



Common Myths and Misunderstandings in Type 1 Diabetes

Although some of the abundant myths in circulation about type 1 diabetes may have been useful in the past, many are misleading now and may lead to inappropriate management. This article discusses some of the more prevalent ones that may mislead doctors.

There are many myths about diabetes in general practice. These easy-to-remember adages have been passed down from generation to generation of doctors and their proponents defend them vigorously. Some may have been applicable and useful in the past, but many are misleading now and may lead to inappropriate management.

Myth 1

GPs should not involve themselves with the management of type 1 diabetes

In contrast to this view, the following guidelines about shared care are worth noting:

'The advice of a specialist physician may be valuable for people with complicated problems related to diabetes – especially children, adolescents and adults with type 1 diabetes A shared care approach by a general practitioner and specialist will provide the best combination of specialised expertise and continuity of care.'¹

A specialist may be able to help with some of the special issues related to type 1 diabetes, but many of these can also be dealt with by a GP who knows the patient. Most of the health problems

experienced are not related to diabetes or its complications and are the same as problems experienced by a similar person without diabetes. Moreover, the GP usually has a better idea of all the other factors affecting the person and is the first port of call if problems arise – related or unrelated to diabetes. Shared care is the ideal, with prompt communication between the GP and specialist diabetes professionals.

Myth 2

Children get type 1 diabetes, adults get type 2

This adage is superficially true: the median age for developing type 1 diabetes is 11 years and for type 2 is sixty-two. However, it is also true that children who developed type 1 diabetes 30 to 40 years ago are now in their 40s and 50s and still have type 1 diabetes, so not all diabetic patients in their 40s and older have type 2 diabetes.

The most important F word for predisposition to type 2 diabetes is *Forty*. However, more and more children and adolescents are developing type 2 diabetes, particularly those with the other F words for type 2 diabetes: *Family history* and *Fatness*. These children are usually from high risk groups and overweight, and the peak age group for diagnosis of type 2 diabetes in young people is adolescence (see box on high-risk groups).^{2,3}

Also, 5% to 10% of people with type 1 diabetes and autoimmune destruction of pancreatic beta cells are adults when

first diagnosed. They may be misdiagnosed as having type 2 diabetes and initially treated with oral hypoglycaemic agents. These people have late onset autoimmune diabetes in adults (LADA) and lack the typical features of type 2 diabetes. They are instead skinny, have rapid progression of hyperglycaemia, are unstable or poorly controlled on oral glycaemic agents early in the course of the disease and have a family or personal history of autoimmune disease (see the box on LADA indicators). It is important to recognise that people with LADA have a form of type 1 diabetes and will require insulin early in the course of their diabetes.

Myth 3

Women who have had gestational diabetes and who develop diabetes later have type 2 diabetes

It is true that most women who have had gestational diabetes do develop type 2 diabetes, and that the gestational diabetes was an early sign of their rising insulin resistance and falling insulin secretion capacity. The hormonal environment of the pregnancy temporarily increases insulin resistance and precipitates gestational diabetes (Figure 1). Postpartum, the progressive increase in insulin resistance and decrease in insulin secretion capacity continues and the woman develops pre-diabetes (impaired fasting glucose and/or impaired glucose tolerance) and then type 2 diabetes.

However, it is also true that if a woman is in the process of developing type 1 diabetes, with progressive autoimmune destruction of beta cells, the remaining beta cell mass may be enough to control glycaemia before, and in the early stages of, pregnancy but may be insufficient in the last trimester when

About the author

Dr Pat Phillips MB BS, MA (Oxon), FRACP, MRACMA, GradDipHealthEcon (UNE) is a Consultant Endocrinologist at the QE Specialist Centre, Woodville.
Dr Jessica Phillips MB BS is a Senior Registrar at the Women's and Children's Hospital, Adelaide, Australia.



High risk groups for type 2 diabetes in childhood or adolescence³

- Overweight: (BMI more than 85th percentile for age and gender; weight for height more than 85th percentile, or weight more than 120% of ideal for height)

Plus

- Any two of the following:
 - family history of type 2 diabetes in a first-degree or second-degree relative
 - high risk ethnic group
 - signs or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidaemia, PCOS)
 - maternal history of diabetes or gestational diabetes

Abbreviations: BMI = body mass index; PCOS = polycystic ovarian syndrome.

