

THE MANAGEMENT OF DIABETES MELLITUS

Year 1

Four different types of diabetes:-

Diabetes mellitus type one

Diabetes mellitus type two

Diabetes mellitus type one and a half

Gestational diabetes

Diabetic ketoacidosis is the most serious complication of diabetes.

Diabetes insipidus is an unrelated disease of the pituitary gland.

Diabetes Mellitus Type Two

(Maturity Onset Diabetes; Non-insulin Dependent Diabetes Mellitus; NIDDM)

DESCRIPTION:

Excessive levels of glucose in the blood. Glucose is used as fuel by every cell in the body. When glucose is eaten, it is absorbed into the blood from the small intestine. Once it reaches a cell, it must cross the fine membrane that forms its outer skin. This is normally impermeable to all substances, but insulin has the ability to combine with glucose and transport it across the membrane from the blood into the interior of the cell. Insulin is made by cells in the Islets of Langerhans in the pancreas, which sits in the centre of the abdomen.

There are two totally different types of diabetes - type one diabetes (juvenile or insulin dependent diabetes mellitus - IDDM) and type two diabetes (maturity onset or non-insulin dependent diabetes mellitus - NIDDM). Diabetes affects approximately 3% of the Australian population, with 90% of diabetics suffering from the maturity onset form, but in some countries (eg. Samoa, United Arab Emirates) the rate is 20%. The cause and treatment of the two types is quite different.

CAUSE:

Multifactorial. Far more common in obese patients.

- inadequate insulin production by the pancreas
- insulin resistance and cells fail to respond to insulin, so glucose cannot enter the cell.
- glucose overproduction by the liver

SYMPTOMS:

Excessive tiredness, thirst, excess passing of urine, visual problems, skin infections and sensory nerve problems. Many patients are totally without symptoms when the diagnosis is discovered on a routine blood or urine test.

INVESTIGATIONS (see Additional Information section of these notes for more details):

Blood and urine glucose levels are high in untreated or inadequately treated patients. A blood glucose tolerance test (GTT) is performed to determine the severity of diabetes. After fasting for 12 hours, a blood sample is taken, then a sweet drink is swallowed, and further blood samples are taken at

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regular intervals for two or three hours. The pattern of absorption and elimination of blood glucose will give the diagnosis.

The glycosylated haemoglobin (HbA1c) is the percentage of haemoglobin in the walls of red blood cells that is glycosylated. It is measured every three to six months to manage diabetes as this gives an average reading of glucose over the preceding two or three months.

Regular blood testing of glucose levels is also necessary, but normally on a weekly rather than daily basis. Urine tests are often inaccurate in the elderly, as their kidney function may be reduced to the point where glucose cannot enter the urine.

COMPLICATIONS:

An increased risk of both bacterial and fungal skin and vaginal infections, the premature development of cataracts in the eye, microscopic haemorrhages and exudates that destroy the retina at the back of the eye, damage to the kidneys that prevents them from filtering blood effectively, poor circulation to the extremities (hands and feet) that may cause chronic ulcers and even gangrene to the feet, the development of brown skin spots on the shins, and sensory nerve damage (diabetic neuropathy) that alters the patient's perception of vibration, pain and temperature. High blood pressure is more common than in the average person of their age.

There are also complications associated with treatment such as a 'hypo' in which too much medication is taken, excess exercise performed or not enough food is eaten, and blood glucose levels drop (hypoglycaemia) to an unacceptably low level. The patient becomes light-headed, sweats, develops a rapid heart beat and tremor, becomes hungry, then nauseated before finally collapsing unconscious. Glucose drinks or sweets given before collapse can reverse the process, but after collapse, an injection of glucose is essential. Diabetic ketoacidosis (see separate entry) is the most severe complication.

PROGNOSIS:

With the correct treatment and careful control, patients should live a near-normal life, with a near-normal life span.

