BIOCHEMISTRY ASSIGNMENT

NAME: IDRIS ESTHER OLUFUNMILOLA

MATRIC NO: 17/MHS01/148

1. DEFINE THE FOLLOWING

a. KETOGENESIS

b. KETONAEMIA

c. KETOURIA

ANSWER

a. KETOGENESIS: This is a 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.

b. KETONAEMIA: This is a condition in diabetes mellitus (under conditions of abnormal carbohydrates metabolism) that is characterized by an abnormal increase of ketone bodies in the blood.

c. KETOURIA: This is the excretion of abnormally large amounts of ketone bodies in the urine, caharacteristic of diabetes mellitus, starvation, or other medical conditions.

2. WHAT ARE THE CONSEQUENCES OF KETOSIS?

ANSWER

Ketosis is a metabollic state characterized by raised levels of ketone bodies in the body tissues, which is typically pathological in conditions such as diabetes, or may be the consequences of a diet that is very low in carbohydrates.

Consequences of Ketosis

i. Frequent urination

ii. Increased hunger which can lead to weight regain

iii. Poor sleep

iv. Nausea

v. Headache

vi. Decreased physical performance

vii. Brain fog

viii. In ketosis the blood becomes too acidic which can damage the liver, kidneys and brain (KETOACIDOSIS)

ix. Diarrhea

x. Less muscle mass

xi. Increased risk of heart disease and diabetes

3. WRITE CONCISELY ON THE MANAGEMENT OF KETOACIDOSIS

ANSWER

When treating patients with DKA (Diabetic Ketoacidosis), the following points must be considered and closely monitored:

i. Correction of fluid loss with intravenous fluid

ii. Correction of hyperglycemia with insulin

iii. Correction of electrolyte disturbance particularly potassium loss

iv. Correction of acid-base balance

v. Treatment of concurrent infection if present

Correction of fluid loss with intravenous fluid

Fluid resustication is acritical part of treating patients with DKA. Intravenous solutions replace extravascular and intravascular fluids and electrolyte losses. They also dilute both the glucose level and the levels of circulating counterregulatory hormones. Insulin is needed to help switch from a catabolic state to an anabolic state, with uptake of glucose in tissues and the reduction of gluconeogenesis as well as fatty acid and ketone production.

Initial correction of fluid loss is either by isotonic sodium chloride solution or by lactated Ringer solution. The recommended schedule for restoring fluids is as follows:

- Administer 1-3 L during the first hour
- Administer 1 L during the second hour
- Administer 1 L during the following 2 hours
- Administer 1 L every 4 hours, depending on the degree of dehydration and central venous pressure reading.

When the patient becomes euvolemic, the physician may switch to half the isotonic sodium chloride solution, particularly if hypernatremia exists. Isotonic saline should be administered at a rate appropriate to maintain adequate blood pressure and pulse, urinary output, and mental status.

If a patient is severely dehydratedand significant fluid resuscitation is needed, switching to a balanced may help to avoid the development of a hyperchloremic acidosis.

When blood sugar decreases to less than 180mg/dL, isotonic sodium chloride solution is replaced with 5-10% dextrose with half isotonic sodium chloride solution.

Correction of Hyperglycemia with insulin

When insulin treatment is started in patientswith DKA, several points must be considered. A low-dose insulin reginem has the advantage of not including the severe hypoglycemia or hypokalemia that may be observed with a high dose insulin reginem.

Only short-acting insulin is used for correction of hyperglycemia. Subcutaneous absorption of insulin is reduced in DKA because of dehydration; therefore, using intravenous routes is preferable.

Subcutaneous use of the fast-acting insulin analog (lispro) has been tried in paediatric DKA (0.15 U/Kgq2h). The results were shown to be comparable to IV insulin but ketosis took another additional 6hours to resolve. Such technically simplified methods may be cost-effective and may preclude admissions to intentive care units in patients with mild cases. Use of subcutaneous insulin analog (aspart) has been shown to be effective as well in adults.

Electrolyte Correction

If the potassium level is greater than 6mEq/L do not administer potassium supplement. If the potassium level is 4.5-6mEq/L, administer 10mEq/h of potassium chloride. If the potassium level is 3-4.5mEq/L, administer 20mEq/h of potassium chloride.

Monitor serum potassiumlevels hourly, and the infusion must be stopped if the potassium level is greater than 5mEq/L. The monitoring of serum potassium must continue even after potassium infusion is stopped in the case of (expected) recurrence of hypokalemia.

In severe hypokalemia, not strating insulin therapy is advisable unless potassium replacement is under way; this is to avert potentially serious cardiac dysrhythmia that may result from hypokalemia.

Potassium replacement should be started with initial fluid replacement if potassium levels are noraml or low. Add 20-40mEq/L of potassium chloride to each liter of fluid once the potassium level is less than 5.5mEq/L. Potassium can be given as follows two-thirds as KCl and one-third as KPO4.

Correction of Acid-Base Balance

Sodium bicarbonate only is infused if decompensated acidosis starts to threaten the patient's life, especially when associated with either sepsis or lactic acidosis. If sodium bicarbonate is indicated,

100-150 mL of 1.4% concentration is infused initially. This may be repeated every half hour if necessary. Rapid and early correction of acidosis with sodium bicarbonate may worsen hypokalemia and cause paradoxical cellular acidosis.

Bicarbonate typically is not replaced as acidosis will improve with the above tratements alone. Administration of bicarbonate has been correlated with cerebral edema in children.

Treatment of Concurrent Infection

In the presence of infection, the administration of antibiotics is guided by the results of culture and sensitivity studies. Starting empiric antibiotics on suspicon of infection until culture results are available may be advisable.