Indicators of late-onset autoimmune diabetes in adults (LADA)

- Skinniness
- Family history of auto-immune disease
- Rapid progression of hyperglycaemia
- Unstable/poor control on oral agents early in the course of the disease

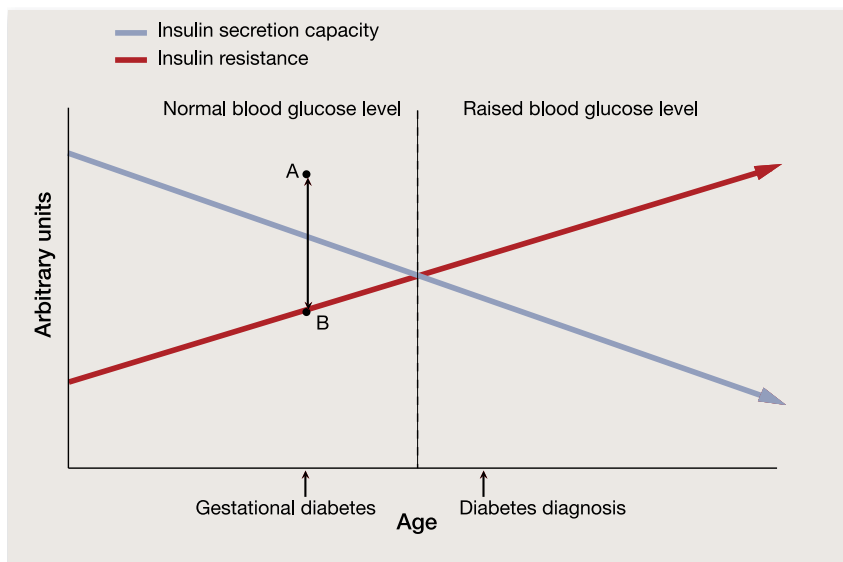
gestational diabetes is usually diagnosed. Postpartum, the progressive immune beta cell destruction continues and the woman develops pre-diabetes and then diabetes – but in this case, type 1 diabetes. As for people with LADA, it is important to identify these women with type 1 diabetes as they will need insulin therapy much earlier than if they had type 2 diabetes.

Myth 4

Type 1 diabetes is not associated with comorbidities whereas type 2 diabetes is

It is true that type 1 diabetes, including LADA, is not associated with the type 2 syndrome (the metabolic syndrome) associated with type 2 diabe-

Figure 1. Insulin resistance and secretion capacity



In a person developing type 2 diabetes, insulin resistance progressively increases with time and insulin secretion capacity progressively decreases. Pregnancy temporarily increases insulin resistance to above the insulin secretion capacity and precipitating gestational diabetes, which resolves at delivery as insulin resistance decreases back to below the insulin secretion capacity (B). After the pregnancy, insulin resistance and secretion capacity continue to change and the blood glucose level progressively rises as insulin resistance and secretion capacity become equal (the point of intersection) and then insulin resistance exceeds secretion. Diagnosis of diabetes usually follows shortly after the point of equivalence.

tes of hypertension, dyslipidaemia, prothrombosis and excess cardiovascular risk. However, type 1 diabetes, being an autoimmune disorder, is often associated with other autoimmune disorders, most commonly thyroid disease, vitiligo and coeliac disease (see box on autoimmune disorders). Thyroid disease is particularly common, and the American Diabetes Association recommends screening for thyroid disease with thyroid antibodies (eg thyroid peroxidase) and coeliac disease with anti-transglutaminase antibodies.⁴

One in 10 pregnant women with type 1 diabetes will develop postpartum autoimmune thyroiditis with temporary hyperthyroidism, followed by hypothyroidism and recovery over several months. Many of these women, particularly those with positive thyroid autoantibodies, will become permanently hypothyroid in the medium to long term and should be monitored with thyroid function tests (eg, annually). Family members may be affected with one or more of these autoimmune disorders but not necessarily the same ones as the index case.

Myth 5

Diabetes complications are microvascular in type 1 diabetes and macrovascular in type 2

There is some truth in this adage because people who develop type 1 diabetes are usually young and have a cardiovascular risk profile similar to their age-matched population peers, whereas those with type 2 are older and have the associated metabolic syndrome with its high cardiovascular risk profile.