TREATMENT OF NIDDM:

1. LIFESTYLE CHANGES

DIET (see Additional Information section of these notes for more details):

Education of patients with diabetes is very important, so that they understand what they can and cannot eat and drink.

Diet is essential because the amount of glucose eaten is not normally constant, but the medication levels do not normally vary from day to day. The diet must restrict the number of kilojoules (calories) being eaten, and sugar in all its forms should be eaten only with great caution. Fat should not account for more than a third of the total calories, and cholesterol intake should be restricted. Protein should be obtained more from poultry and fish than red meats. Carbohydrates other than sugar can be consumed freely. Grains and cereals with a high fibre content should be the main part of the diet. Artificial sweeteners such as aspartame (NutraSweet) can be used to flavour food and drinks.

Two systems of dietary management, KISS and Glycaemic index.

KISS (keep it simple stupid) is simply the rule :-

NO SUGAR, MINIMAL FAT

Glycaemic Index involves learning the GI of every type of food and applying that to diet. The GI values of foods are not intuitive, for example Mars bars have a lower GI than baked potatoes, sweet corn is worse than strawberries and marmalade is better than spaghetti.

Unless patients are very dedicated and interested, the KISS principle works quite well.

Alcohol should be reduced, particularly beer and cider, while a glass of wine a day is reasonable.

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EXERCISE

Patients should exercise as much as possible, because the fitter they are, the better the diabetes will be controlled, and they are also more likely to lose weight, which again will help the diabetes. Walking briskly 30 minutes a day is adequate, but more is better. There is no limitation on vigorous sports such as squash, swimming or cycling.

SMOKING

No diabetic should smoke as it dramatically increases the risk of peripheral vascular complications.

WEIGHT LOSS

Fat cells can react abnormally to insulin very easily, and so overweight diabetics must lose weight.

Weight loss in an obese patient may mean that they no longer have NIDDM, or they may be able to avoid or reduce their medication. Every kilo of weight loss counts, but it must be kept off. Yo-yo dieting is often worse than not dieting at all as they often reach a higher than initial weight on the rebound. Most patients with NIDDM are overweight.

Weight loss is a combination of diet and exercise.

Ideal BMI is 22 to 25.

2. MEDICATION

MONOTHERAPY

Metformin is normal initiating medication UNLESS patient is thin or metformin not tolerated or contraindicated (eg. heart failure, liver disease) when a sulfonylurea class medication (eg. chlorpropamide, glipizide, tolbutamide, glibenclamide) can be used as a single agent.

These medications make the cell membrane respond to insulin again.

Start low and go slow, gradually increasing dose of single agent every week or two until blood glucose levels (ideally done fasting on waking) are stable in desired range (usually 5 to 7 mmol/L). Patient should have a glucometer and home test every morning on waking and before evening meal.

COMBINED ORAL THERAPY

IF NIDDM not controlled by monotherapy, ADD another agent.

IF on metformin, ADD a sulfonylurea OR a gliptin (eg. sitagliptin - Januvia, vildagliptin - Galvus) OR a glitazone (eg. rosiglitazone, pioglitazone).

IF on a sulfonylurea class medication, ADD a glitazone OR a gliptin OR acarbose.

Again start low and increase dose slowly until control of blood glucose achieved.

IF metformin AND sulfonylurea combined do not control NIDDM,

THEN either:-

- STOP sulfonylurea and CONTINUE metformin and ADD a glitazone OR sitagliptin OR acarbose OR glimepride
- Better option is often to add insulin to low dose metformin

INSULIN

IF NIDDM still not controlled, ADD insulin to a single oral agent (metformin OR sulfonylurea).

Start by adding a single daily dose of a long duration type insulin (eg. insulin glargine - Lantus) OR mixed medium and short acting insulin twice a day (eg. insulin and insulin protamine - Novomix)

If morning blood glucose high, give insulin in evening.

If evening blood glucose high, give insulin in morning.

