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Type 2 Diabetes Treatment

Although diabetes cannot be cured, it can be treated successfully. If a high blood sugar level is brought down to a normal level, your symptoms will ease.

You still have some risk of complications in the long term if your blood glucose level remains even mildly high - even if you have no symptoms in the short term. However, studies have shown that people who have better glucose control have fewer complications (such as heart disease or eye problems) compared with those people who have poorer control of their glucose level.

Therefore, the main aims of treatment are:

- To keep your blood glucose level as near normal as possible.
- To reduce any other risk factors that may increase your risk of developing complications. In particular, to lower your blood pressure if it is high and to keep your blood lipids (cholesterol) low.
- To detect any complications as early as possible. Treatment can prevent or delay some complications from becoming worse.

Type 2 diabetes is usually initially treated by following a healthy diet, losing weight if you are overweight, and having regular physical activity. If lifestyle advice does not control your blood sugar (glucose) levels then medicines are used to help lower your blood glucose levels. One medicine (usually metformin) is used first but two or even three medicines may be needed.

Most of the medicines for type 2 diabetes are given in tablet form. However, some people with type 2 diabetes need insulin injections to help control blood glucose levels. Some people gain a great deal of benefit from insulin injections and these are sometimes used fairly soon after the diagnosis of type 2 diabetes has been made. Insulin injections can be used in combination with other medicines to further improve glucose control.

Lifestyle - diet, weight control and physical activity

You can usually improve your blood sugar (glucose) control if you:

- Eat a healthy balanced diet. Your practice nurse and/or a dietician will give details on how to eat a healthy diet. The diet is the same as recommended for everyone. The idea that you need special foods if you have diabetes is a myth. Basically, you should aim to eat a diet low in fat, high in fibre and with plenty of fruit and vegetables. Read more about type 2 diabetes diet for healthy eating.
- Lose weight if you are overweight. Getting to a perfect weight is unrealistic for many people. However, if you are obese or overweight then losing some weight will help to reduce your blood glucose level (and have other health benefits too).
- Do some physical activity regularly. If you are able, a minimum of 30 minutes' brisk walking at least five times a week is advised. Anything more vigorous and more often is even better - for example, swimming, cycling, jogging, dancing. Ideally you should do an activity that gets you at least mildly out of breath and mildly sweaty. You can spread the activity over the day - for example, two 15-minute spells per day of brisk walking, cycling, dancing, etc. Regular physical activity also reduces your risk of having a heart attack or a stroke.

Many people with type 2 diabetes can reduce their blood glucose (and HbA1c) to a target level by the above measures. However, if the level remains too high after a trial of these measures for a few months then medication is usually advised. Medication is used in addition to, and not instead of, the above lifestyle measures.

Medication to reduce the blood glucose level

Metformin

Metformin is a biguanide medicine. It lowers blood sugar (glucose) mainly by decreasing the amount of glucose that your liver releases into the bloodstream. It also increases the sensitivity of your body's cells to insulin (so more glucose is taken into cells with the same amount of insulin in the bloodstream). Metformin has also been shown in studies to lower your risk of other complications of diabetes (such as heart attack and stroke).

Metformin is commonly the first tablet advised if your blood glucose level is not controlled by lifestyle measures alone. It is particularly useful if you are overweight, as it is less likely than some other glucose-lowering tablets to cause weight gain. Another advantage of metformin is that it generally does not cause a low blood glucose level (hypoglycaemia) which is a possible problem with some other glucose-lowering tablets. You can also take metformin in addition to other glucose-lowering tablets if one tablet does not control blood glucose well enough on its own.

Possible problems with metformin
When metformin is first started, some people feel sick (nausea) or have mildly runny stools (diarrhoea). These are less likely to occur if you start with a low dose and gradually build up to the usual dose over a few weeks. If these side-effects do occur, they tend to ease off in time. Other side-effects are uncommon. (See the leaflet that comes in the medicine packet for full details of cautions and possible side-effects.)

