Management of Type 2 Diabetes

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Introduction

Diabetes is the most common chronic disease managed within general practice. It requires a systematic approach, either opportunistic or planned screening and careful management. The key to avoiding complications of diabetes is by paying attention to the key risk factors of glucose levels, lipid levels, blood pressure, smoking and alcohol.

Systematic approach

The most important factor in the management of diabetes is a systematic approach to monitoring. This can be done in a variety of ways as best suits the practice staff and practice population.

- Regular clinics – scheduling patients with diabetes to come on a designated half day so that practice staff, notes etc. are all ready and prepared. Some practices have the facilities for morning teas and group education for patients who attend on these clinic days.
- Regular timetable of checks with spreadsheet or reminder in notes so that every three months certain activities are carried out, spreading annual requirements out over the year. Plans for this are found in the RNZCGP Diabetes Audit package. One practice, whose patients tended to see whoever was available, developed a practice based schedule for the year so that whoever the patient saw in each quarter, the same checks were done.
- Annual review to ensure that all checks that should have been done in the previous year have been carried out.

Other factors very important in a systematic approach are:

- a team approach that clarifies the complimentary roles of both doctor and nurse;
- register of diabetes patients;
- regular recall and follow-up of patients to ensure they do not skip appointments;
- extra schedule of activities for those patients whose control is poor, e.g. extra practice nurse visits for extra monitoring and education, referral to dietician, patient support groups;
- practice specific feedback on key indicators such as average HbA1c, BP, cholesterol and BMI levels compared with other practices, such as that obtainable from the Diabetes Care Support Service;
- helping the patient become expert in their own management;
- negotiating goals and expectations with the patient.

Screening

Up to date and well referenced guidelines for screening for diabetes were recently published by Kenealy et al.[1]

They recommend that for patients with no risk factors, Europeans should be screened three-yearly from 50 years, and non-Europeans from 40 years. Where risk factors are present (see Table 1) screening should commence 10 years earlier. For those with a past history of impaired glucose tolerance, impaired fasting glycaemia, gestational diabetes screening should be yearly.

For an asymptomatic person, the best screening test is a fasting venous plasma glucose. A result of 7.0 mmol/L or greater indicates diabetes if confirmed on a second test. A result of 6.0 to 6.9 indicates impaired fasting glucose and is worth following with a full oral glucose tolerance test. If the result is 5.5 to 5.9, do an oral glucose tolerance test if the person has any of the risk factors in Table 1.

If a random glucose is equal or greater than 11.1 mmol/l this is indicative of diabetes. However, lower

Table 1. Risk factors for diabetes

A parent or sibling with type 2 diabetes	Hypertension > 140/90
Obesity – BMI >27	HDL < 0.9 mmol/l
Maori, Pacific, Asian, African, Hispanic ethnicity	TG > 2.8 mmol/l
Previously identified IFG or IGT	Polycystic ovaries
History of gestational diabetes	Baby with birth weight > 4kg

levels do not exclude diabetes, hence limiting the use of random glucose as a screening test because a significant number of false negatives will be found. The combination of a random glucose greater 11.1 mmol/l and a fasting test of 7.0 mmol/l or greater confirms diabetes.

Patient self-monitoring devices results are not reproducible enough to use to make a diagnosis and should be avoided if possible. HbA1c has not been well validated as a screening test.

Management

The following management guidelines are based on the New Zealand Guidelines Group Diabetes guidelines,[2] the Counties Manukau DHB Diabetes Chronic Care Management for Diabetes guidelines[3] and a BMJ review of vascular complications.[4]

1. Glycaemic control

In Type 2 diabetes HbA1c should be checked every 3–12 months depending on the degree of control and stability of the person's diabetes. The ideal target level is less that 7%, with 8% being the threshold that triggers further interventions. Table 2 is a useful checklist for reviewing the management of patients whose glycaemic control is inadequate.

In regards to self-monitoring, some patients under test and some over test – test strips are a significant part of the drug budget. Patients with less than adequate control, or who are undergoing lifestyle change, should test at least twice weekly. Initially the test times are chosen to identify then eliminate hypos. Next test to ensure the medications last long enough, then test to identify and control glucose peaks after meals. Unwell patients should test twice daily. Stable patients with good control can opt for three monthly HbA1c as a routine with extra testing only when unwell.

If HbA1c is greater than eight, then follow the steps in Table 3.

