



Case Report

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Adrenal Insufficiency in Post COVID Patient

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Abstract

Background: A novel coronavirus disease (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has affected over 18 crore individuals, claiming more than 38 lakhs lives, till date 24 June 2021, worldwide ever since its mysterious outbreak in Wuhan, China in December 2019.

COVID-19 has a broad spectrum of severity, ranging from asymptomatic to multiorgan dysfunction [1,2,3].

Keyword: Post covid, Cortisol deficiency, Adrenal insufficiency, Post Covid complications.

Introduction

Several complications of COVID-19 already have been described in

- Respiratory failure
- Cardiac and cardiovascular complications. 4,5,6,7
- Thromboembolic complications .8,9,10,11
- Neurologic complications – 12 ,13

Autopsy studies have noted detectable SARS-CoV-2 RNA (and, in some cases, antigen) in the kidneys, liver, heart, brain, and blood in addition to respiratory tract specimens, suggesting that the virus disseminates systemically in some cases; whether direct viral cytopathic effects at these sites contribute to the complications observed is uncertain .14,16,17

Similarly adrenal gland suppression (responsible for secretion of cortisol via Hypothalamo Pituitary Axis) has been already reported as a rare finding in covid patients.

We have also found a rare case of adrenal insufficiency in post covid patient.

Case Reports

A 24-year-old female presented to the emergency department with complaints of dizziness which was on and off since one month which is increased in severity for the last 4-5 days. Patient also has history of

blurring of vision which is associated with light-headedness which was present since last five days. No history of fever, loose stool, shortness of breath, chest pain or palpitations, change in intensity of dizziness on changing postures, hearing problem.

Patient has a history of Covid RT PCR positive on 24/4/21. During that time, she was having fever & dry cough for 4 days for which Covid RT PCR was done. Patient had persistent fever till Day 6 of illness for which she was started on treatment as per covid protocol (including oral steroid therapy from 26 April 2021 to 13th may 2021).

On further evaluation of past history, patient is a known case of polycystic ovarian disease & acyanotic congenital heart disease (fossa ovalis ASD 9mm) with Left to right shunt with post ASD repair status in 2010. Before Covid she was physically active and even involving in boxing activity.


In emergency on arrival, her BP was 80/50, Pulse rate was 72 per minute, bilateral radial pulse volume was low, temperature was 98.6F, oxygen saturation was 98 % on room air, GCS was E4V4M5, bilateral chest was clear, S1S2 was present & no murmurs were audible. Patient was started on iv fluid therapy immediately in the emergency 1.5litres iv fluid was transfused as bolus followed by continuous transfusion. Patient was shifted to the intensive care unit for further management. Despite the fluid therapy her average blood pressure was 90/50 (earlier her baseline BP was 120/70) and had persistent dizziness. Cardiology opinion was taken, echocardiogram was advised which showed situs solitus, normal Inferior vena cava, Left Ventricular ejection fraction of 60% , intact interventricular septum , mild pulmonary stenosis with peak pressure gradient of 25 mm Hg .Covid Rt PCR sent as per hospital protocol, which came negative . Routine investigations were normal in study (Hemoglobin 10.4gm %, Total Leucocyte Count 4300, SGOT 29, SGPT 37, Urea 21, Creatinine 0.71, Calcium 8.2, Sodium 135, Potassium 3.8). Patient was still hypotensive even after continuous iv fluid infusion. In view of Persistent hypotension despite adequate intravenous fluid therapy with post covid history , adrenal insufficiency was suspected after which blood sample for Serum cortisol & ACTH (reports attached) was sent as per standard timing & iv steroids was started .Serum cortisol came significantly low ,less than 1 microgram per decilitre (biological reference range at 8 am is 5-23 mcg / dl) , whereas ACTH was under normal range , 19.5pg/ml (8am reference range is 10-50 pg/ ml) (report attached).Endocrinologist opinion was taken, abdominal non contrast CT for adrenal gland was advised which showed bilateral normal morphology of adrenal gland. (Fig1&2).Patient was continued on iv hydrocortisone 100 mg stat dose followed by 50 mg twice daily for next 3 days after which average blood pressure came to 120/70 and patient improved significantly . She was discharged after 3 days, on oral steroids and doing well.



