a large teaching hospital with a catchment population of about 200,000. Cases and controls were matched for area code to minimise socioeconomic differences. The variables studied were the data recorded at first presentation. These data comprised age, sex, duration of diabetes, treatment for diabetes (none, oral hypoglycaemic agents or insulin) and metabolic regulation (HbA$_{1c}$). BMI, use of tobacco or alcohol (yes or no), total serum cholesterol and triglycerides, and blood pressure were also studied, as these are known risk factors for coronary and vascular disease. Furthermore, diabetic complications were assessed, i.e. ischaemic heart disease, retinopathy and proteinuria. Ischaemic heart disease was defined as a history of myocardial infarction, coronary artery bypass grafting (CABG), percutaneous transluminal coronary angioplasty (PTCA) or an episode of unstable angina. Retinopathy was present if examination of the eye fundus by an ophthalmologist revealed background retinopathy, pre-proliferative or proliferative abnormalities. Proteinuria was diagnosed in case of microalbuminuria (>30 mg albumin/day) or macroalbuminuria (>300 mg albumin/day) as measured in a 24 hour urine collection.

STATISTICS

Baseline characteristics and frequencies of diabetic complications were compared using the two-tailed student's t-test for continuous variables and chi-square test for categorical variables. We used a stepwise multiple logistic regression analysis to evaluate the independent effects of the following factors on the frequency of diabetic complications in the different ethnic groups: age, duration of diabetes, HbA$_{1c}$, BMI, smoking, use of alcohol, systolic and diastolic blood pressure. Factors with a p value of less than 0.05 were entered into the multivariate model, together with ethnic origin. All statistical analyses were performed using SPSS software. P values (two-sided) of 0.05 or less were regarded as significant.

RESULTS

From January 1992 to May 1998, 59 Turkish, 62 Surinam-Asian and 185 European patients with a matching area code were referred. The characteristics of all patients at first visit to the medical clinics are given in *table 1*. Turkish and Surinam-Asian patients were younger than European patients. BMI was elevated in all groups, but was higher in the Turkish subjects. Surinam-Asians had the highest prevalence of ischaemic heart disease, but the difference from the European patients was not significant. However, the frequency of cardiac complications in Turkish patients was significantly lower. Smoking and alcohol consumption were lower in the Turks. Two risk factors, total serum cholesterol and the diastolic blood pressure, were lower in the Surinam-Asians. The systolic blood pressure was higher in the Europeans. Turkish patients had less proteinuria and accordingly, their serum creatinine levels were lower. There were no differences in the prevalence of retinopathy.

In univariate analysis both Turkish, OR 0.34 (0.14-0.83) p=0.02, and Surinam origin, OR 1.84 (1.00-3.38) p=0.05, were related to ischaemic heart disease. From the risk factors only smoking was significantly related to ischaemic heart disease, OR 1.78 (1.18-2.68) p=0.006. Diastolic blood pressure, OR 0.98 (0.97-1.00) p=0.10, and age, OR 1.02 (1.00-1.05) p=0.09, did not reach a significant relationship with ischaemic heart disease.

In the multivariate analysis more Surinam-Asian patients had ischaemic heart disease than Europeans, OR 2.77 (1.45-5.28), p=0.002. In contrast to the Surinam-Asians, Turkish patients had less cardiac involvement than the Europeans, OR 0.19 (0.06-0.65) p=0.007. The relation of smoking to ischaemic heart disease in this model was OR 1.79 (1.20-2.66) p=0.004. HbA$_{1c}$ level and smoking were also independent risk factors for proteinuria.

DISCUSSION

This study confirms the high frequency of diabetic complications in Asian migrants at a relatively young age. Notably, the prevalence of cardiac ischaemia in Surinam-Asian patients with type 2 diabetes was high compared with European patients, independent of smoking as a risk factor. In contrast, Turkish patients showed a relatively low prevalence of ischaemic heart disease.

