Hyperglycemia

Hyperglycemia is characterized by having an abnormally high blood glucose level. It is often a hallmark sign of both type 1 and type 2 diabetes. Other conditions leading to its occurrence may include Cushing’s syndrome, pancreatitis, imbalances in hormone secretion due to illness or cancer, and certain medications. If hyperglycemia goes untreated a life-threatening emergency known as Diabetic Ketoacidosis can occur.



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Mechanism

Insulin Resistance
Insect-syringe swatted by Resistance
In some individuals, most commonly in type 2 DM, cells become resistant to insulin and cannot use it effectively. Glucose then builds up in the system because there is not enough insulin being produced to overcome the insulin resistance.

Too Little Insulin/Medication
Broken Insect-syringe Medication
Insulin regulation can come from synthetic subcutaneous insulin or oral hypoglycemic medication. Counting carbohydrates is typically used to determine how much insulin should be given to cover a meal.

Infection/Illness
Bacteria
When the body becomes stressed from an illness or infection, hyperglycemia can occur. This is caused by the body releasing counterregulatory hormones and pro inflammatory cytokines that enhance glycogenolysis and gluconeogenesis.

Corticosteroids
Quarter-on-steroids
Steroids come in a variety of forms. However, the effect on glucose in the body is similar. It reduces glucose uptake by certain cells and stimulates gluconeogenesis.

Assessment

Elevated Blood Glucose
Up-arrow Blood-vessel Glue-bottle
In normal individuals the blood glucose range is 80-120mg/dL. Clinical manifestations vary with each patient when hyperglycemia occurs. It is important to routinely check the blood sugar before each meal, and if the patient has any clinical changes. Severely elevated glucose levels can lead to medical emergencies such as diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic syndrome (HHS).

Polyphagia
Polly-fajita
The first P refers to the patient experiencing excessive hunger or increased appetite as a result of glucose accumulating in the blood stream. This results in the body's cells being deprived of glucose and this lack of energy causes an increase in hunger.

Polydipsia
Polly-dipper
The second P refers to the dehydration effect that polyuria has on the system causing the patient to have an unquenchable thirst.

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Polyuria

Polly-urinates

The third P refers to increased urine output. Glucose is typically reabsorbed back into the blood stream when the kidneys filter it out to make urine. In patients with hyperglycemia there is too much glucose in the system, and it all cannot be reabsorbed. The glucose that is not being reabsorbed then pulls more water out of the system creating more urine.

Hypotension

Hippo-BP

Due to excess fluid being eliminated, patients can become hypovolemic and have a low blood pressure as a result. This dehydration and hypotension can cause shunting of the blood away from the digestive tract, leading to nausea, vomiting, and cramping.

Fatigue/Drowsiness

Sleepy-guy

Due to dehydration, typically from an increase in urine output and the patient's inability to convert excess glucose into energy, patients will feel fatigued or drowsy.

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