

SECTION 16

Reference

Glossary

A1c – see glycosylated (glycated) haemoglobin.

acanthosis nigricans – a skin condition characterised by darkened skin patches; common in people whose body is not responding correctly to the insulin that they make in their pancreas (insulin resistance). This skin condition is also seen in people who have pre-diabetes or type 2 diabetes.

acetone – a chemical (see ketone bodies) formed when the body breaks down fat instead of glucose for energy. Levels rise and acetone ‘spills’ into urine and is exhaled in the breath producing a ‘fruity’ smell.

alkalosis – a pathologic condition resulting from an accumulation of alkaline chemicals or from the loss of acids without comparable loss of alkali in the body fluids. It is characterised by decrease in hydrogen ion concentration and an increase in pH.

alpha cells – cells in the pancreas that produce the hormone glucagon.

anabolism – the constructive growth and repair phase of metabolism within the body cells.

angiography – an X-ray of blood vessels of the body.

arteriosclerosis – an arterial disease characterised by thickening and loss of elasticity of the arterial walls. Often known as ‘hardening of the arteries’.

atherosclerosis – a form of arteriosclerosis in which plaques of fatty deposits build up in the large and medium arteries. This causes thickening of the arterial wall and reduces blood flow.

auscultation – listening for sounds within the body, chiefly to ascertain the condition of the thoracic or abdominal viscera and to detect pregnancy.

background retinopathy – an early stage of diabetic retinopathy that usually does not impair vision – also referred to as ‘non-proliferative retinopathy’.

bacteriuria – bacteria in the urine.

beta cells – the insulin producing cells of the pancreas.

bolus – a concentrated mass of pharmaceutical preparation such as insulin therapy when neutral insulin doses are given prior to each meal.

bruit – a sound or murmur heard in auscultation, especially an abnormal one.

carbohydrate (CHO) – one of the main food groups which provides an immediate source of energy for the body. Carbohydrates which include sugars and starches are digested into simple sugars such as glucose. Carbohydrates are stored as glycogen.

catabolism – the destruction phase of metabolism whereby substances are converted into an energy source for cellular activity.

creatinine – a nitrogenous compound formed in the muscle in small amounts, passed into the blood and excreted in the urine. A test of the amount of creatinine in blood or urine may be an indicator of kidney disease.

CSII (Continuous Subcutaneous Insulin Infusion) – see insulin pump therapy.

CT scan – abbreviation for computed tomography scan that produces images of 'slices' of a person's body.

dawn phenomenon – the early morning (4am – 8am) rise in blood glucose level.

diabetes insipidus – a disease of the pituitary gland not diabetes mellitus. Often known as 'water diabetes' due to a deficient quantity of anti-diuretic hormone being released or produced resulting in failure of reabsorption of water from the renal tubules.

diabetes mellitus – a term used to describe a syndrome where there is relative or absolute deficiency of insulin. The condition is characterised by disturbances in carbohydrate, fat and protein metabolism. This is due to a malfunction of the beta cells of the pancreas whose role is to produce insulin. There are two main types of diabetes and other subtypes.

Type 1 accounts for 10-15% of all types of diabetes mellitus. Its clinical onset is sudden and usually occurs in people under the age of 30 but can occur at any age. This type of diabetes is dependent on injections and exogenous insulin as there is an absolute insulin deficiency.

Type 2 has an onset which is insidious and usually occurs in people over 40 years of age but is becoming more common in the younger age group. It is characterised by a relative deficiency of insulin and resistance to insulin action.

diabetogenic – producing diabetes.

dialysis – artificial removal of waste products from the blood when the kidneys fail.

Doppler instrument – a device for measuring blood flow within an artery or vein. Sound waves are reflected by the moving red blood cells back towards the transducer. The sound is proportional to the velocity of blood flow. It is used in assessment of vascular status and abnormalities in major arteries and veins.

dorsalis pedis – the pulse on the upper outer part of the foot.

dyspnoea – laboured or difficult breathing.

electrolytes – chemical substances which when dissolved in water or melted, disassociate into electrically charged particles and are capable of conducting an electric current.

endocrine glands – glands that produce chemicals (hormones) which affect other body cells.

endogenous – grown or made inside the body. Insulin that is made by the person's own pancreas is endogenous.

erectile dysfunction – see impotence.

erythematous – characterised by redness of the skin caused by congestion of the capillaries in the lower layers of the skin. It occurs with any skin injury, infection or inflammation.

euglycaemia – a normal level of glucose in the blood.

exchanges – servings of food that contain the same food value. Also known as portions.

