Hyperglycemia is the medical term for blood glucose (sugar) that is too high. High blood glucose (HBG) is a common problem for people with diabetes. Blood glucose can also rise too high for patients in the hospital, even if they do not have diabetes. This patient guide explains why some patients develop HBG when they are hospitalized and how their HBG is treated.

Until about 10 years ago, doctors thought that HBG in hospital patients was not harmful as long as their blood sugar stayed at or below 200 milligrams per deciliter (mg/dL). Recent research studies show that HBG above 180 increases the risk of complications in hospital patients. Keeping blood sugar below this level with insulin treatment lowers the risk for these problems.

Most doctors agree that controlling blood sugar so it stays below 180 mg/dl is best for very ill patients in intensive care units (ICU). Less clear is what the best target blood sugar should be for inpatients who are admitted for general surgery or non-critical medical conditions.

In some patients, insulin treatment can cause low blood sugar, called hypoglycemia. Just like blood sugar levels that are too high, blood sugars that are too low are not safe and should be avoided.

This patient guide for glucose control in the hospital is based on The Endocrine Society’s practice guideline for health care providers on preventing and treating HBG. This guide applies just to patients on a regular hospital floor, not those who are in an ICU.

What causes HBG in the hospital?

Many conditions can cause or worsen HBG in hospital patients. These include:

• Physical stress of illness, trauma, or surgery
• Inability to move around
• Steroids like prednisone and some other medicines
• Skipping diabetes medicines
• Liquid food given through a feeding tube or nutrition given intravenously.

Why is HBG unsafe?

Patients with HBG have more problems in the hospital, including:

• Longer hospital stay
• Slower wound healing
• More infections
• More disability after discharge from the hospital
• Higher risk of death

How is HBG found?

Health care providers find HBG by doing a simple blood test. Blood sugar is usually measured by pricking the finger and testing a drop of blood with a glucose meter. Your blood sugar should be measured when you are admitted to the hospital. You may need this test more than once if you are at high risk for HBG. For example, you have a higher risk if you have diabetes, are treated with medications that increase your blood sugar, or are receiving tube feeding or intravenous (IV) feeding.

In-hospital HBG is defined as a pre-meal blood sugar above 140 mg/dL. After finding HBG, your care providers will check your blood sugar before meals and at bedtime. You may need more testing in some cases. This includes if you are not eating, are receiving IV insulin, have a medication change that could affect blood sugar, or have frequent bouts of low blood sugar (hypoglycemia).
What are the blood sugar targets in the hospital?

Health care providers want most ICU patients to have a blood sugar between 110 and 180 mg/dl. Outside the ICU, most providers aim to keep blood sugar between 100 and 140 before meals and below 180 at other times.

What is the treatment of HBG?

Insulin is the best treatment for HBG in the hospital. This is true even if you do not have diabetes or if you do not use insulin at home. Insulin injection is the most effective way to control blood sugar. Also, some diabetes pills can cause low blood sugar or other health problems while you are sick. For these reasons, you may have to stop taking your non-insulin diabetes medicines during your hospital stay.

Hospital patients with HBG should receive insulin shots under the skin (subcutaneous injections). You should get basal (long- or intermediate-acting) insulin once or twice a day to keep blood sugar levels steady. Before meals, getting bolus (rapid-acting) insulin helps prevent blood sugar levels from going too high after eating. Besides mealtime insulin, some patients with HBG may need additional insulin injections. This constant treatment prevents HBG or, in some patients, a dangerous health problem called diabetic ketoacidosis (when acids and substances called ketones build up in the blood due to lack of insulin).

For all patients with HBG, good nutrition is important to help control blood sugar. A dietician should work with you to plan your meals. The point is to make sure you get enough calories and eat the right amount and types of sugars or carbohydrates. These include whole grains, fruits, vegetables, and low-fat milk.

How should patients with diabetes who are having surgery be treated?

Before surgery, patients who take insulin should continue to receive insulin. If you do not take insulin, your care providers usually will stop non-insulin medicines and advise you to receive insulin if you develop HBG while in the hospital.

Before and after surgery, all patients with type 1 diabetes and most patients with type 2 diabetes should receive insulin to prevent HBG. Insulin can be given through an IV or by multiple injections under the skin. When you can eat again, you should get mealtime (bolus or rapid-acting) insulin before meals.