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May 15th, 11:30 AM - 1:30 PM

### Thyrotoxicosis presenting with nondiabetic ketoacidosis in a 4 year old female

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Jeng, Henry S. Dr, "Thyrotoxicosis presenting with nondiabetic ketoacidosis in a 4 year old female" (2019). *Research Days*. 1.

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## Thyrotoxicosis presenting with nondiabetic ketoacidosis in a 4y/o female

**Submitting/Presenting Author (must be a trainee): Henry Jeng, DO**

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**Fellow**

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**Other authors/contributors involved in project: Michelle Knoll, MD**

**IRB Number: N/A (Case report)**

**Describe role of Submitting/Presenting Trainee in this project (limit 150 words):**

Will present case via a poster presentation.

### **Background, Objectives/Goal, Methods/Design, Results, Conclusions limited to 500 words**

**Background:** Graves' disease occurs in about 1 per 10,000 children in the US and represents the most common cause of hyperthyroidism in children. There is a peak incidence in girls aged 11-15 years of age. There have been numerous reports of patients presenting with diabetic ketoacidosis (DKA) and thyrotoxicosis simultaneously, but only one previous case report of an adult patient with previously undiagnosed thyrotoxicosis presenting with non-diabetic ketoacidosis (NDKA).

**Objectives/Goal:** To raise awareness that thyrotoxicosis should be on the differential diagnosis for ketoacidosis in the pediatric population. In this particular case, the initial clinical and laboratory evaluation resembled that of a patient in new-onset diabetic ketoacidosis. However, awareness of thyrotoxicosis as a possible cause of ketoacidosis in children can help pinpoint and expedite evaluation and management of similar cases in the future.

**Methods/Design:** A 4y10m old African American female presented with a 1-month history of extreme hunger, polydipsia, polyuria, weight loss, cachexia, and vomiting that worsened in the 48 hours prior to presentation. Patient's family had car trouble en route to Colorado and recently were living in a shelter. She was afebrile, but tachycardic (181 bpm) and hypotensive (73/40 mmHg). She had Kussmaul respirations, was lethargic and unable to answer questions. Venous pH was 7.159, with POC glucose 53 mg/dL and POC ketones 6.7 mmol/L. She exhibited signs of severe dehydration, with BUN 101 mg/dL and creatinine 2.32 mg/dL.

**Results:** She was given a bolus of D5NS for hypotension and hypoglycemia, after which her glucose increased to 254 mg/dL. She was started on an insulin drip at 0.05 u/kg/hr and fluids at 1.5x maintenance for presumed DKA. Tachycardia (180-200 bpm) persisted despite adequate fluid resuscitation, and she became hypertensive. Free T4 level was elevated to >7.0 ng/dL, and TSH undetectable. Insulin drip was stopped, and she was started on methimazole and propranolol for control of thyrotoxicosis. Her ketoacidosis resolved after 24 hours of IV fluids, and she clinically improved. She was found to have mitral valve prolapse and mitral regurgitation. Due to concern of severe malnutrition, she was monitored for refeeding syndrome. Thyroid-stimulating immunoglobulin titers returned

elevated, and thyroid ultrasound showed diffusely enlarged and heterogeneous thyroid gland, consistent with Graves' disease.

**Conclusions:** Our patient had extreme weight loss in a very short amount of time, likely due to inadequate intake and increased metabolic demand associated with thyrotoxicosis. This may have contributed to her presentation in significant NDKA. Our routine initial lab work for DKA includes thyroid function tests which fortunately led to a quick diagnosis. This is the first reported pediatric case of thyrotoxicosis presenting with NDKA. Though rare, thyrotoxicosis should be considered if there is not another explanation for a child presenting with NDKA.