

# Hyperglycemia (High Blood Sugar)

Our goal in the treatment of diabetes is to maintain good blood sugar control. However, there will be times that the blood sugar levels will be out of range, especially when you are dealing with children.

To determine why the blood sugar is elevated it is important to know what causes too much sugar in the blood. High blood sugars may be due to:

- Not enough insulin
- Too much food
- Not enough exercise
- Stress or illness

It is also important to know if blood sugars are getting high as early as possible so you can change the treatment before it causes serious problems. By testing your blood regularly (and often) you will know if your blood sugar is getting too high. If the person with diabetes has not been tested recently, you should suspect high blood sugar if they are drinking large amounts of liquid, are urinating a lot and feel tired.

High blood sugar occurs whenever there isn't enough insulin available in the body to control what has been eaten, or what the body needs. When they were diagnosed, the Type I diabetic had high blood sugar (hyperglycemia) because their body had stopped making insulin. Insulin is a hormone that allows the sugar in our bloodstream to get into the cells of the body. This is how our bodies use the food we eat. When sugar leaves the bloodstream and enters the cells, the "blood sugar" level decreases and the body has fuel to be able to work. If the body is not making insulin, the sugar builds up in the bloodstream. The kidneys try to get rid of the extra sugar by increasing urination. Some extra sugar is lost in the urine but important electrolytes such as sodium, potassium and lots of fluids are also lost. When fluids are lost, the patient becomes thirsty. Increased urination and thirst are the first symptoms of hyperglycemia. If treatment (insulin or extra insulin) is not provided, the condition may progress to a medical emergency called Diabetic Ketoacidosis.

Diabetic Ketoacidosis is a condition that occurs usually only in Type I Diabetes, and is the main cause of hospitalizations for the Type I Diabetic. Luckily, once a person has been diagnosed, DKA can almost

always be prevented with proper care. When there isn't enough insulin to get the sugar into the cells, the body looks for another source of energy. The other source comes from fat. When the cells can't get fuel from sugar, the body will break down fat cells to provide energy. Unfortunately, when the fat cells are broken down, an acid, called ketoacid, is released. Normally, our bodies can tolerate and neutralize a small amount of ketoacids. This happens when we are sick or are dieting. But, when the Type I diabetic is progressing into Diabetic Ketoacidosis, the "fuel" for the body is coming from the breakdown of fats. So much acid is being released that the body can't control it. Eventually, the body becomes "acidotic" and severely dehydrated. This condition can cause:

- Fatigue from the lack of the normal energy source, sugar.
- Stomach pain and vomiting from acidosis
- Weight loss from the breakdown of fats
- Deep, rapid breathing as the body tries to get rid of the extra acid
- A "fruity" odor to the breath from the ketones (ketoacids)
- Severe dehydration from loss of fluids and electrolytes in the urine causing shock

### **Treatment:**

To prevent an elevated blood sugar from progressing into DKA, first it is important to try to identify the cause of the high blood sugar.

- Usually, high blood sugars are caused by eating too much food. If the blood sugar is less than 250 and NO ketones are in the urine, extra exercise can help lower the blood sugar.
- If the blood sugars are over 300, and ketones are in the urine, extra insulin needs to be given. Over the next few weeks, the Endocrine Doctor will be advising you on appropriate insulin dose changes or "spot" doses of fast acting insulin. Remember that extra insulin is ONLY given before lunch or bedtime snack (or, rarely, at 2 a.m.) . The doctor will instruct you on the amount to be given.

The diabetic team will tell you to check blood sugars at regular times during the day. If the blood sugar is greater than 250-300, check for ketones. If moderate or large ketones are present, and especially, if your child is ill, you must call the doctor.