Chapter A

Introduction and Explanation of Type 1 Diabetes and Treatment

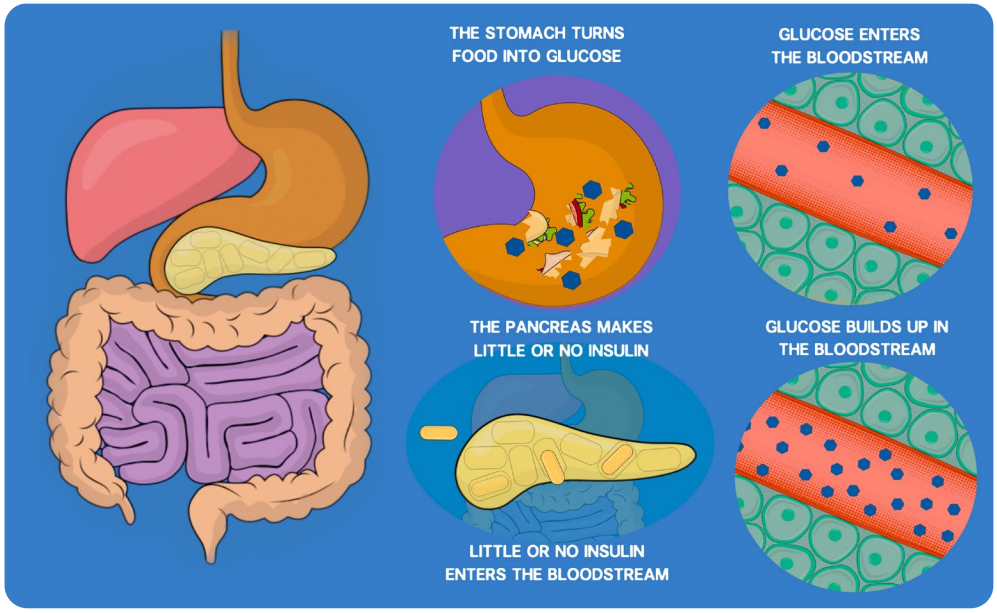
A: Explanation of Type 1 Diabetes and Treatment

A1: What is Type 1 Diabetes?

The most common type of diabetes in childhood in the UK is Type 1 Diabetes. It affects over 30,000 children in the UK. Type 1 diabetes should not be confused with Type 2 Diabetes, which is usually diagnosed in adults and can often be managed with lifestyle changes and medication.

In Type 1 diabetes your body loses the ability to regulate the level of glucose (sugar) in your blood due to a failure to make insulin. Glucose levels in the blood are usually controlled very accurately between about 4 to 7mmol/l.

Insulin is one of the key hormones that regulate the body's blood glucose levels. Insulin is made in Islet cells found in the pancreas. Type 1 diabetes occurs because the body's own immune system attacks these cells and the body is unable to make enough insulin. Getting glucose levels in range early will help preserve some islets cells for a time, making it easier to maintain normal blood glucose levels.



Key message: Type 1 diabetes is due to the body's inability to make sufficient insulin and control glucose levels.

How Insulin Works

Insulin helps convert the food we eat into energy, by allowing glucose to pass from the blood to all the cells in the body. The sweet and starchy food we eat and drink, (carbohydrates) are broken down into glucose in the stomach and intestines; glucose then passes into the bloodstream. Insulin allows the glucose to be used as fuel for all our daily activities, even for sleeping, to ensure adequate growth and to repair cells when damaged. Insulin also transfers any extra glucose in the bloodstream to muscles, fat cells and the liver to be stored until it is needed for energy.

Extra energy is required for exercise and during emergencies, e.g. when we are unwell. The body uses up the energy stored in our muscles and liver for these occasions. If the energy stores are empty due to a failure of glucose to cross from the blood to tissues, the body uses fat for energy. This explains why tiredness and loss of weight are common signs of diabetes.

Without insulin, the glucose from food and drink stays in the blood stream causing the blood glucose level to rise; some is filtered through the kidneys and then passed out of the body in the urine, taking water from the body along with it. This explains why many children drink (polydipsia) and wee a lot (polyuria), before diagnosis. High glucose levels can also increase the risk of infections.

