

Measuring and Improving Level of Diabetic Care in a Primary Care Setting - an Audit

Dr Odette PACE

Background: Type 2 diabetes mellitus requires an efficient management strategy aimed at preventing long-term complications and decreasing mortality. Detection and proper care early on is especially important due to the 'legacy effect', i.e. further reduction of morbidity and mortality due to effective initial management.

Objectives: To assess the level of diabetes care provided at Rabat Health Centre, comparing it with international standards to identify any shortcomings and implement changes required.

Methods: An audit of diabetes management during 2008 was carried out retrospectively on 60 randomly selected type 2 diabetics who attend the diabetes clinic at Rabat Health Centre. A reaudit was carried out the following year.

Results: Reaudit showed a disappointing lack of improvement in glycaemic and lipid control despite implementation of changes. However, there was better control of hypertension and weight management, together with more prophylactic use of aspirin.

Conclusion: Improved care was achieved in many areas but more must be done to ensure optimal

management and outcome in all patients according to international guidelines. A protocol should be in place to ensure standardised care.

Introduction

Type 2 diabetes mellitus is an increasingly common, chronic condition characterized by decreased insulin output by the pancreatic beta cells, and peripheral insulin resistance. Genetic factors, in addition to the increasing incidence of obesity in developed countries secondary to poor dietary habits and lack of exertion, contribute to this epidemic. Complications of diabetes pose a high financial, social and personal burden, which can be decreased by primary prevention, early detection and optimal management according to set standards (Table 1).

Lack of proper care in diabetes would result in a very high risk of micro and macrovascular complications. The importance of effective early management to prevent

Key Words

Diabetes; Recommendations; Complications.

Table 1 - Set Standards for Optimal Diabetes Care according to American Diabetes Association (ADA) Guidelines

HbA1c	<7%, repeated at least twice yearly ¹
Blood Pressure	<130/80mmHg ^{1,2}
Total Cholesterol	<5.0mmol/l ¹
Prophylactic Aspirin	>40yrs unless complications present* ^{1,3}
At least twice yearly reviews ¹	
BMI	18.5-24.9Kg/m ² ¹
Exercise	150mins moderate intensity, weekly ¹
Smoking status	Record status + cessation advice
Yearly blood investigations, ophthalmic reviews and foot exams ¹	

*Recommendations changed in 2010

later complications has been effectively demonstrated and is called the legacy effect⁴. Microvascular disease includes retinopathy, nephropathy and neuropathy, while macrovascular disease involves the coronary, cerebral and peripheral arteries. Efficient glycaemic and blood pressure control, management of dyslipidaemia, institution of lifestyle measures, prophylactic use of aspirin and smoking cessation advice all contribute to optimal diabetes care aimed at reducing morbidity and mortality.

Primary care plays a large role in educating the public, early detection of diabetes and pre-diabetes through screening, while minimising the onset of complications through intervention⁵, thus reducing the burden on secondary care.

This audit was performed to measure the level of care provided at Rabat Health Centre and institute changes in practice where required.

Methods

Sixty patients were randomly chosen from the computerized diabetic register at Rabat Health Centre, equivalent to 13% of a total of 459 type 2 diabetics. Type 1 diabetics are under secondary care. The patients' ages ranged between 47 and 84 years. A specified dataset containing both process components e.g. frequency of blood pressure measurement, and outcome data measures e.g. cholesterol levels, was set up and this data was collected retrospectively from the patients' files over the period 1st January to 31st December 2008.

After identifying shortcomings and instituting changes in practice, data was again obtained retrospectively from the same cohort, the following year. There were no deaths in this sample during this time period but 4 patients were lost to either dropout or continued care at Mater Dei Hospital.

Results

The first audit showed that the basic structures for optimal diabetic care were in place, with regular review, and weighing and blood pressure monitoring at every visit. In fact, nearly 90% of patients were being reviewed twice or more yearly and had yearly blood investigations. However, it also revealed some areas where a change in practice was indicated, where less clinician inertia and more aggressive measures were needed in order to achieve optimal goals. For example, only 20% of patients had twice-yearly HbA1c measurement as recommended¹, while 44% of patients not on antihypertensives had uncontrolled blood pressure (>130/80mmHg).

