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Case Report

How much cortisol do we need? chronic secondary adrenal insufficiency presenting as recurrent severe hypoglycemia

Abstract

Objective: We present a case of chronic untreated secondary adrenal insufficiency presenting solely as recurrent hypoglycemia.

Method: We have summarized detailed clinical and diagnostic evaluation followed by treatment provided and a brief discussion.

Results: A young male presents with recurrent severe hypoglycemia without any evidence of spurious insulin administration or oral hypoglycemic medication ingestion. Cortisol levels were undetectable on multiple occasions over the past 5 years. Patient had undetectable ACTH, low growth hormone and prolactin levels and hypogonadotropic hypogonadism. Pituitary imaging was normal. Chronic marijuana use and meningitis may have contributed to panhypopituitarism.

Conclusion: Recurrent life threatening hypoglycemia as the isolated presenting manifestation in a patient with secondary adrenal insufficiency from possible chronic marijuana abuse and or meningitis is unusual and not reported to the best of our knowledge.

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Abbreviations: ACTH, adrenocorticotrophic hormone; LH, luteinizing hormone; FSH, follicle stimulating hormone; TSH, thyroid stimulating hormone; IGF-1, insulin like growth hormone-1; CBC, complete blood count; CMP, comprehensive metabolic panel

Introduction

Hypopituitarism often results from pituitary or hypothalamic tumor or treatment of the tumor.[1] Other less common causes like infiltrative diseases (Sarcoidosis, hemochromatosis, histiocytosis)[2-4] Sheehan's syndrome,[1] inflammation, infection, head trauma[5-7] and genetic mutations have been reported. Clinical presentation depends on the etiology and hormonal axis involved. We describe a case of panhypopituitarism presenting with severe recurrent hypoglycemia as the only presenting manifestation.

Case report

A 31 year old Caucasian gentleman was found in his room by his parents with altered mental status. On arrival to the ER, his blood sugar was found to be 16 mg/dl. On testing, his blood insulin (<2mcU/ml), proinsulin (<5pmol/L) and C-Peptide (<0.1ng/ml) levels were suppressed appropriately for hypoglycemia (blood sugar 16 mg/dl). Urine toxicology was negative for sulphonylureas. Patient was treated with dextrose and his mental status improved. Patient denied skipping any meals but admitted to having diarrhea and symptoms of upper respiratory infection for a week. Vital signs and physical exam were unremarkable. CBC and CMP were normal except for hypoglycemia. Patient maintained euglycemia throughout the rest of his hospital stay. Review of past records showed that patient has had 3 hospitalizations for hypoglycemia precipitated by various infections in past 5 years. Patient had normal development of his skeletal system (Height 177 cm, weight 68 kg, BMI 21) and secondary sexual characteristics. He did not have a family history of any genetic disorder. He has history of hypothyroidism being treated with levothyroxine (75 mcg daily), remote history of viral meningitis and chronic daily marijuana abuse (about 3 marijuana cigarettes every day). He complained of mild fatigue on and off for few years. He denied headaches, visual problems, sexual dysfunction, heat/cold intolerance and hair or skin changes. Past records revealed undetectable cortisol levels (<0.8 mcg/dl) on several occasions in the past 5 years and it is not known why this was not investigated and surprisingly patient has not been on any steroid replacement. He failed the ACTH stimulation test (Table 1). His thyroid function on levothyroxine supplement showed TSH of 0.9 mcU/ml (0.4-5) and FT4 of 0.96 ng/dl (0.8-1.8) with negative antibodies. Evaluations for other pituitary hormones are shown in Table 1. Enhanced and unenhanced MRI of pituitary was normal. He was treated with oral hydrocortisone (total daily dose of 30 mg) with improvement in fatigue and resolution of recurrent hypoglycemia. On follow-up through one year, patient had no further episode of hypoglycemia. Despite repeated counselling he continues to use marijuana.

Table 1 Pituitary profile

Lab	Result	Normal range
AM ACTH	< 1.1	(7.2-63.3 pg/ml)
AM Cortisol	<0.8	(4-20 mcg/dl)
30 min post Cosyntropin	<0.8	
1 hour post Cosyntropin	<0.8	
LH	7.5	(1-8 mU/ml)
FSH	2.4	(1-11 mU/ml)
Total Testosterone	166	(300-1200ng/dl)
SHBG	95.4	(16.5-55.9nmol/L)
Calculated Free Testosterone	1.48 ng/dl	>4.5 ng/dl
IGF-1	11	(71-241 ng/ml)
Prolactin	3.2	(0-17 ng/ml)
TSH(on LT4)	0.9	(0.4-5 mcU/ml)
Free T4 (on LT4)	0.96	(0.8-1.8ng/dl)
T3(on LT4)	65	(75-165ng/dl)

Abbreviations: ACTH, adrenocorticotrophic hormone; LH, leutinizing hormone; FSH, follicle stimulating hormone; IGF, insulin-like growth factor; TSH, THYROID stimulating hormone; SHBG, sex hormone binding globulin; LT4, levothyroxine, Calculated Free Testosterone = Calculated using the calculator at: http://www.issam.ch/freetesto.htm

