

Free case study on diabetic ketoacidosis

[Business](#), [Management](#)



Abstract

The rate of diabetes ketoacidosis complication is on the rise in line with the rate of population increase as well as urbanization all around the globe. Learning how to handle this complication and maintaining the blood glucose within the suitable levels is becoming a big challenge for those with diabetes, outlining the need of educating the patients as a modality for self-empowerment, treatment which is necessary for betterment of the quality of the lives of the patients. This paper seeks to analyze a patient's condition and describe various factors that led to associated symptoms and the effects of those symptoms. The role of the nurses in trying to deal with this complication was also highlighted.

Introduction

Briefly explain the pathophysiology of the development of DKA. Why was it triggered in this patient?

Diabetic ketoacidosis is really a serious diabetic complication that occurs when one's body produces high levels of ketones which are blood acids. It develops when your body is not able to produce insulin in enough quantities. Insulin usually plays a major role in helping glucose (a key energy source for the muscles and other tissues) enter the cells. Lack of sufficient insulin makes the body start breaking down fat for alternate fuel. This process leads to a buildup of toxic acids known as ketones in ones bloodstream, eventually leading to diabetic ketoacidosis if not treated early enough. (Mayo clinic, 2012).

Why it was triggered in the patient is because

The main reason why Diabetic ketoacidosis (DKA) was triggered in this patient was simply because of shortage of insulin. Another factor that could have contributed to the shortage was simply because of the episodes of vomiting and anorexia which made him to stop taken insulin. This shortage automatically results to the burning of fatty acids to produce highly acidic ketone bodies which research shows is the cause for most of the complications and symptoms. Patients with undiagnosed diabetes may suffer diabetes ketoacidosis as the first symptoms. However patients known to suffer from diabetes resulting from various causes such as inter-current disease or relatively bad compliance with insulin therapy can also fall victim to this complication under certain circumstances. It is definitely one of the most serious complications for those people with diabetes mellitus.

What clinical signs/symptoms of DKA does Jeff exhibit?

What are the pathophysiological causes of each one?

'DKA' causes acid ailment from the blood vessels to be a link between ketone currently being produced. Nevertheless physicians are usually not proficient at diagnosing 'DKA' on many instances. For that reason, one has to be aware of the signs and symptoms of the illness. Recalling these indicators could even save one, their own or even another person's life. Some of the signs and symptoms exhibited by Jeff are;

- Nausea and vomiting
- Anorexia
- Bad breath
- Fast and strained breathing

- Lethargic
- Confusion

Nausea and vomiting

Experiencing nausea and vomiting may also be a sign of DBK. It is usually caused by the ailment from the blood vessels. Failure of proper food movement in the intestines may lead to such nausea and vomiting.

Bad breath

One can find that they are experiencing bad breath from their mouth. Usually it smells like a fruit due to acetone.

Anorexia

Anorexia occurring in DKA is due to fuel fat catabolism which in turn exacerbates the symptom.

Fast and strained breathing

Rapid breathing and strained breathing may be a symptom of DBK. This happens because our bodies are trying to hit off a number of acids over the lungs (C. Kruger, & Mineapolis, 2008).

Lethargy and confusion

These symptoms are caused by the effects of the excess ketones and sodium in the blood. These are the electrolytes that lead to neurologic symptoms once they are in excess values.

Discuss Jeff's laboratory studies and the physiological basis for all the abnormalities.

Blood glucose = 730mg/dl

Serum K (potassium) = 5.2mEq/L

Hgb A1c = 8.5%

ABG: pH = 7.26

pCO₂ = 13mmHg

HCO₃ = 5mEq/L

The serum biochemistry profile of Jeff clearly indicates what is going on within his system. In this system, we can clearly see that the blood glucose is exceedingly high with the 730mg/dl figure. This shows that there has been a deficiency in the work of insulin over a period of time. The degree of this hyperglycemia is also influenced by the severity of the diabetic ketoacidosis, the renal profile of the patient and presence of dehydration.

The blood pH is still within the normal range because it is usually expected to fall below 7 when there is diabetic ketoacidosis to cause a state of acidosis. The implication of that state of pH will be fatal when compared to this present pH.

The value of potassium is slightly on the normal side. The basic factor for this stable value is that which relates to what DKA usually causes in terms of DKA causes more of hypokalemia hence the value of potassium should be expected to go down. However there are situations where acidosis and the insulin deficiency will contribute to the rise of potassium making it to go up. In such situations when fluid is administered, the value will then fall.

The pCO₂ and HCO₃ are of both values that are lower than the normal values. The physiological basis for these values might be as a result of the

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deep and fast respiration which characterized the DKA. Since $p\text{CO}_2$ is meant to be excreted during respiration, deeper respiration will thus result in excretion of more of the carbon dioxide.

Analyze the ABG results. Is there compensation?