Sulfonylurea medicines

There are several types of sulfonylurea medicines. These include glibenclamide, gliclazide, glimepiride, glipizide and tolbutamide. They work by increasing the amount of insulin that your pancreas makes. (If you have type 2 diabetes, you still make insulin in your pancreas. However, you do not make enough to keep your blood glucose level normal.)

A sulfonylurea tends to be used if you cannot take metformin (perhaps because of side-effects or other reasons), or if you are not overweight. Usually a low dose is started. The dose can be increased if necessary every few weeks until there is good control of the blood glucose level. You can take a sulfonylurea in addition to other glucose-lowering tablets if one tablet does not control blood glucose well enough on its own.

Possible problems with sulfonylureas
As sulfonylureas boost your level of insulin, hypoglycaemia is a possible complication. However, this is an uncommon problem. See separate leaflet called Dealing with Hypoglycaemia (Low Blood Sugar).

Some weight gain is a common side-effect. Other side-effects are uncommon and are usually mild. They include feeling sick, mild diarrhoea and constipation. (See the leaflet that comes in the medicine packet for full details of cautions and possible side-effects.)

Nateglinide and repaglinide

Nateglinide and repaglinide have a similar action to sulfonylureas. However, they are not commonly used. After taking a dose they quickly boost the insulin level but the effect of each dose does not last very long. Each dose is taken shortly before main meals (and a dose omitted if you miss a meal). One of these medicines may be an option if you have meals at irregular times.

However, a sulfonylurea is generally preferred as a first choice to boost the level of insulin throughout the day. As with sulfonylureas, possible side-effects include weight gain and hypoglycaemia. (See the leaflet that comes in the medicine packet for full details of cautions and possible side-effects.)

Dipeptidyl peptidase-4 inhibitors - also known as incretin enhancers

This group includes alogliptin, linagliptin, saxagliptin, sitagliptin and vildagliptin. Dipeptidyl peptidase 4 (DPP-4) is a chemical (an enzyme) which breaks down hormones called incretins. Incretins are chemicals which are produced by the gut (intestine) in response to food.

These medicines work by reducing your blood glucose level by enhancing the effects of incretins as they prevent DPP-4 from working. One of these may be advised in addition to metformin or a sulfonylurea, or even to both of these if your HbA1c level is still high.

Side-effects are uncommon and are usually mild. They may include feeling sick or having wind (flatulence). If you take vildagliptin then there is a slight risk of liver damage. Therefore, you should have a blood test to check on your liver function before starting it and then at regular intervals. (See the leaflet that comes in the medicine packet for full details of cautions and possible side-effects.)

Pioglitazone

Pioglitazone is a thiazolidinedione (sometimes called a glitazone). Pioglitazone lowers blood glucose by increasing the sensitivity of your body's cells to insulin (so more glucose is taken into cells for the same amount of insulin in the bloodstream). They are not usually used alone but are an option to take in addition to metformin or a sulfonylurea.

Possible problems with pioglitazone
You should not take these medicines if you have heart failure, as this can worsen. There is also a slight risk of liver damage. Therefore, you should have a blood test to check on your liver function before starting these medicines. The blood test is then repeated at regular intervals.

Some weight gain is a common side-effect, probably due to fluid retention. Hypoglycaemia is an uncommon side-effect. Other possible side-effects are uncommon. (See the leaflet that comes in the medicine packet for full details of cautions and possible side-effects.)

Acarbose

Acarbose works by delaying the absorption of carbohydrates (which are broken down into glucose) from the gut. Therefore, it can reduce the peaks of blood glucose which may occur after meals. It is an option if you are unable to use other tablets to keep your blood glucose level down. It can also be used in addition to other glucose-lowering tablets. However, many people develop gut-related side-effects when taking acarbose, such as bloating, wind and diarrhoea. Therefore, it is not used very often.

