COVID-19 may deplete testosterone, helping to explain male patients' poorer prognosis

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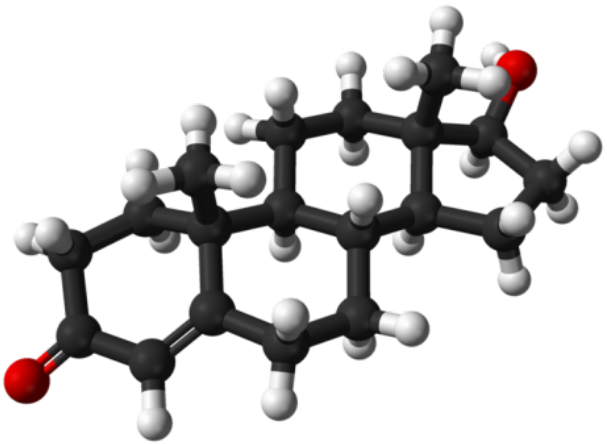

Ball-and-stick model of the testosterone molecule, C19H28O2, as found in the crystal structure of testosterone monohydrate. Credit: Ben Mills/Wikipedia

For the first time, data from a study with patients hospitalized due to COVID-19 suggest that the disease might deteriorate men's testosterone levels.

Publishing their results in the peer-reviewed journal *The Aging Male*, experts from the University of Mersin and the Mersin City Education And Research Hospital in Turkey found as men's testosterone level at baseline decreases, the probability for them to be in the intensive care unit (ICU) significantly increases.

Lead author Selahittin Çayan, Professor of Urology, states that while it has already been reported that low testosterone levels could be a cause for poor prognosis following a positive SARS-CoV-2 test, this is the first study to show that COVID-19 itself depletes testosterone.

It is hoped that the development could help to explain why so many studies have found that male prognosis is worse than those females with COVID-19, and therefore to discover possible improvement in clinical outcomes using testosterone-based treatments.

"Testosterone is associated with the immune system of respiratory organs, and low levels of testosterone might increase the risk of respiratory infections. Low testosterone is also associated with infection-related hospitalization and all-cause mortality in male in ICU patients, so testosterone treatment may also have benefits beyond improving outcomes for COVID-19," Professor Çayan explains.

"In our study, the mean total testosterone decreased, as the severity of the COVID-19 increased. The mean total testosterone level was significantly lower in the ICU group than in the asymptomatic group. In addition, the mean total testosterone level was significantly lower in the ICU group than in the Intermediate Care Unit group. The mean serum follicle stimulating hormone level was significantly higher in the ICU group than in the asymptomatic group.

"We found hypogonadism—a condition in which the body doesn't produce enough testosterone—in 113 (51.1%) of the male patients.

"The patients who died, had significantly lower mean total testosterone than the patients who were alive.

"However, even 65.2% of the 46 male patients who were asymptomatic had a loss of loss of libido."

The research team looked at a total of 438 patients. This included 232 males, each with laboratory confirmed SARS-CoV-2. All data were prospectively collected. A detailed clinical history, complete physical examination, laboratory and radiological imaging studies were performed in

every patient. All data of the patients were checked and reviewed by the two physicians.

The cohort study was divided into three groups: asymptomatic patients (n: 46), symptomatic patients who were hospitalized in the internal medicine unit (IMU) (n: 129), and patients who were hospitalized in the intensive care unit (ICU) (n: 46).

In the patients who had pre-COVID-19 serum gonadal hormones test (n: 24), serum total testosterone level significantly decreased from pre-COVID-19 level of 458 ± 198 ng/dl to 315 ± 120 ng/dl at the time of COVID-19 in the patients ($p = 0.003$).

Death was observed in 11 of the male adult patients (4.97%) and 7 of the female patients (3.55%), revealing no significance between the two genders ($p > 0.05$).

Commenting on the results of the study, Professor Çayan added: "It could be recommended that at the time of COVID-19 diagnosis, testosterone levels are also tested. In men with low levels of sex hormones who test positive for COVID-19, testosterone treatment could improve their prognosis. More research is needed on this."

The limitations of this study include it not including a control group of patients with conditions other than COVID-19, this was due to the restrictions placed on the hospital that they were monitoring the patients in.

The authors state future studies should look at the concentration levels of ACE2 (Angiotensin-converting enzyme 2)—an enzyme attached to the cell membranes of cells located in the intestines—in relationship with the total testosterone levels.

More information: Selahittin Çayan et al, Effect of serum total testosterone and its relationship with other laboratory parameters on the prognosis of coronavirus disease 2019 (COVID-19) in SARS-CoV-2 infected male patients: a cohort study, *The Aging Male* (2020). DOI: 10.1080/13685538.2020.1807930