Table 2. Review checklist for poor glycaemic control

First ask the patient what they think is going on	
Dietary issues	Self glucose monitoring
Hypoglycaemic episodes	Compliance with medication
Physical activity	Other medical problems
Weight management	Psychosocial issues

Table 3. Management of HbA1c>8

STEP ONE	**Patients on diet** Commence monotherapy, metformin being the preferred option if BMI > 25
STEP TWO	**On monotherapy** • Titrate dose to maximum recommended or tolerated dose reached • Consider combination therapy – sulphonylurea plus metformin
STEP THREE	**On combination therapy** Titrate doses to maximum recommended or tolerated dose reached
STEP FOUR	**On maximum combination therapy** • Consider daily insulin • Consider diabetes specialist or nurse advice

2. Retinal screening

All Type 2 diabetes patients should have retinal screening done by the ophthalmology service at diagnosis. Twenty per cent of patients will have established retinopathy at this time. Rescreening should be done two yearly unless otherwise suggested by the ophthalmology service.

3. Diabetic nephropathy

All Type 2 patients require annual microalbuminuria testing, commencing three months after initial treatment has commenced.

If the result is high, exclude other causes (UTI, severe hyperglycaemia, CHF, vigorous exercise, blood contamination, other renal disease) and repeat twice in the next three to six months. If two of three test are positive, the patient needs management for incipient nephropathy (see Table 4).

Table 4. Management of nephropathy

1. Ensure adequate glycaemic control
2. Check serum creatinine – if >0.15 refer to secondary care
3. Check BP – (if high see below under hypertension management)
4. If normotensive consider ACE inhibitor and recheck urine albumin:creatinine ratio after 3 months to monitor effectiveness
5. Review other cardiovascular risk factors
6. Refer if BP target not reached or urine albumin:creatinine ratio rises progressively
7. Double check smoking and cholesterol levels

Table 5. Risk factors for diabetic foot

- History of previous ulcers
- Peripheral vascular disease
- Active foot problems – callus, corns, infection, ulcers
- Absence of peripheral pulses
- Insensitivity to Semmes Weinstein 5.07 filament

4. Diabetic foot

Foot screening is one of the least well managed aspect of diabetes care in general practice, as demonstrated by a number of audits, and yet more than half of all diabetes-related lower extremity amputations are preventable by primary care interventions. Poor sensation is a major risk factor for diabetic foot, and may be present at the time of diagnosis in Type 2 diabetes. Testing with sensation with a Semmes Weinstein 5.07 should therefore be carried out as part of the initial assessment. More information on foot testing is available in the guidelines on the NZ Guidelines Group website.

If any of the risk factors for diabetic foot exist (see Table 5), foot checks should be done three-monthly, otherwise yearly. For these high risk people the primary object is to protect the foot from injury, by patient education, protective footwear and routine podiatry care. Consider using a foot contract as per the NZ guideline site.[2] This includes agreement to check feet daily, wear shoes, get regular podiatry, and written instructions on when to seek help.

If skin infections occur, including infected small ulcers, these can be treated with elevation, daily dress-

A PRACTICAL GUIDE TO STARTING PATIENTS ON INSULIN

1. Pre-warn patient – can usually do so many months in advance. Give positive message:
- they will feel better;
- everyone finds it much easier than they expected.

2. Pt needs to know how to test own glucose at home with a meter.

3. Script protaphane 10ml vial + 10 syringes, or protaphane penfil + 10 needles and give them Novopen (monotard 10ml or Humulin N vial or pen equally appropriate).

4. Bring pt in at end of day to see you or PN. Tell pt he/she will give first injection. Demonstrate drawing up 10U air, injecting into inverted vial, withdrawing 10U insulin. Get pt to do same a couple of times. Then patient pulls up shirt/blouse, takes pinch of skin between thumb and forefinger, pushes needle vertically into top of raised skin, pushes plunger, withdraws.

5. If on bd metformin and sulphonylurea, can stop evening sulphonylurea from that day.

6. Pt needs to check and record fasting glucose each morning for present.

7. Bring patient back into surgery daily at much the same time until both you/PN and patient are happy that patient can continue unsupervised at home. Shift injection time at home to about 9pm. Educate about hypos, though in practice highly unlikely.

8. Patient phones in fasting glucose reading, initially daily. You/PN instruct to increase insulin dose, initially in 2U increments every two days, later may increase by 5U if fasting glucose not quickly coming down. Works remarkably simply – as insulin steadily goes up, glucose steadily comes down. If get to 40U, switch to bd insulin, either same insulin or mixed as below.