Figure 1




Figure 2



54213150400590

PID NO: P542100561278
Age: 24.0 Year(s) Sex: Female




Reference: SELF
Sample Collected At:
MOOLCHAND HOSPITAL
LAJPAT NAGAR-III NEW
Zone: LAJPAT NAGAR
Sample Processed At: Metropolis Healthcare Ltd
E-21, B1 Mohan Co-op Ind Estate New
Delhi-110044

VID: 54213150400590
Registered On:
09/06/2021 01:40 PM
Collected On:
09/06/2021 1:40PM
Reported On:
09/06/2021 05:21 PM

Investigation	Observed Value	Unit	Biological Reference Interval
Cortisol, Serum (Serum,CMIA) Medical Remarks: Rechecked	Below 1.0	µg/dL	08:00 hr AM: 5-23 16:00 hr PM : 3-16


Interpretation:

- Cortisol, is the main glucocorticoid, produced by adrenal cortex; plays a central role in glucose metabolism and in the body's response to stress.
- Cortisol levels are regulated by adrenocorticotrophic hormone (ACTH), which is synthesized by the pituitary in response to corticotrophin-releasing hormone (CRH). CRH is released in a cyclic fashion by the hypothalamus, resulting in diurnal peaks (6 a.m. - 9 a.m.) and nadirs (11 a.m.) in plasma ACTH and cortisol levels.



54213150401634

PID NO: P542100562776
Age: 24.0 Year(s) Sex: Female



Reference: Dr.SELF
Sample Collected At:
Moolchand hospital
Lajpat nagar-iii new zone: lajpat nagar
PROCESSING LOCATION:- Metropolis
Healthcare Ltd, Unit No. 409- 416, 4th
Floor, Commercial Building-1, Kohinoor
Mall, Mumbai-70

VID: 54213150401634
Registered On:
10/06/2021 01:39 PM
Collected On:
11/06/2021 3:59AM
Reported On:
11/06/2021 12:34 PM

Investigation	Observed Value	Unit	Biological Reference Interval
ACTH-Adreno Corticotrophic Hormone (Plasma,ECLIA)	19.5	pg/mL	7.2-63.6 Please note change in Reference range and method

Interpretation :

- ACTH determinations are valuable in the differential diagnosis of adrenal insufficiency and hypersecretion.
- In Addison's disease (Primary adrenal insufficiency),elevated levels are typical.Whereas low levels are the rule when adrenal insufficiency is secondary to pituitary dysfunction.
- ACTH determinations can also help to identify the cause of cortisol hypersecretion in Cushing's syndrome.

Discussion

This current report presented an individual infected with COVID-19 with no prior history of adrenal diseases who experienced acute adrenal insufficiency after covid recovery.

Due to the new emergence of this virulent pathogen, which mostly affects the respiratory system, other non-respiratory presentations of this infection must be considered, especially in terms of endocrine organs.

Several mechanisms have been suggested for the development of this disease, including thrombosis, autoimmune issues, and drugs. These aforementioned circumstances may increase cortisol demand, which can result in adrenal insufficiency occurrence.

Overall, because physiological concentrations of corticosteroids play a crucial role in maintaining an appropriate vascular response to vasoconstrictors, adrenal insufficiency was associated with severe resistant hypotension, which was entirely reversed with corticosteroids 18

On the other hand, it has been suggested that an older member of the Coronaviridae family, named severe acute respiratory syndrome (SARS), produces certain amino acid sequences mimicking host ACTH. Consequently, antibody production against this peptide might be responsible for the occurrence of adrenal insufficiency 19

Moreover, the hypothalamus and pituitary express angiotensin-converting enzyme 2 (ACE2) and SARS genome had been identified in autopsy samples. Therefore, coronavirus might also affect the HPA axis and cause acute adrenal insufficiency.20,21.

Patients with COVID-19 are subjected to structural adrenal gland changes during the illness course .Histological findings report focal necrosis of the adrenal gland and vasculitis of the small veins . Furthermore, SARS-CoV-2 RNA was detected in the hypo- thalamic-pituitary system, suggesting the possibility of underlying hypophysitis.

Thus, undiagnosed primary and secondary adrenal insufficiency may contribute to the high mortality rates associated with COVID-19.

Conclusions

We have seen almost every organ involved in COVID-19. The adrenal insufficiency has already been described in various viral illnesses.

Adrenal insufficiency should be considered among COVID-19 recovered patients and high clinical suspicion is required in this regard, especially during hypotensive attacks unresponsive to iv fluid therapy.

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