Unmasking the Cause: A Case of Adrenal Insufficiency masquerading as Insulinoma-Induced Hypoglycemia

Abstract

- Primary adrenal insufficiency is characterized by the loss of cortisol production by the adrenal glands and can result in many physiologic manifestations that are often vague and nonspecific including fatigue, abdominal pain, hypotension, hyponatremia, hypoglycemia, and many others
- We discuss a case of a 69-year-old African American male who presented to the emergency department for only symptomatic hypoglycemia episodes in the absence of other lab abnormalities consistent with adrenal insufficiency. He initially underwent workup for an insulinoma who was later found to have chronic primary adrenal insufficiency.

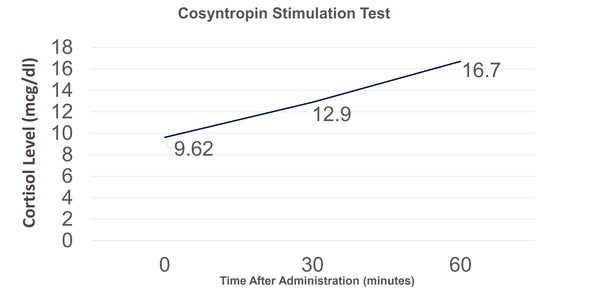
Background

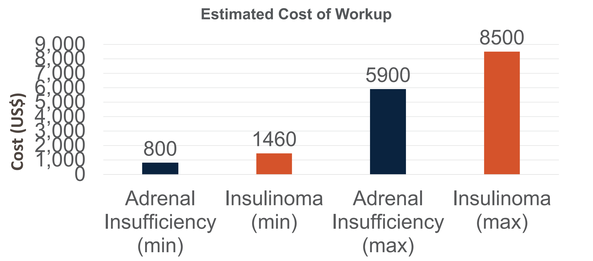
- Primary adrenal insufficiency usually manifests as acute adrenal insufficiency with symptoms of adrenal crisis due to lack of glucocorticoids and mineralocorticoids, resulting in shock, unexplained hypoglycemia, abdominal pain, hyponatremia, hypokalemia, nausea, vomiting, and hyperpigmentation.
- Chronic adrenal insufficiency usually presents with more indolent and vague symptoms of fatigue, hypotension, hypoglycemia and other electrolyte abnormalities that are subtler and more difficult to pinpoint a clear cause for their symptoms.
- Adrenal insufficiency is a condition characterized by decreased production of cortisol and aldosterone by the adrenal glands. The lack of cortisol can lead to decreased glucose production by the liver and decreased glucose uptake by peripheral tissues, leading to hypoglycemia.

