MATRIC NUMBER: 17/MHS01/033

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DEPARTMENT: MEDICINE AND SURGERY

COURSE TITLE: MEDICAL BIOCHEMISTRY (IV)

COURSE CODE: BCH 313

ASSIGNMENT TITLE: DIABETES, OBESITY AND CANCER (GROUP 2).

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1. DEFINE THE FOLLOWING TERMS

A. KETOGENESIS: It is the biochemical process through which organisms produce ketone bodies through breakdown of fatty acids and ketogenic amino acids. It is a catabolic pathway of metabolism.

B. KETONAEMIA: a condition marked by an abnormal increase in the concentration of ketone bodies in the circulating blood.

C. KETONURIA: the excretion of abnormally large amounts of ketone bodies in the urine.

D. KETOGENESIS: Ketogenesis is the biochemical process through which organisms produce ketone bodies through breakdown of fatty acids and ketogenic amino acids.

1. WHAT ARE THE CONSEQUENCES OF KETOSIS?
2. Headache.
3. Fatigue.
4. Brain fog.
5. Increased hunger.
6. Poor sleep.
7. Nausea.
8. Decreased physical performance
9. Muscles cramps
10. Elevated heart rate
11. Coma
12. Excess ketosis can lead to ketoacidosis.
13. WRITE CONCISELY ON THE MANAGEMENT OF KETOACIDOSIS.

Diabetic Ketoacidosis (DKA) is a potentially life threatening condition that occurs when excessive amounts of ketones are released into the bloodstream, as a result of the body breaking down lipids, instead of utilizing glucose as the energy source. The means of managing it is as follows:

**Airway, Breathing and Circulation as Per Any Emergency**

DKA patients need to have their airway, breathing and circulation assessed immediately. A decreased level of consciousness may lead to an unprotected airway and compromised breathing. The osmotic diuresis can cause a significant loss of fluid, leading to severe dehydration and circulatory collapse. Furthermore, severe electrolyte derangements significantly increase the risk of life threatening cardiac arrhythmias.

**Commence Fluid Resuscitation**

Due to the osmotic diuresis causing a large fluid depletion, fluid resuscitation is a must! The amount of fluid resuscitation required in severe DKA is often the amount of fluid that is lost (around six to ten litres). Half of the fluid resuscitation volume is initially replaced quickly over the first eight hours, with the rest being administered over the next sixteen hours. Fluid resuscitation also independently decreases blood glucose levels, increases renal perfusion (thereby increasing the removal of glucose via the urine), increases tissue perfusion (thereby aiding in insulin mobilisation) and decreases intravascular osmolality (reducing the fluid shift from the interstitial space to the intravascular space.)

**Treat Potassium**

Due to the increased level of ketones in the body, there is an increased level of extracellular hydrogen ions (acidic) which are exchanged for intracellular potassium in an attempt to help the metabolic acidosis improve. Due to the osmotic diuresis observed in DKA, potassium is then excreted via the urine eventually leading to an overall depletion of potassium in both the intravascular and intracellular spaces. Potassium levels therefore need to be closely monitored and replaced as required, usually with an intravenous potassium infusion.

**Replace Insulin**

The replacement of insulin is the cornerstone of rectifying DKA as it allows the uptake of glucose as an energy source, thereby reducing hyperglycaemia and stopping the pathophysiology of gluconeogenesis. However, blood glucose levels should not be decreased by more than three mmol/L per hour. This is to ensure that the osmolality of the blood does not change too quickly resulting in the rapid movement of fluids from the intravascular space into the interstitial space, leading to one of the biggest complications associated with DKA management: cerebral oedema.

**Acidosis Management**

Acidosis is only actively managed by administering bicarbonate if the pH is less than 7.0, although there is no evidence showing a benefit in clinical outcomes for patients in DKA. As the ketone levels decrease via fluid resuscitation and insulin therapy, the acidosis will improve on its own. Insulin therapy should be continued until ketones are reduced to an acceptable level. As blood glucose levels will usually return to a normal range before the ketoacidosis resolves, a concurrent five per cent dextrose infusion is usually commenced to avoid hypoglycaemia.

**Prevent Complications**

Complications usually result from the pathological process of DKA or too fast a reversal of the hyperglycaemia/osmolarity. Complications can include dehydration, hypovolaemia, hypotension, electrolyte abnormalities, cardiac arrhythmias, cardiac arrest and cerebral oedema.