9. As fasting glucose comes down, start monitoring glucose before evening meal, as the morning metformin and sulph (which were not controlling glucose before) will be much more effective when they are taken in the presence of a more normal fasting glucose. As the evening pre-meal glucose comes down, decrease and perhaps stop the morning sulphonylurea.

10. The doses are right, for the meantime, when the fasting glucose is about six (adjusted by night insulin) and the evening glucose is about six pre-meal (adjusted by the morning sulph). Metformin continues – it does not cause hypos but limits the amount of insulin or sulph needed.

11. Over months and years, the evening glucose will rise, and you may need insulin in the morning, stopping the morning sulphonylurea. I usually go to a pre-mix insulin at this point, at breakfast and tea, continuing the metformin but stopping the 9pm insulin. An eventual typical combination would be 2/3 in the morning, and 1/3 in the evening, using a 30/70 mixture, i.e. 30% quick acting and 70% long acting. To start, however, it is sensible to use less rather than more, so I would take the protaphane units given before bed, give the same number as Mixtard (or Penmix or Humulin 30/70) before tea instead, and give the same before breakfast.

12. Adjust the doses up or down two units at a time, according to glucose test as follows. Monitor the pre-breakfast fast-acting insulin by testing before lunch, the intermediate-acting by testing before the evening meal, the evening fasting-acting by testing before bed and the evening intermediate-acting by testing before breakfast.

13. Obviously with a pre-mix insulin, you increase/decrease both fast and intermediate components at once. If you need to adjust them separately, you could adjust the food or exercise relevant to a specific part of the day, but in practice you will either need to change the insulin mix to e.g. 20/80, or give the two components separately.

ings and oral antibiotics, e.g. amoxycillin clavulanic acid. Early signs of cellulitis warrant admission. If deep or non healing ulcers are present it is advisable to x-ray to check for bony involvement, which if present, requires referral.

5. Hypertension

Treatment of hypertension in patients with diabetes significantly decreases the incidence of stroke, cardiovascular disease, CHF, and retinopathy. Target BP is 130/85 or lower, or if vascular complications are already present, 130/80 or lower.

First line drug therapy is with ACE inhibitors, followed by the addition of low dose thiazide, betablockers, alpha blockers and long acting calcium antagonists (diltiazem or verapamil) as required and dependent on other factors such as a history of previous MI or presence of angina. One third of patients will require three or more medications to reach the target level.

6. Smoking

Attention to smoking in patients with diabetes is of paramount importance. Table 6 summarises a simple effective approach.

Table 6. Smoking cessation guide

1. ASK	Ask every patient whether they smoke and document the answer Update smoking status regularly
2. ADVISE	Give brief cessation messages at each encounter which are: • clear and supportive • non confrontational but unambiguous • tailored to the patient's readiness to quit
3. ASSIST	Provide additional support for those ready to quit: • offer self help material in an appropriate language • set a quit date • explore barriers to successful cessation and strategise solutions • offer referral to organised cessation support e.g. Quitline 0800 778 778 • offer nicotine replacement therapy
4. ARRANGE FOLLOW-UP	Arrange follow up: • schedule follow-up contacts regularly for first three months after quitting (consult, phone, letter) • reinforce staying quit during regular consultations for first year after quitting

Cholesterol

The objective of cholesterol management in diabetes is to keep the total cholesterol below 4.5mmol/L. Testing should be carried out at the time of diagnosis and at least yearly thereafter. If the result is above 4.5 mmol/L then initially review lifestyle issues in regards to diet, exercise, and weight, discussing with the patient concrete and realistic changes they could make in these areas. If the target cholesterol is not reached in three to six months then a statin should be introduced at an initial dose of 10 to 20 mg per day, with simvastatin currently being cheaper than atorvastin. Dose can be increased every three months to a maximum of 80mg/day. Liver dysfunction and myopathy are the most common troubling side effects that need monitoring. If side effects require cessation of treatment, then alternatives are bezafibrate 200–400 mg daily or gemfibrozil 600–1200 mg daily. These can also be added or used as an alternative if HDL is low or triglycerides high.

Partnership

There is increasing evidence that the more the patient with chronic disease understands and self-manages their health, the better the outcomes. When looking at lifestyle changes it is always helpful to explore with the patient perceived barriers to the proposed changes. Continuing attention to patient education, and developing a partnership between the patient and the general practice team in managing their diabetes will promote better outcomes.

References

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