Acute Adrenal Crisis From Mental Stress in a Patient With Hypopituitarism

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A 39-year-old woman presented to the emergency department (ED) via ambulance after a coworker found her unresponsive in her friend's camper. A fingerstick blood sample obtained en route showed a low blood sugar level of 22 mg/dL (reference, 70-99 mg/dL). After emergency medical technicians administered dextrose, 10% in water, the patient was sluggishly responsive.

History

Upon presenting to the ED, the patient appeared extremely lethargic and was difficult to arouse. She was unable to report her medical or surgical history.

Physical examination

She was afebrile with a pulse rate of 85 beats/min and blood pressure of 78/53 mm Hg. The rest of the physical examination was unremarkable.

Differential diagnosis

Based on the presentation and lack of medical history, a broad differential was considered, including adrenal crisis, myxedema coma, rhabdomyolysis, tickborne illness, diabetic coma, and intracranial pathology, including but not limited to stroke.

Table. Results of Laboratory Studies Obtained on Arrival

TEST	VALUE	REFERENCE RANGE
Hemoglobin	9.9 g/dL	12.0-16.0 g/dL
Leukocyte count	3.06 K/μL	4.8-10.8 K/μL
Neutrophil count	0.85 K/μL	1.4-6.5 K/μL
Platelet count	87 K/μL	130-400 K/μL
Electrolytes	Normal	
Serum creatinine	1.23 mg/dL	0.6-1.2 mg/dL
Serum aspartate aminotransferase	118 U/L	15-37 U/L
Serum alanine aminotransferase	Normal	12-78 U/L
Serum bilirubin, total	Normal	0.2-1.0 mg/dL
Serum alkaline phosphatase	36 U/L	45-117 U/L
Serum thyroid-stimulating hormone	< 0.005 mIU/mL	0.300-4.500 uIU/mL
Serum-free thyroxine	< 0.10 ng/dL	0.8-1.6 ng/dL
Serum cortisol	< 0.50 μg/dL	4.3-22.4 μg/dL
Serum creatine kinase	3763 U/L	26-192 U/L

Diagnostic studies

Results of laboratory studies are shown in the **Table**.

Results of a Lyme immunoglobulin (Ig)G/IgM test, peripheral smear for anaplasmosis and other parasites, and babesiosis DNA tests were all negative. An electrocardiogram showed a normal sinus rhythm. A chest radiograph showed no abnormalities, and a computed tomography scan of the head was unremarkable. A toxicology screen was negative.

As the patient became less lethargic, she recalled undergoing removal of a pituitary tumor 13 years prior for loss of outer half, right-eye vision. Following surgery, she began hydrocortisone and levothyroxine treatment but discontinued 5 years

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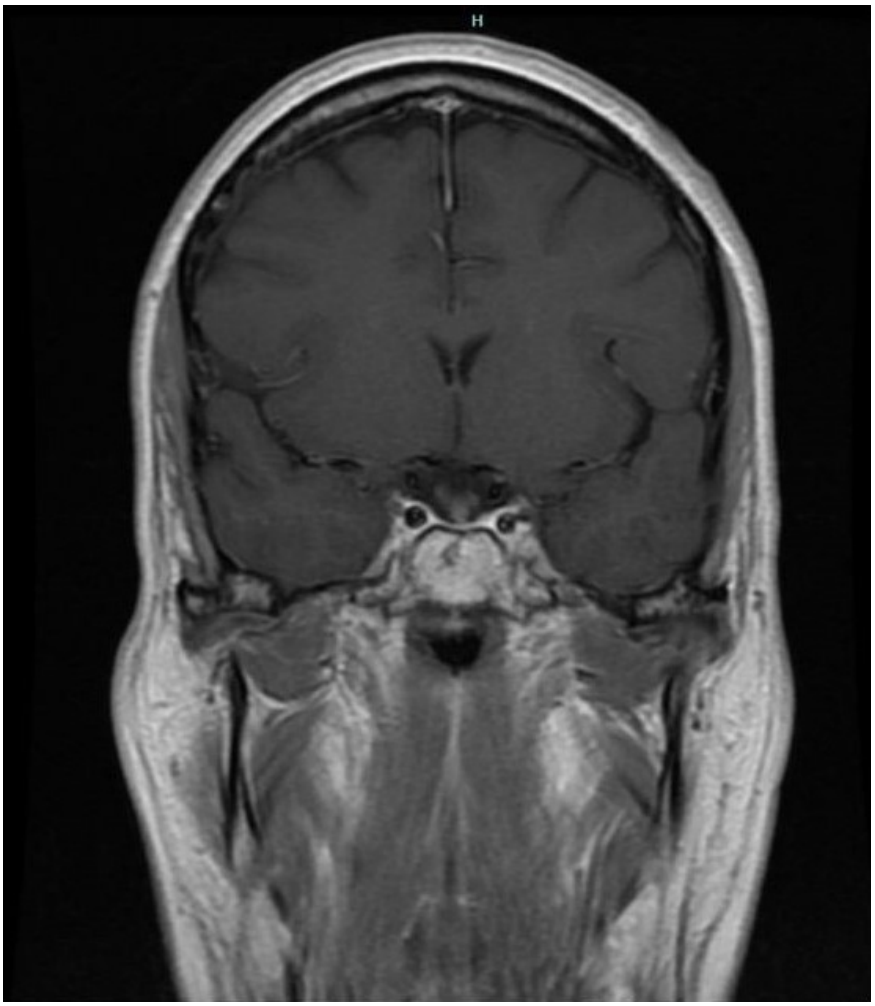

