The endocrine system in Covid-19 experiencing monitoring A multi-center study of Pakistan

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Abstract---SARS-CoV-2 (SARS-CoV-2) is a new coronavirus that surfaced in December 2019 and is accountable for a pandemic. A wide range of clinical manifestations, ranging from the absence of symptoms to multisystem organ failure due to hypoxaemic acute respiratory syndrome, are recorded. Coronavirus illness 2019’s effect on endocrine glands is not yet clear. To help patients with chronic endocrine illnesses, we may draw on prior research on viruses in the same family to provide treatment options. Treatment for SARS-CoV-2 must not be halted if these patients are infected. Hormone replacement therapy dosages may need to be raised in certain circumstances. Hormonal biological surveillance is required in the event of deteriorating clinical symptoms. This article will assist improve the treatment of chronic endocrine illnesses that might impair thyroid, adrenal, gonad, and pituitary gland activities. Subjects infected with COVID-19 or those in touch with COVID-19-infected individuals might be studied using these ideas.
**Keywords**—Endocrine System, Covid-19, Experiencing Monitoring, A Multi-center study, Pakistan

**Figure 01**: Virology, pathogenesis, diagnosis and in-line treatment of COVID-19

**Introduction**

Newly discovered SARS-CoV-2 is a coronavirus belonging to the Coronaviridae family, which has respiratory tract tropism, and is the cause of coronavirus disease 2019 (COPD-19) pneumonia\(^1\). Data on this novel virus’ influence on the endocrine glands is limited to diabetics. Patients with chronic endocrine illnesses may benefit from the information in this article, which summarises the best practises for treating them\(^2\).

**Thyroid Diseases Require Endocrine Monitoring**

Since SARS-CoV-2 is a newly discovered virus, little information has been gathered on the virus’ impact on people with thyroid disorders. Patients with a chronic thyroid condition, however, should be aware that thyroid hormones govern both normal metabolic and brain function. Inflammatory mediators are produced as a result of viral infection, which is one of the most common environmental triggers for autoimmune disease.\(^2\) SARS CoV-1 data may be used for extrapolation. \(^3\)\(^-\)\(^5\) SARS-CoV-1 has previously been related to follicular cell dysfunction, including the breakdown of the follicular epithelium, the exfoliation of epithelial cells into the follicle, and the expansion of fibrosis after the acute phase. Even if certain discrepancies continue, the harm caused by SARS CoV-2 is anticipated to be comparable to that caused by SARS CoV-1. Reduced deiodinase enzyme activity is associated with alterations in thyroid hormone binding, cellular absorption, and reduced T4-to-triiodothyronine (T3) conversion during acute
sickness. Peripheral tissues are also shown to have a higher activity of the endocrine hormone iodothyronine D3. Patients with persistent hypothyroidism who are suspected, infected, or recently cured with COVID-19 may need to increase the prescription of levothyroxine and monitor thyroid hormone levels. Proposals for treating patients with hypothyroidism and hyperthyroidism have been issued by scientific societies. Unless neutropenia (neutrophil count of 1.0 x10⁹/L) is evident, COVID-19 individuals with hyperthyroidism must take antithyroid medications (ATDs). ATDs need a check on the white cell count in patients with symptoms such as fever or those that point to neutropenia. ATDs should not be stopped because of lymphopenia. Thyroid eye disease patients treated with immunosuppressive steroids or thyroid eye disease immunosuppressive medications are highly sensitive to the severe form of COVID-19. They must abide by the restrictions, but they must not halt their care. As regular thyrotoxicosis biochemical monitoring might be considered the “block and replace regimen” advocated by the Society for Endocrinology.

**Radioiodine therapy for hyperthyroidism or thyroid cancer**

must be postponed during the epidemic of COVID-19. There is no evidence to suggest that delaying therapy for thyroid cancer would affect the prognosis; high-risk patients should receive thyroid stimulating hormone that is well-restrained and clinically tolerated (TSH).

**Monitoring of Parathyroid Diseases**

Previous SARS-CoV S-mediated fusion seems to need calcium. Patients with parathyroid abnormalities should be closely monitored. Subjects with hypoparathyroidism, according to the endocrine societies, have no increased risk of contracting COVID-19. In order to maintain stable calcium levels, which may be compromised by SARS-CoV-2, they recommend routine blood testing to monitor calcium levels. To prevent an emergency hypocalcaemia, it is recommended that calcium levels be kept slightly higher than normal. No evidence has been found that primary hyperparathyroidism increases the likelihood of infection with coronavirus. Calcium levels may be affected by the amounts of phosphate, magnesium, and vitamin D.

**Renal Damage Caused By Covid-19**

Due to the renal damage caused by COVID-19 and the uncertain influence on parafollicular thyroid cells and calcitonin levels, calcium levels should be monitored in both acute and recovered COVID-19 patients. There should be a search for any recurrence of the clinical symptoms of hypocalcaemia and hypercalcaemia such as cramping, tingling and numbness, which may be caused by both conditions.

**Alertness of the Adrenals' Endocrine System**

People who have had primary or secondary adrenal insufficiency or who are infected with the virus may have signs of severe adrenal insufficiency or an
adrenal crisis. Diarrhea, vomiting, stomach discomfort, and hypotension at rest are all symptoms of severe primary adrenal insufficiency. Hyponatraemia, hyperkalaemia, hypoglycemia, anaemia, eosinophilia, lymphocytosis, and alterations in blood count are among the laboratory findings. Treatment with intravenous hydrocortisone in the hospital Hydrocortisone 200 mg/24 hours and sufficient fluid resuscitation, along with 100-100 mg/m² for children, must be administered as an immediate 100-mg dosage. Fludrocortisone will not be needed in this case since hydrocortisone dosages over 50 mg daily would have adequate effect on mineralocorticoid receptors. But it should be begun after the total daily hydrocortisone dosage falls below 50 mg/24h.

