Insulin

Insulin is a hormone secreted by the pancreas. The function of insulin is to transform glucose into energy.

For all patients with type 1 diabetes and for some patients with 2 type diabetes insulin is necessary for maintaining normal glucose level.

Three groups of insulin

There are three groups of insulin: animal insulin, human insulin (synthetic insulin similar to the one produced by the human body) and analogue insulin (if we pretend that insulin molecules are beads, we can say that scientists have managed to change the position of some beads and in such a way to create analogue insulin).

Nowadays the majority of people use human and analogue insulin, although some still apply animal insulin since they consider its influence better.

Main insulin types

There are six main types of insulin

• **Rapid-acting insulin** may be applied directly before, with or after meals. It peaks within the first three hours, lasts for about 2-5 hours and it is sufficient only for the food it has been consumed with. It appears transparent.

• **Long acting analogue insulin** is taken once per day to provide organism with insulin for up to 24 hours. This type of insulin is unnecessary to apply together with food since it has no influence peak. It is transparent.

• **Short acting insulin** should be taken 15-30 minutes before meals to "cover" the increase of blood glucose levels which occurs after having meals, peaks anywhere from 2 to 6 hours after injection, and is effective for approximately 30 hours. It is transparent.

• **Intermediate acting and long acting insulin** are applied twice per day to maintain a normal cholesterol level combined with short acting insulin or fast acting insulin. The peak is reached in 4 hours after meals and lasts up to 8 hours. The influence of this type of insulin lasts for 30 hours. It appears muddy.

• **Premixed insulin** is a mixture of short acting and intermediate acting insulin.

• **Premixed analogue insulin** is a mixture of intermediate acting and rapid acting insulin.

About injections

The needle used for insulin injections is very small since insulin should be injected hypodermically, and not intramuscularly or intravenously. After the injection it is absorbed into small blood vessels and joins the blood flow.

Diabetes-related injections can be annoying and painful. In particular, the first few weeks and months can be the most difficult, since you may feel tense. Once you have got used to injections, you will learn how to get rid of tension and injections won't cause any painful feelings.

There are three main areas for insulin injections: stomach, buttocks and thighs. In some cases the doctor might recommend insulin injections into other areas, for example, into your arms. It is essential that you should use a different site for each injection in the same general area (to

avoid swelling which can arise if you keep making injections in the same site).

Insulin storage

All types of insulin should be stored at a temperature between 2 to 25'C. The average room temperature is 25'C; however, it can grow higher in summer.

The insulin you are not using currently should be stored in the refrigerator. It can be stored there within a year. Insulin kept at room temperature will last 28 days.

Tips on storing insulin:

• Store your insulin supplies in the refrigerator

• Store the insulin you are not using currently in a cool dry place

• Do not use the insulin which has been kept at room temperature for more than 28 days

• Store at least one dose of the insulin you take in the refrigerator

• Don't store insulin in the freezer or close to it. Frozen insulin is unfit for injections.

• Don't take out your insulin vials in the car in hot weather.

• Don't use insulin beyond its expiration date (check the expiration date on the package)

Insulin pump therapy

How insulin pump therapy works

Insulin pump therapy is defined as hypodermic injection. Most insulin therapy options are based on injections of long acting insulin combined with small doses of short acting insulin (as a rule, twice a day). Insulin pumps replace the need for periodic injections by delivering rapid-acting insulin continuously throughout the day according to pre-established requirements.

For example, thanks to rapid-acting insulin you can increase your insulin dose directly while having meals only by pressing one button on the pump. Thus, insulin pump therapy simulates the normal work of pancreas.

The insulin pump isn't "independent"; it doesn’t measure your blood glucose levels, nor does it calculate the necessary dose. You should learn to set the doses of your insulin and make adjustments to the dose depending on your food intake. It is recommended for the people using insulin pump to check the blood glucose levels at least 4 times a day to be aware of what doses of insulin they need. Insulin pumps demand constant attention. The advantage of insulin pump therapy is that it successfully helps to keep your diabetes under control and minimizes the risk of hypoglycemia.

What is the size of an insulin pump?

The size of an insulin pump is about the size of a cell phone. Insulin pumps work on batteries and notify if batteries are used up or if insulin is running out.

How are insulin pumps attached to the body?

Pumps are attached to the body without any effort in different ways, for example, with a belt fixed round the waist. They can also be located in a small bag attached to the leg or to the arm.

Insulin injection is carried out with the help of a thin plastic tubule with a small needle (cannula). The needle is inserted under your skin and then you only need to change the site every 2 – 3 days.

Do I have to wear my insulin pump all the time?

Insulin pumps are usually worn for 24 hours a day. However, they can be disconnected for some time, for example, while practicing some kinds of sports.

Can I do physical exercises while wearing an insulin pump?

There are different types of pumps; the majority of them can be safely used during physical exercises. You can disconnect the pump for a while if you think that it might be damaged, for example, during swimming (although insulin pumps are mostly water resistant nowadays).

After disconnecting the pump the needle remains in the body. A small cap is put on the tip of the needle to protect it from damage.

Since pumps use only rapid-acting insulin, they can't be disconnected for a long time (more than one hour). After the pump is disconnected, blood glucose levels will start to increase rapidly.

To keep your blood glucose levels within your target ranges, you should not forget to attach the insulin pump as soon as possible. Measuring glucose level in blood will help to calculate the necessary dose of insulin more precisely.

Arterial pressure

Arterial pressure can be improved by:

• Giving up smoking

• Keeping to a balanced diet

• Maintaining normal weight

• Avoiding excessive alcohol drinking

• Decreasing the amount of salt

• Doing regular physical activity

• Avoiding stress

You may still find out that these changes are not enough and you still need medicines to maintain the blood pressure at the level of 130/80.

Several types of medication are available aimed at maintaining a normal level of pressure; your doctor will consult you on this matter. Not everyone takes the same blood pressure medication, and many people take more than one kind. If a suitable treatment plan has been found for you,

you should adhere to it strictly.

Cholesterol

Blood cholesterol level can be lowered by:

• Giving up smoking

• Keeping to a balanced diet

• Maintaining normal weight

• Avoiding excessive alcohol drinking

• Doing regular physical activities

You may still find out that these changes are not enough and you still need medicines to maintain normal cholesterol level in blood. Several types of medication are available aimed at maintaining normal cholesterol level; your doctor will consult you on this matter.

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