

Signature Assignment: Case Analysis

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Abstract

This report is about the case analysis regarding a sixty year old female named Sarah. This patient has a medical history of diabetes mellitus, cirrhosis, and a heavy smoking history. She was also recently diagnosed with end-stage renal disease and has started taking insulin for her diabetes.

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Introduction

The liver, pancreas, and kidneys play a vital role in maintaining homeostasis in the human body. It plays an important role in the body as it takes responsibility for digestion, metabolism, storage, detoxification, and production of proteins. The liver functions to produce proteins and also produces bile, which aids in the digestion of fats into fatty acids. Vitamins are stored in the liver and detoxification occurs when the liver works to remove toxins such as drugs and alcohol out of the body to keep the body functioning properly. The pancreas has an exocrine function, which aids in the productions of enzymes that break down fats. Along with an exocrine function, it has an endocrine function that maintains homeostasis with two hormones. Those two hormones are insulin, which aid in decreasing excessive sugar levels and glucagon, which aids to increase blood sugar levels. The pancreas must produce the correct hormones in necessary situations in order to maintain a normal blood sugar level. The kidney functions to maintain a fluid balance in the body, filter minerals and particles in the blood, and produce hormones vital for the production of red blood cells, regulation of blood pressure, and the promotion of bone health.

Calcium and Sodium Imbalance

As stated in the case analysis, Sarah is diagnosed with end-stage renal disease, which is when the kidney's become chronically impaired making it unable to support the body's needs. This brings complications to her electrolyte levels. Due to having renal failure, the patient now has a decrease of calcium and sodium levels, while potassium, phosphate, and magnesium levels are increased. Sodium and potassium are inversely proportional, while phosphate and calcium levels are directly proportional. A healthy functioning kidney is responsible for potassium

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excretion. However, because her kidneys are improperly functioning they are unable to excrete potassium leading her to have low sodium levels. (Silverthorn, 2016, p.746). Improper kidney functions also lead to phosphorus retention, which in turn decreases the levels of calcium in her blood. This would lead to her diagnoses of having weakness that has lasted for more than three weeks.

Low Red Blood Cell Levels

Sarah is also suffering from anemia. This is shown by the levels of low red blood cells on her lab results. This is mainly caused by the fact that her kidneys are no longer able to support her body's needs. The kidney's malfunction causes her there to be a decrease in a hormone called erythropoietin. This hormone functions to decrease oxygen levels in the blood. As the levels of oxygen decrease in the blood, the bone marrow becomes stimulated and encourages red blood cell formation. The dysfunction results in low red blood cell levels causing anemia.

Vasopressin

Hypotension has occurred probably because of Sarah's diagnosis of diabetes mellitus, which has symptoms of polyuria. Another reason would probably be her low sodium levels, with less sodium there is less water that follows. If Sarah is receiving dialysis for her end-stage renal disease, she may also be experiencing hypotension due to the fluid volume decrease as filtration occurs. Her body will compensate by raising her natural antidiuretic hormone. This hormone decreases her urine output, keeping fluids retained in her body.

Increase of Respiratory Rate

Sarah has a low pH level and high bicarbonate level. This means that she is having metabolic acidosis. In order to for her body to compensate, her lungs will try to raise the pH level

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by increasing her respiratory rate. In this way, more carbon dioxide is decreased by expelling from her body.

Diagnosis of Cirrhosis

Cirrhosis is the chronic degeneration of cells of the liver, the liver becomes scarred and impairs proper functioning. The body's digestive system breaks down glucose and uses it as energy in a form of ATP, because the glucose-rich blood enters through Sarah's dysfunctional liver, the hepatocytes responsible for halting the body from vast decreases of glucose in the blood is no longer functioning properly. In turn, there is no communication for the release of enough insulin from the pancreas to maintain proper blood sugar levels in the blood.

End-Stage Renal Disease (ESRD), and Cirrhosis

Renin is a hormone that is secreted in the kidneys. Renin helps increase the blood pressure in the body. Vitamins and minerals are stored in the liver in order to supply the body's needs. However, because Sarah suffers from ESRD and cirrhosis these hormones and storage are unable to be kept up.

Parathyroid Hormone

In response to low calcium levels in the blood, the parathyroid hormone would begin to secrete. This hormone is found in the parathyroid gland in the neck, which increases calcium levels when the levels become insufficient. The calcium levels have become insufficient as the phosphorus levels dropped due to ESRD.

Cirrhosis

Jaundice occurs in Sarah's body in relation to cirrhosis of her liver. This is caused because of the improper digestion of bile in the liver. Though bile is produced by the liver, it is

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stored in the gallbladder. Bile contains bilirubin, cholesterol, water, and bile salts. Bilirubin is the byproduct of worn out red blood cells. Bilirubin indigestion is what gives the body the yellowish hint of color.

Steatorrhea and ESRD

The cause of her abnormal stool is due to a malabsorption of enzymes in the pancreas. The pancreas secretes enzymes to break down fat. However due to the Sarah's diagnosis of diabetes mellitus, this shows that she has a dysfunctional pancreas. This is causing her to expell excess fats through her stools. The kidneys are also impaired due to end stage renal disease and are unable to filter the bilirubin in the blood. Bilirubin is responsible for the yellow color of urine. The urine sample shows the urine as white, which concurs with impaired kidneys due to the inadequate filtration and excretion of bilirubin by the kidneys (Silverthorn, 2016, p.522).

Islet of Langerhans

I think the Glisten medication works on the endocrine cells of the postassium. This cell is incharge of releasing insulin. Since the potassium channels to close, the ATP never reaches a depolarization. The ATP is stronger and insulin is able to be produced even if there is damage to the liver.

Conclusion

In conclusion, Sarah may have to go through dialysis in order to continue her life with a diagnosis of end-stage renal disease. She may need to be on accuchecks to regulate her blood sugar levels, as well maintaining a healthy diet. Sarah may need to be on many different medications for her liver cirrhosis as well as being put on vitamins for supplements. Her doctor may also prescribe her to be on fluid restriction due to her ESRD.

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