NAME: **AJAYI EMMANUEL OLUWASEGUN**

MATRICULATION NUMBER: **17/MHS01/039**

DEPARTMENT: **MEDICINE AND SURGERY**

**KETOGENESIS**

Ketogenesis is the biochemical process through which organisms produce ketone bodies through breakdown of fatty acids and ketogenic amino acids. This process supplies energy under circumstances such as fasting or caloric restriction to certain organs, particularly the brain, heart and skeletal muscle.

Insufficient gluconeogenesis can cause hypoglycemia and excessive production of ketone bodies, ultimately leading to a life-threatening condition known as ketoacidosis.

**KETONAEMIA**

This is the presence of recognizable (abnormally high) concentrations of ketone bodies in the blood (plasma).

**KETONURIA**

Ketonuria is a medical condition in which ketone bodies are present in the urine.

It is seen in conditions in which the body produces excess ketones as an indication that it is using an alternative source of energy. It is seen during starvation or more commonly Type-1 Diabetes mellitus.

Production of ketone bodies is a normal response to a shortage of glucose, meant to provide an alternative source of fuel from fatty acids.

**CONSEQUENCES OF KETOSIS**

Like any significant change to your diet, when starting a ketogenic diet, it is normal to experience one or more side effects as the body adapts to a new way of living.

When going on a ketogenic diet, the body has to switch its fuel source from the glucose in carbohydrate to using its own fat stores, and this can lead to experiencing some of the following side effects:

* KETO FLU: Often referred to as ‘Low-carb flu’. Characterized with some symptoms that are similar to the flu, such as:
  + Dizziness
  + Fatigue
  + Brain fog / Slow thinking
  + Cravings
  + Insomnia
  + Racing heart rate when lying down
* BAD BREATH: Sometimes referred to as ‘keto-breath’, it is one of the most common side effects of ketosis. Acetone is a form of ketone that when released on the breath may lead to a metallic taste in the mouth or a less-than-pleasant smelling breath.
* LEG CRAMPS: One of the causes of leg cramps on a ketogenic diet is a condition called hyponatremia, which occurs when the level of sodium (salt) in the blood is too low.
* CHANGES IN BOWEL HABITS: Changing to a ketogenic diet may bring about changes in bowel habits such as constipation. This should usually improve within a couple of weeks with drinking enough water and consumption of non-starchy, fibrous vegetable, legumes, nuts and seeds.
* LOSS OF SALTS: There are some changes with fluid balance that can typically occur within the first couple of weeks of a ketogenic diet. This happens as the body uses its stored sugar (glycogen) which releases water into the blood that gets passed out of the body through urine. As fluid is passed out of the body, salts in the body can get depleted too.

Other effects of ketosis include: Lack of energy, Kidney stones, Raised cholesterol levels, Ketoacidosis.

**MANAGEMENT OF KETOACIDOSIS**

Patients diagnosed with diabetic ketoacidosis, might be treated in the emergency hospital or admitted to the hospital depending on the severity of the condition. Treatment usually involves:

* FLUID REPLACEMENT: The amount of fluid replaced depends on the estimated degree of dehydration. If dehydration is so severe as to cause shock (severely decreased blood pressure with insufficient bloody supply to the body’s organs), or a depressed level of consciousness, rapid infusion of saline (1 liter for adults, 10ml/kg in repeated doses for children) is recommended to restore circulating volume. Slower rehydration based on calculated water and sodium shortage may be possible if the dehydration is moderate, and again saline (normal saline – 0.9%) is the recommended fluid. Very mild ketoacidosis with no associated vomiting and mild dehydration may be treated with oral rehydration and subcutaneous rather than intravenous insulin under observation for signs of deterioration.
* INSULIN THERAPY: Insulin reverses the processes that cause ketoacidosis. Insulin is given at 0.1unit/kg per hour to reduce the blood sugars and suppress ketone production. Guidelines differ as to which dose to use wen blood sugar levels start falling; some recommend reducing the dose of insulin once glucose falls below 16.6mmol/l (300mg/dl) but others recommend infusing glucose in addition to saline to allow for ongoing infusion of higher doses of insulin.
* ELECTROLYTE REPLACEMENT: Electrolytes are minerals in the body that carry an electric charge, such as sodium, potassium and chloride. The absence of insulin can lower the level of several electrolytes in the blood. Electrolytes are infused into the body intravenously to help keep the heart muscles and nerve cells functioning normally.

Potassium levels can fluctuate severely during the treatment of DKA, because insulin decreases potassium levels in the blood by distributing it into cells via increased sodium-potassium pump activity. A large part of the shifted extracellular potassium would have been lost in urine because of osmotic diuresis. Hypokalemia (low blood potassium concentration) often follows treatment. This increases the risk of dangerous irregularities in the heart rate. Therefore, continuous observation of the heart rate is recommended, as well as repeated measurement of the potassium levels and addition of potassium to the intravenous fluids once levels fall below 5.3mmol/l. If potassium levels fall below 3.3mmol/l, insulin administration may need to be interrupted to allow correction of the hypokalemia.