

A study of risk factors and complications in newly referred patients to diabetes clinic

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Abstract

This study investigated the presence of risk factors and complications in the newly referred patients to our diabetes clinic. It also looked into how these risk factors and complications were being managed as compared to existing guidelines and evidence. In the present study 58 diabetic patients were included, 24 % (14/58) were smokers, 55% (32/58) were obese and 27 % (15/58) were overweight. Mean total cholesterol/HDL ratio was 4.52 and mean HbA1c was 8.29. Out of 49 type 2 diabetic patients 57.1% (28/49) patients were hypertensive and 50% (14/28) patients were on 3 or more antihypertensive drugs. Twenty of forty nine (40.8%) type 2 diabetic patients had high microalbumin/creatinine ratio and 55% (11/20) of them were on ACE inhibitors. In the type 2 diabetic group 85.7 % (42/49) were either overweight or obese and 40.4% (17/42) of these patients were on metformin. Thirteen of fifty eight patients (22 %) had ischaemic heart disease; and 22% (13/58) had total cholesterol/HDL ratio > 3.9 out of whom 31% (4/13) were on statins. All patients who were smokers received advice on stopping smoking and were offered counseling services and nicotine patches/bupropion by their General Practitioners.

Key words: risk factors, diabetes, complications, patients

Introduction

Chronic macrovascular (ischaemic heart disease, cerebrovascular disease, peripheral vascular disease and hypertension) and microvascular complications (retinopathy, nephropathy and peripheral and autonomic neuropathy) are often present in patients at the time of diagnosis of diabetes and with increasing duration these become more frequent.¹ Many of these complications can be delayed or prevented with better glycaemic and blood pressure control.² In addition, early identification and management of these complications can retard the progression of these complications.² In the UK the majority of type 2 and a small number of type 1 diabetic patients are managed by the primary care physician (GP) and referred to hospital either because there is a problem with metabolic control or there is a development of complications which cannot be managed at their local practice. Our aim was to study the prevalence of cardiovascular risk factors and chronic macro- and micro- vascular complications in newly referred patients to the hospital diabetes clinic. We also aimed to find out the management of these complications in the primary care centre according to pre-existing guidelines.

Materials and Methods

All patients seen in the hospital diabetes clinic between the periods of 1st August 2001 to 31st July 2002 as new referrals from primary care physicians were identified using the hospital electronic database. There were 58 diabetic patients (37 males, 21 females) referred to the Chorley Hospital outpatient diabetes clinic during that period. Chorley hospital is a district general hospital; a part of Lancashire Teaching Hospitals NHS Trust and provides

health care for a population of 201,547. It has a dedicated outpatients department for diabetes and 3 consultant diabetologists. Data were collected from case notes and were analysed with the help of the audit department. All patients were Caucasians except for one who was a South Asian. All patients were referred from general practitioners because of their poor diabetes control. Many of the complications were already known to the GPs and were included in the referral letter and when necessary further tests were done to confirm them.

The patients had body mass index (BMI) measured at the time of the first appointment and those with BMI 25-29.9 were included in the overweight group and patients with BMI greater than 30 were included in the obese group. HbA1c was also measured in all patients. Patients with blood pressure greater than 140/80 mm Hg were considered hypertensive. Patients with documented evidence of myocardial infarction or angina with ECG changes/ positive exercise tolerance test/ positive coronary angiography were considered to have ischaemic heart disease. Peripheral neuropathy was diagnosed by clinical examination of the feet using 10 gram monofilament and neurotip with use of nerve conduction studies when needed. Urinary albumin/creatinine ratio was measured in the early morning urine sample of the patients and the patient was considered to have microalbuminuria if it was greater or equal to 2.5g/24h in males and 3.5g/24h in females. Fasting blood sample was collected to measure total cholesterol and total cholesterol/HDL ratio. Retinopathy was diagnosed by slit lamp examination of fundus by ophthalmologists or accredited opticians.

Results

Hypertension was found in 57.1 % (28/49) of type 2 diabetic patients while none of the patients with type 1 diabetes was hypertensive. All patients with high urinary

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microalbumin/creatinine ratio [40.8% (20/49)] were type 2 diabetic patients. In addition 14 % (8/58) had peripheral neuropathy [type 1, [22 % (2/9); type 2, 12 % (6/49)], 7% had retinopathy [type 1, 11 % (1/9); type 2 6.1% (3/49)]. Foot ulcers and raised serum creatinine >150 µm/L were found in 1 patient in type 1 and type 2 diabetic group of patients, respectively. (Table 1)

