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Thyrotoxicosis presenting with nondiabetic ketoacidosis in a 4 year old female: A case report

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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/Goals

- 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 DKA.
- 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.

Case Description

A 4 year old African American female presented with a one month history of extreme hunger, polydipsia, polyuria, weight loss, cachexia, and vomiting that worsened in the 48 hours prior to presentation. In the Emergency Department, she was found to be afebrile, but tachycardic at 181 beats/min and hypotensive with a blood pressure of 73/40 mmHg. Clinical exam showed Kussmaul respirations, lethargy and inability to answer questions.

Hospital Course

Initial bloodwork came back with a Venous pH of 7.16, POC glucose of 53 mg/dL and POC ketones of 6.7 mmol/L. She exhibited signs of severe dehydration, with a Basal Metabolic Panel showing a BUN of 101 mg/dL and Creatinine 2.32 mg/dL. She was then given a bolus of D5 and Normal Saline for hypotension and hypoglycemia, after which her glucose increased to 254 mg/dL. She was started on an insulin drip at 0.05 units/kg/hr and IV fluids at 1.5 x maintenance for presumed DKA. Her tachycardia persisted at 180-200 bpm despite adequate fluid resuscitation, and she became hypertensive.

Patient timeline



Key: MMI = Methimazole, PRO = Propranolol

As part of routine labwork drawn for DKA, her Free T4 level came back elevated at >7.0 ng/dL, and was accompanied by an undetectable TSH. 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 improved clinically. Thyroid-stimulating immunoglobulin titers returned elevated, and thyroid ultrasound showed diffusely enlarged and heterogeneous thyroid gland, consistent with Graves' disease.

Discussion

- This patient had extreme weight loss in a very short amount of time, likely due to inadequate intake and increased metabolic demand associated with thyrotoxicosis.
- The 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.
- Although rare, thyrotoxicosis should be considered if there is not another explanation for a child presenting with NDKA.

References

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