The amount of insulin being produced would have been slowing down for a considerable time (weeks-months) so sometimes the onset of the symptoms may have been gradual and can often go unrecognised for some time. Occasionally presentation can be dramatic with severe dehydration, rapid breathing and vomiting. This is diabetic ketoacidosis (DKA) and requires urgent and careful treatment and is potentially life threatening.

How We Can Treat Diabetes

We can do this by giving you insulin that your body is not able to make itself. Insulin has to be delivered to the area under the skin and it is therefore given by an injection or tiny cannula (if using an insulin pump).

Insulin is given in a dose which matches the carbohydrate content of the food and drink we eat at meals and snacks; called “carbohydrate counting”. The dose of insulin given with food and drink is called “bolus insulin”. Your body, also requires a low level of insulin in the blood stream to deal with glucose released from the liver and muscles. This is called “basal insulin”, and is given once or twice daily and is not related to food.

What is Type 2 Diabetes?

It is possible to be diagnosed with type 2 diabetes as a young person even though it is often considered to be a disease in older people. It is just as serious as type 1 diabetes but will require different treatments and education sessions. With type 2 diabetes the body does make insulin but the insulin does not work well enough to keep the blood glucose in the normal range.

Other types of Diabetes

There are other types of diabetes, including steroid induced diabetes, cystic fibrosis related diabetes, some rare genetic syndromes and types of monogenic diabetes.

Monogenic diabetes is diabetes caused by a change in a single gene. It runs in families and is passed on directly from a parent to a child so does not 'skip a generation'. It includes Neonatal Diabetes and types of MODY (Maturity Onset Diabetes of the Young). This can be caused by a change in quite a few different genes and the treatment needed will depend on which gene is affected. Further information **www.diabetesgenes.org**

A2: Diabetes supplies and medication

A variety of equipment and medication is required to look after your child's diabetes at home. Not all equipment will be needed every day, but may be needed for illness management.

Equipment and medication to be kept at home

- Insulin - Bolus Insulin and Basal Insulin 1 box of 5 cartridges or 1 box of 5 disposable pens or an insulin vial.
- Insulin pen(s) - with half or full unit increments
- Pen needles - 1 box of 4mm needles.
- Safety Pen needles - For school or nursery.
- Finger-pricking lancets.
- Blood glucose test strips.
- Blood ketone test strips.
- Glucose & Ketone meter
- Glucose gel
- Glucose tablets
- Glucose drink
- Glucagon kit.
- Sharps bin

The above items are available on prescription. You will be given a small supply on discharge and will need to obtain further supplies from your GP. The diabetes team will write to your GP and request a repeat prescription to be set up.

Your GP/ Health Centre should help dispose of sharps bins.

You will also be given a finger-pricking device, a blood glucose and ketone meter.

Storage and use

Insulin

- Store unopened insulin in a refrigerator. Do not freeze. Insulin will last until the expiry date when stored this way.
- Protect from excessive heat and light.
- After opening do not refrigerate. Store below 30˚C. Use within one month.

Pen needles and lancets

- A new pen needle or lancet should be used for each blood check or injection.
- Dispose of all needles and lancets into a sharps bin*.
- Remove pen needle after injection and store pen without a needle to prevent air from entering the cartridge, and reduce the risk of injury

Insulin pens

- These are obtained through your GP on prescription
- Make sure you have the correct pen for the insulin
- Use a different colour pen for each type of insulin to prevent errors
- Keep a spare at home.

Blood glucose and ketone strips

- Store strips at room temperature away from direct sunlight and heat
- Do not refrigerate
- Keep strips within the closed container or sealed in foil paper
- Do not use strips if they have been damaged or are out of date

Glucagon

- Store either in a refrigerator (2˚C to 8˚C), or out of a refrigerator below 25˚C for up to 18 months before the expiry date.
- Store in original package to protect from light
- Do not freeze, to prevent damage to the product
- Use immediately after preparation - do not store for later use
- Do not use after the expiry date stated on the label.
- Do not use if the solution, looks like a gel or if any of the powder has not dissolved properly
- Use the correct dose smaller children will not require the full amount.

GlucoGel/Dextrogel

- Keep GlucoGel/Dextrogel at room temperature. If the gel has been kept in the fridge, allow it to reach room temperature again before using it will become thicker and harder to administer
- Ask your pharmacist how to dispose of medicines which are no longer required.