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Review Article

A Review On Diabetes Mellitus With Ketoacidosis

Juveria, Dr. A. Srinivas Rao, Dr. AV Kishore Babu

¹Pharm D ^{5th} Year, Bhaskar Pharmacy College, Yenkepally, Moinabad

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ABSTRACT

Chronic metabolic disease known as diabetes mellitus (DM) is typified by hyperglycemia brought on by either insulin resistance, insufficiency, or both. A potentially fatal acute complication known as diabetic ketoacidosis (DKA) is primarily observed in patients with type 1 diabetes mellitus (T1DM), while it can also, in certain cases, happen to those with type 2 diabetes mellitus (T2DM). An overview of the pathogenesis, clinical characteristics, diagnosis, treatment, and preventative measures for diabetic ketoacidosis is given in this abstract. Insulin insufficiency, high levels of counter-regulatory hormones (glucagon, cortisol, catecholamines), and enhanced lipolysis with the concomitant generation of ketone bodies are all factors in the pathogenesis of diabetic ketoacidosis (DKA). Hyperglycemia, ketonemia, metabolic acidosis, and electrolyte imbalances are the results of this metabolic disorder. DKA can present with altered mental status, nausea, vomiting, polyuria, polydipsia, and abdominal pain. When the body produces insufficient insulin, glucose counter-regulatory hormone overload amplifies blood sugar's ability to enter cells and be used as energy, leading to diabetic ketoacidosis. Anxiety, vomiting, and stomach discomfort are some of the hazy symptoms of diabetic ketoacidosis.

INTRODUCTION

According to a new international consensus, low serum bicarbonate, high serum ketones, or urine ketones along with hyperglycemia and metabolic acidosis characterize diabetic ketoacidosis. A serious side effect of diabetes called diabetic ketoacidosis is caused by low insulin levels in the body, which raise blood sugar and cause the body to produce ketones. It is becoming more commonplace globally, especially in children and

teenagers with type 1 diabetes. The primary clinical distinction between the two forms of diabetes is that type 2 diabetes has less acidity and no hyperkalemia. A potentially fatal consequence of diabetes that puts a person in a diabetic coma is diabetic ketoacidosis. The symptoms of diabetic ketoacidosis include acidosis, hyperglycemia, hyperosmolality, and ketosis. Additionally, individuals with type 2 diabetes or women with gestational diabetes may be affected. A metabolic

*Corresponding Author: Juveria

Address: Pharm D 5th Year, Bhaskar Pharmacy College, Yenkepally, Moinabad

Email ✉: juvshaik@22379gmail.com

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decompensation brought on by an increase in blood ketones is known as diabetic ketoacidosis. When the body produces insufficient insulin, glucose counter-regulatory hormone overload amplifies the effects of blood sugar entering cells for energy production, leading to diabetic ketoacidosis. Effective diagnosis and treatment can enhance a patient's outcome. Although patient education and insulin therapy have improved, hospitalization for diabetic ketoacidosis is still common and is linked to significant morbidity and mortality. The majority of DKA patients visit the emergency room in order to address a hyperglycemic crisis. Correction of electrolyte imbalances, hyperglycemia, and dehydration is necessary for the successful treatment of diabetic ketoacidosis (DKA), along with regular monitoring of the metabolic and clinical markers that support DKA resolution.

PATHOPHYSIOLOGY:

One of the most dangerous side effects of diabetes mellitus, especially type 1 diabetes, is diabetic ketoacidosis (DKA).

The pathophysiology of it is broken down as follows:

Insulin Deficiency: In most cases, DKA is brought on by insufficient insulin, which causes: Increased Gluconeogenesis: The liver produces more glucose from non-carbohydrate sources when insulin is not present in the body, which prevents cells from absorbing glucose efficiently.

Increased Lipolysis: A lack of insulin causes the breakdown of fat, or lipolysis, to occur, which releases free fatty acids (FFAs) into the bloodstream.