Increase insulin dose and frequency as necessary while maintaining oral hypoglycaemic at average level.

3. ONGOING MANAGEMENT

HbA1c (see Additional Information section of these notes for more details):

The glycated haemoglobin (HbA1c) is a fascinating test that has only been available since the early 1990s and has revolutionised the management of all forms of diabetes mellitus.

It measures the percentage of haemoglobin in the walls of red blood cells (erythrocytes) that has been glycosylated. RBCs have a half life of about three months. As a result the HbA1c gives an average blood sugar reading over a period approaching three months. Spot readings of glucose may be high or low, but if the HbA1c is below 7, the patient is well controlled.

This test should be performed every three months initially, but once patient is stable, may be reduced to six monthly.

The HbA1c is not used to diagnose diabetes in Australia, but is being used overseas.

ILLNESSES

A variety of illnesses from infections to hyperthyroidism (overactive thyroid gland) and malignancies can alter blood sugar levels and cause NIDDM to be difficult to control.

Further investigations are necessary in any diabetic whose control is variable or difficult and lifestyle causes have been excluded.

EYES

Diabetics should have an eye check by an optometrist or ophthalmologist every two years to exclude any retinal damage or the premature development of cataracts.

FEET

The feet of diabetics (especially smokers) have poor circulation and are more likely to be damaged, ulcerate, have nail damage (eg. onychogryphosis), develop neuropathy (nerve damage) and develop fungal or bacterial infections. Annual checks by a GP or podiatrist are necessary.

MICROALBUMINURIA

The presence of tiny amounts of the protein albumin in urine, at a level normally undetectable by simple dipstick tests, is called microalbuminuria, and is an early sign of kidney damage in conditions such as diabetes mellitus. This should be checked annually.

OTHER MEDICATIONS

Hypoglycaemics can interact with other medications to increase or decrease their effect. Examples include the oral contraceptive pill, menopausal hormone replacement therapy, steroids, thiazide diuretics, anti-epileptic medications (eg. phenytoin), antipsychotics and antivirals.

If the other medication is taken regularly, the dose can be appropriately adjusted, but intermittent medication use may make control of glucose levels difficult.

Diabetes Mellitus Type One

(Insulin Dependent Diabetes Mellitus; IDDM; Juvenile Diabetes; Sugar Diabetes)

DESCRIPTION:

Type one diabetes (juvenile or insulin dependent diabetes mellitus - IDDM) is due to a lack of insulin production by the Islet of Langerhans cells in the pancreas. Most people develop this type as a child or in early adult life. It is probably an autoimmune disease.

SYMPTOMS:

These are identical to NIDDM, but have a far more rapid onset in children or young adults. They include excessive tiredness, thirst, excess passing of urine, weight loss despite a large food intake, itchy rashes, recurrent vaginal thrush infections, pins and needles and blurred vision. Patients become steadily weaker because their muscles and other organs cannot work properly. Coma (diabetic ketoacidosis) is a very common presenting symptom.

INVESTIGATIONS:

The investigation and diagnosis of IDDM is the same as NIDDM. The two are distinguished by age group (IDDM <25y, NIDDM > 40y) or more sophisticated investigations (eg. glutamic acid decarboxylase, islet cell antigen antibodies).

COMPLICATIONS AND PROGNOSIS:

These are similar to NIDDM, but because of the earlier onset and more difficult control of IDDM, the complications are more common, more serious and the prognosis is more guarded.

TREATMENT OF IDDM:

Diet, exercise, not smoking and avoiding obesity are all essential in IDDM, but most of these patients are not obese at the time of diagnosis.

IDDM patients should use the glycaemic index diet rather than the KISS principle in order to better regulate their carbohydrate intake and energy release.

Oral medications are never used in IDDM.

