Type 2 diabetes: why a timely diagnosis matters

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Key points

- **Type 2 diabetes is reaching epidemic proportions in countries all around the world and the prevalence of diabetes is still rising despite improved knowledge and therapies.**
- **Diabetes is a largely asymptomatic condition with potentially severe complications, including microvascular and cardiovascular disease. Many patients already have complications at the time of diagnosis.**
- **Screening for diabetes is recommended using the Australian type 2 diabetes risk assessment tool (AUSDRISK) for all people over 40 years of age and all Aboriginal and Torres Strait Islanders over 15 years of age.**
- **Definitive diagnosis using blood glucose testing is recommended in high-risk groups, including those scoring over 12 using the AUSDRISK tool.**
- **HbA_{1c} testing is not as yet indicated or funded for diagnosis of diabetes in Australia but this is likely to change in the near future.**
- **Early aggressive therapy in people with type 2 diabetes is likely to be the best strategy to prevent diabetes-related complications.**

General practice is playing an increasingly vital role in the early diagnosis of diabetes. Screening of all high-risk patients using risk assessment tools or blood glucose testing is now recommended. The aim of an early diagnosis is to reduce long-term diabetes-related complications, and trials studying the effects of early aggressive treatment in people with diabetes have generally shown significant benefits.

The prevalence of type 2 diabetes is increasing and reaching epidemic proportions in developed and developing nations. It is well recognised that the financial cost of diabetes and its complications are growing and this is causing concern globally for healthcare services. From a patient perspective, people with diabetes have a shorter life expectancy, reduced quality of life, higher rates of cardiovascular disease and higher risk of microvascular complications.

Diabetes is a largely asymptomatic condition and it is estimated from epidemiological studies that for every person with diabetes there is another undiagnosed case.[1] Furthermore, a high percentage of

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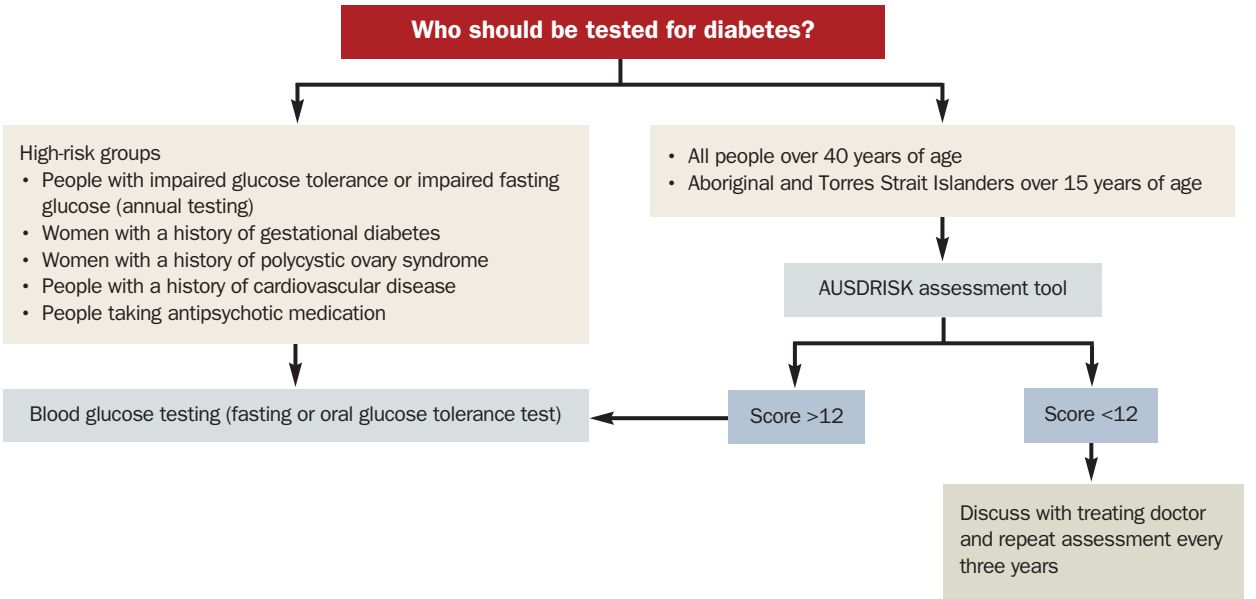

Figure. Screening for type 2 diabetes.

ABBREVIATION: AUSDRISK = Australian type 2 diabetes risk assessment tool.

patients with diabetes have complications at diagnosis. There is growing evidence that early aggressive treatment of diabetes is the most effective preventative strategy for long-term complications. With all of these factors in mind it is clear that a timely diagnosis of diabetes is of great importance.

Benefits of an early diagnosis and early treatment

The aim of an early diagnosis of diabetes is to reduce long-term diabetes-related complications and trials studying the effects of early aggressive treatment of diabetes have generally shown significant benefits. The Steno-2 trial showed that a multifactorial intervention with tight glucose regulation, use of renin-angiotensin system blockers, aspirin and lipid-lowering agents in patients with type 2 diabetes reduced microvascular and cardiovascular events and mortality.[2]

The United Kingdom Prospective Diabetes Study (UKPDS) was designed to assess the effects of intensive glucose-lowering therapy compared with standard therapy in patients with newly diagnosed type 2 diabetes.[3] Microvascular outcomes were significantly decreased by 25% in the intensive group over a 10-year period. Furthermore, this reduction in microvascular complications was maintained 10 years after the trial had been completed suggesting a legacy effect from the previous 10 years. In contrast, cardiovascular events were not significantly different in the two treatment arms after the randomised phase of the study. There was, however, a significant reduction in cardiovascular events and all-cause mortality in those previously randomised to the intensive arm of the study in the 10-year follow up of these patients. This again suggests a legacy effect of early intensive glycaemic control for prevention of diabetes-related complications.

