



Diabetes Mellitus & Pituitary Disease

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What is it?

The word “diabetes” comes from the Greek language and indicates excessive urination. The relatively rare type of diabetes, but one familiar to people with pituitary problems, is diabetes insipidus, where the excess urination is due to lack of a pituitary hormone that allows the kidneys to reabsorb water and concentrate the urine. The more common type of diabetes in the community, diabetes mellitus, is due to a high blood glucose level; once the blood glucose level is substantially elevated (above about 10 mmol/L), glucose starts to leak out through the filtering system in the kidneys and drags water with it – hence the excessive urination. This article is about the combination of pituitary disease and diabetes mellitus.

Diabetes mellitus is classified into different types according to the causation. Type I diabetes (often called juvenile onset diabetes or insulin-dependent diabetes) accounts for about 10% of all people with diabetes, and is due to destruction of the insulin producing cells of the pancreas by the immune system, so that people with Type I diabetes need insulin injections from the time of diagnosis, for the rest of their lives. Type II diabetes (sometimes called maturity onset or non insulin dependent diabetes) accounts for about 90% of all diabetes in Australia and affects about 7% of the adult community.

What causes it?

Type II diabetes is due to a combination of sluggish insulin production from the insulin producing cells of the pancreas, and a poor response of the body's tissue to the action of insulin (“insulin resistance”). Because Type II diabetes is quite common, it is not rare for people with pituitary disorders to have Type II diabetes by coincidence. However, certain pituitary disorders may actually contribute to the development of diabetes. Diabetes which develops in this way generally behaves like Type II diabetes and can generally be controlled with diet, exercise and tablets, but may eventually need insulin treatment. Sometimes people have a lesser abnormality of blood glucose levels which doesn't reach the level for diagnosis of diabetes. This condition of Impaired Glucose Metabolism is important because it signifies an increased risk of cardiovascular disease and a relatively high risk of progression to diabetes.

Disturbances of pituitary function may contribute to the development of diabetes mellitus in the following ways:

Acromegaly

Growth hormone can oppose the effects of insulin. Normal growth hormone levels do not seem to upset the action of insulin, but high growth hormone levels which occur in people with acromegaly can substantially interfere with the action of insulin – leading to an inability of insulin to control glucose output from the liver, and promote utilisation of glucose by muscle. Diabetes does not occur in all people with acromegaly but it does occur quite often – perhaps in 10-25% of cases, with another 30% or so having impaired glucose metabolism. Successful treatment of acromegaly leads to an improvement or even disappearance of diabetes.

Cushing's syndrome

Abnormalities of pituitary function or pituitary tumours which result in an increased production of adrenocorticotrophic hormone (ACTH) generate increased production of cortisone from the adrenal glands. High cortisone levels stimulate the liver to put out more glucose and also block the action of insulin on glucose disposal in muscle. So people with Cushing's syndrome quite commonly develop diabetes (15-20%) or impaired glucose tolerance (70-80%). Once again, if the Cushing's syndrome can be cured or controlled the diabetes may remit.

Hypopituitarism

It may seem strange that when high levels of two pituitary hormones can cause diabetes that a lack of pituitary hormones may also contribute to the diabetic state. But this is true. Lack of pituitary hormone levels, especially a lack of growth hormone and a lack of hormones controlling the ovaries or testes, results in an excessive accumulation of fat in the body, especially abdominal fat. Excessive amounts of abdominal fat also interfere with the action of insulin and cause "insulin resistance". We do not yet fully understand the mechanism by which this happens but it probably relates to an excessive supply of fat (fatty acids) from abdominal fat to muscle and liver, which are the main body organs involved in the disposal and production of glucose. Fat cells also produce several hormones which may assist or interfere with the action of insulin. When there is an excessive amount of abdominal fat, there is an imbalance of these hormones (too much of the "baddies" and too few of the "goodies") which adds to the impairment of insulin action and the abnormality of blood glucose levels. Diabetes is not a frequent occurrence in hypopituitarism but the lesser abnormality of impaired glucose tolerance is more common.

How is it treated?

The medications used to control diabetes in people with pituitary disorders are the same as those used generally in the treatment of Type II diabetes. Sulphonylurea tablets (including Diamicon, Amaryl, Minidiab, Daonil etc) stimulate the insulin producing cells of the pancreas to release extra insulin into the circulation. Metformin (Diabex, Glucophage, Diaformin, Novomet etc) helps insulin to work better (i.e. helps to overcome insulin resistance) especially at the liver. The new thiazolidinedione ("glitazone") group of drugs (Avandia and Actos) also help insulin to work better, but particularly on muscle. When tablet treatment is not able to control the blood glucose level, insulin must be used; there are a variety of insulin preparations with shorter or longer action, appropriate to the needs of the individual with diabetes. Of course diet and exercise are of paramount importance in treating diabetes. In Type I diabetes the critical issue is a balance between food intake, exercise and insulin injections. In Type II and other types of diabetes (including diabetes caused by pituitary disorders) calorie reduction to reduce body fat accumulation, and exercise both help to make insulin work better and improve the diabetic condition. In fact if we ate less and exercised more as a community there would be a lot less diabetes in Australia!

Diabetes Australia

Contact Diabetes Australia on 1300 136 588 or visit www.diabetesaustralia.com.au
View Don't Ignore Diabetes Campaign www.dontignorediabetes.com.au

About Diabetes Australia

Diabetes Australia is the national peak body for diabetes in Australia. The organisation's ultimate vision is a healthy world free of diabetes. With this goal in mind, its purpose now is to minimise the impact of diabetes for people with diabetes, their carers, families, friends and supporters.

Diabetes Australia began in 1937 and is the third oldest diabetes association in the world after the United Kingdom and Portugal. Today Diabetes Australia is a federation of 12 major diabetes organisations, including diabetes health professionals and researchers.

As the national voice of people with diabetes and their health professionals and researchers Diabetes Australia's plays a vital leadership role. DA lobbies for greater availability of medications as government cost-subsidised items, and concessions on other health benefits.

Diabetes Australia is a not-for profit organisation and relies heavily on the generous support of the Australian community to continue its vital work. Financial support through membership is an important element of this support. All funds raised by, or on behalf of, the organisation are re-invested to provide diabetes awareness, education, research and advocacy. A customer help line, 1330 136 588 provides personal and professional advice to help people better manage their diabetes needs as well as information about subsidised diabetes products listed on the National Diabetes Scheme.

National Diabetes Services Scheme

The National Diabetes Service Scheme (NDSS) provide diabetes products at subsidised prices to people with diabetes who are registered on the NDSS. Some of the products available are blood and urine testing strips, syringes and needles for special injection systems.

To register you as well as your doctor or accredited diabetes educator must complete an NDSS registration form. There is no cost to register for NDSS. To be eligible for successful registration you must be a resident in Australia, have been diagnosed with diabetes by a medical practitioner, and hold a current Australian Medicare card.

Registering on the NDSS and joining Diabetes Australia as a membership are separate.

The NDSS is an initiative of the Commonwealth Government and is administered by Diabetes Australia Ltd.