Figure. A magnetic resonance image of the brain (coronal view) showed postoperative changes of prior transsphenoidal pituitary surgery.

prior on her own volition. Over the past 5 years, she had not experienced any symptoms other than mild hair loss and cold intolerance.

In the weeks leading up to her current admission, she had been feeling a great deal of stress from an ongoing divorce caused by the erratic behavior and lack of financial support from her former husband. Ultimately, her economic situation forced her to give up her rental home and move into her friend's camper as she struggled to support her 2 children. In light of the patient's surgical history, magnetic resonance imaging of the pituitary was conducted; a partially empty sella confirmed transsphenoidal resection **(Figure)**.

Treatment and management

The patient was admitted for further evaluation, and an infusion of dextrose, 5% in normal saline was initiated. Hydrocortisone, 25 mg/kg/d in 4 divided doses (300 mg every 6 hrs), and levothyroxine, 1.6 µg/kg/d (105 µg/d) were initiated.

After her vital signs and plasma glucose levels normalized, the patient was discharged with a prescription for prednisone, 7.5 mg/d, and levothyroxine, 75 µg/d. She was extensively counselled on medication compliance, the role of stress contributing to her presentation, and the need for medication dose adjustments during periods of high stress. She was offered the opportunity to set up counseling services, which she opted to do herself after discharge. A follow-up appointment was scheduled, but the patient canceled her visit. No further information was available regarding her medical care after she was discharged from the hospital.

Discussion

Hypopituitarism has a reported relative prevalence of roughly 45.5 cases per 100,000 person-years with the most common cause being pituitary tumors.[1] Treatment via transsphenoidal resection poses a risk of transient or permanent partial or total panhypopituitarism.[2] Even in patients receiving treatment with hydrocortisone,[3] hypopituitarism has been linked to excess mortality with adrenal crisis being an important cause.[4]

Adrenal crisis is a life-threatening condition, and improved patient education, medical alert identification, and glucocorticoid emergency kits play an essential role in prevention.[5,6] In a patient with secondary adrenal insufficiency who experiences adrenal crisis, an immediate parental injection of 50 to 100 mg of hydrocortisone is necessary. Follow-up thyroid hormone replacement with levothyroxine is also required to achieve free thyroxine levels in the mid- to upper half of the reference range.[7]

Among the causes of adrenal crises in patients with primary or secondary adrenal insufficiency (ie, hypopituitarism), emotional stress contributes to as high as 16% of adrenal crises.[8] In times of mental stress, hydrocortisone medication regimens should be increased as tailored to the patient's physiological need,[3] ideally as a proactive measure before the patient encounters the psychological stressor.[9] Despite these recommendations, as few as 46% of patients adapt their glucocorticoid treatment during times of emotional stress,[8] likely because there are no definitive guidelines indicating how to discriminate the severity of stress necessitating an increased hydrocortisone dose.

Conclusion

This case reiterates the importance of

regular follow-up to determine appropriate patient medication adherence. Furthermore, patients should be made aware of the need to adjust the dose of hydrocortisone in anticipation of mental distress in conjunction with other stressors that can precipitate adrenal crisis. Patients should be educated on some of the most common symptoms of an adrenal crisis, including fatigue, nausea, vomiting, diarrhea, low blood pressure, and abdominal pain.[8] Additionally, each patient should carry a cortocosteroid card and emergency kit of parental hydrocortisone in the case of an adrenal crisis.[3] Further research is needed to distinguish the severity of mental stress requiring a stress dose of corticosteroid medication.

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