Diagram 1 - Level of Glycaemic Control Comparison 2008 & 2009

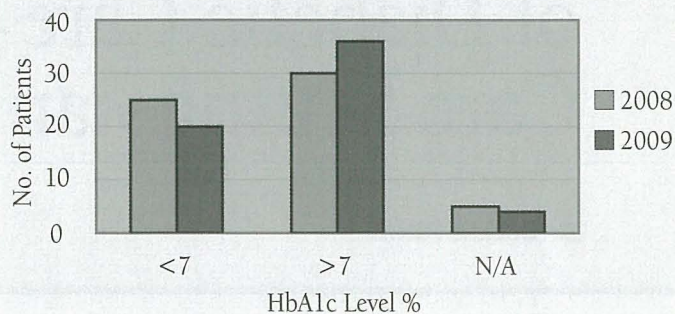


Diagram 2 - Control of Blood Pressure Comparison 2008 & 2009

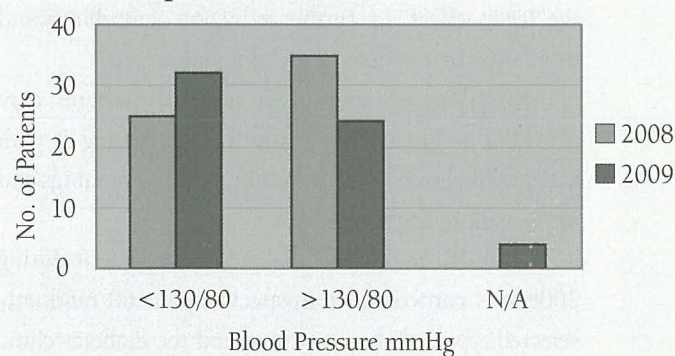
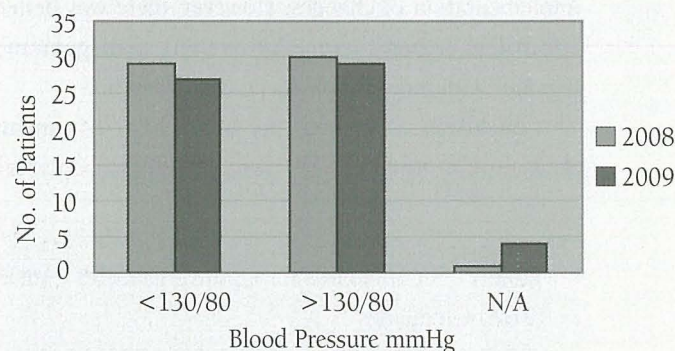


Diagram 3 - Control of Cholesterol Level Comparison 2008 & 2009



The following were the recommendations after the first audit:

- HbA1c to be taken twice yearly in all patients and quarterly in uncontrolled patients (HbA1c > 7%).
- a) Starting treatment with OHA's in diabetics with HbA1c > 7% who are not already on treatment.
- b) An increase in dose or number of OHA's when HbA1c >7% in patients on treatment.
- c) Starting insulin when HbA1c >7% and patient is on maximum doses of OHA's.

- To initiate antihypertensive therapy or increase dose or number of drugs when blood pressure is persistently >130/80mmHg.
- Encouraging lifestyle changes.
- Starting statins as early as possible in dyslipidaemia.
- Measuring BMI in all patients.
- Starting low dose aspirin where indicated.
- Recording smoking status and providing smoking cessation advice.
- Yearly referral to a dietician.
- Yearly referral for ophthalmic and podology review.
- Recording complications of diabetes.

The results obtained on reaudit, a year after these recommendations were made, are discussed below.

Discussion

Glycaemic control

Good glycaemic control is central to the management of diabetes. When this is achieved, there is decreased incidence of microvascular and neuropathic complications, improving outcome^{1,3,5}.