INSULIN

When first diagnosed, patients are often quite ill, and most are hospitalised for a few days to stabilise their condition. Insulin injections must be given regularly several times a day for the rest of their life. Initially derived from pigs and cattle, human insulin has now been produced by genetic engineering techniques. Insulin cannot be taken by mouth as it is destroyed by acid in the stomach, but can be injected into any part of the body covered by loose skin, although the same site should not be used repeatedly. The newer pen-style delivery systems enable diabetics to easily dial the required dose and inject as necessary with minimal inconvenience. There are many different types of insulin that vary in their speed of onset and duration of action.

Insulin is given in one to three or more daily injections of one or more of the different types, eg. :_

- soluble (peak 4h, duration 8h)
- isophane (peak 10h, duration 24h)
- protamine zinc (peak 16h, duration 36h)
- lente zinc suspension (peak 8h, duration 24h)
- semilente zinc suspension (peak 4h, duration 12h)
- biphasic (peak 2h, duration 24h).

There is a tendency to use frequent doses of soluble insulin in young newly diagnosed diabetics who may check their blood sugar many times a day and adjust their insulin dosage accordingly.

Implanted and external insulin pumps are now available, and experiments with Islet of Langerhans cell implants are looking promising as a cure for IDDM.

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Those with IDDM need the same ongoing care (eg. regular HbA1c, eye checks) as those with NIDDM, but because of the long term nature of the condition and the age of the patients, many take more responsibility for their care than those with NIDDM.

Diabetes Mellitus Type 1.5 (Latent Autoimmune Diabetes in Adults)

Also known as diabetes mellitus type 1.5, latent autoimmune diabetes in adults (LADA) is effectively type one diabetes mellitus that has a delayed onset in mid-life rather than in childhood. Because it has an unusual age of onset and symptoms which are not necessarily typical of diabetes, and does not respond to oral hypoglycaemics, it is often diagnosed only after many investigations.

Patients are usually between 35 and 55 years of age, and unlike type two diabetics, they are not overweight. The symptoms are the same as any other form of diabetes with thirst, hunger, excessive tiredness, excess passing of urine, and weight loss despite a large food intake.

The diagnosis of diabetes is made by finding high levels of glucose in the blood, but the specific type of diabetes can be confirmed by specific tests such as the glutamic acid decarboxylase (GAD) antibody levels and the anti-tyrosine phosphatase antibody (also known as the insulinoma associated 2 antibodies).

There is a strong association between this type of diabetes and autoimmune thyroid disease.

It is successfully treated in the same way as type one diabetes mellitus, with regular insulin injections.

Gestational Diabetes

Pregnancy may trigger gestational diabetes in a woman who was previously well but predisposed towards this disease. One of the reasons for regular antenatal visits to doctors and the urine tests taken at each visit is to detect diabetes at an early stage. If diabetes develops, the woman can be treated and controlled by diet, but often regular injections of insulin are required. In some cases, the diabetes will disappear after the pregnancy, but it often recurs in later years.

If the diabetes is not adequately controlled, serious consequences can result. In mild cases, the child may be born grossly overweight but otherwise be healthy. In more severe cases, the diabetes can cause a miscarriage, eclampsia, malformations of the foetus, urinary and kidney infections, fungal infections (thrush) of the vagina, premature labour, difficult labour, breathing problems in the baby after birth, or death of the baby within the womb.

Diabetic women tend to have difficulty in falling pregnant, unless their diabetes is very well controlled.

Diabetic Ketoacidosis

Ketoacidosis is a severe complication or initial presentation of diabetes mellitus. It is due to a build-up of waste products (ketones) and glucose in the bloodstream because of untreated or under-treated diabetes. Patients who are careless about their treatment, diet and self-testing may be affected. Almost invariably, it is the juvenile insulin dependent diabetics that develop this complication.

The symptoms include mental stupor, nausea, vomiting, shortness of breath and eventually coma. Blood sugar levels are very high and other blood and urine tests are abnormal.