Hyperglycemia: Elevated blood glucose levels (hyperglycemia) are the outcome of an insulin shortage. This elevated blood sugar causes:

Osmotic Diuresis: When there is an excess of glucose in the blood, it leaks into the urine and draws water with it, which causes dehydration. and polyuria (frequent urination).

Ketogenesis: FFAs are beta-oxidized in the liver when insulin is not present in the synthesis of ketone bodies (acetone, beta-hydroxybutyrate, and acetoacetate).

Acidosis: Acidic substances are ketone bodies. Metabolic acidosis is caused by the blood's pH falling due to the buildup of ketones. Electrolyte imbalance: Depletion of bicarbonate ions in the urine can cause hyperkalemia, hyponatremia, and hypokalemia, as well as worsen metabolic acidosis.

Starvation ketosis: Any person experiencing a sustained decrease in caloric intake (less than 500 kcal/day) may experience starvation ketosis. The mechanism involves a drop in blood glucose due to little or no carbohydrate consumption and a decrease in insulin production, which triggers the activation of two mechanisms: lipolysis and ketogenesis.

Alcoholic ketoacidosis: Alcoholic ketoacidosis develops in people with chronic alcohol abuse.

DISGNOSIS

Diagnosis: Hyperglycemia, metabolic acidosis, and ketosis are the three main symptoms that are used to diagnose diabetic ketoacidosis

1. glucose A: Glucose cut-off of greater than 11 mmol/L is advised by the Joint British Diabetes Societies. The American Diabetes Association recommends a higher cut-off (>13.9 mmol/L).

2. Ketones: In order to assess the occurrence of diabetic ketoacidosis, more recent observational studies have shown variations in 3-hydroxybutyrate levels (30-32).

3. Bicarbonate: It is recommended by the Joint British Diabetes Societies that venous bicarbonate (HCO_3) be kept below 15 mmol l (29).

4. Venous pH: Venous pH should be less than 7.3, according to the Joint British Diabetes Societies.

MANAGEMENT

The management of diabetic ketoacidosis is:

Check the ABCs (airway, breathing, circulation) during the initial assessment.



Fluid Resuscitation: To restore fluid balance, give out isotonic saline.

Insulin Therapy: To reduce blood sugar and stop the development of ketones, begin with regular insulin administration.

Electrolyte Correction: Keep an eye on potassium levels, replace them carefully, and adjust other electrolyte imbalances as necessary.

Determine Triggers: Take care of any underlying issues like non-compliance with insulin or infection.

Keep an eye on things constantly: Keep a careful eye on your electrolyte levels, glucose, and vital signs.

Change from IV to Subcutaneous Insulin: After DKA clears up, switch to subcutaneous insulin. Patient education should focus on symptom recognition and insulin adherence in order to prevent problems down the road.

PREVENTION

A balanced diet and frequent exercise are important components of a healthy lifestyle, as is regular monitoring of blood glucose and ketone levels, consistent and appropriately adjusted insulin administration, and prevention of diabetic ketoacidosis (DKA). Early DKA symptoms, including elevated blood sugar, frequent urination, intense thirst, nausea, vomiting, and stomach discomfort, must be identified. It is essential to provide education on managing diabetes, particularly when unwell. It's crucial to have regular check-ups with healthcare professionals, as well as an emergency plan and the essential supplies. It's also critical to stay hydrated, especially when blood glucose levels are up. The risk of DKA can be considerably decreased by following these preventive strategies.

CONCLUSION

Diabetic ketoacidosis (DKA) is a serious diabetes complication that needs to be treated right away. It is crucial to take preventive actions including routinely checking blood sugar and ketone levels,

managing insulin properly, leading a healthy lifestyle, and continuing education on the illness. Preventive measures include early symptom recognition and having a plan in place for managing diabetes while unwell. The risk of DKA can be considerably decreased by having emergency supplies on hand and scheduling routine medical examinations. Strategies for effective prevention and management are essential to maintaining the health of people with diabetes and averting the potentially fatal outcomes of diabetic ketoacidosis (DKA).

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