The recently published Anglo-Danish-Dutch study of intensive treatment in people with screen-detected diabetes in primary care (ADDITION) was designed to investigate the effects of multifactorial intervention in patients with diabetes diagnosed on recent screening.[4] This was a surprisingly negative study showing no significant benefit of intensive management of blood glucose level, blood pressure and lipids on cardiovascular events compared with conventional therapy after five years of randomisation. There was a nonsignificant decrease in events in the intensive group and there appeared to be divergence of events after approximately four years of study duration. Long-term follow up of this group will be important as this was a study of much shorter duration than the UKPDS trial.

Role of screening

As most cases of diabetes are asymptomatic and the health consequences may be severe, screening for diabetes plays an important role in the prevention of chronic complications. Cut points for diabetes are predominantly based around prediction of microvascular complications, which has largely centred around the threshold for retinopathy. Prevention of cardiovascular disease is one of the main goals of screening for, and the early detection of, diabetes. The relation of glucose levels to cardiovascular disease is more continuous and there is no obvious threshold. Although it is clear that higher glucose levels (fasting or postprandial) increase

the risk of cardiovascular disease, this continuous relation is similar to other cardiovascular risk factors such as blood pressure and cholesterol levels. Both impaired glucose tolerance and impaired fasting glucose are recognised as categories of increased risk of cardiovascular disease.

Risk assessment tools

Although a definitive diagnosis of diabetes is based on blood glucose testing, risk assessment tools are becoming increasingly important. These tools are a cheap and generally noninvasive assessment of the risk of developing diabetes. The Australian type 2 diabetes risk assessment tool (AUSDRISK) was developed based on the Finnish diabetes risk assessment tool and was adapted for the Australian population. The tool is a questionnaire that scores risk according to a number of criteria including diet, exercise, waist measurement, ethnicity and family history. AUSDRISK can be downloaded at www.ausdrisk.com.au. It is suggested that brochures highlighting the availability of this tool be displayed in medical clinics, healthcare centres and pharmacies. Information regarding the risk factors for the development of diabetes should be sent to all clinic patients considered at risk of diabetes.

Which test for a definitive diagnosis?

Measuring the blood glucose level remains the test of choice for a definitive diagnosis of diabetes and prediabetes. The following results are diagnostic of diabetes:

- a fasting blood glucose level of 7.0 mmol/L or more
- a random blood glucose or two-hour blood glucose level on oral glucose tolerance testing (OGTT) of 11.1 mmol/L or more.

OGTT remains the gold standard for diagnosing diabetes; however, fasting blood glucose and HbA_{1c} measurements are being increasingly used. Fasting blood glucose measurements have a lower cost and greater convenience than that of the OGTT. It is recommended that diabetes should be diagnosed using a minimum of two tests performed on separate days in the absence of symptoms of diabetes because of the variability of fasting and postprandial glucose levels. Plasma venous glucose samples are required for analysis and, in general, capillary blood testing using a glucose meter is not recommended.

HbA_{1c} is gaining acceptance around the world for use in the diagnosis of diabetes. This is a more expensive test and not accessible in some countries; however, it is subject to less day-to-day variability and fasting samples are not required. In Australia, HbA_{1c} is not yet recommended or funded for use as a diagnostic tool for diabetes but this is likely to change in the near future. One of the concerns about HbA_{1c} is that it is a test based on haemoglobin and any illness that interferes with haemoglobin or red blood cell turnover may potentially distort the results. It is important that clinicians are aware of this pitfall particularly in patients with anaemia, haemolysis or haemoglobin variants. HbA_{1c} of 6.5% or more is diagnostic based on current international guidelines.[5]

Who to screen?

Current recommendations are that AUSDRISK should be used in all people over 40 years of age and in Aboriginal and Torres Strait Islander people aged over 15 years. AUSDRISK assessment should be repeated every three years. People scoring over 12 are at high risk and are advised to discuss pathology testing with their treating doctors (see Figure).

Biochemical testing should also be performed in those in known high-risk groups, including:

- people with impaired glucose tolerance or impaired fasting glucose
- women with a history of gestational diabetes
- women with a history of polycystic ovary syndrome
- people with a history of cardiovascular disease
- people taking antipsychotic medication.

Annual biochemical testing is recommended for all people with known impaired glucose tolerance or impaired fasting glucose according to the National Evidence Based Guideline for the Primary Prevention of Type 2 Diabetes 2009 (see http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/di20.pdf).

Summary

Diabetes is a largely asymptomatic condition with potentially severe complications, including microvascular and cardiovascular disease. Many patients already have complications at the time of diagnosis.

Screening for diabetes is recommended using the AUSDRISK screening tool in Australia for all people aged over 40 years and in all Aboriginal and Torres Strait Islander people aged over 15 years. Definitive diagnosis using blood glucose testing is recommended in high-risk groups, including those scoring over 12 using the AUSDRISK tool. HbA_{1c} testing is not as yet indicated or funded for diagnosis of diabetes in Australia but this is likely to change in the near future.

Early aggressive therapy in people with type 2 diabetes is likely to be the best strategy to prevent diabetes-related complications; therefore, a timely diagnosis is of great importance. **ET**

References

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COMPETING INTERESTS: Dr Cohen has received honoraria for presentations from pharmaceutical companies including Eli Lilly, Sanofi Aventis, Novo Nordisk, Merck, AstraZeneca, Bristol Myer Squibb, Medtronic; and Advisory roles for the following companies: Abbott, Sanofi Aventis, Medtronic, Eli Lilly.