ABG: $\text{pH} = 7.26$

$p\text{CO}_2 = 13\text{mmHg}$

$\text{HCO}_3 = 5\text{mEq/L}$

Analyzing the ABG status, we can see that the pH is below the normal hence indicating a state of acidosis. As we know in terms of the value of the respiratory involvement in the cause of acidosis, to determine that, we have to evaluate the PaCO_2 values to know where the problem is actually from. The PaCO_2 which is 13mmHg is a value that is extremely below the normal range. The implication of this is that the source of the acidosis must have been metabolic source and not respiratory. This is because according to the Henderson-Hasselbalch equation, when there is high PaCO_2 , definitely that will result in low pH (acidosis). Taking a thorough look at the value of the HCO_3 which is very low than the average, we can deduce clearly that the origin of the acidosis being experienced by the patient is clearly metabolic and not of respiratory origin.

What distinguishes this case history from one of HHNK (hyperglycemic hyperosmolar nonketosis). How do the symptoms of DKA and HHNK differ from those of hypoglycemia?

The fact that distinguishes this case from hyperglycemic hyperosmolar nonketosis is fact that this case occurs in young adult unlike the HHNK that usually occur in the elderly. It is not exclusively encountered in people with

type 1 diabetes mellitus and no associated increase in ketone level like what is obtained in diabetic ketoacidosis. The differences between the symptoms of these three conditions or complications are related to their underlying pathophysiology. The fact that hypoglycemia is related to lowered sugars makes the associated symptoms to be more of those that relates to reduced sugar such Confusion, Dizziness, Feeling shaky, Hunger, Headaches, and Irritability. Those symptoms of HHNK and DKA are related to more of acidosis symptoms which are; Nausea, vomiting, anorexia, bad breath, fast and strained breathing, and confusion.

What educational needs must be met before the patient's discharge? How should he be instructed to handle further illnesses? Research and discuss current dietary recommendations for Diabetics. How can his wife contribute to the management of his diabetes?

The educational need Jeff is as regards to the management of his diabetes from the aspect of diet, check-ups and medication use. These are very important in preventing most of the complication that brought him to the hospital. In a bid to handle further illnesses, any time he feels some abnormal changes in the way he breathe or his body system is changing rapidly, he needs to consult the specialist on time.

Diabetics need to focus on timing when feeding. I. e. should have almost the same timing for all their meals. They should also focus on nutrition that helps to reduce weight. Consume few calories once in a while. Sugar reduction remains the key in the management of meal.

What other physiological disorders are commonly associated with diabetes mellitus? How can Jeff best attempt to limit these complication risks?

- Diabetic ketoacidosis,
- hyperglycemia hyperosmolar state,
- hypoglycemia,
- diabetic coma,
- respiratory infections and
- periodontal diseases

Jeff can prevented these complications by focusing on these preventive measures

As it is always said, prevention is better than cure. To avoid Diabetes Ketoacidosis and all other complication or physiological disorders associated with diabetes, Jeff must become rigorous with his diabetes management, monitoring his blood sugar levels, checking his ketone amount, as well as altering his insulin dose whenever desired. Issue on diabetes are usually very frightening thus the need for one to comply strictly with the physicians advice so as to manage the complication appropriately.

What are the roles of the nurses in the management of DBK?

Effectively take care for the patients.

Nursing has always reflected the technological advancement of its time and age. Therefore, nurses should effectively be able to interpret the most recent technological developments in healthcare to their patients. In this era, patients suffering from diabetes should be able to cope with insulin pumps,

continuous monitoring of blood glucose, prosthetic devices used for amputations, and dialysis at homes. Nurses have the responsibility of guiding and ensuring patients are well conversant with the technological advancements around them. They should aim at using any available knowledge of technology they have at ensuring that diabetes patients smoothly transition to diabetes self-management. Caring and technology are intimately interwoven nurses can demonstrate high caring levels by applying the knowledge they have on technology to benefit their patients.

Enhancing their knowledge on diabetes

Nurses will many at times be needed to make an extra step in critically analyzing what's affecting their patients. Cardiology, dermatology, neurology, gastroenterology, nephrology, psychiatry and ophthalmology will definitely become sub specialized zones of concern for nurses as they learn more on how to help and educate their patients. As their knowledge level increases, they will have some sense of pride in the amount of information they will be able to share with their patients.

Patient education

Nurses should be educators of the patients in matters concerning diabetes and DBK. They should be able to educate their patients on the dos and don'ts of diabetes. They should also aim at promoting behavior change of their patients through relevant education on that and also ensure that the patients are taught about the national standards for diabetes self-management

Increase psychological support to patients

Psychological support is very important in every nursing field especially when patients are suffering from chronic illnesses and their complications. Diabetic patient at times come across difficult news and usually have to make quit tough decisions. Some may be diagnosed with complications such as kidney failure and they may be asked to choose either go for a transplant or dialysis. At this point, they really need someone to encourage and give them hope. A caring and empathetic nurse should be present to encourage the patient and give them hope.

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