Maryland ACEP Chapter Educational Conference & Annual Meeting
March 12, 2020

FACULTY: Maria ‘Marysia’ Lawrynowicz, M.S., MD

PRESENTATION
Alcoholics Anonymous

DESCRIPTION
Recognizing alcoholic ketoacidosis as the etiology of your patient’s symptoms is difficult as the presentation is varied and lab interpretation is nuanced. This presentation will provide several salient points to help you understand the relevant pathophysiology as it relates to diagnosis and treatment of the disease.

OBJECTIVES
- Describe the pathophysiology of alcoholic ketoacidosis as it relates to diagnosis and treatment.
- Identify the constellation of lab values that may be seen in alcoholic ketoacidosis.
- Brief case presentation.
- Pathophysiology of AKA.
- Diagnostic results.
- Treatment.

DISCLOSURE
No significant financial relationships to disclose.
Alcoholics Anonymous

MARYSIA (MARIA) LAWRYNOWICZ, PGY2
MGUH/MWHC

HAPPY 4TH OF JULY
I'M STARTING MY DRINKING A LITTLE EARLY
HPI

53yoF p/w CP and LBP.

She has not been taking her meds or eating due to the pain, but has been drinking alcohol.

She was found down hypoxic and tachycardic with AMS.
HPI cont.

**PMHx:** NONE per patient

BUT, per paperwork....

COPD, atrial fibrillation, atrial flutter, GERD, obesity s/p gastric bypass with revision, spinal stenosis s/p L4 laminectomy and L4-5 discectomy, anxiety, depression
VS  T: 36C (Oral)  HR: 109  RR: 18  BP: 149/69  SpO2: 90%

General: Chronically ill appearing. **Shifting in bed.**
HEENT: **Edentulous.** Dry MM.
Resp: **Tachypneic.** CTA.
CV: **Tachycardic.**
Abdomen: Soft, +**diffuse TTP.** BS+
Neuro: Difficult to understand speech. **No FND.**
Skin: **Cool and clammy.**
Lab called... ‘no no it’s L-A-W-R-Y...’

pH 7.14    pCO2 18    HCO2 8
👎         👎         👎

Anion gap metabolic acidosis

<table>
<thead>
<tr>
<th>Lab View</th>
<th>07/04/2018 13:18 EDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH Art</td>
<td>7.14 * CRITICAL ||</td>
</tr>
<tr>
<td>pCO2 Art</td>
<td>18.0 * CRITICAL ||</td>
</tr>
<tr>
<td>pO2 Art</td>
<td>53.0 L</td>
</tr>
<tr>
<td>HCO3 Art</td>
<td>6.1 L</td>
</tr>
<tr>
<td>Base Ex/Def Art</td>
<td>-20.9 L</td>
</tr>
</tbody>
</table>

ANION GAP: Na – (Cl+CO2) = 133 – (94+8)

Expected feedback on presentation after bringing up acid-base disorders
Alcoholic ketoacidosis

AKA THE OTHER KETOACIDOSIS
Roadmap

- Case presentation ✅
- Pathophysiology
- Presentation
- Diagnostic results
- Treatment
- Conclusion

THE AMOUNT OF PHYSIOLOGY ALREADY IN THIS POST IS TOO DARN HIGH!
1. Ketotic state
2. Increased NADH
3. Adrenergic state

Pathophysiology of AKA

https://www.emra.org/emresident/article/understanding-alcoholic-ketoacidosis/
1. Ketotic state

**STARVATION**

**LIPOLYSIS**

**KETONES**

2. Increased NADH

3. Adrenergic state
Roadmap

- Case presentation✅
- Pathophysiology✅
- Presentation
- Diagnostic results
- Treatment
- Conclusion

When you and your bff are recovering after a night of drinking..
### Presentation

**HPI:**
- PMHx of ETOH use
- Recent cessation of binge drinking
- +/- Gastritis
- +/- Pancreatitis
- +/- Aspiration pneumonia

**Symptoms:**
- Nausea/ vomiting
- Abdominal pain
- Dehydration

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**DDx**

- **Toxic alcohol ingestion**
  - *Altered sensorium*
  - *Initial osmolar gap → anion gap*

- **Diabetic ketoacidosis**
  - *Altered sensorium*
  - *BG > 250 usually*

- **Starvation ketosis**
  - *Bicarbonate usually not as low*

- **Lactic acidosis > 4**

<table>
<thead>
<tr>
<th></th>
<th>DKA</th>
<th>AKA</th>
<th>Fasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicarb</td>
<td>&lt;10 possible</td>
<td>&lt;10 possible</td>
<td>&gt;18</td>
</tr>
<tr>
<td>Glucose</td>
<td>High</td>
<td>Low – mild high</td>
<td>Low – normal</td>
</tr>
<tr>
<td>Ketonuria</td>
<td>+</td>
<td>+/-</td>
<td>+</td>
</tr>
</tbody>
</table>

[https://www.emra.org/emresident/article/understanding-alcoholic-ketoacidosis/](https://www.emra.org/emresident/article/understanding-alcoholic-ketoacidosis/)
Roadmap

- Case presentation ✅
- Pathophysiology ✅
- Presentation ✅
- Diagnostic results
- Treatment
- Conclusion
Delta delta delta

AKA w/ ABG (n = 40)
23% anion gap metabolic acidosis
... the rest was mixed

Roadmap

- Case presentation
- Pathophysiology
- Presentation
- Diagnostic results
- Treatment
- Conclusion
Treatment

1. Isotonic AND dextrose containing fluids
2. Thiamine 100mg IV or IM
3. Replete all electrolytes
4. Treat alcohol withdrawal
5. Treat cause

Roadmap

- Case presentation ✅
- Pathophysiology ✅
- Presentation ✅
- Differential Dx ✅
- Diagnostic results ✅
- Treatment ✅
- Conclusion
Pearls and pitfalls

- Recognizing this is half the battle
- Listen to the story
- Know the limitations of your lab studies
- Give volume with dextrose (and thiamine)!
- Be an internist... *replete the lytes*
- Treat precipitating factor

- Case reports do not have to be that interesting


Howard R and Bokhari S. Alcoholic ketoacidosis. Treasure Island (FL): StatPearls Publishing; 2018 Jan-.