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Table 1

Characteristics of type 2 diabetic patients at presentation

	TURKISH PATIENTS (N=59)	SURINAM-ASIAN PATIENTS (N=62)	EUROPEAN PATIENTS (N=185)
Male sex (%)	48	58	47
Median age (years)	52 ± 10[†]	46 ± 12[†]	64 ± 11
Duration of diabetes (years)	4 ± 4	5 ± 7	5 ± 6
Treatment (%)			
- Diet only	29	34	32
- Medication	65	63	59
- Insulin	7	3	9
HbA_{1c} (%)	8.8 ± 2.5	8.1 ± 2.3	8.2 ± 2.6
Ischaemic heart disease (%)	9[*]	29	23
Proteinuria	24[†]	37	46
Creatinine (µmol/l)	71 ± 16[‡]	80 ± 20	84 ± 23
Retinopathy (%)	14	20	14
Risk factors			
- Body mass index (kg/m²)	32 ± 5[†]	27 ± 5[‡]	29 ± 5
- Smoking (%)	23[†]	46	50
- Use of alcohol (%)	4[†]	19	19
- Total cholesterol (mmol/l)	5.8 ± 1.2	5.5 ± 1.4[‡]	6.0 ± 1.6
- Triglycerides (mmol/l)	3.0 ± 2.3	3.0 ± 2.3	3.2 ± 2.9
- Systolic blood pressure (mmHg)	145 ± 22[†]	140 ± 24[†]	162 ± 28
- Diastolic blood pressure (mmHg)	87 ± 12	85 ± 14[‡]	91 ± 5

Plus-minus values are means ± SD, [‡] p<0.05 , [*]p<0.02, [†] p<0.001 for comparison with Europeans.

Other studies also found differences in the relation between ethnicity and macrovascular diabetic complications. A study in the Netherlands observed a negative association between diabetic complications and Northern African as well as Negroid ethnicity but no difference with Armenians.[9] A lower risk in Afro-Caribbeans for cardiovascular disease was observed in the United Kingdom,[10,11] which was partly ascribed to a lower degree of central obesity.[10] Interestingly, the UKPDS study, a large follow-up study of diabetic complications in non-insulin-dependent diabetes mellitus (NIDDM) patients in the United Kingdom, did not show a different risk for cardiovascular disease in the South Asians than for whites,[11] contrary to most other studies.[4,5,12] However, it was found that the risk for coronary heart disease is not uniform among South Asians and there appear to be important differences between Indians, Pakistanis and Bangladeshis.[13] In larger studies these differences could be obscured.

Increased BMI, coinciding with an increased prevalence of type 2 diabetes and consequently cardiovascular complications, is observed in most migrant populations. This phenomenon has been studied mostly in Japanese-Americans and in Asians in the UK.[2,3] Turkish migrants in the Netherlands – we studied first-generation immigrants – predominantly originate from poor rural areas in Turkey and have migrated to urban areas in the Netherlands. On the one hand they seem to adopt a Western lifestyle, as

far as can be concluded from results of a study that showed that Turkish people living in the Netherlands have a higher blood pressure, higher total cholesterol and LDL cholesterol, and higher BMI than people living in Ankara, Turkey.[14] The Turkish patients in our study were indeed characterised by obesity but by low use of alcohol or tobacco. Interestingly, a study of food intake of adult Turkish immigrants living in the Netherlands for many years revealed a traditional Turkish food intake.[15] This diet could have a protective effect on the development of cardiovascular disease. On the other hand an analysis of mortality revealed that the cause of death due to cardio-vascular disorders was 44% in Europeans, 48% in Turkish people living in the Netherlands, and 60% in Turks living in Turkey in the category 45 to 64 years for males, and 28, 40 and 62%, respectively, in females.[16,17] This difference could suggest that people who migrate are a selection, relatively healthy and fit enough for the acquisition of work abroad.

Limitations of our study could arise from the relatively small numbers of patients and the fact that the patient population we studied may not be representative for the ethnic groups. However, the patients were referred by their general practitioners and live in a relatively poor area with high levels of unemployment, comparable with other large inner cities in the Netherlands.

In conclusion our study shows that first-generation

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Turkish patients with type 2 diabetes are different from other migrant populations studied so far. We are not aware of other populations where type 2 diabetes in combination with obesity is not related with an increased prevalence of coronary artery disease. It can be envisaged that the second-generation Turkish immigrants could show a pattern of complications of type 2 diabetes comparable with other second-generation immigrants.[3] This, in turn, would suggest that environmental factors determine the risk of cardiac complications of type 2 diabetes.

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