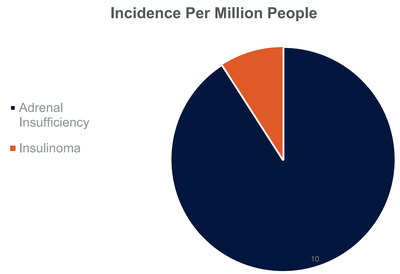
Case Report

- The patient is a 69-year-old male who presented to the emergency department for concerns of persistent hypoglycemia while at home. He had been experiencing dizziness and noticed his blood sugar was 80mg/dl. He took two tablets of oral glucose and rechecked blood sugar and noticed his blood sugar had decreased to 73mg/dl. He became worried and decided to come to the emergency department.
- In the emergency department, the patient's blood glucose had further decreased to 30mg/dl. He was started on D5W and given more glucose tablets with improvement of glucose levels to 84mg/dl and his symptoms abated. Other labs on admission were notable for normal sodium, mildly elevated potassium, and a chronic normocytic anemia, and sulfonylurea screen was negative. We became concerned this could be an insulinoma.
- This workup initially consisted of attempts to complete a 72-hour fast in order to obtain levels of c-peptide, beta hydroxyurea, and insulin antibodies. We attempted to fast the patient but were unable to complete fasting for 72 hours due to persistent episodes of symptomatic hypoglycemia when removed from D5W. We did collect the labs while the patient was fasting and hypoglycemic, although it was not for 72 hours. CT of the abdomen and pelvis and MRI were also negative.
- Labs revealed c-peptide 4.85ng/dl (0.48-5.05ng/dl), beta-hydroxybutyrate 0.3mg/dl (0.2-2.8mg/dl), and insulin antibodies <0.5uU/ml (normal <0.05uU/ml) which were essentially negative for insulinoma or insulin deficiency.
- We decided to investigate for an adrenal cause and collected a random morning cortisol, which was 9.62mcg/dl (4.30-22.40mcg/dl) and deemed to be indeterminate for adrenal insufficiency.
- We then performed a cosyntropin stimulation test with 0.25mg of cosyntropin and measured cortisol production at 0, 3, and 60-minutes post-administration. The results revealed increased cortisol level at 60 minutes of 16.70mcg/dl from 9.2mcg/dl, which was consistent with adrenal insufficiency. (figure 1) We also measured an adrenocorticotropic hormone (ACTH) level which was normal at 46.9pg/dl (7.2-63.3pg/dl).
- We started the patient on hydrocortisone 10mg in the morning and 5mg in the evening and blood glucose began to increase into the 110-130mg/dl range while the patient remained on D10 fluids. The patient was weaned off D10. The patient was able to go 48 hours without any more episodes of hypoglycemia after discontinuation of D10 and was discharged on hydrocortisone 10mg in the morning and 5mg at night with close PCP and endocrinology follow up outpatient.

Figures







Discussion

- Isolated hypoglycemia is an unusual presentation of adrenal insufficiency, as it is typically associated with symptoms such as fatigue, weight loss, and hypotension, which were lacking in our patient.
- Several case reports have described patients with adrenal insufficiency who presented with hypoglycemia, some of whom were initially misdiagnosed with an insulinoma.
- The estimated price of lab and imaging tests used to diagnose insulinoma versus adrenal insufficiency carries a wide range of price and resources. (figure 2)
- The possibility of underlying adrenal insufficiency should have also been considered in the differential diagnosis in patients presenting with unexplained hypoglycemia.
- The prevalence of adrenal insufficiency is estimated to be around 1 case per 100,000 individuals while still uncommon, is over 10 times more common than an insulinoma at an incidence of 1 per 100 million. (figure 3)
- A thorough history and physical examination should be performed, along with appropriate laboratory tests such as serum cortisol and ACTH levels and cosyntropin stimulation testing.
- Treatment of adrenal insufficiency involves replacement therapy with glucocorticoids. It is important to note that, in this presentation of adrenal insufficiency, close monitoring of blood glucose levels is necessary to ensure proper dosing and to avoid hypoglycemia.

Conclusion

- In conclusion, this case report highlights an unusual presentation of adrenal insufficiency, emphasizing the need for a high index of suspicion in patients presenting with hypoglycemia as the sole symptom.
- The workup done is particularly important in our healthcare cost-conscious society in order to minimize costly workup for rare conditions in patients who have atypical presentation or do not respond to treatment as expected and to widen our differential diagnoses.
- Further studies are needed in the future to establish the incidence of adrenal insufficiency presenting mainly as hypoglycemia.

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Key Points

Adrenal Insufficiency usually manifests with symptoms of fatigue, shock, hyperkalemia, hypoglycemia, nausea, vomiting, and hyperpigmentation

Workup of an insulinoma consists of measuring c-peptide, betahydroxybutyrate, insulin antibodies, while the patient is fasting for 72 hours

Workup for adrenal insufficiency consists of measuring random AM cortisol, cosyntropin stimulation test, and ACTH levels

AM cortisol levels <3mcg/dL are highly correlated with adrenal insufficiency, while values >20 rule it out.

Values 3-18 are indeterminate and warrant further testing

Administration of cosyntropin and measurement of cortisol levels at 0, 30, and 60 minutes with a cortisol <18mcg/dL indicates adrenal insufficiency

Treatment of adrenal insufficiency involves hydrocortisone in divided doses of 15-25mg/day and titrated to optimal patient response at the smallest dose

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