Corticosteroid Deficiency in COVID-19 as a Result of Critical Illness

As a result of the HPA axis being activated by acute stress during critical illness, more cortisol is secreted. Critical illness-related corticosteroid insufficiency (CIRCI) may arise with SARS-CoV-2 infection if this pathway is compromised in critically sick individuals. In koalas with relict adrenal glands, this affects the acute stress response, which is akin to the "Koala Stress Syndrome" that occurs. A longer stay in the intensive care unit and an increased risk of mortality are all linked to CIRCI. Hyperkalemia, hyponatraemia, normal anion gap metabolic acidosis and low blood glucose are common symptoms in patients with dementia. The absence of a cortisol response to cosyntropin injection or measurement of a random plasma cortisol level below 10 ng/dl (275 nmol/l) are used to make the diagnosis.

Depending on the reaction, a course of IV hydrocortisone at a modest dosage (400 mg/day) is suggested. Current WHO recommendations urge against using corticosteroids when COVID-19 is detected because of prior SARS outbreaks in which steroid therapy resulted in severe consequences (released January 28, 2020). Corticosteroids were associated with an increased need for mechanical breathing, vasopressors, and renal replacement therapy. Medical Monitoring for Cushing’s Syndrome

The diagnosis and surgical treatment of patients with Cushing syndrome (CS) may be delayed. Medically managed patients should avoid medication interruptions. The prognosis for patients with CS and COVID-19 is unknown at this time, however there are many possible explanations for their poor prognosis.

Diabetes and hypertension are related with poor prognosis in COVID-19, regardless of age, resulting in an increased mortality risk. Moreover, glucocorticoid excess has been shown to induce prothrombotic states that lead to a bad prognosis in individuals with cardiovascular disease. It also decreases the activity of natural killer cells and alters the function of white blood cells, resulting in a lower ratio of CD4 to CD8 lymphocytes and an increased vulnerability to infection. As a result of this, patients with CS should be given rigorous instructions on how to avoid infection. Patients with CS who have been infected with COVID-19 should have their blood pressure and glucose monitored on a regular basis.

**Monitoring of Gonads’ Endocrine Functions**

Germ cell death, spermatozoa dysfunction, and testes infiltrated by mostly
lymphocytes and macrophages have been reported as symptoms of SARS-CoV-1.5
During the COVID-19 crisis, the Society of Endocrinology has released a guide on
androgen replacement. 7 Men with androgen deficiency who are receiving
testosterone replacement injections must, per their advice, continue the
medication indefinitely. Intramuscular testosterone preparations may be
temporarily replaced with an empirical dosage of a testosterone-based gel for
those who are already using them. As soon as your next testosterone injection
was due, you may begin using the testosterone gel. Once non-urgent services are
restored, the intramuscular preparation may be resumed. Studying afflicted and
healed men and women’s gonadal functioning following the severe crisis would be
intriguing.

COVID-19 sufferers have reported instances of anosmia and ageusia, both of
which are connected to a primary cause that cannot be disregarded. To avoid hypo-
or hypernatremia, fluid and electrolyte levels must be closely managed. The
pathophysiology of COVID-19 may possibly be influenced by changes in the
dopamine synthase pathways. 17 Replacement dosages of several
deficient hormones are given to patients with pituitary dysfunction. Regularly
treated patients with pituitary insufficiency need no further therapy. Care paid to
the details 14.

Both primary and secondary hypothyroidism in COVID-19 infected individuals
should be treated with levothyroxine at the same dosage or higher, depending on
the clinical situation.

07 Like COVID-19, the development of a high temperature, exhaustion, cough,
shortness of breath, nausea, and diarrhoea in individuals with secondary adrenal
insufficiency necessitates increased hydrocortisone dosage (twice the normal
amount). 7 If the patient’s condition worsens, they should seek immediate
emergency medical attention and be admitted. The treatment for patients with
secondary adrenal insufficiency will be the same as for those with primary adrenal
insufficiency.

**Replacement of DDAVP for Electrolyte Imbalance**

Individuals with cranial diabetes insipidus need therapy with desmopressin in a
small percentage of patients (DDAVP). In the event of an altered state of
consciousness, DDAVP may be administered intravenously or intramuscularly (IM
or IV). 18 Owing to high temperature and tachypnoea, as well as gastrointestinal
losses such as vomiting and diarrhoea, electrolyte imbalances may arise in the
case of COVID-19. This is due to the inability to take appropriate fluids due to
decreased awareness.

Hypokalemia in COVID-19-infected patients may be explained by the SARS-CoV-2
destruction of Angiotensin-converting enzyme 2 and the subsequent dysregulation of the renin-angiotensin system. The endocrine system may be affected by the novel SARS-CoV2 infection in a variety of ways, and the scientific evidence is now being analysed. It is essential to keep a close eye on both the underlying disorders as well as any new ones that may arise.

**Conclusion**

The endocrine system may be affected in a variety of ways by the novel SARS-CoV2 infection, and the scientific evidence is still being evaluated. It is essential to keep a close eye on both the underlying disorders as well as any new ones that may arise.

**References**