In this audit, glycaemic control was defined by an HbA1c level of < 7% as proposed by the American Diabetes Association¹. There is still much controversy over the optimal level of glycaemic control, HbA1c < 6.5% being preferred by International Diabetes Federation (IDF)⁶. The latter more stringent level poses a higher risk of hypoglycaemia in older patients, while the Accord study⁷, with increased cardiovascular deaths in the intensive therapy arm, has further muddied the waters.

On reaudit, glycaemic control during 2009 was only achieved in 33% of patients, a decrease of 7% from the previous year (diagram 1). This result was unexpected but compares with a similar level of 36% in the U.S. back in 2000⁸. More patients were on oral hypoglycaemic agents (OHA's), while 60% of patients were tested for HbA1c twice or more during 2009, as per recommendations, up from only 20% during 2008. Actually, 13% of patients were tested every 3 to 4 months, as recommended in poorly controlled diabetics¹, compared to only 3% during 2008.

The results obtained, with no improvement in glycaemic control during 2009 despite instituting changes in management, are rather disappointing. There could be different reasons for this including the fact that

a protocol was not in place and that initiating treatment with insulin or increasing the dose was only carried out in 6.7% of patients during 2009.

Blood pressure control

Hypertension in diabetes doubles mortality and increases cardiovascular disease (CVD) by 75%⁹, besides leading to renal, cerebrovascular and retinal angiopathy¹. There is a close association between good control of blood pressure in diabetes and a reduction in incidence of complications^{1,10}: the Steno-2 Study showed a decrease in CVD by 53% and of microvascular complications by 58-63%¹¹. An emphasis should be made on regular monitoring and adequate control by both life-style measures and adequate drug therapy. Various studies have shown that multidrug regimens are more effective in controlling hypertension.^{1,10}

All patients attending primary care diabetes clinics have their blood pressure measured at each visit. On reaudit, 53% of patients were adequately controlled (<130/80mmHg) as compared with 43% during 2008 (diagram 2). This compares favourably with a level of only 28% of controlled patients in a study carried out in Australia during 2008¹³. Additionally, 75% of patients reviewed were now on antihypertensives (1 to 4 different agents), up by 5% from 2008. This data shows a satisfactory improvement in blood pressure control coupled with increased use of drug therapy.

Lipid control

Dyslipidaemia is closely associated with diabetes mellitus. Hypercholesterolaemia, hypertriglyceridaemia, high LDL and low HDL are all contributory factors towards an increased risk of CVD. Lipid levels were measured yearly in nearly all the patients in this audit. For the sake of simplicity only cholesterol levels are being considered here, the target being a level of < 5 mmol/l¹. The ADA guidelines based on various studies recommend that all diabetics with CVD, and those over 40, with CVD risk factors but regardless of lipid levels, would benefit from taking statins^{1,14}.

Unfortunately, there was no improvement in lipid control on reaudit (diagram 3). The use of statins had not increased, remaining at 52%, while 45% of the total number of patients remained uncontrolled. On reaudit, 60% of diabetics not on statins were uncontrolled, as compared to 45% in 2008, while 45% of patients on statins were also uncontrolled (34% in 2008). The latter result could be due to dietary excess or inadequate doses.

These alarming statistics should be a cause for concern, considering the high risk of CVD in diabetic

patients¹⁴. Despite international recommendations for the use of statins as outlined above, we are as yet not doing enough in our clinics, largely due to local policies which do not concur with these recommendations.

Life-style measures

Weight control

Weight loss decreases insulin resistance¹. This in turn decreases hyperglycaemia and the consequent risk of CVD¹⁴. Body Mass Index (BMI) is a reliable way of measuring whether patients are of normal weight for their height¹, preferably maintaining it at a level between 18.5 and 24.99 kg/m².

As in 2008, all patients attending for diabetic review during 2009 had their weight recorded. Overall more patients lost weight than gained, 43% vs. 33%. In 17% of patients no change in weight was recorded. A similar trend had been seen during the initial audit.

