

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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| Volume 7 | Issue 8

Alcoholic Ketoacidosis

A 35 year old male with a history of depression and chronic alcoholism presents to the ED with abdominal pain, nausea, 5 episodes of vomiting today, and chills. Patient is afebrile and vitals are significant for tachycardia and tachypnea. On physical exam, patient is alert and oriented to person place and time. He has ketonic breath and has generalized abdominal tenderness. Which of the following laboratory findings do you expect to find?

- A. Glucose level > 500mg/dL
- B. Normal Liver profile
- C. Normal platelet count
- D. High anion gap metabolic acidosis
- E. Positive Nitroprusside test



©2020 Wikipedia Alcoholic Ketoacidosis

Alcoholic Ketoacidosis (AKA) is a distinct syndrome of malnutrition, volume depletion, and hormone imbalance most often occurring in chronic alcohol drinkers after a period of chronic nausea and vomiting and low PO intake.

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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Warriors

The correct answer is D. Alcoholic ketoacidosis causes a high anion gap metabolic acidosis.

Introduction

Alcoholic Ketoacidosis (AKA) is a distinct syndrome of malnutrition, volume depletion, and hormone imbalance most often occurring in chronic alcohol drinkers between ages 20-60. The National Survey on Drug Use and Health stated that 6.2% of people over 18 years of age suffer from alcohol use disorder.¹ It occurs equally in men and women between and has a prevalence directly correlating with the amount of alcohol abuse in that community.¹ It usually presents after an episode of binge drinking, followed by abdominal pain, nausea, and vomiting, with poor PO intake. It is sometimes precipitated by another illness like infection or pancreatitis

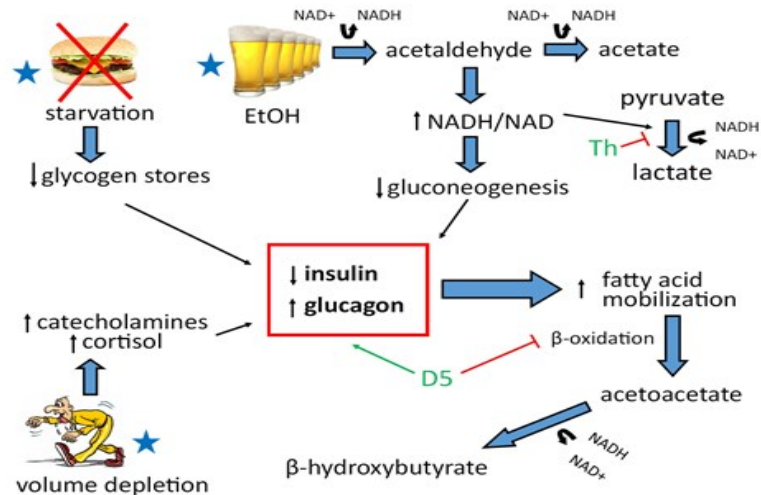
Pathophysiology

For many chronic alcoholics, **alcohol is their only source of nutrition**. As a result, the body enters a period of starvation precipitating the following **catabolic** events:

- Decreased insulin secretion & Increased glucagon, catecholamines, cortisol and growth hormone.²
- Glycogen stores are depleted²
- Lipolysis occurs and free fatty acids are oxidized to CO₂ or **ketone** bodies (Acetoacetate, hydroxybutyrate, and acetone)²

As they enter periods of prolonged vomiting, the following may occur:

- Dehydration²
- Decreased renal perfusion²
- Increased catecholamine & cortisol levels²
- Delayed excretion of ketone bodies in order to retain more volume²



<https://www.emra.org/emresident/article/alcoholic-ketoacidosis/>

Consumption of ethanol multiplies these factors by:

- Inhibiting ADH secretion promoting fluid loss²
- Increasing NADH/NAD⁺ inhibiting hepatic gluconeogenesis and inhibiting lactate conversion to pyruvate (increased lactic acidosis)²
- Creation of primarily **hydroxybutyrate** ketones²

Clinical Presentation & Physical Exam

Presentation

- Nausea, vomiting, abdominal pain with normal mental status (contrast with DKA likely to have AMS)
- Dyspnea, dizziness³
- Signs of withdrawal if nausea/vomiting >24 hours³

Physical Exam & Vital Signs

- Abdominal Tenderness, hepatosplenomegaly³
- Ketotic breath³
- Hypothermia, Tachycardia, and tachypnea³

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **"Conference"** link.

All are welcome to attend!

Complications to rule out and/or prevent in the ER:

- Cardiac Arrhythmias
- Seizures
- Infection, aspiration pneumonia
- Shock
- Pulmonary Edema
- GI Bleed

Workup in the ER

Initial orders should include an EKG, ABG, CMP, CBC, UA, Magnesium and Phosphorus to look for:

- Electrolyte imbalances leading to EKG abnormalities²
- Hypomagnesemia and hypophosphatemia³
- Hypokalemia²
- Lactic acidosis²
- pH <7.3 and serum bicarbonate <15mEq/L²
- Wide anion gap metabolic acidosis with respiratory compensation with possible serum and/or urine ketones
 - Conducting a Nitroprusside test may underestimate the severity of ketosis as it tests for Acetoacetate and acetone more commonly than hydroxybutyrate (more common in alcoholics)³
- Rule out diabetic ketoacidosis with a slightly low, normal, or slightly elevated glucose level

Treatment

Prognosis in patients with AKA is good with early diagnosis and treatment. Mortality has been reported in AKA due to the acidosis but is rare. Death is more commonly caused by alcohol withdrawal or GI bleeding precipitated by persistent nausea and vomiting.³

The mainstay of treatment for alcoholic ketoacidosis include reversal of the pathophysiology which involves reduced glycogen storage, intravascular volume depletion, and increased ratio of NADH: NAD⁺²

- Glucose Administration with 100mg Thiamine supplementation
 - Give 5% Dextrose with Normal saline until volume is repleted
 - Once volume is repleted, give Dextrose 5% with half normal saline (maintenance fluid)
- Acid base balance
 - Administer Sodium Bicarb only if pH <7
- Correct Electrolyte abnormalities
 - Replete Phosphorus, Potassium, and Magnesium (4,3,2 rule: Keep Phosphorus >4, Potassium >3 & Magnesium >2)

About the Author

This month's case was written by Jessica Wassef. Jessica is a 4th year medical student from NSU-KPCOM. She did her emergency medicine rotation at BHMC in February 2020. Jessica plans on pursuing a career in General Surgery after graduation.



References

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