Discussion

Hypopituitarism as a cause of hypoglycemia is well documented but recurrent severe hypoglycemia, as isolated presenting symptom of secondary adrenal insufficiency is uncommon. It is noteworthy that this patient survived for several years with undetectable cortisol levels without steroid replacement. It is also intriguing that thyroid hormone replacement in the setting of undetectable cortisol levels for several years also did not precipitate adrenal crisis. We did not test for genetic mutation. However given the age of onset of symptoms, normal development of his skeletal system, secondary sexual characteristics and absence of a family history of genetic disorder; genetic mutation is less likely to cause his panhypopituitarism.[8]

It is arguable that viral meningitis may also have contributed to his pituitary dysfunction. Transient and permanent pituitary dysfunctions have been reported following various forms of meningitis.[9] Schaefer et al.,[10] have reported a case of hypothalamic-pituitary insufficiency diagnosed 49 months after an episode of viral meningitis however it's persistance over prolonged period of time has not been reported. But to our knowledge none of them presented with persistent severe disruption of hypothalamo-pituitary-adrenal axis with undetectable cortisol and ACTH levels even after 13 years of an episode of acute meningitis.[9] Patient reported no trauma and therefore it is not responsible for hypopituitarism in this case.[6,11] Chronic marijuana use has been shown to be associated with low testosterone, FSH and suboptimum GH and cortisol responses on insulin tolerance test.[12,13] Our patient also had low FSH and inappropriately normal LH with low testosterone, IGF-1, prolactin levels with undetectable ACTH and cortisol levels. However, severe hypocortisolism caused possibly by chronic marijuana abuse and viral meningitis resulting in recurrent life threatening hypoglycemia as the presenting manifestation has not been reported. This case would alert the clinicians about this atypical presentation and therefore would facilitate its appropriate work up and timely management.

Conclusion

Recurrent life threatening hypoglycemia as the isolated presenting manifestation in a patient with secondary adrenal insufficiency from possible chronic marijuana abuse and or meningitis is unusual and not reported to the best of our knowledge. Furthermore chronic marijuana abuse and or meningitis can also lead to panhypopituitarism which can persist for many years.

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None.

Conflicts of interest

The author declares that there are no conflicts of interest.

References

1. Bates AS, Van't Hoff W, Jones PJ, et al. The effect of hypopituitarism on life expectancy. *J Clin Endocrinol Metab*. 1996;81(3): 1169–1172.
2. Asa SL, Kovacs K. Histological classification of pituitary disease. *Clin Endocrinol Metab*. 1983;12(3):567–596.
3. Stuart CA, Neelon FA, Lebovitz HE. Hypothalamic insufficiency: the cause of hypopituitarism in sarcoidosis. *Ann Intern Med*. 1978;8(5):589–594.

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4. Braunstein GD, Kohler PO. Pituitary function in Hand-Schuller-Christian disease. Evidence for deficient growth-hormone release in patients with short stature. *N Engl J Med*. 1972;286:1225–1229.

5. Carpinteri R, Patelli I, Casanueva FF, et al. Pituitary tumours: inflammatory and granulomatous expansive lesions of the pituitary. *Best Pract Res Clin Endocrinol Metab.* 2009;23(5):639–650.

6. Edwards OM, Clark JD. Post-traumatic hypopituitarism. Six cases and a review of the literature. *Medicine (Baltimore).* 1986;65:281–290.

7. Cheung CC, Ezzat S, Smyth HS, et al. The spectrum and significance of primary hypophysitis. *J Clin Endocrinol Metab.* 2001;86(3):1048–1053.

8. Moseley CT, Phillips JA. Pituitary gene mutations and the growth hormone pathway. *Semin Reprod Med*. 2000;18(1):21–29.

9. Tsiakalos A, Xynos ID, Sipsas NV, et al. Pituitary insufficiency after infectious meningitis: a prospective study. *J Clin Endocrinol Metab.* 2010;95(7):3277–3281.

10. Schaefer S, Boegershausen N, Meyer S, et al. Hypothalamic-pituitary insufficiency following infectious diseases of the central nervous system. *Eur J Endocrinol*. 2008;158(1):3–9.

11. Bondanelli M, Ambrosio MR, Zatelli MC, et al. Hypopituitarism after traumatic brain injury. *Eur J Endocrinol.* 2005;152(5):679–691.

12. Pagotto U, Marsicano G, Cota D, et al. The emerging role of the endocannabinoid system in endocrine regulation and energy balance. *Endocr Rev.* 2006;27(1):73–100.

13. Benowitz NL, Jones RT, Lerner CB. Depression of growth hormone and cortisol response to insulin-induced hypoglycemia after prolonged oral delta-9-tetrahydrocannabinol administration in man. *J Clin Endocrinol Metab.* 1976;42(5):938–941.

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