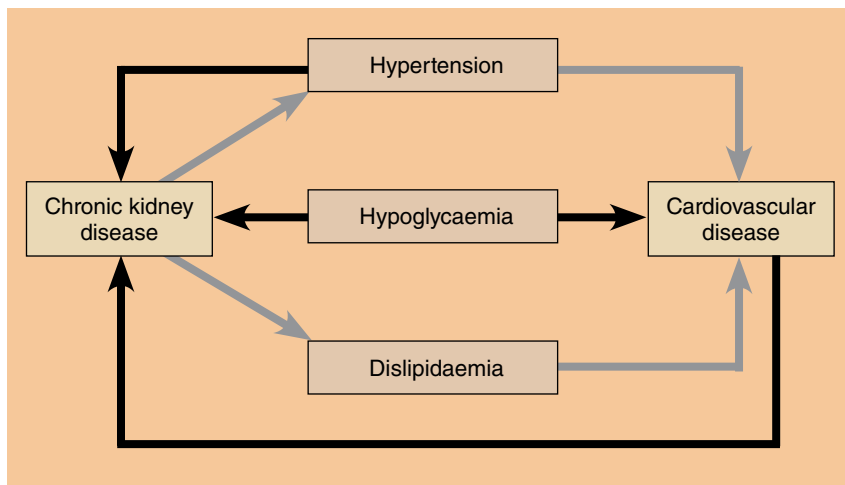
With type 1 diabetes, there will be plenty of time after diagnosis to develop microvascular complications (these take five to 15 years to occur). With type 2 diabetes, there has been plenty of time for cardiovascular disease to develop before diagnosis. However, cardiovascular risk increases dramatically once nephropathy occurs in type 1 diabetes.⁵ A series of vicious cycles is initiated, as shown in Figure 2 and listed below.

• Glycaemic vicious cycle.

Hyperglycaemia (with or without



Figure 2

*Chronic kidney disease and cardiovascular disease: vicious cycles.*

hypertension) causes renal microvascular damage and renal impairment makes glycaemic control more difficult, partly because reduced renal gluconeogenesis, neuropathy and poor nutrition increase the risk of severe hypoglycaemia.

• **Hypertensive vicious cycle.** Renal impairment increases blood pressure, hypertension causes renal impairment, hypertension causes cardiovascular disease and renovascular disease increases blood pressure.

• **Dyslipidaemic vicious cycle.** Micro- and macro-proteinuria are associated with dyslipidaemia, which accelerates cardiovascular disease, which increases renal impairment.

The net result of these vicious cycles is accelerating renal impairment and cardiovascular disease, although most people with type 1 diabetes who develop nephropathy will die of cardiovascular disease before they progress to end-stage renal failure.⁵

Also, people with type 1 diabetes may have the same problems of overweight/overweight as many non-diabetics, with the associated metabolic problems that increase cardiovascular disease risk.

Myth 6

In type 1 diabetes, treatment focuses on glycaemic control, whereas in type 2 diabetes, the ABCs are targeted

Cardiovascular risk in people with type 1 diabetes is similar to the risk in the gen-

eral population – until renal impairment initiates the vicious cycles, accelerating further renal impairment and cardiovascular disease. However, some of those with type 1 diabetes, like some people from the general population, will have or develop hypertension and/or dyslipidaemia, or will develop a lifestyle behaviour (especially smoking) that increases cardiovascular risk.

In all people with diabetes, the five major goals of diabetes care – the ABCs – should be targeted. The ABCs are listed below, and the treatment targets are shown in the Table.

A = controlling A1c (glycosylated haemoglobin)

B = controlling Blood pressure

C = Controlling cholesterol

s = quitting Smoking

s = taking Salicylates.

The risk factors associated with cardiovascular disease, especially hypertension, are also associated with renal impairment. The 'double whammy' of hyperglycaemia and hypertension more than doubles the risk of renal damage. It is important to maintain blood pressure below 130/80mmHg or as close as possible to values at diagnosis. A 'healthy' blood pressure of 125/75mmHg is not ideal for someone who previously had a blood pressure of 95/60mmHg, and represents a considerable increase of 30/15mmHg. Blood pressure control is particularly important once renal impairment occurs, and a lower target (below 125/75mmHg) is recommended if there is proteinuria.

Autoimmune diseases associated with type 1 diabetes

Thyroid

- Graves' disease
- Hashimoto's disease
- Autoimmune thyroiditis

Gastrointestinal

- Coeliac disease

Adrenal

- Addison's hypoadrenalism

Other

- Vitiligo
- Autoimmune hepatitis
- Myasthenia gravis
- Pernicious anaemia

The dyslipidaemia associated with chronic kidney disease should also be treated, remembering also that renal impairment decreases the excretion of statins. Lower doses of statins should be used if the glomerular filtration rate (GFR) is below 30 mL/min (eg, up to half the usual maximum dose).

Myth 7

In people with type 1 diabetes, glycaemia should be tightly controlled

With the caveat, '.....if this can be achieved safely', this is generally true. There are two reasons why glycaemic targets cannot be met: patient capacity and willingness, and medical caution mainly related to hypoglycaemic risk.

The everyday burden of glycaemic control is considerable. Some people may not have the mental capacity to juggle the current blood glucose reading, the mealtime glycaemic load and the corrective and prandial bolus insulin doses, or the physical capacity to perform multiple blood glucose measurements and insulin injections. For others, it is just too hard. They may understand that they are risking future complications but they do not want the 'hassle' of the complex diabetes routines.