exogenous – grown or made outside of the body. Insulin that is manufactured from animal pancreas or genetically engineered is exogenous insulin.

femoral – pertaining to the femur or to the thigh.

flourescein – a harmless yellow coloured dye that is used to outline the vessels of the eye.

fructosamine – a glycated protein like glycated haemoglobin that measures glucose control over the preceding weeks.

gastroparesis – a form of neuropathy that affects the stomach. Digestion of food may be incomplete or delayed, resulting in nausea, vomiting or bloating which makes blood glucose control difficult.

gestational diabetes – a type of diabetes that presents and is recognised during pregnancy. It usually occurs in the second half of the pregnancy at about 24-28 weeks' gestation. The condition usually reverts to normal glucose tolerance after delivery. However, women with a history of gestational diabetes are at high risk of developing overt diabetes later in life and should receive education and counselling.

glomerular filtration rate – measure of the kidneys' ability to filter and remove waste products.

glomerulus – a tiny tuft of blood vessels that is part of the functional unit of the kidney.

glucagon – a hormone produced by the alpha cells in the pancreas. Glucagon is an insulin antagonist and increases blood glucose levels by stimulating the production of glucose in the liver. Glucagon injections are used in the treatment of severe hypoglycaemia.

gluconeogenesis – the formation of glucose by the liver from non-carbohydrate molecules such as fats and proteins. It occurs whenever the supply of glucose is insufficient and is stimulated by the sympathetic nervous system.

glucose – a simple sugar – a monosaccharide also known as dextrose. Glucose is the end product of carbohydrate digestion. The molecular formula is $C_6H_{12}O_6$.

glucose tolerance test – a diagnostic test for diabetes involving a drink of glucose (after an overnight fast) followed by a series of blood glucose estimations over 2 hours.

glycogen – a substance made up of sugars or polysaccharides, and is formed by and stored in the liver and to a lesser extent in the muscles. Liver glycogen is converted into glucose and released into the blood when needed. Glycogen is the chief source of stored carbohydrate in the body.

glycogenesis – the conversion of glucose into glycogen for storage in the liver.

glycogenolysis – the breakdown of glycogen into glucose in the liver when blood glucose levels are very low.

glycosuria – the presence of glucose in the urine.

glycosylated (glycated) haemoglobin (HbA1c) – a haemoglobin molecule with glucose attached. The amount of glucose attached to the haemoglobin will be determined by the concentration of glucose in the blood and the lifespan of the red cells. A glycosylated haemoglobin test is a measure of the average blood glucose levels from the previous 4-6 weeks.

HbA1c – see glycosylated (glycated) haemoglobin.

honeymoon phase – temporary remission of hyperglycaemia that occurs in some people newly diagnosed with type 1 diabetes, when some insulin secretion resumes for a short time, usually for a few months, before stopping again.

hyperglycaemia – abnormally increased blood glucose concentration which is a pathological sign of diabetes. Hyperglycaemia is accompanied by symptoms of polyuria, polydipsia and polyphagia. Hyperglycaemia left untreated can progress to more severe conditions such as ketoacidosis and hyperglycaemic non-ketotic hyperosmolar state.

hyperglycaemic hyperosmolar state – a rare but serious condition that occurs in type 2 diabetes and is characterised by hyperglycaemia, hyperosmolality and dehydration but without ketoacidosis. Random blood glucose levels are often found to be greater than 25mmol/L. (Previously known as HONK – hypersmolar hyperglycaemic nonketonic coma).

hyperinsulinemia – a condition in which the level of insulin in the blood is higher than normal. Caused by overproduction of insulin in the body. Related to insulin resistance.

hyperlipidaemia – elevated concentrations of any or all of the lipids (fats) in plasma.

hyperosmolality – an increased concentration of osmotically active substances – eg increased glucose concentration in body fluids.

hypoglycaemia – abnormally low blood glucose levels of less than 4mmol/L. A risk for people who require medication to control diabetes.

hypoglycaemia unawareness – a state in which a person does not feel or recognise the symptoms of hypoglycaemia. People who have frequent episodes of hypoglycaemia may no longer experience the warning signs of it.

impaired fasting glucose (IFT) – describes a condition in which blood glucose levels are moderately elevated but not elevated to the range diagnostic of diabetes mellitus. Fasting blood glucose is found between 5.5 and 6.9mmol/L. See pre-diabetes.

impaired glucose tolerance (IGT) – describes a condition in which blood glucose levels are moderately elevated but not elevated to the range diagnostic of diabetes mellitus. IGT is diagnosed when the 2 hour value post oral glucose test is between 7.8 and 11.0mmol/L. See pre-diabetes.

