

A Case of COVID-19 Induced Adrenal Crisis Presenting as Psychosis

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Introduction

- Glucocorticoids (i.e. cortisol) and mineralocorticoids are hormones essential for fluid homeostasis and energy balance
- The hypothalamic-pituitary axis (HPA) regulates cortisol release from the adrenal cortex (Figure 1)
- Primary adrenal insufficiency is the inability of the adrenal cortex to produce sufficient amounts of cortisol
- Under stress, cortisol demands increase, and predisposes individuals with adrenal insufficiency to adrenal crisis, which can be life threatening
- Typical symptoms are nonspecific, including fatigue, abdominal pain and confusion. Psychosis uncommonly occurs

Patient Information

- 41 year old female with past medical history of primary adrenal insufficiency, and no past psychiatric history
- She was nonadherent with hydrocortisone for over a year

Clinical Course

- **Day 1:** presented with flu like symptoms. Tested positive for COVID. Cortisol level <0.85 mcg/dL (normal range 10-20 mcg/dL). Discharged from the emergency department with hydrocortisone 20mg daily and 10mg qHS
- **Day 7:** admitted to for paranoid ideations. Cortisol level <0.85 mcg/dL. Patient was started on Risperidone 0.25mg daily and 0.5mg qHS, in addition to hydrocortisone as above
- Day 17: psychosis improved, cortisol level increased to 18 mcg/dL. She was discharged on risperidone 0.5mg qHS and hydrocortisone at previous doses
- **Day 32:** re-admitted for paranoid ideations, thought blocking, restlessness. Cortisol level <0.85 mcg/dL. Hydrocortisone switched to prednisone 5mg daily. Risperidone switched to olanzapine 1.25mg daily and 2.5mg qHS
- Day 43: symptoms gradually improved, psychosis resolved and olanzapine was tapered off. Patient was discharged on prednisone 5mg daily

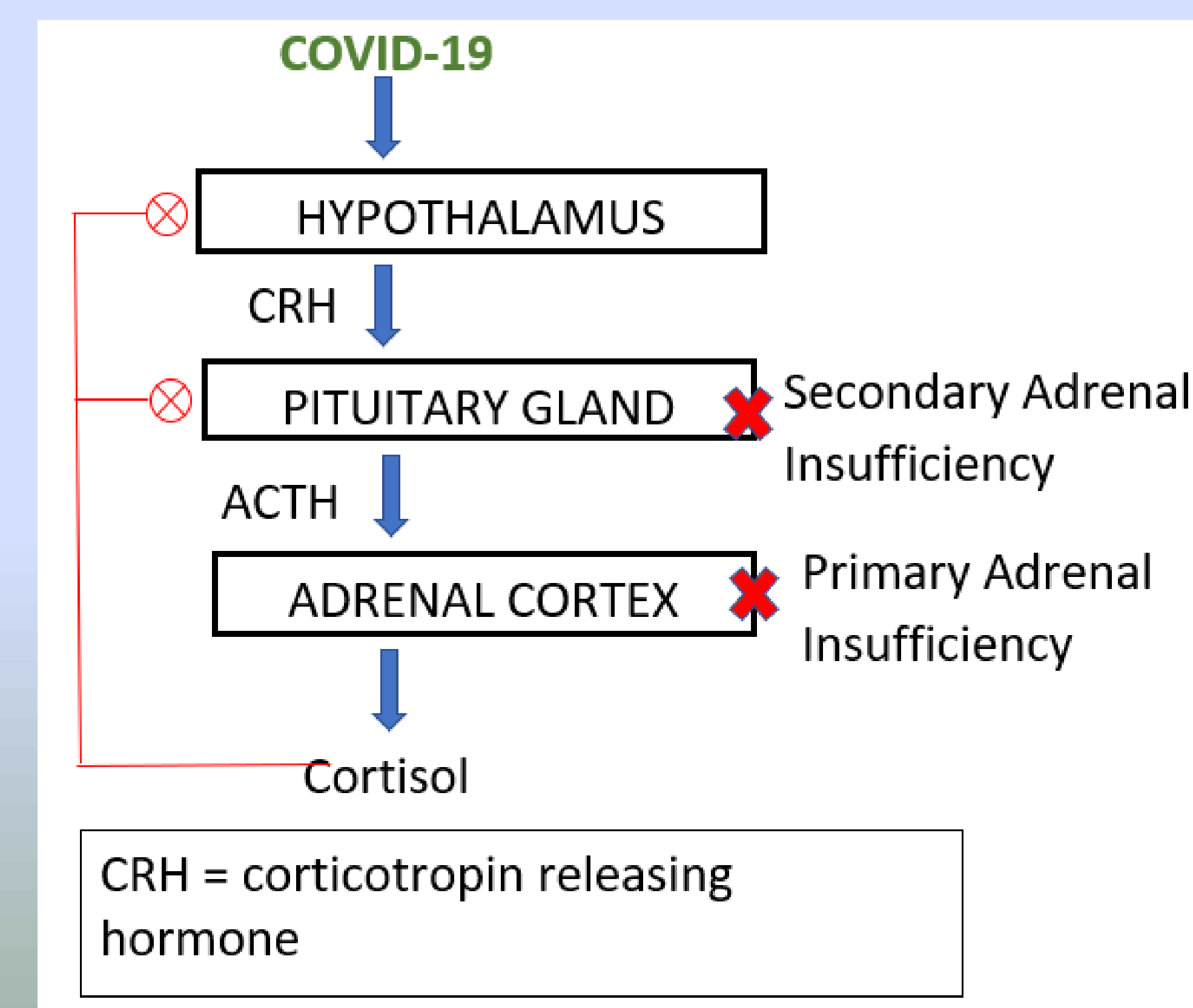


Figure 1: The hypothalamic-pituitary axis. Primary and secondary adrenal insufficiency is due to dysfunction of the adrenal cortex and pituitary gland, respectively, and leads to lower levels of cortisol. When infections such as COVID-19 increase the body's demand for these already low cortisol stores, there is increased risk of adrenal crisis.

Discussion

- This patient with a known diagnosis of primary adrenal insufficiency, was infected with COVID-19, placing her body under extreme stress
- This stress depleted her already low cortisol stores, driving her into adrenal crisis
- She did not show signs of psychosis until after this infection, despite over a year of medication nonadherence
- Her psychosis improved as cortisol levels increased to normal levels
- There is a well known correlation between neuropsychiatric symptoms and adrenal dysfunction due to cortisol excess, however the association with cortisol deficiency not as clearly understood
- Psychosis in primary adrenal insufficiency is uncommon, but there are reports of it being the presenting symptom in adrenal crisis

Conclusion

As COVID-19 cases rise again throughout the world, healthcare providers should be mindful of how this infection may impact other medical co-morbidities, and should optimize treatment early on to prevent complications.

References

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*Other references were utilized in this report and are available upon request