Treatment involves the emergency injections of insulin, but urgent hospital treatment is necessary to control the situation adequately. If left untreated, death will occur due to kidney, heart or brain damage.

The prognosis is good with prompt medical care, but permanent organ damage may occur if treatment is delayed.

Diabetic Ketoacidosis Treatment

1. Establish diagnosis and severity by appropriate laboratory investigations.
2. Nasogastric tube if unconscious.
3. Oxygen.
4. Fluid replacement with isotonic saline to correct electrolyte imbalance and shock.
5. Soluble insulin by intravenous infusion.
6. Potassium supplements.
7. Bicarbonate if pH low (<7).
8. IM insulin once stabilised.
9. Antibiotics to prevent secondary infection.
10. Heparin to prevent thrombosis in elderly, unconscious or hyperosmolar patients.

Prec: Fluid and electrolyte balance critical; monitor all relevant biochemical levels constantly.

ADDITIONAL INFORMATION

INVESTIGATIONS

RI = Reference interval (normal values) Ind = Indication for performing test
 Int = Interpretation of test Phys = Physiology of test

Glucose, Blood

RI: 3.5 - 6 mmol/L (60 - 100 mg/100 mL)
 (Fasting whole blood specimen)

Ind: Diabetes

Int: HIGH - Diabetes mellitus [>7.0 fasting diagnostic] (GTT?), infection (WCC?), hyperthyroidism (ETR?), hyperpituitarism, adrenal cortical excess, hepatic disease (LFT?), acromegaly, pheochromocytoma, Leschke syn., Prader-Willi syn., Reaven syn., Turner syn., polyglandular autoimmune syn., hypokalaemia, burns, steroid therapy, recent meal
 LOW - Vomiting, diarrhoea, insulinoma, hyperinsulinism, adrenal insufficiency, hypopituitarism, Addison's disease, hypothyroidism (ETR?), severe hepatic disease (LFT?), hepatoma, alcoholism (GGT?), post-gastrectomy, von Gierke syndrome, Hers syndrome, Reye syndrome, unpreserved blood specimen, drugs [eg. insulin, laxatives, hypoglycaemic agents, diuretics]

Phys: Glucose in adequate levels is essential for normal body functions. Its level is controlled by the insulin released by the Islets of Langerhan in the pancreas. No food for 12 hours before test

Glucose Tolerance Test [GTT]

RI: 75 g of glucose is given orally. The blood sugar level should not exceed 8 mmol/L (140 mg/100 mL) after 30 minutes, and should return to normal within 2 hours. No sugar should appear in the urine

Ind: Diabetes

Int:	FASTING mmol/L	TWO HOURS mmol/L
Normal	<6.1	<7.8
Impaired glucose tolerance	<7.0	7.8-11.0
Impaired fasting glycaemia	6.1-6.9	<7.8
Diabetes mellitus	>7.0	>11.1

Phys: Diabetic (and potential diabetic) patients do not produce adequate insulin to clear glucose from serum rapidly. Test may be impaired by diuretics, steroids, lithium, phenytoin, phenothiazines

Glycosylated Haemoglobin, Blood [GHb or HbA_{1c}]

RI: $<6\%$ of Hb as HbA_{1c} - not diabetic
 6 to 7% of Hb as HbA_{1c} - good non-insulin dependent diabetic control
 6 to 8% of Hb as HbA_{1c} - good insulin dependent diabetic control
 $>9\%$ of Hb as HbA_{1c} - poor diabetic control

Ind: Diabetic management

Int: HIGH - Above average normal glucose level (ie. diabetes, poorly controlled diabetic, noncompliance with therapy)
 FALSE HIGH - Uraemia, beta thalassaemia
 FALSE LOW - Haemolytic anaemia, blood loss

Phys: Glucose reacts with and attaches to Hb nonenzymatically. Index of compliance and efficacy of treatment as life cycle of erythrocyte is about 3 months. Should not be used in under this time for change of therapy. Inaccurate in conditions of shortened RBC lifespan (eg. haemolytic disease, blood loss). Not to be used for diagnosis of diabetes.