impotence – the inability to get or maintain an erection for sexual activity. Also called erectile dysfunction.

insulin – is a hormone that is secreted by the beta cells of the pancreas and is the major fuel regulating hormone. Insulin is secreted in response to a rise in blood glucose and facilitates the utilisation of glucose by the cells. Insulin enables the transport of glucose across the cell membrane. Insulin is responsible for the storage of glucose and amino acids, increases protein and fat synthesis and inhibits the breakdown of fat.

insulin (basal)

intermediate acting – (12-24hrs) – cloudy insulin (*Isophane) prolonged duration of action, mixed/biphasic insulins also fall into this category. They comprise a combination of ultra-short acting or short acting insulin, in varying proportions with an intermediate acting insulin. *Isohane – scientific name for a type of intermediate-acting insulin. Also known as NPH.

long acting – (24-36hrs) – clear insulin (*analogue) prolonged duration of action, a constant basal insulin over 24 hours and is given once daily. Long acting insulin analogues cannot be mixed with other insulins before administration. Human insulin *analogue – insulin produced in the laboratory, using genetic engineering technology, that has a slightly altered structure compared to the insulin found in the human pancreas; this alteration changes the onset and duration of action of the insulin.

insulin basal rate – a steady trickle of small amounts of *ultra-short acting insulin used in insulin pumps.

types of ultra-short acting insulin

*Aspart – insulin aspart. A copy of human insulin made by recombinant DNA technology (genetic engineering). This is a ultra short acting insulin and so starts to work very quickly.

*Lispro – insulin lispro. A copy of human insulin made by recombinant DNA technology (genetic engineering). This is a ultra short acting insulin and so starts to work very quickly.

insulin bolus – an amount of insulin taken to cover an expected rise in blood glucose, often related to a meal or snack.

insulin pump therapy (also known as CSII – Continuous Subcutaneous Insulin Infusion) – a device that delivers a continuous supply of short-acting insulin into the body.

insulin resistance – the body's inability to respond to and use the insulin it produces; may be linked to obesity, hypertension, and high levels of fat in the blood.

intermittent claudication – symptoms characterised by pain in calf muscles of one or both legs. Pain is brought on by walking and relieved by rest. The cause is due to diminished blood supply in the femoral artery which is diseased with atherosclerotic lesions. Treatment involves vascular reconstructive surgery.

ionic agents – an atom or group of atoms having a positive or negative electric charge. Substances forming ions are electrolytes.

ischaemia – a deficient blood supply to part of the body due to constriction or actual obstruction of a blood vessel.

islet cell autoantibodies (ICA) – proteins found in the blood of people with newly diagnosed type 1 diabetes. They are also found in people who may be developing type 1 diabetes. The presence of ICA indicates that the body's immune system has been damaging beta cells in the pancreas.

islets of Langerhans – a group of cells in the pancreas that make and secrete hormones. Beta cells make insulin. Alpha cells make glucagon. Delta cells make somatostatin.

ketoacidosis – a severe metabolic disturbance with hyperglycaemia, hyperosmolality and metabolic acidosis. Fat catabolism leads to accumulation of ketone bodies in the blood. If not corrected diabetic ketoacidosis is life threatening.

ketone bodies – chemicals which occur as a result of fat catabolism or breakdown.

ketonuria – the presence of ketones in urine.

ketosis – accumulation of large quantities of ketone-bodies in the body tissue and fluids.

Kussmaul respirations – rapid, deep, laboured breathing which occurs in ketoacidosis. Also called ‘air hunger’.

lactic acidosis – a serious condition caused by the build up of lactic acid which is produced from glucose when there is not enough oxygen. Similar effects as ketoacidosis.

laser (Light Amplification by Stimulated Emission of Radiation) – an intense narrow beam of light which can be used to heal damaged areas in the body (eg blood vessels in the eye).

lipoatrophy – atrophy of the subcutaneous tissue which may occur at injection sites due to poor injection techniques.

lipohypertrophy – lumps that may occur at injection sites due to poor injection technique and over use of the site of injection.

lipolysis – fat catabolism or breakdown.

lipodystrophy – lumps or small dimples seen on the skin of people using insulin injections. The cause is due to poor injection technique or not rotating the injection site and then over using the same injection area and/or administering cold insulin.

macrosomia – greater than normal bodily size. In full term babies this is determined by birth weights greater than 4.4 kilograms.

macrovascular disease – a disease of large and medium blood vessels. Vessels become diseased due to scarring and fatty plaque deposits which occur on the vessel lining.

