INTRODUCTION

**Diabetic Ketoacidosis**

- DKA is a condition that is primarily seen in patients with type I diabetes and is caused by insufficient insulin levels.
- DKA manifests as rapid onset (>24 hours) abdominal pain, nausea, vomiting, polyuria, polydipsia, volume depletion, and eventually mental status changes and coma.1
- DKA (and type I diabetes) typically first occur before 20 years old, peaking at 4-6 years and 10-14 years, but may occur at any age.2

**Arripiprazole**

- Arripiprazole is a second-generation antipsychotic indicated for bipolar disorder, major depressive disorder, and schizophrenia.3
- It is similar to most second-generation antipsychotics in its adverse metabolic effects of dyslipidemia, hyperglycemia, and weight gain.4

CASE SUMMARY

**History of Present Illness:**

- 24-year-old black male presents to the Emergency Room with a 1-day history of abdominal pain, nausea and vomiting. He describes the abdominal pain as central before localizing to the left lower quadrant. He has been unable to keep any food down.
- He denies hematochezia, melena, or any changes in bowel habits. Remainder of ROS is negative. Patient states he usually has a morning blood sugar of 315 mg/dL.
- He reports first developing diabetes after 4 months of taking arripiprazole and methylphenidate for mood disorder at the age of 14. The patient was on these medications for 5 months before discontinuation. He was not trialed antipsychotics at any other point.

**Social History:**

- No illicit substance use

**Medications:**

- Metformin 1g twice per day

**Physical Exam:**

- Vitals: T 99.6F, HR 126, RR 22, BP 127/90, SpO2 100% on room air, BMI 23.4
- Abdominal examination:
  - Abdomen: scaphoid, nondistended, hypoactive bowel sounds; tenderness to palpation predominantly in the right lower quadrant with referred tenderness from the right upper and left lower quadrant; no rebound; localized peritoneal signs identified.
- Lungs, Heart and Extremities: unremarkable

**Laboratory Data:**

- CBC: WBC 12.4, absolute neutrophil count 11.0, otherwise WNL
- CMP: sodium 132, calcium 10.4, glucose 459, chloride 92, Bicarb 21
- Blood gas: pH 7.35, venous CO2 42, venous bicarb 23

**Imaging:**

- CT Abdomen Pelvis: W Contrast: Image 1. CT abdomen pelvis with contrast

CLINICAL COURSE

- Two subcutaneous injections of Insulin Aspart U100 are administered to bring patient to an operable status, and patient is brought to the OR on day of admission.
- Laparoscopic appendectomy is performed without complications.
- Follow-up appointment is scheduled for 1-2 weeks.
- The patient is admitted to Intensive Care Unit and started on insulin drip and broad-spectrum antibiotics. He is transitioned to subcutaneous Lantus and discharged in good condition.
- The patient’s first hospitalization for diabetic ketoacidosis or hyperglycemic emergency.

**Serum Measurement**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>130</td>
<td>135 – 145 mmo/L</td>
</tr>
<tr>
<td>Potassium</td>
<td>4.8</td>
<td>3.5 – 4.9 mmo/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>96</td>
<td>98 – 112 mmo/L</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>&lt;10</td>
<td>24 – 34 mmo/L</td>
</tr>
<tr>
<td>Glucose</td>
<td>457</td>
<td>74 – 106 mg/dL</td>
</tr>
<tr>
<td>Ketones</td>
<td>Large</td>
<td>Negative</td>
</tr>
<tr>
<td>White Blood Cells</td>
<td>21.4</td>
<td>4.8 – 10.8 K/uL</td>
</tr>
<tr>
<td>Lactic Acid</td>
<td>2.9</td>
<td>0.4 – 2.0 mmo/L</td>
</tr>
<tr>
<td>Venous pH</td>
<td>7.12</td>
<td>7.32 – 7.42</td>
</tr>
</tbody>
</table>

DISCUSSION

- This case describes a patient, complaining of abdominal pain, who is subsequently diagnosed with appendicitis and diabetic ketoacidosis. The antipsychotic use associated with new onset hyperglycemia, points towards a rare adverse complication of arripiprazole.
- While a majority of second-generation antipsychotics are associated with weight gain and development of glucose intolerance, antipsychotic induced hyperglycemic emergencies are rather uncommon (1-2 events per 1000 persons per year of exposure).4 However, the incidence of DKA in the population exposed to antipsychotics is tenfold higher relative to the general population.6
- Risk factors for antipsychotic associated DKA include average age younger than in general population of patients with diabetes type 2, gender imbalance with predominance of males, absence of autoimmunne markers of diabetes, as well as the absence of significant weight gain.7
- Conversely, risk factors for development of Type 2 diabetes among this population includes pre-existing diabetes, diagnosis of schizophrenia, male gender, middle age, specific drug combinations, and polypharmacy.8
- While hyperglycemia and metabolic syndrome are common adverse effects, the risk of hyperglycemic emergencies precipitated by second generation antipsychotics are rare, but recognized, events.
- Hyperglycemic emergencies need to be considered in all patients starting or continuing second generation antipsychotic therapy, especially with the DKA mortality rate as high as 26% in this demographic.9
- This case also illustrates the prolonged effect antipsychotics may have on patients with only a short course of antipsychotics. Similar cases may be undocumented in literature.
- Preventative measures for patients include regular assessment of preexisting risk factors, avoidance of polypharmacy, and regular screening for diabetes in the first months of antipsychotic treatment.10

REFERENCES