Insulin

Insulin injections lower blood glucose. Only some people with type 2 diabetes need insulin. It may be advised if your blood glucose level is not well controlled by tablets. The dose and type of insulin used varies from person to person. Sometimes insulin is used alone. However, sometimes it is used in addition to your tablets (such as metformin or a sulfonylurea). If you are advised to use insulin, your doctor or practice nurse will give detailed advice on how and when to use it.

Possible problems with insulin

Some weight gain is a common side-effect. Weight gain may be less of a problem if you use insulin in combination with a glucose-lowering tablet such as metformin. Hypoglycaemia is a possible complication.

Exenatide, albiglutide, dulaglutide, liraglutide and lixisenatide - glucagon-like peptide-1 mimetics

Exenatide, albiglutide, dulaglutide, lixisenatide, and liraglutide are glucagon-like peptide-1 (GLP-1) mimetics which are treatments given as an injection. They work in a similar way to the action of the naturally occurring hormone glucagon-like peptide 1. These actions include stimulating insulin secretion in response to glucose and preventing glucagon release after meals. Glucagon is a hormone which raises blood sugar.

Exenatide and liraglutide are usually used as an add-on treatment to improve glucose control when insulin treatment is not acceptable. There is a once-weekly treatment available. Side-effects may include hypoglycaemia, feeling sick and headaches. People receiving this treatment usually lose weight.

Canagliflozin, dapagliflozin, and empagliflozin - sodium-glucose co-transporter-2 inhibitors

Canagliflozin, dapagliflozin and empagliflozin are sodium-glucose co-transporter-2 (SGLT-2) inhibitors which increase the amount of glucose in your urine and so reduce blood glucose levels. These medicines can be used on their own or with other medicines to help control blood glucose for people with type 2 diabetes.

How is the blood glucose level monitored?

Your treatment should be monitored regularly in a diabetes clinic. You may need to step up treatment from time to time. For example, your blood sugar (glucose) may be well controlled by lifestyle measures alone for a number of years. However, in time, you may need to add in one tablet. And then at a later time you may need to add in another tablet to keep your blood glucose level down.

The blood test that is mainly used to keep a check on your blood sugar (glucose) level is called the HbA1c test. This test is commonly done every 2-6 months by your doctor or nurse.

The HbA1c test measures a part of the red blood cells. Glucose in the blood attaches to part of the red blood cells. This part can be measured and gives a good indication of your average blood glucose level over the previous 1-3 months.

Treatment aims to lower your HbA1c to below a target level which is usually agreed between you and your doctor. The ideal target for many people is to maintain your HbA1c to less than 48 mmol/mol (6.5%) but higher target levels - for example, 53 mmol/mol (7.0%) - may be more appropriate.

Higher target levels are usually advised for people who are at particular risk if the blood sugar goes too low (this is called hypoglycaemia, or a 'hypo'). Examples include people who are prone to falls, people who are unwell due to other illnesses, or people who use heavy machinery at work.

See separate leaflet called Dealing with Hypoglycaemia (Low Blood Sugar).

Other treatments

- To help prevent heart disease, stroke and poor circulation:
    - If you have high blood pressure (hypertension) then it should be treated.
    - You should not smoke.
    - You will usually be advised to take tablets to lower your blood cholesterol level.
- To help prevent some serious infections, you are usually advised to be immunised against flu each year, and also given an immunisation against pneumococcal infection.
- Other treatments may be advised if you develop complications from diabetes.

Further reading & references

- Management of diabetes; Scottish Intercollegiate Guidelines Network - SIGN (March 2010 - updated Sept 2013)
- Type 2 Diabetes Know Your Risk; Diabetes UK
- Type 2 diabetes in adults: management; NICE Guidelines (December 2015, updated May 2017)
- Diabetes - type 2; NICE CKS, July 2016 (UK access only)
- Diabetes UK; Information prescriptions - living well.

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