40.8 % (17/42) of all obese/overweight type 2 diabetic patients were on metformin. In addition, 57.1 % (28/49) of these type 2 patients were hypertensive. Most of these patients required combined antihypertensive treatment. Moreover 53.4% (31/58) had total cholesterol/HDL ratio > 3.9 out of which 35.4% (11/31) on statins, while 41.3% (24/58) of patients had cholesterol >5mmol/litre with 45.8% (11/24) of them on statins. Out of 40.8% (20/49) of type 2 patients with high microalbumin/creatinine ratio, 60% (12/20) were on ACE inhibitors. Only 1 type 2 diabetic patient had serum creatinine >150 µm/L. All patients who were smokers received advice for stopping smoking and also offered counseling services [71.4 % (10/14)] and nicotine patches/bupropion [57.1 % (8/14)] by their general practitioners. (Table 1)

Discussion

We found that the main reason for referrals was poor glycaemic control. More than two thirds of referred patients had HbA1c above 7%. Despite poor glycaemic control 51% were on a single oral hypoglycaemic drug. This could have been addressed with the addition of another oral hypoglycaemic agent in the primary care clinic. In addition, the UKPDS trial² has shown that metformin can reduce diabetes related death by 42% and all causes of mortality by 36% and in the existing guidelines, this is the first line drug for the treatment of overweight type 2 diabetes. In the present study only 40.8% obese/overweight type 2 diabetic patients were on metformin.

Three quarters of all patients were obese/overweight including a significant proportion of patients with both type 1 and type 2 diabetes. More patients of type 1 diabetes were overweight while more patients with type 2 diabetes were obese. Obesity is associated with high prevalence of type 2 diabetes and the high prevalence of overweight/obese patients in type 1 group are worrying. The prevalence of obesity and extreme obesity among individuals at the time they first met the criteria for diabetes has increased over time.³ This is disturbing in the light of the finding that diabetic individuals who are extremely obese are at an increased risk of mortality compared with their non-obese diabetic counterparts.³ IDNT trial⁴ has shown that in patients with diabetes and microalbuminuria, angiotensin converting enzyme (ACE) inhibitors have been shown to reduce progression of renal disease. Inhibition of angiotensin converting enzyme can arrest or reduce the albumin excretion rate in microalbuminuric normotensive diabetes patients, as well as reduce or prevent an increase in blood pressure.⁵ Microalbuminuria was found in 20 subjects and all had type 2 diabetes and hypertension. However, only 60% (12/20) of these patients were on ACE inhibitors despite local guidelines for the treatment

with ACE in diabetic patients with microalbuminuria. None of the type 1 diabetic patients were hypertensive while more than half of type 2 diabetic patients were hypertensive, this could be because of higher age of patients with type 2 diabetes as well as the disease itself which might have been present for a long time before diagnosis. In the present study 36.3% patients required 3 drugs and 13.4% patients required 4 or more drugs to control their blood pressure to the recommended levels. Most diabetic hypertensive patients require more than one antihypertensive agent to control their blood pressure as noted in this article on treatment of hypertension in diabetes patients.⁶ In the HOPE⁷ trial; ramipril reduced the incidence of myocardial infarction, stroke and death from cardiovascular events in people with either pre-existing ischaemic heart disease or diabetes. In the present study 64% of hypertensive patients were on ACE inhibitors. Slightly less than one quarter of the patients had ischaemic heart disease and about one tenth had cerebrovascular disease and peripheral neuropathy. One large meta-analysis and several clinical trials demonstrate the efficacy of using aspirin as a preventive measure for cardiovascular events including stroke and myocardial infarction.¹ In the present study, 85% of patients with ischemic heart disease and 80% of patients with cerebrovascular disease were on antiplatelet treatment.

About one quarter of all patients were smokers out of whom about three quarters were receiving counselling services for smoking cessation and about half were receiving nicotine patches/Bupropion. Studies of individuals with diabetes consistently found a heightened risk of morbidity and premature death associated with the development of macrovascular complications among smokers.⁸ Smoking is also related to the premature development of micro-vascular complications of diabetes and may have a role in the development of type 2 diabetes.⁸

A number of large randomized clinical trials have demonstrated the efficacy and cost-effectiveness of counselling in changing smoking behaviour. Such studies, combined with the others specific to individuals with diabetes, suggest that smoking cessation counselling is effective in reducing tobacco use.⁸ In the present study high total cholesterol > 5 mmol/litre was found in less than half patients and high total cholesterol/HDL ratio was found in about half of the patients. In addition more than a third of patients with high total cholesterol/HDL ratio were on statins, while about half of the patients with total cholesterol >5 mmol/litre were on statins. In the LIPID⁹ study benefits have been shown in all patients with average cholesterol level with ischaemic heart disease in terms of reductions in coronary events, strokes and all other causes of mortality. The NICE guidelines¹⁰ recommends that statins should be started in patients with total cholesterol >5 mmol/litre and LDL cholesterol >3 mmol/litre with diabetes, and in patients with total cholesterol <5 in patients with both diabetes and ischemic heart disease.