Glutamic Acid Decarboxylase Antibodies, Serum [GAD]

RI: <0.9 U/mL

Ind: Diabetes

Int: HIGH - Type one diabetes mellitus, potential to develop type one diabetes mellitus, latent autoimmune diabetes in adults, autoimmune thyroid disease

Phys: Present in 70% of type one diabetics, and frequently in first degree relatives of patients, and others at risk of developing the disease. More commonly raised in early stages of disease

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Anti-Tyrosine Autoantibodies, Serum [IA-2]

(Insulinoma Associated 2 Antibodies, Serum)

RI: <0.8 U/mL

Ind: Diabetes

Int: HIGH - Type one diabetes mellitus, latent autoimmune diabetes in adults, potential to develop type one diabetes

Phys: Definitive diagnostic marker for type one diabetes.

DIABETES KISS DIET

FOODS TO AVOID

Sugar and fat.

Full cream milk, butter, ice cream, yoghurt, custard, cream, soft cheese.

Fatty meats such as sausages, hamburgers, chops, chicken skin and roasts.

Pastries, cakes, puddings, filled and sweet biscuits, milk chocolate.

Fried foods, chips, pies, pasties, sausage rolls, cream based sauces and soups.

Cereals with added sugar (eg. Nutri-Grain, Coco-Pops).

Fried and scrambled eggs, omelettes.

Soft drinks and cordials.

FOODS ALLOWED

All fresh fruit and vegetables.

Bread (particularly whole grain and high fibre).

Crispbreads and crackers.

Pasta (spaghetti, macaroni etc.).

Cereals that have no added sugar (eg. Weet-Bix).

Seafood, chicken breast, lean meats.

Boiled or poached eggs.

Polyunsaturated margarines, canola and olive oil.

Tofu and soy products.

Low fat milk, diet yoghurt and ice cream, soy milk.

Diet soft drinks (eg. Diet Coke) with artificial sweeteners (eg. Nutra-Sweet).

Nuts, dark chocolate (in limited quantities).

Herbs, spices, garlic, vinegar.

Tea, coffee, soda and mineral water.

Alcohol (wine and spirits preferable to beer and sherry) up to two drinks a day.

Grill, microwave, dry roast and stir-fry foods.

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GLYCAEMIC INDEX

The glycaemic index (GI) is a measure of how much a food affects the blood sugar level. This is very important for diabetics who need to keep their blood sugar level within specific limits. Diabetics can determine their diet by referring to the GI of foods they eat.

Different foods have different effects on the blood sugar level, and a GI level between 0 (no effect) and 100 (serious effect) has been given to most foods, and comprehensive lists of these are available from doctors, dieticians and diabetic educators. A limited number of foods and their GI are listed below.

FOOD	GI		
All bran cereal	30,	Mango	51
Apple, fresh	38	Mars bar	65
Apple juice	40	Milk, full cream	31
Apricot	57	Milk, skim	32
Apricot, dried	31	Muesli bar with fruit	61
Baguette	95	Noodles, two minute	46
Baked beans in tomato sauce	48	Nutri Grain	66
Banana	55	Orange	44
Beetroot	64	Orange juice, unsweetened	53
Biscuit, plain digestive	59	Paw paw	57
Bread, high fibre white	80	Peach	42
Bread, white, one slice	70	Peaches, canned, unsweetened	38
Bread, wholemeal	77	Pear	39
Cake, sponge, plain	46	Peas, boiled	45
Carrots, boiled	49	Pineapple, raw	66
Cherries	22	Pineapple juice, unsweetened	46
Chocolate, dark	49	Porridge	42
Chocolate, milk	45	Potato crisps, plain	63
Coca-Cola	58	Potatoes, baked	85
Coco-Pops	70	Potatoes, boiled	50
Corn Flakes	84	Pumpkin, boiled	70
Crumpet	69	Raisins	65
Fettucini	32	Ravioli	39
Fish fingers	38	Rice Bubbles	83
Flour, white	70	Rice, boiled brown	77
French fries	75	Rice, boiled white	56
Fruit loaf	47	Sausages, fried	28
Grapefruit	25	Scones, plain	92
Grapes	46	Soft drink (eg. lemonade)	63
Ice cream, full cream	60	Soy milk	44
Ice cream, low fat	50	Spaghetti	41
Jatz crackers	55	Strawberries, fresh	40
Jelly beans	78	Sweet corn, fresh cooked	52
Just Right	60	Watermelon	72
Lamingtons	87	Yoghurt	36
Macaroni cheese	64	Yoghurt, diet	27
Marmalade	33		