metabolism – the physical and chemical processes and reactions taking place among ions, molecules and atoms in the body. The utilisation of nutrients following digestion.

microalbuminuria – the presence of small amounts of albumin in the urine and is an early sign of kidney damage.

microvascular disease – a disease of the smallest blood vessels. The walls of the vessels become thickened and weak which results in blood and protein leakage or blockage.

millimole (mmol) – a concentration of the concentration of chemicals in the blood.

nephropathy – disease of the kidneys caused by degeneration of the small blood vessels or the glomeruli (kidney units that filter blood). Damage can progress to chronic renal failure.

nephrotoxic – an agent or drug that is destructive to the kidney.

neuropathy – disease of the nervous system due to degenerative changes of the sensory motor and autonomic nerves. The severity of neuropathy is directly related to the duration and control of diabetes. Although any nerve may become affected peripheral neuropathy is more common. Effects include loss of sensation, power, double vision, diarrhoea, paralysis of the bladder and sexual problems in both men and women.

oral hypoglycaemic agents (OHA's) – medications taken by mouth that stimulate the release or improve the action of insulin:

biguanides – reduces the amount of glucose produced by the liver and helping the body respond better to the insulin made in the pancreas.

sulfonylurea – lowers blood glucose by increasing the amount of insulin it makes.

meglitinides – lowers blood glucose by helping the pancreas make more insulin immediately after meals.

thiazolidinedione – a group of medicines called glitazones, decreases insulin resistance.

alpha-glucosidase inhibitor – slows and lowers rise in blood glucose throughout the day. Slows down the digestion of carbohydrates (complex sugars) from your diet, especially post prandial.

glucagon like peptide (GLP-1) – enhances insulin secretion, inhibits glucagon secretion and reduces both fasting and post prandial blood glucose.

osmolality – the concentration of a solution in terms of osmotically active particles (osmoles of solutes per kilogram of solvent).

pancreas – an elongated gland that lies in the abdomen posterior to the stomach and partially surrounded by a loop of the small intestine. Its exocrine function is to produce and secrete digestive enzymes. The endocrine function in relation to diabetes is to produce and release insulin and glucagon.

paresthaesiae – abnormal sensations such as burning or prickling.

pedal pulses – arterial pulses which can be palpated on the dorsum (dorsalis pedis) and medial site (posterior tibial).

photocoagulation – a treatment for diabetic retinopathy. A strong beam of light (laser) is used to seal off bleeding blood vessels in the eye and to burn away extra blood vessels that should not have grown there.

polycythaemia – an increase in the total cell mass of the blood.

polydipsia – excessive thirst.

polyphagia – excessive ingestion of food.

polyuria – excessive excretion of urine.

popliteal – pertaining to the area behind the knee.

portions – see exchanges.

post prandial – after a meal.

post prandial blood glucose – the blood glucose level taken 2 hours after eating.

pre- diabetes – a condition in which blood glucose levels are higher than normal but are not high enough for a diagnosis of diabetes. People with pre-diabetes are at increased risk for developing type 2 diabetes and for heart disease and stroke. Other names for pre-diabetes are impaired glucose tolerance and impaired fasting glucose.

pruritus – itching.

pyelography – x-ray of the kidney and ureter after injection of a contrast medium.

pyuria – pus in the urine.

rebound hyperglycaemia – see Somogyi effect.

retinopathy – microvascular degeneration in the retina of the eye causing impaired vision. The changes can lead to aneurysms, haemorrhage and exudates with resultant blindness. Retinopathy is one of the major long term complications of diabetes mellitus.

s/c – abbreviation for subcutaneous as in subcutaneous insulin injections.

serum osmolality – a measure of the number of dissolved particles per unit of water in serum.

Somogyi effect – rebound hyperglycaemia following a hypoglycaemic episode.

teratogenic – an agent or influence that causes physical defects in the developing embryo.

type 1 diabetes – a condition characterised by high blood glucose levels caused by a total lack of insulin. The body's immune system attacks the insulin-producing beta cells in the pancreas and destroys them. The pancreas then produces little or no insulin. Type 1 diabetes develops most often in young people but can appear in adults.

type 2 diabetes – a condition characterised by high blood glucose levels caused by either a lack of insulin or the body's inability to use insulin efficiently. Type 2 diabetes develops most often in middle aged and older adults but can appear in young people.

uremia – the illness associated with a build up of urea in the blood because the kidneys are not working effectively. Symptoms include nausea, vomiting, loss of appetite, weakness and mental confusion.