In conclusion, the results of this study have shown that most of the patients referred from primary care had poor diabetes control. The prevalence of obesity was high and it is known

to be associated with poor control of type 2 diabetes and increased the incidence of complications in both types of diabetes. The measures to help control obesity/overweight in patients in primary care could help in reducing the prevalence of complications. Slightly less than half of the

obese type 2 diabetic patients were on metformin. It is good to know that most of the patients with IHD and CVD were on antiplatelet drugs. Also more than half of hypertensive patients were on ACE inhibitors/ A II receptor blockers because of high microalbumin/ creatinine ratio. Most of the

Table1:

	Type 1 diabetic patients	Type 2 diabetic patients	Total
Number	9 (15.5%)	49 (84.5%)	58 (100%)
Mean Age	35.4 years	60.3 years	47.8 years
Mean Duration	9.12 years	6.22 years	7.67 years
Smokers current	22.2% (2/9)	26.5% (13/49)	25.8% (15/58)
Ex	None	12.2% (6/49)	
Management			
Counseling services	22.2% (2/9)	61.5% (8/13)	66.6% (10/15)
Nicotine patches /Bupropion	11.1% (1/9)	53.8% (7/13)	53.3% (8/15)
Overweight	67% (5/9)	21% (10/49)	25.8% (15/58)
Obese	16.5% (2/9)	61% (30/49)	55.1% (32/58)
Patients on metformin		42.5% (17/40)	
HbA1c			
Mean	8.29	9.33	8.81
Greater than 7	100% (9/9)	63.2% (31/49)	68.9% (40/58)
Between 7-7.9	none	22.4% (11/49)	18.9% (11/58)
Between 8-8.9	44.4% (4/9)	14.2% (7/49)	18.9% (11/58)
Between 9-9.9	33.3% (3/9)	10.2% (5/49)	13.7% (8/58)
Between 10-10.9	none	8.1% (4/49)	6.8% (4/58)
Between 11-11.9	none	6.1% (3/49)	5.1% (3/58)
Above 12	22.2% (2/9)	2.0% (1/49)	5.1% (3/58)
Diabetes Management			
Diet alone		24%	
Single oral hypoglycaemic drug		51%	
Two or more oral hypoglycaemic drug		20%	
Combined oral hypoglycaemic drug and insulin		6%	
Insulin alone	100%	none	
Mean total cholesterol/HDL ratio	4.27	4.56	4.52
High cholesterol/HDL ratio (greater than 3.9)	44.4% (4/9)	55.1% (27/49)	53.4% (31/58)
Cholesterol greater than 5 mmol/litre	44.4% (4/9)	40.8% (20/49)	41.3% (24/58)
Patients on statins			
Patients with high cholesterol/HDL ratio	none	40.7% (11/27)	35.4% (11/31)
Patients with high cholesterol	none	35% (7/20)	45.8% (11/24)
Mean triglyceride mmol/litre	1.73	2.39	2.3
Mean blood pressure mm Hg	125.8/73.2	143.4/79.9	
Hypertension		57.1% (28/49)	
Hypertension management			
Group of Medicine			
ACE inhibitors/ Angiotensin II receptor blocker		64% (18/28)	
Beta blocker		32.1% (9/28)	
Calcium channel blocker		39.2% (11/28)	
Diuretics		28.5% (8/28)	
Alpha blockers		7.1% (2/28)	
Centrally acting agents		3.5% (1/28)	
Number of different group of medicines			
Two drugs		50% (14/28)	
Three drugs		36.2% (10/28)	
Four or more drugs		13.4% (3/28)	
Patients with high microalbumin/creatinine ratio		40.8% (20/49)	
On ACE inhibitors/angiotensin II receptor blocker		60% (12/20)	
Ischaemic heart disease	11% (1/9)	24% (12/49)	22% (13/58)
On antiplatelet drugs	none	91.6% (11/12)	85% (11/13)
Cerebrovascular disease	11% (1/9)	9.6% (4/49)	7.1% (5/58)
On antiplatelet drugs	none	100% (4/4)	80% (4/5)

smokers received treatment/counseling to stop smoking. It appears that although the control of diabetes was poor in most patients, many of them were receiving treatment for their complications according to current standards. But much work is required to improve these aspects in primary care. Measures to increase awareness among the general public about diabetes and education of general practitioners might be helpful in improving the quality of diabetes care in the primary care setting.

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