METFORMIN

TRADE NAMES:

Diabex, Diaformin, GenRx Metformin, Glucohexal, Glucomet, Glucophage.

DRUG CLASS:

Hypoglycaemic.

USES:

Type two diabetes mellitus.

DOSAGE:

500 to 3000 mg. a day in divided doses.

FORMS:

Tablets of 500, 850 and 1000mg. Long acting form available.

PRECAUTIONS:

Not to be used in pregnancy (C), breast feeding or children.

Blood tests every three to six months to check long term sugar levels and acidosis recommended.

Illness, changes in diet, exercise and stress may change dosage requirements.

Use with caution if dehydrated, recent significant injury, suffering from liver or kidney disease.

Lower doses required in elderly and debilitated patients.

Strict control of carbohydrates and sugars in diet essential.

Do not take if:-

- suffering from type one diabetes, severe heart disease, blood clot in lungs, pancreatitis, alcoholism, severe liver or kidney disease, recent surgery, severe infection.

SIDE EFFECTS:

Common: Minimal.

Unusual : Nausea, vomiting, belly discomfort, weakness.

Severe but rare : Low blood sugar (see Overdose below), yellow skin (jaundice), unusual bleeding or bruising, rash.

INTERACTIONS:

Other drugs:

- Cimetidine, other hypoglycaemics, beta blockers, diclofenac, ACE inhibitors, corticosteroids, anticoagulants (eg. warfarin), thiazide diuretics, thyroxine.

Other substances:

- Reacts adversely with alcohol.

Herbs:

- Alfalfa, celery, eucalyptus, fenugreek, garlic, ginger, ginseng, karela.

PERMITTED IN SPORT:

Yes.

OVERDOSE:

Generally a very safe medication but excessive dosage can be serious. Symptoms of low blood sugar (hypoglycaemia) may include tiredness, confusion, chills, palpitations, sweating, vomiting, dizziness, hunger, blurred vision and fainting. Significant overdosage can lead to coma and death. Give sugary drinks or sweets if conscious, glucagon IM or intravenous dextrose.

CURIOSITY

In Greek “diabetes” means “siphon” because patients would siphon huge amounts of fluid through their bodies as the main symptoms of diabetes are thirst and polyuria (frequent urination).

In Latin “mellitus” means “honey like”. Ancient doctors diagnosed diabetes mellitus by tasting the urine which was sweet like honey.

The disease diabetes insipidus was noted as a rare but separate disease with similar symptoms to diabetes mellitus, but these patients (who have a pituitary disorder) had insipid tasting urine rather than sweet.

TOTALLY, COMPLETELY AND UTTERLY USELESS MEDICAL INFORMATION

Sir Frederick Grant Banting (1891-1941) was a Nobel Prize winning Canadian physiologist who, in cooperation with then medical student Charles Best, first discovered in 1922 when experimenting on dogs that a lack of insulin, produced in the pancreas, was responsible for diabetes. His discovery has saved the lives of millions of diabetics since then.

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