As thirty-two year old Tim, a patient who has had type 1 diabetes since he was 14, put it: 'I often get sick of it. All



TABLE

The ABCss of diabetes care and treatment targets

ABCss	Target
A1c (glycosylated haemoglobin)	≤7%
Blood pressure	≤130/80mmHg (<125/75mmHg if proteinuria >1 g/day)
Cholesterol	<4mmol/L
smoking	0
salicylates	Aspirin 75 to 150mg/day

the fingerpricks, the injections, the eating, the thinking about what I should do next. I just want to forget it and get on with my life without all that hassle. I hate it.'

Hypoglycaemia is the main reason for medical caution. Minor hypoglycaemia disrupts life with its unpleasant symptoms and the need to interrupt whatever is happening, eat carbohydrates and check that the blood glucose value increases to a safe level. Severe hypoglycaemia can be life-threatening if it is very profound or if it causes loss of control in a dangerous situation (such as when driving). On average, a person with type 1 diabetes has a minor hypoglycaemic episode weekly and a severe hypoglycaemic episode (requiring help from a third party to recover) once a year. Within that average, however, there is a wide range. A few unlucky people have most of the hypoglycaemia (minor and severe), while the lucky few rarely have it.

There are several 'red flags' to identify those who are more likely to develop severe hypoglycaemia (see the box on red flags).⁶

The glycaemic targets for people lacking the capacity or will to handle the hassle of the necessary diabetes routines will be determined by how much they are able and/or willing to tolerate. For those at high risk of severe hypoglycaemia, targets will be determined by how low they can go without an unacceptable risk of severe hypoglycaemia. This may be an A1c of 8% to 9%, or even higher. Circumstances do, however, change with time and people may become more able and/or willing to try to control their gly-

caemia, or become less prone to hypoglycaemia and able to achieve tighter targets.

Summary

Myths and misunderstandings demystified

- **Myth 1:** GPs should not get involved with the management of type 1 diabetes.
Reality: A specialist may be able to help with some of the special issues related to type 1 diabetes but most issues can be dealt with by a GP who knows the patient and is aware of their other health problems.
- **Myth 2:** Children get type 1 diabetes, adults get type 2.
Reality: Many children who are overweight and have a family history of type 2 diabetes, a maternal history of diabetes or gestational diabetes, or signs and conditions associated with insulin resistance, develop type 2 diabetes that is diagnosed mostly in adolescence. About 5% to 10% of those with type 1 diabetes are adults who have late onset autoimmune diabetes in adults (LADA).
- **Myth 3:** Women who have had gestational diabetes and develop diabetes later have type 2 diabetes.
Reality: Some women who are developing type 1 diabetes first present during gestation.
- **Myth 4:** Type 1 diabetes is not associated with comorbidities whereas type 2 diabetes is.
Reality: Type 1 diabetes, including LADA, is an autoimmune disorder and is often associated with other autoimmune disorders (most commonly

Hypoglycaemic red flags in order of importance

- History of hypoglycaemic episode
- Hypoglycaemic unawareness (autonomic neuropathy)
- Erratic lifestyle
- Tight glycaemic targets
- Sleeping alone

thyroid disease). One in 10 pregnant women with type 1 diabetes will develop postpartum autoimmune thyroiditis.

- **Myth 5:** Diabetes complications are microvascular in type 1 and macrovascular in type 2.

Reality: This is largely true, but once nephropathy develops in type 1 diabetes several vicious cycles are initiated (glycaemic, hypertensive, dyslipidaemic) that accelerate renal impairment and cardiovascular disease.

- **Myth 6:** In type 1 diabetes, the treatment focuses on glycaemic control, whereas in type 2 diabetes the ABCss are targeted.

Reality: People with type 1 diabetes have similar cardiovascular risks to the general population, and some will have or will develop cardiovascular risk factors or renal impairment. Cardiovascular risk factors, the ABCss, should be sought and treated actively in all people with diabetes.

- **Myth 7:** In people with type 1 diabetes, glycaemia should be tightly controlled.

Reality: This is true if it can be achieved safely. Patient capacity and willingness, and medical caution related to hypoglycaemic risk, may mean that tight glycaemic control cannot be achieved. 'Red flags' to identify people most likely to develop severe hypoglycaemia include a history of hypoglycaemic episodes, hypoglycaemic unawareness, an erratic lifestyle and sleeping alone. In these situations, glycaemic targets depend on the level of glycaemia achievable without an unacceptable risk of severe hypoglycaemia.