BMI was only calculated in 7% of patients during both years. (*This has now become routine since Jan 2010.*) Five patients were referred to a dietician during 2009 as compared to only one during 2008.

The persistent higher rate of weight loss rather than weight gain was encouraging. Continuous emphasis on the benefits of weight reduction together with referral for dietary advice is an important part of diabetes management. However, many patients declined referral to a dietician at Mater Dei Hospital, preferring to attempt dieting on their own.

Exercise

An exercise regimen of moderate intensity physical activity of 150 minutes weekly¹ should be recommended to all patients as it decreases CVD risk factors and promotes weight loss. Lack of data has precluded this factor from being included in this audit.

Number of diabetic reviews

Over 90% of patients were reviewed twice or more during 2009, slightly more than during 2008. This correlates well with international recommendations of at least twice yearly visits in controlled patients, less controlled patients being seen more often depending on response to treatment changes¹. During 2009 there was an increase in frequency of reviews, 58% having 3 reviews (35% in 2008), 23% being seen 4 times (5% in 2008) and nearly 7% having 5 reviews (none in 2008).

As expected, the level of glycaemic control falls with the frequency of visits. The only patient with one review was well controlled, as were half the patients with 2 and 3 reviews. On the other hand, almost all patients with 4 or 5 reviews were uncontrolled. These findings were very similar to 2008 figures, but the increase in frequency of reviews during 2009 means that recommendations for more frequent reviews in uncontrolled patients were being followed.

Use of aspirin

Aspirin is a useful drug in the primary and secondary prevention of CVD in diabetes³. It is associated with a 30% decrease in myocardial infarctions and a 20% decrease in strokes¹. At the time of audit, aspirin was recommended in all diabetics over 40 years of age or when another risk factor was present¹, unless contraindicated. The ADA has modified these recommendations this year to use of aspirin in males over 50 years, and over 60 years in females, unless another risk factor is present¹⁶.

At reaudit, 73% of patients were on aspirin compared to 62% during 2008, indicating an improvement in adherence to guidelines.

Smoking

Smoking is associated with a much higher risk of CVD, microvascular disease and premature death in diabetes¹; therefore it is of utmost importance to record smoking status so that the opportunity can be taken to provide smoking cessation advice when necessary. This status was recorded in 73% of cases on reaudit, an improvement of 30%. (*Smoking status routinely recorded since Jan 2010.*)

Preventive measures

Although yearly ophthalmic reviews are recommended¹, this was only carried out on just over half the patients on both audit and reaudit, probably due to excessively long waiting lists. Fundoscopy can be performed during routine diabetic review if time allows, but should not replace examination by an ophthalmologist/optometrist¹⁶.

Yearly blood investigations were carried out in 95% of patients.

Only 3% of patients had a foot examination during reaudit, a further decrease of 7% from 2008, perhaps due to time constraints. (*Routine yearly podologist review since Jan 2010.*)

Conclusion

Reaudit showed improvement in diabetic care on many levels but much remains to be done in particular areas. Unfortunately, the increase in frequency of reviews, HbA1c testing and increased use of OHA's were not effective in improving overall glycaemic control. Besides lack of an official protocol, clinician inertia in starting insulin (only 6.7% during 2009) may have played a part.

The management of hypertension in the selected diabetic patients was more successful. An increase in the appropriate use of antihypertensives has been translated

into a well-controlled blood pressure in over half the patients. More frequent use of aspirin and increased recording of smoking habits were other positive changes.

On the other hand, there was no increase in the use of statins, while deterioration in lipid control was registered. Statins should be more easily available to diabetics as recommended by international standards.

All these findings will influence future care of the diabetics registered at Rabat Health Centre. A good protocol should be instituted to help us reach our goals and ultimately provide optimal standardised care.

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Dr Odette PACE MD MMCFD Cert Diab (ICGP)

M F D CORRESPONDENCE email: journalmfd@yahoo.com